



## Driveway deaths of child pedestrians

Every year, a number of young children in Australia are killed as a result of low-speed impact with a motor vehicle, often as a consequence of a parent or family friend unwittingly driving a motor vehicle over a child in their yard or driveway. These collisions have a devastating and lasting impact on the whole family. Prevention of driveway deaths and injuries requires an understanding of their circumstances and causal factors and increased public awareness.

This monograph presents a summary of driveway deaths of child pedestrians during the period 1996–2001. It incorporates data from earlier Australian Transport Safety Bureau (ATSB) published research covering the period 1996–1998.<sup>1</sup>

### Key facts

- During 1996–2001, there were 66 reported cases of driveway deaths of children.
- The majority of these deaths (59 per cent) occurred in regional, rural or remote areas.
- More than a third of the cases (39 per cent) occurred when the motor vehicle was travelling forwards.
- Toddlers under 3 years of age were most at risk (86 per cent).
- Boys (62 per cent) were at greater risk than girls.
- The majority of accidents occurred at or near the child's home (68 per cent).
- In most cases (83 per cent), the driver was a parent or relative of the child, or a family friend.



- Large vehicles were the predominant vehicle type involved (97 per cent), with large passenger vehicles accounting for 61 per cent of this category.
- In none of the cases was alcohol considered to be a factor.

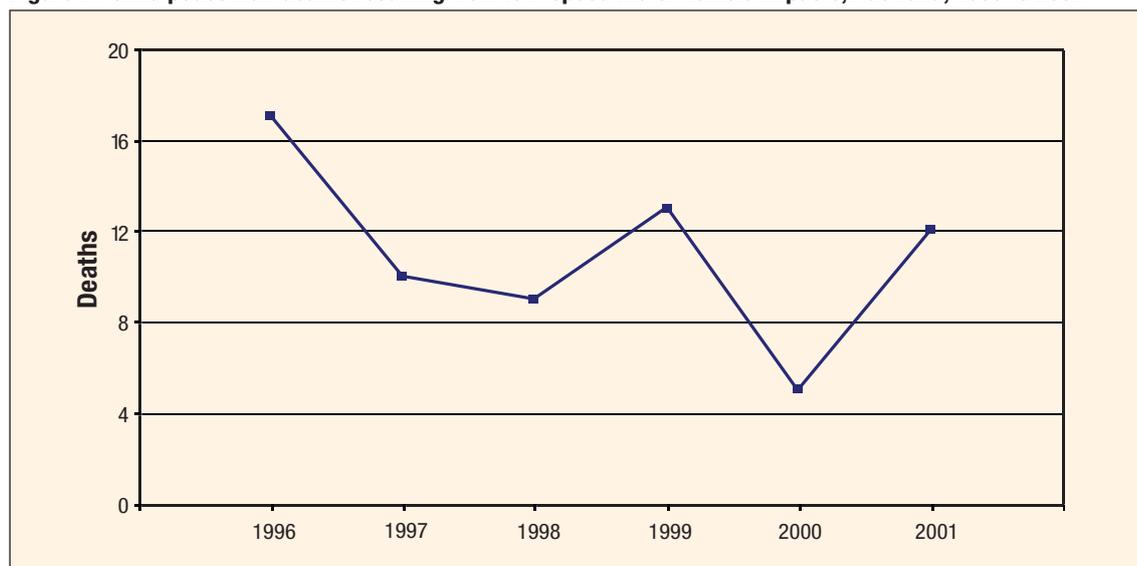
### Driveway deaths

For the purposes of this study, driveway deaths include cases that occurred using the following criteria:

- child killed was under 7 years of age
- incident was in a residential driveway or yard, adjacent neighbourhood street, car park, commercial property or farm
- motor vehicle was travelling at slow speed (i.e. less than 10 km/h)
- motor vehicle had a driver
- motor vehicle driver was reported to be unaware that the child was either near the vehicle or in immediate danger.

Cases where the child had been in the vehicle and had fallen out immediately prior to being run over were excluded.

**Figure 1: Child pedestrian deaths resulting from low-speed motor vehicle impacts, Australia, 1996 to 2001**



During the period 1996–2001, there were 66 cases of driveway deaths of young child pedestrians. The case series was collected through Australian Bureau of Statistics (ABS) mortality files and state coronial records. The ATSB was unable to gain access to a few coronial reports required to confirm whether some extra cases should have been included; therefore, the driveway deaths tally for the period may actually be slightly higher than represented in this monograph.

### Locality

The majority of driveway deaths (59 per cent) occurred in non-metropolitan areas:

- 27 deaths (41 per cent) were reported in metropolitan areas
- 25 deaths (38 per cent) were reported in inner regional/outer regional areas
- 14 deaths (21 per cent) were reported in rural or remote areas.

