What do we know about the causes of child pedestrian fatalities in Australia?

Summary of findings and directions for action from the report:

Analysis of the causes of fatal child pedestrian crashes for
0- to 14-year-olds in Australia, 2001 to 2019.

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The problem

Land transport crashes are the leading cause of death for children aged 0 to 14 years. Compared to adults, children are naturally at higher risk around roads and vehicles because of their smaller stature and their developmental immaturity. Children do not understand risk in the same way as adults do. Just over half of the road and vehicle-related fatalities involving children occur when they are passengers, but a significant number, nearly one-third, occur when the child is a pedestrian.

The study

This study investigated the available information from coroner's records on the circumstances leading to child pedestrian fatalities in Australia between 2001 and 2019. It is the largest study to-date to look at why child pedestrian fatalities occur. The results provide evidence on the causes of these fatalities which is essential for developing better strategies to prevent them.

Study results

According to Coronial records, in Australia, between 2001 and 2019, a total of 439 children aged 0 to 14 years were killed by a vehicle when they were a pedestrian. While the number of child pedestrian fatalities decreased in the first half of this period, there is little evidence of improvement in numbers over the most recent decade. These patterns show that continuing along the same path will not reduce child pedestrian deaths. We need to do more to prevent child pedestrian fatalities. To do this, we need to understand more about why these tragedies occur.

Our analysis shows that the location of child pedestrian fatalities depends on the age and gender of the child. For very young children, aged three years or less, most pedestrian fatalities occur in a home driveway, with boys and girls equally likely to be involved. Pedestrian fatalities involving older children are more likely to occur on the road and more likely to involve boys. Fatalities in different locations also involve different types of vehicles, with fatalities occurring in driveway and carparks more likely to involve large vehicles whereas road fatalities involve a range of different vehicle types.

Driveway fatalities

Driveways were the location of around on-third of all child pedestrian fatalities (32.4%). Our analysis shows that the number of child fatalities in driveways has unfortunately been increasing over the past two decades. It seems that our efforts to reduce child deaths in driveways have not been successful. We obviously need new approaches to make a difference.

Our analysis gives clues about two main approaches for preventing child fatalities in driveways: making drivers more aware of children in driveways and ensuring direct supervision of children in the vicinity of driveways. Both need to be targeted to eliminate these tragedies.

1. *Driver awareness*: We need to make drivers more aware of the potential for a child to be in the driveway before they move the vehicle in any direction. Most drivers reported they were

not aware of the presence of the child or failed to see them. Many of these fatalities involved larger vehicles which may have obscured the child, however in most cases the driver was a parent/carer or knew the child (87.6%). This means they should, and even could have, been aware that there was a child in the vicinity. The results show that before they move a vehicle, drivers must be sure there are no children in its path by being certain the child is indoors, keeping the child in-sight during the move, or putting the child in the vehicle when they move it.

Technology on vehicles such as sensors and cameras can help alert drivers to the presence of a child in the path of the vehicle. Many vehicles now have reversing technologies, and this study shows that driveway fatalities involving reversing vehicles decreased over the last decade. Unfortunately, more than one-third of driveway fatalities involved a vehicle moving forward (34.1%), and this study found that fatalities involving forward-moving vehicles increased over the past decade which has kept the numbers of driveway fatalities high. These results show that to make any impact on reducing driveway fatalities, sensors and cameras are needed that show all around the vehicle, with no blind spots. Not just reversing cameras.

2. *Child supervision*: We need to ensure children are actively supervised when they are in the vicinity of driveways. This study showed that at least one supervisor was present in almost all cases (94.6%), but the supervision was most often indirect or only partial (69%) because there were other activities going on which distracted the supervisor including the need to manage multiple children. In the few cases where the child was being directly supervised, the fatality occurred when supervision was disrupted as the supervisor changed, which allowed the child to access the driveway area on their own. In nearly one-third of cases a lack of a security barrier between the house and driveway also made this possible. These findings show that we need to make parents and carers aware of their essential role in supervising children to prevent driveway fatalities.

Roadway fatalities

Half of child fatal pedestrian crashes over the study period occurred on roadways. Numbers decreased over the first half of the study period but showed little improvement in recent years, indicating again that greater effort is needed to reduce these fatalities.

The circumstances of road pedestrian fatalities changed with age of the child. Most often road crashes involved 3- to 5-year-old children (26%), was lowest for children around 11 to 12 years (9%) but numbers increased again for 13- to 14-year-olds (18%). Boys were involved in most cases up to 12 years, but girls and boys were equally represented for road pedestrian fatalities involving 13- and 14-year-olds.

