

# PEDESTRIAN SAFETY IN NEW SOUTH WALES —

## TRENDS, ATTITUDES AND KEY ISSUES

**Rosemary Rouse**  
**Manager, Road User Safety**  
**NSW Roads and Traffic Authority**

### INTRODUCTION

*Pedestrians form the largest single road-user group. Most individual trips, whatever the primary mode used, begin and/or finish with a walk section, so that walking is a fundamental component of all travel (AUSTROADS, 1996).*

As the above statement indicates, all road users are pedestrians at some time or other. This is when they are at their most vulnerable and are dependent on the competence of drivers, the design of the vehicle and road environment and the presence of effective pedestrian facilities for protection.

Pedestrian accidents represent a considerable proportion of road trauma on New South Wales (NSW) roads, along with speed, drink driving, fatigue and failure to wear a restraint or an approved helmet. However, much of the road safety effort has focused on drivers, riders and passengers and on improving the safety of school-aged children. Overall, less attention has been paid to the problem of adult pedestrians.

This paper provides an overview of the scope of the adult pedestrian accident problem in NSW and presents preliminary research findings on current pedestrian safety issues from the perspective of drivers and pedestrians. It also outlines some of the key issues affecting pedestrian safety in the future. It aims to:

- document the pedestrian safety problem, with a special focus on alcohol-affected and older pedestrians
- identify current issues for drivers and pedestrians, and
- raise key areas of future pedestrian safety issues.

### SCOPE AND CURRENT TRENDS

For the purposes of recording road traffic accidents in NSW, the NSW Roads and Traffic Authority (RTA) has defined a *pedestrian* as:

*Any person who is not in, on, boarding, entering, alighting or falling from a road vehicle at the time of the accident (NSW RTA, 1996: p. xiii).*

A **fatal pedestrian accident** is defined as an accident for which there is at least one fatality and one pedestrian impacted<sup>φ</sup>.

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<sup>φ</sup> It is worth noting that some fatal crashes in which a pedestrian was impacted, do not result in the death of a pedestrian, but rather the death of another road user involved.

Fatal pedestrian crashes result in an average of 113 deaths per year. As shown in Table 1, over the five-year period 1996–2000, about one in five fatal crashes was a pedestrian accident<sup>φ</sup>.

**Table 1: Proportion of fatal pedestrian crashes 1996–2000**

Year	Proportion of fatal crashes involving a pedestrian (%)
1996	25
1997	23
1998	21
1999	21
2000	21
1996–2000	22

Source: RTA crash statistics

In 2001, 88 pedestrians were killed, this being the lowest number since reliable records were kept in the 1930s. Nevertheless the death of 88 people is unacceptable and was 16 per cent of the total (532) road toll in 2001.

Looking at the international context, in 1997 NSW had a rate of 1.82 pedestrian fatalities per 100,000 population, above the median for the OECD as a whole (1.68), Denmark (1.65), Germany (1.40) The Netherlands (0.76) (ATSB, 2000).

#### **When do pedestrian crashes occur?**

While pedestrian crashes occur at all times of the day, there are certain peak times when the number of pedestrian fatalities is particularly high.

Of all fatalities from crashes that occur during the four-hour period 5pm–9pm, 33 per cent are the result of a vehicle hitting a pedestrian. Dusk and darkness are high-risk times for pedestrian fatalities with 56 per cent occurring during these times. Darkness is also associated with high alcohol use and alcohol-affected pedestrian casualties. The months of April, May, June and July in which the length of daylight hours is shorter have a higher number of fatal pedestrian crashes than other times of the year. These months account for 43 per cent of all fatal pedestrian crashes, (Pedestrian Problem Definition and Countermeasure Summary, RTA, 2002).

#### **Where do pedestrian crashes occur?**

Fatal crashes, which involve speeding, fatigue and to a lesser extent alcohol, are associated with higher speed limit environments and country non-urban roads. Unlike these crashes, pedestrian fatal crashes are an urban and lower speed environment problem. A British review of research studies (Davies, 1999) that examined the factors leading to accidents revealed that a key theme of pedestrian crashes was the ordinariness of the circumstances leading to the accident.