By comparison, 65 per cent of the population lives in metropolitan areas, 22 per cent lives in regional areas, and 13 per cent lives in rural or remote areas.

### Families with young children

For families with at least one child under 7 years of age, the 2001 Australian census, indicates that:

- 64 per cent of young families live in

metropolitan areas (cf. 41 per cent of driveway deaths)

- 23 per cent of young families live in regional areas (cf. 38 per cent of driveway deaths)
- 13 per cent of young families live in rural or remote areas (cf. 21 per cent of driveway deaths).

Considering families of Indigenous status with at least one child under 7 years of age, the 2001 Australian census indicates that:

- 2 per cent of young families in metropolitan areas are of Indigenous status (cf. 4 per cent for driveway deaths)
- 7 per cent of young families in regional areas are of Indigenous status (cf. 8 per cent for driveway deaths)
- 7 per cent of young families in rural and remote areas are of Indigenous status (cf. 29 per cent for driveway deaths).

### Metropolitan

The majority of deaths in metropolitan areas were caused by a reversing motor vehicle (70 per cent), and 74 per cent of the collisions occurred at the home of the child. Seventy-four per cent of the victims were under two years of age, 96 per cent were under 3 years of age, and 4 per cent were of Indigenous status. About three-quarters of the vehicles involved (74 per cent) were large passenger cars or vans, with 35 per cent in this category being

four wheel-drive vehicles (4WD). A further 7 per cent of the collisions involved large utilities, 11 per cent involved large trucks and 7 per cent involved medium-sized passenger vehicles.

### Regional

About half the deaths in regional areas were caused by a reversing motor vehicle (52 per cent), and 52 per cent of the collisions occurred at the home of the child. Fifty-two per cent of the victims were under two years of age, 72 per cent were under three years of age, and 8 per cent were of Indigenous status. Two-thirds of the vehicles involved (68 per cent) were large passenger cars or vans, with 53 per cent in this category being 4WDs. A further 12 per cent of the collisions involved large utilities and 20 per cent involved large trucks.

### Rural & remote

The majority of deaths in rural and remote areas were caused by a reversing motor vehicle (57 per cent), and 64 per cent of the collisions occurred at the home of the child. Fifty-seven per cent of the victims were under two years of age, 93 per cent were under three years of age, and 29 per cent were of Indigenous status. Almost two-thirds of the vehicles involved (64 per cent) were large passenger cars or vans, with 56 per cent in this category being 4WDs. A further 21 per cent of the collisions involved large utilities and 14 per cent involved large trucks.

### Driveway deaths by jurisdiction

A breakdown of the driveway deaths by jurisdiction shows that:

- 21 (32 per cent) occurred in New South Wales
- 16 (24 per cent) occurred in Queensland
- 10 (15 per cent) occurred in Western Australia
- 9 (14 per cent) occurred in Victoria
- the remaining 10 (15 per cent) occurred in South Australia, the Northern Territory, Tasmania and the Australian Capital Territory.

Note: Proportions may not add to 100 per cent due to rounding.

## Children most at risk

The children most at risk of a driveway death are toddlers under three years of age. During 1996–2001:

- 41 children (62 per cent) killed in driveway deaths were under two years of age
- 57 children (86 per cent) were under three years of age
- 59 children (89 per cent) were under four years of age
- 62 children (94 per cent) were under five years of age.

The majority of the remaining four children (who were all males aged five or six years) were killed either on public roads outside their homes or in car parks, and tended to be playing around the moving vehicles when they slipped or overbalanced prior to being dragged under the vehicle and run over.

The median age of the child pedestrians killed in driveway accidents was 21 months, with ages ranging from 8 months to 6½ years. In 39 out of the 48 reported cases (81 per cent) where information on siblings was available, the child killed was not the only child in the family. Sixty-two per cent of the child victims were boys.

## Reversing vehicle

In the 40 cases where the child was killed by a reversing vehicle:

- 78 per cent involved a child under 2 years of age
- 93 per cent involved a child under 3 years of age.

## Forward-moving vehicle

In the 26 cases where the child was killed by a forward-moving vehicle:

- 38 per cent involved a child under 2 years of age
- 77 per cent involved a child under 3 years of age
- at least 19 per cent of the victims were of Indigenous status.

## Indigenous population

The 2001 census indicates that 2.3 per cent of the non-migratory population of Australia had Indigenous status. In this case series on driveway deaths, 10.6 per cent of the victims were of Indigenous status. Moreover, while 4.6 per cent of the rural and remote area population is registered as being of Indigenous status, 28.6 per cent of the driveway deaths in rural and remote areas were of Indigenous toddlers.

## Collision circumstances

Most collisions (68 per cent) happened at or near the child's home. The home of a friend or relative was the site of a further 15 per cent of the incidents. Collisions not on residential property, and not in specifically commercial areas, tended to be in open public areas such as caravan parks, car parks, or similar environments where there were no clearly delineated areas separating vehicle travel and pedestrian movement.