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<sup>φ</sup> All statistics in this report are based on fatal pedestrian crashes and fatalities for NSW for the period 1996–2000 unless otherwise stated.

On roads within the Sydney, Newcastle and Wollongong metropolitan areas 37 per cent of all fatal crashes involve a vehicle hitting a pedestrian compared with the state average of 22 per cent. In country areas of NSW, the proportion is 11 per cent.

For fatal pedestrian crashes in NSW 72 per cent occur on metropolitan roads in Sydney, Newcastle or Wollongong and 28 per cent occur on country roads. Further, 68 per cent occur on roads zoned 60 km/h or less and 87 per cent in zones 80 km/h or less.

The 12 local government areas (LGA's) with the most fatal pedestrian crashes are listed in Table 2. As would be expected an LGA's population is a strong determinant of the number of pedestrian crashes in the LGA.

**Table 2: Local government areas with a high number of fatal pedestrian crashes 1996–2000**

Local government area	Number of fatal pedestrian crashes
Wollongong City	26
Blacktown City	22
Bankstown and Canterbury Cities	21
Fairfield and Lake Macquarie Cities	20
Rockdale City	17
Parramatta City	16
Marrickville	15
Sutherland City	14
Penrith and Warringah Cities	13
Randwick and South Sydney Cities	11

Source: RTA crash statistics

### **Gender**

Of all pedestrians killed in crashes during the period 1996–2000, 67 per cent were men and 33 per cent were women. While males still represent the majority of pedestrians killed for those pedestrians over 60 years, the involvement of female pedestrians becomes greater in the 60 years and over age group. Women comprise 22 per cent of the 17–39 year old pedestrians killed, but 41 per cent of those pedestrians killed aged 60 years and over.

The majority of drivers who are involved in fatal pedestrian crashes are males aged 17–39 years who reside in the Sydney metropolitan area, Wollongong and the Central Coast.

The three most significant factors associated with the risk of being killed as a pedestrian on NSW roads are being a male, level of intoxication and age.

### **Key characteristics of alcohol related pedestrian fatal crashes**

Alcohol impairment is a major factor in pedestrian fatalities. Of pedestrians killed during the period 1996–2000 whose blood alcohol content (BAC) level was known, 28 per cent had a BAC level of 0.050 g/100mL or greater.

Of those pedestrians killed with a BAC level of 0.050 g/100mL or greater, 75 per cent had a BAC level of 0.150 g/100mL or greater and a further 19 per cent had a BAC level between 0.080 and 0.150 g/100mL.

Males account for the majority of alcohol-affected pedestrian fatalities. However alcohol is a not just a problem for young male pedestrians. As Table 3 indicates over one in two pedestrians aged 17–49 years killed had a BAC level greater than 0.05. Alcohol is a factor in one quarter of all pedestrian fatalities up to the age of 70 years and remains a factor in a least one in 10 pedestrian fatalities up to the age of 80 years.

**Table 3: Alcohol involvement (greater than 0.050) in fatal pedestrian crashes for each age group**

Age Group	Proportion with a BAC level greater than 0.050 (%)
17-20	52
21-29	55
30-49	50
50-59	32
60-69	25
70-79	10

Source: RTA crash statistics 1996-2000

About 90 per cent of pedestrian fatalities involving alcohol occur in darkness compared to 36 per cent for non-alcohol-affected pedestrians. Approximately 60 per cent of all alcohol-affected pedestrians were killed between Thursday night and Saturday. About 40 per cent of alcohol-affected pedestrians were killed while on the carriageway but not in the process of crossing a road at the time. Of all alcohol-affected pedestrians killed only seven per cent were killed in a crash that occurred at a pedestrian facility.

#### **Key characteristics of older pedestrian fatal crashes**

While older people (those aged 60 years and older) comprise about 17 per cent of the total NSW population (Pedestrian Council of Australia and the RTA, 1998) they represent 40 per cent of all pedestrian fatalities in NSW.