The driver was generally unaware that a child was in the vicinity of the vehicle. For those collisions that occurred at home, it was reported that the driver believed that the child was inside the house, in another part of the yard, or being supervised by another adult. Often there were other adults nearby, either inside the house or in another part of the yard. The collision documentation identifies:

- 46 cases (70 per cent) where the child was either deemed under direct supervision by an adult (e.g. the child made a sudden movement away from the adult and into the path of the vehicle), or indirectly supervised (i.e. the carer was in the vicinity of the child but occupied with other activities and unaware of the imminent danger to the child)
- 13 cases (20 per cent) where the child was unsupervised, having been left alone for some time
- 7 cases (11 per cent) where there was insufficient information to determine the level of supervision.

Note: Proportions may not add to 100 per cent due to rounding.

Most of the collisions (86 per cent) occurred during full daylight, with a marked bunching of incidents at 8am–9am and 5pm–6pm.

**Table 1: Circumstances of fatal low-speed impacts between motor vehicles and child pedestrians, Australia, 1996 to 2001**

	<i>Deaths</i>	<i>Per cent</i>
<b>Location</b>		
At/near child's home	45	68
Home of relative/friend	10	15
Other	11	17
<b>Supervision</b>		
No supervision	13	20
Direct or indirect supervision	46	70
Unknown supervision	7	11
<b>Hour of day</b>		
Early morning (6am-9am)	11	17
Morning (9am-12 noon)	15	23
Afternoon (12 noon-3pm)	11	17
Late afternoon (3pm-6pm)	25	38
Evening (6pm-7pm)	4	6
<b>Time of day</b>		
Daytime	57	86
Dawn, dusk or early evening	9	14

Note: Proportions may not add to 100 per cent due to rounding.

## Driver of vehicle

In the majority of driveway death incidents involving young children, the driver was a parent or relative of the child, or a family friend. During 1996–2001:

- in 30 cases (44 per cent) the driver was the mother or father of the child
- in 25 cases (39 per cent) the driver was a relative or family friend
- in 11 cases (17 per cent) the driver was unknown to the child.

In 80 per cent of the cases the driver of the vehicle was a male.

Information on the driver's licence was not reported in 38 per cent of the collisions. For those occasions where the driver's licence was reported, in 85 per cent of cases the

driver had a full licence. In none of the cases was alcohol considered to be a factor in the incident.

### Vehicles involved

Large vehicles, particularly large family-sized sedans and station wagons and large four-wheel-drive (4WD) passenger vehicles, were the most common vehicle type involved in driveway deaths in this series. In 1996–2001:

- 41 per cent of child pedestrian deaths involved passenger cars or vans
  - 20 per cent involved large sedans
  - 9 per cent involved large station wagons
  - 9 per cent involved people movers/vans
  - 3 per cent involved medium-sized sedans
- 32 per cent involved large 4WD passenger vehicles
- 27 per cent involved trucks or large utilities
  - 15 per cent involved trucks
  - 12 per cent involved large utilities.

It was noted in several coronial reports that the child had been positioned very close to, or under the vehicle, out of the visibility range

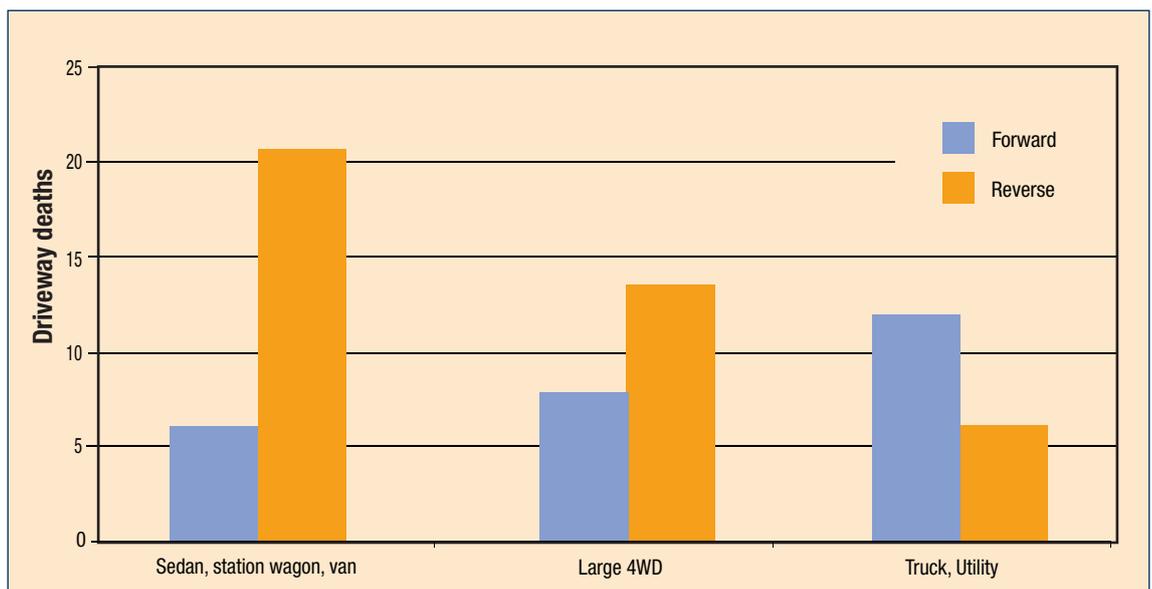
of the driver. In 39 per cent of the cases the vehicle involved was travelling forwards at the time of impact with the child, indicating that 'blind spots' are not associated only with vehicles in reverse motion. Clearly, it is also easy for a small child located immediately in front, or on the off-side, of a high-fronted vehicle to be obscured from the driver.