The largest resident population of people aged 60 years and over (by Statistical Local Area) is located in Lake Macquarie, followed by Wollongong, Gosford and Sutherland Shire. Lake Macquarie and Wollongong LGA's are among those with the most fatal pedestrian crashes.

Several reviews have examined age-related factors associated with the over-representation of older pedestrians in road trauma. One such review (Pedestrian Council of Australia and the RTA, 1998) identifies the following key factors:

- declining vision
- declining speed judgement
- poor balance control

- slower walking speeds
- confusion and anxiety with pedestrian signals.

A study for the OECD found that ‘while younger adults assess all relevant aspects simultaneously, older people tend to process information sequentially’ (OECD Report, 2001).

The particular crash characteristics of older pedestrians in NSW confirm the effects of the above age-related deficits on road crossing behaviour.

**Travel patterns and crossing behaviour of older pedestrians**

For pedestrians aged 60 years and over, a higher proportion of fatal accidents occur on Tuesday, Wednesday and Thursday, compared to Friday, Saturday and Sunday for younger pedestrians.

Older pedestrian fatalities are more likely to occur during daylight hours. The mid-morning hours, specifically between 10am–11am are a peak time for older pedestrian fatalities. Of all pedestrian fatalities occurring during these hours 70 per cent are aged 60 years and over.

As people get older they reduce driving and use more public transport and walk to shops or transport. They also take a longer time to walk the same distance than younger pedestrians thereby increasing their exposure on the roads. As can be seen from Table 4 the percentage of people who walk falls during their middle years but rises again as they get older. Walking, as a form of travel is highest among the most vulnerable road user groups, that is, those aged 70 years or over.

**Table 4: 2000 Household travel survey — percentage of travel for each age group by mode (Sydney Statistical Division on an average weekday)**

Mode	Age Group				
	11-20	21-40	41-60	61-70	70+
Private vehicle	57	71	78	70	55
Public transport	21	11	7	8	15
Bicycle	2	<1	<1	<1	<1
Walk	20	17	15	21	30

Source: 2000 Household Travel Survey - Linked Trips

In terms of overall travel modes, Sydney in particular and NSW as a whole are often viewed to be more similar to those of cities in the USA than to Europe. Conversely, as can be seen from Tables 5 (a), (b) and (c), in terms of walking Sydneysiders aged 60 years and over are similar to their peers in Germany and the Netherlands and totally unlike those in the USA.

**Table 5 (a): Shift in modal choice with increasing age in The Netherlands, 1998  
(as percentage of all trips by all modes)**

Mode	Age Group				
	18-24	25-39	40-64	65-75	75+
Private car	36	61	59	51	43
Public transport	16	5	4	4	7
Bicycle	30	19	22	25	24
Walk	12	13	14	19	24

Source: Central Bureau for Statistics of The Netherlands in Pucher and Dijkstra (2000)

**Table 5 (b) Shift in modal choice with increasing age in Germany, 1995  
(as percentage of all trips by all modes)**

Mode	Age Group			
	18-44	45-64	65-74	75+
Private car	62	57	37	21
Public transport	10	10	15	24
Bicycle	10	9	11	7
Walk	17	23	39	48

Source: W. Broeg and E. Erl, Kenngrößen fuer Fussgaenger and Fahrradverkehr in Pucher and Dijkstra (2000)

**Table 5 (c) Shift in modal choice with increasing age in the USA, 1995  
(as percentage of all trips by all modes)**

Mode	Age Group			
	16-24	25-39	40-64	65+
Private vehicle	87	89	92	91
Public transport	3	2	2	2
Bicycle	1	0.5	0.3	0.2
Walk	7	5	4	6

Source: W. Broeg and E. Erl, Kenngrößen fuer Fussgaenger and Fahrradverkehr in Pucher and Dijkstra (2000)

Older pedestrians are more likely than other pedestrians to have their fatal crashes at locations controlled by a traffic signal or crossing. Nearly one quarter of all older pedestrian fatalities occur at a pedestrian facility compared to 12 per cent for those aged less than 60 years.

When an older pedestrian is crossing the road, they have difficulty judging the speed of traffic coming in both directions. While judging the speed of nearside traffic is difficult, they find performing this task while crossing and judging the speed of farside traffic much more difficult than pedestrians aged under 60 years. This is demonstrated in Table 6 below whereby older pedestrian fatalities are more likely to result from both nearside and farside pedestrian movements than those aged less than 60 years.

**Table 6: Proportion of road user movement for older pedestrian and other pedestrian fatalities in 1996–2000.**

<b>Road User (Pedestrian) Movement</b>	<b>Older pedestrians (%)</b>	<b>Pedestrians under 60 (%)</b>
Nearside	39	32
Farside	39	26
Playing, working, lying, or standing on carriageway	5	22
Emerging	4	4
Walk with	2	6
Other	11	10
<b>Total</b>	<b>100</b>	<b>100</b>

Source: RTA crash statistics.

## **CURRENT PEDESTRIAN SAFETY ISSUES FOR DRIVERS AND PEDESTRIANS**

In April 2002 the RTA commissioned research into pedestrian safety, (AMR Interactive 2002).

The broad objective of this qualitative research is to gain a better understanding of pedestrian safety issues from both driver and pedestrian perspectives. The specific research aims are to examine:

- driver and pedestrian interaction issues
- key areas of concern
- driver and pedestrian understanding of pedestrian facilities, and
- attitudes to risk.

Findings from the focus group research will be used to fine-tune the development of a community attitude survey to be conducted later this year.

Nine focus group sessions were held in Sydney, the Central Coast, Newcastle and Wollongong. Groups consisted of participants who regarded themselves as primarily drivers or pedestrians based on the frequency of travel in each mode of road use.

Each group contained seven to 10 participants. Focus group sessions included materials designed to generate spontaneous discussions of pedestrian safety issues.

### **Driver and pedestrian interaction issues**

Preliminary findings from this research reveals two key influences on the way drivers and pedestrians interact with each other. These are:

1. age and life stage
2. self-perception as a driver or pedestrian or both.

### **Age and life-stage influences**

Attitudes shift with age and a sense of mortality. The younger participants were aware of the road rules, confident about using their own judgement to assess risks (both as drivers and pedestrians), prepared to bend the rules and felt physically fit and able to react quickly. Potentially, these were the most aggressive drivers and pedestrians.

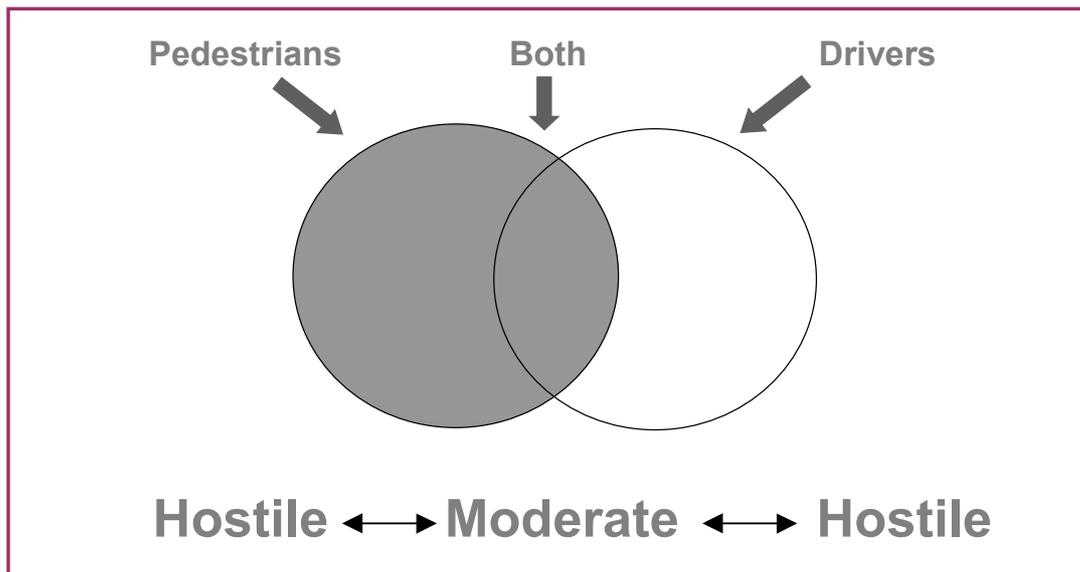
In the middle years, particularly as many became parents (25–39 and 40–59), attitudes were characterised by a broader perspective due to their increased social responsibilities. However while these participants demonstrated a greater empathy with other road users, they often developed bad habits and were set in their ways. They remained over-confident in their abilities as drivers and pedestrians and did not recognise the impact of these attitudes and behaviours on others. Their attitudes were largely characterised by a male driver in Gosford.