### Visibility

Visibility research has shown that all cars have a blind area that could easily obscure a young child. Reverse visibility has been measured for many popular vehicle models using the Reversing Visibility Index<sup>6</sup>. The test uses a cylinder 60 centimetres high (to represent the shoulder height of an average 2 year old) which is placed in a series of test positions behind the vehicles. In nearly all vehicles, when the cylinder was placed closer than three metres from the rear passenger side, it was not visible to a person seated in the driver's seat.

However, as can be seen in this analysis, there is a high incidence of collisions involving forward moving vehicles. Looking at Figure 2, it would appear that the larger the vehicle, the greater

**Figure 2: Vehicle types and direction at time of impact in fatal low-speed collisions between motor vehicles and child pedestrians, Australia, 1996 to 2001**



the incidence of a forward moving vehicle being involved. This indicates that, from the driver's seat, there is also poor visibility of young children positioned close to the front of vehicles with high bonnets.

### Prevention strategies

Toddlers under three years of age are the most vulnerable group. They are old enough to be mobile and yet too young to be aware of the potential danger of motor vehicles. Therefore, direct and constant supervision is particularly critical for children in this age group. It is very important for carers of young children to know exactly where children are when any movement of motor vehicles is expected to occur.

Restricting access by erecting fencing and barriers to the driveway area would contribute towards keeping young children a safe distance from the threat of moving vehicles. However, attention is required to ensure that barriers are well maintained and that access points such as gates are kept closed if young children are around.

Improvements in driver visibility, particularly for large vehicles, could also lead to a reduction in driveway deaths.

### Data sources

Although the ATSB has a comprehensive database of statistical information on fatal motor vehicle crashes that occur on public roads, the database does not include low-speed non-traffic events. Possible cases were obtained from the ABS following an ATSB request for a search of all traffic and non-traffic deaths of child pedestrians and pedal cyclists under seven years of age that were registered between 1996 and 2001. The relevant ICD 10 external cause codes were V01-09, V10-19, V89 and V99. For each ABS death record, the state/territory of registration of death, a death registration number, date of death and age of deceased were obtained. Cases occurring at traffic speeds were excluded by matching cases to the ATSB fatal road crash database and National Coroner's Information System (NCIS) maintained by the Victorian Institute of Forensic Medicine. For the remaining cases, names of deceased children were obtained from the state and territory Registrars of Births, Deaths and Marriages. With this additional information, more cases could be excluded after additional matching with the NCIS and CITEC (a business of the Queensland Government). Coronial reports for all relevant records were requested from all six states and two territories.

### Relevant websites

- <sup>1</sup> ATSB road safety report on driveway deaths  
[http://www.atsb.gov.au/publications/2002/Driveway\\_deaths.aspx](http://www.atsb.gov.au/publications/2002/Driveway_deaths.aspx)
- <sup>2</sup> Driveway safety and child injury prevention – Motor Accidents Authority NSW  
<http://www.maa.nsw.gov.au/default.aspx?MenuID=152>
- <sup>3</sup> Where are your kids? Child safety in your driveway  
[http://www.atsb.gov.au/publications/2005/Child\\_safety\\_in\\_driveways.aspx](http://www.atsb.gov.au/publications/2005/Child_safety_in_driveways.aspx)
- <sup>4</sup> Driveway safety – Kidsafe  
<http://www.kidsafensw.org/roadsafety/index.htm>  
<http://www.kidsafewa.com.au/factsheets>
- <sup>5</sup> Early childhood road safety education program – NSW RTA and Macquarie University  
<http://www.kidsandtraffic.mq.edu.au/>
- <sup>6</sup> Reversing visibility index for many popular vehicles – NRMA  
[www.nrma.com.au/reversing](http://www.nrma.com.au/reversing)