*I know I often drive above the speed limit, but I'm a safe driver ... (Male driver 40–59 age group.)*

Interestingly, older (60-70) and elderly (70+) participants did not view themselves as 'old'. While safety issues were salient, most did not appreciate the risks they took and were likely to blame other 'old' people or young people for risky behaviour. Only respondents in their late seventies and eighties fully appreciated their increased vulnerability.

### **Type of road user**

Three 'types' of road users with differing attitudes and behaviour towards pedestrians were identified. These types were a function of the extent to which participants viewed themselves as drivers, pedestrians or both.



**Figure 1: Road user type**

As Figure 1 indicates, there was a strong ‘them and us’ mentality prevalent in participants who viewed themselves as predominantly drivers or pedestrians. Lack of empathy or consideration for the ‘other’ group was a common problem. Conflict over control of the road when pedestrians move onto a road was therefore more likely.

*I'd keep walking and give the driver a death stare. (Young male pedestrian.)*

*The elderly ... they are indecisive ... often can't get across before the light changes, so they are still half way and the traffic ends up going around them. ... [You get] frustrated. (Young male driver.)*

Those participants who saw themselves as both a driver and a pedestrian had the most balanced and moderate perspective. Conflict over control of the road was less likely to occur for these people.

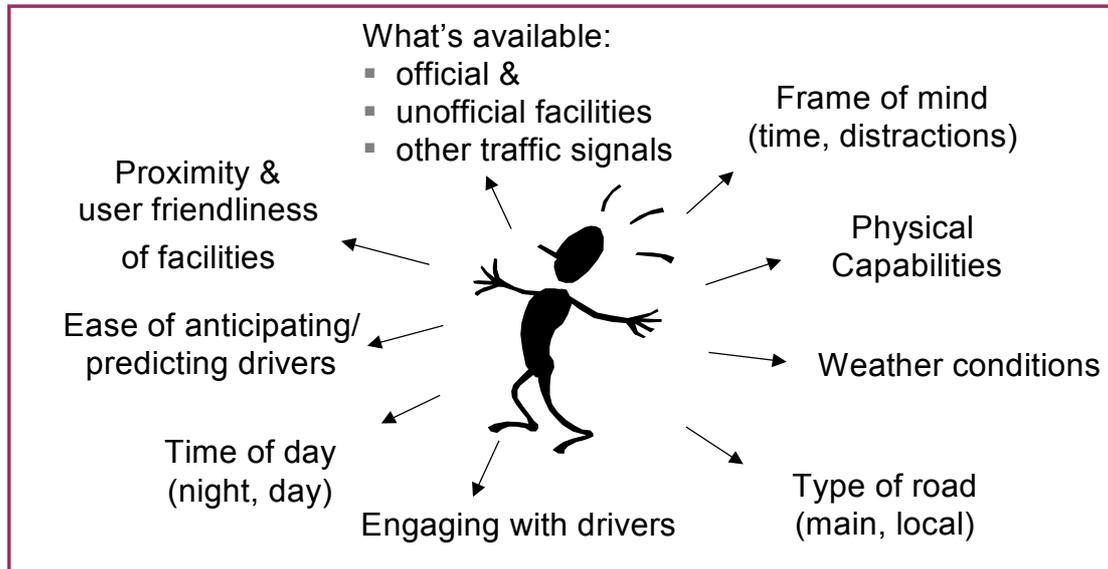
*Quicken your pace and acknowledge the driver with a hand gesture. (Older pedestrian.)*

### **Key areas of concern**

For both drivers and pedestrians, pedestrian safety only became an issue when a sense of control was lost. Both drivers and pedestrians felt confident in their own abilities. It was the actions of others that concerned them most as these situations caused them to feel that they had lost control.

While the majority of drivers and pedestrians were aware of the rules or what they felt to be correct and courteous behaviour they ‘bent’ both the official rules and rules of good behaviour and based their decisions on ‘sensible judgement’. Therefore drivers knew they should not stop beyond the white line at the approach to the signal, but they did. Drivers felt that they should wait for pedestrians to clear the crossing and not drive between pedestrians if there was a small gap, but they did. Pedestrians knew they should not start to cross on the flashing pedestrian red light, but they did.

For both pedestrians and drivers, pedestrian safety was not always about following the ‘rules’. Pedestrian safety was seen in terms of applying a personal ‘sensible judgement’ to the situation. The key factors used to make a ‘sensible judgement’ are below in Figure 2.



**Figure 2: Factors that contribute to determining a ‘sensible judgement’.**

The ‘sensible judgement’ approach to pedestrian safety is similar to the attitude to drink driving prior to the introduction of random breath testing (RBT) in 1985. Up to that time most drivers considered that they were in the best position to make a personal assessment of their capacity to drive safely after drinking and that the problem drink driver was someone else. The decision to drive depended on the extent to which they felt in control rather than on external ‘rules’. RBT was therefore viewed as an unwarranted intrusion into a commonsense and morally valid system of personal decision making.

### **Understanding of pedestrian facilities**

Focus group participants segmented pedestrian facilities into two broad categories of ‘official’ and ‘unofficial’ facilities. Official facilities consisted of pedestrian crossings at traffic lights and zebra crossings. A secondary category of ‘official’ facilities included pedestrian refuges, refuge islands, pedestrian islands, underpasses and bridges.

Unofficial facilities included median strips, traffic islands and speed humps. There was some confusion with between ‘official’ and ‘unofficial’ facilities.

Traffic lights were the most commonly mentioned pedestrian facility. Both drivers and pedestrians felt this was the safest place for pedestrians, but also spontaneously mentioned them as an area of conflict. Both drivers and pedestrians identified the flashing red pedestrian phase as an issue of concern in terms of whether drivers or pedestrians have priority. Pedestrians felt that the flashing red phase is a signal for them to hurry up. There was also confusion from both drivers and pedestrians regarding priority of left and right turning vehicles.

Overall pedestrians saw themselves as having lower priority as a road user and felt that the lights did not change often enough and that the 'walk' sign changed too quickly. The elderly in particular valued the audio signals but still felt frightened and vulnerable when crossing at signals on busy roads.

Correct procedure at zebra crossings was less well understood and therefore the potential for conflict was greater. The most important cues for both drivers and pedestrians were the yellow leg road signs, zebra road markings and the zig zag lines. There was confusion over the status of pedestrian refuges.

Unofficial crossings were recognised as traffic management facilities but were used by pedestrians to help them cross the road.

### **Attitudes to risk**

While pedestrians did not perceive their risk as a road user to be high, they felt more vulnerable under the following circumstances:

- lack of or poor pedestrian facilities
- lower priority status given to them at pedestrian facilities
- speeding vehicles
- inconsiderate/hostile driver actions
- unexpected driver behaviour, such as vehicles encroaching into pedestrian areas, and
- their mental/physical capabilities impaired as a result of alcohol/drugs, time pressure or distraction and physical weakness.

Younger pedestrians seldom felt vulnerable except when affected by alcohol.

Drivers saw the key risks as other drivers rather than pedestrians. Drivers up to the age of 60 years believed that the road is made for vehicles and that they should have priority. Their key concern was other drivers and how their own actions would impact on the other drivers. They rarely thought about pedestrians who, they believed should behave responsibly and should be mindful of their own safety.

Pedestrians were a secondary concern for these drivers. They became agitated when pedestrians encroached on what was perceived as their territory (the road). However, drivers were concerned about the unpredictable behaviour of pedestrians, such as children and drink walkers.

Older drivers were less aggressive in their behaviour and more sympathetic towards children and older pedestrians. Notwithstanding this consideration they were primarily concerned with the effect of their actions on other drivers.

*The pedestrians get half way across the crossing and there's some idiot behind you blowing the horn because he wants you to go ... Unbelievable! ... (Older male driver.)*

## FUTURE DIRECTIONS AND ISSUES

Two key issues, which will impact on pedestrian safety over the next 10-20 years, are:

1. the aging population
2. increasing urban density and pedestrian exposure.

### The aging population

It is important to note that the proportion of crashes involving older pedestrians is expected to increase in the next two decades as the proportion of older people in the population increases.

This group is the fastest growing segment of the population with one in four Australians being 60 years and over in 20 years time. Table 7 shows the population projection figures for NSW. In NSW, 17 per cent of the population belonged to the 60 years and over age group in 2001. But this group will grow very quickly to 20 per cent of the population in ten years' time (2012) and 25 per cent of the population in 20 years' time. These population projections are similar to those for Australia as whole, (ABS, 2001).

**Table 7 Projected percentage of population by age group in NSW 2001–2022**

Age	2001	2007	2012	2022
0-59	83%	81%	79%	74%
60+	17%	19%	21%	25%
85+	1%	2%	2%	2%

Source: Australian Bureau of Statistics, 2001

A number of factors such as lower birth rates and increased life expectancy is associated with the aging population. According to the *Intergenerational Report 2002-03* (2002–03 Budget Paper No.5, 2002) life expectancy for both males and females is estimated to increase by at least four years in the next 20 years due to improved health care.

### Increasing urban density and pedestrian exposure

Population density continues to increase particularly in the Sydney, Central Coast and Wollongong areas. The re-generation of inner city areas (particularly by the 'empty nesters' aged 50+) and increased participation in walking as a recreational activity – are both trends which are likely to lead to increased pedestrian exposure on the roads and increased demands for better pedestrian safety.

Concurrently, societal concern about reducing vehicle emissions and congestion is also likely to lead to strategies for the reduction of personal vehicle use.

In summary, the growth in the number of older people and their concentration in metropolitan areas in the Sydney-Newcastle-Wollongong conurbation has important

ramifications for road safety planning and implementation since there will be an increase in the proportion of pedestrians at risk.

## **FUTURE ACTIONS**

A key strategy identified in *Road Safety 2010* (RTA, 1999) the Strategic Plan for road safety is the implementation of lower speed limits in urban areas as a means of improving pedestrian safety.

Accordingly, all the councils in the greater Sydney metropolitan areas (bounded by Wollongong, Newcastle and Katoomba) have implemented the 50 km/h urban speed limit. There are 141 councils and two communities within the unincorporated area involved with the RTA in this initiative. These areas house in excess of 96 per cent of the NSW population.

NSW has been one of the early implementers of traffic calming in the form of Local Area Traffic Management (LATM) schemes. LATMs serve to influence driver behaviour by changes to the physical environment and reduction of vehicle speeds. They have the result of reducing through traffic and reducing the exposure of pedestrian-vehicle conflict.

In some LGA areas 40 km/h local speed limits have been implemented. This strategy is identified in *Road Safety 2010* (RTA, 1999) and the RTA will continue to negotiate with councils to implement 40 km/h zones in areas of high pedestrian and vehicle conflict.

The RTA recently launched a new pedestrian safety campaign. The primary message of this campaign is to use pedestrian facilities. Other messages communicated are to check that the road is clear before crossing and to wear bright clothing to ensure that they can be seen by drivers. The target audience is pedestrians aged 60 years and over. This new campaign complements existing campaigns which target drivers and community education campaigns implemented by Council Road Safety Officers.

In mid 2002 the RTA will conduct a large scale survey of pedestrians and drivers. This survey will provide comprehensive information on community understanding, knowledge, attitudes and behaviours in relation to pedestrian safety. This information will help to inform the development of future public education strategies and also the development of a *Pedestrian Safety Strategy for Sydney-Newcastle and Wollongong* identified in the *Road Safety Task Force Report* (RTA 2001).

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