For children under 11 years, road fatalities occurred when the child moved into the path of the vehicle (43.5%) or was attempting to cross the road (28.9%). A notable percentage of younger children attempted to cross the road to join a known person or family member (11%). The passing vehicle made contact with the child when the driver failed to see or avoid them (38.6%), although in a significant percentage of cases, the driver was possibly or even definitely aware of the child at the

time (38.6%). Careless driving was mentioned in a minority of crashes (9.7%), but often the Coronial files contained few details about the driver's role in the crash. Factors that made it difficult for a driver to see a small child, such as poor visibility (37.2%) or road characteristics like curves or parked cars (24.1%) played a role in many of these crashes and consequently are likely targets for preventing them. In locations where primary school aged children are common, obstructions to vision of child pedestrians should be eliminated and clearly marked and easily accessible road crossings must be made available for children to use.

Up to the age of 11 years, supervision is an important strategy used for keeping children safe around roads. Not surprisingly, children involved in fatal pedestrian road crashes were mostly not supervised at all (33.8%) or only indirectly (30.4%). In the minority of crashes where the child was directly supervised (28.3%), the crash occurred after the child moved impulsively into the path of the vehicle (36.6%), the supervisor suddenly changed or was distracted (24.4%) or the crash was attributable to the vehicle or driver (26.8%). In only a small percentage of cases (7.6%), the supervisor was making physical contact with the child just before the crash. In half of these cases, however, the crash occurred when the child broke free from the supervisor (58.3%), whereas in the remainder, the crash was due to the driver/vehicle (41.7%). These findings highlight the need for active supervision around roads for children up to the age of 11 years, especially active supervision involving physical contact for younger children.

For older children aged 11 to 14 years, almost all pedestrian fatalities occurred around roads (87.3%) and for this group, the numbers of crashes increased with age, with 13- to 14-year-olds involved in more crashes and notably, girls were involved as frequently as boys. Most often fatal crashes for older children occur when the child was attempting to cross a road (41.9%), they moved into the path of a vehicle (29.1%) or they engaged in risky behaviour around the road (21.9%). In nearly one-third of these crashes, the driver was driving carelessly or in a risky manner (29.0%), and in most cases the driver maintained that they were unaware of the child in the period before the crash. Most crashes occurred on the road (67.3%) rather than at intersections (12.7%) or pedestrian crossings (10.9%) and for most poor visibility and lighting around the road contributed to the crash (43.7%). As might be expected, these older children were acting independently and were not being directly supervised at the time of the crash (81.8%). This research suggests that strategies for preventing pedestrian fatalities for older children should involve ensuring that pedestrians are visible to drivers and that they are crossing in the safest locations.

Overall directions for action

This study highlights directions for action to prevent child pedestrian fatalities. These include:

1. Driveway child pedestrian fatalities:
   We need to review strategies to reduce child pedestrian fatalities in driveways. In Australia, a report calling for action to reduce child deaths in driveways appears around every decade (e.g., Neeman et al., 2002; BITRE, 2012), but child driveway fatalities have not reduced over this period. We must respond to the findings of this and previous studies and implement better strategies to eliminate these tragic outcomes. These strategies focus on increasing driver and parents/carers awareness of their role in preventing these crashes through:
   - sensor/camera technology that covers the entire circumference of the vehicle,
   - educating drivers of the need to be sure of the location of any children in the vicinity of the driveway and the need to ensure that children are not in the vicinity of risky locations around vehicles,
   - educating parents/carers of the need to supervise children actively and directly when around driveways.

2. Roadway child pedestrian fatalities
   a) *Road design improvements*: We need improvements in road design in areas where child pedestrians are likely to be (e.g., daycare centres, schools, playgrounds, shopping centres). In these areas design improvements include:
      - better signage, road marking and lighting, as well as traffic calming to reduce speeds,
      - ensuring that access points between areas where children are common, and the road are placed in quiet traffic areas rather than on higher speed roads and that access points are protected by strategically placed barriers,
      - improving the visibility of children for drivers (e.g., removing parked cars and other visual obstacles) and
      - ensuring that designated pedestrian crossings are also strategically placed.

   b) *Vehicle design*: Improvements are needed in vehicle design to enhance all-around visibility of small stature children from vehicles, especially larger vehicles. Where vision-based or sensor technologies are used to improve or stand in place of clear vision from vehicles, they must be able to demonstrate all-around functionality and the driver must be aware of any limitations or blind spots.

   c) *Increase awareness of child pedestrian risk around roads for drivers*: We need to help drivers to be more aware of the risk of child pedestrian fatalities through more community education and communication campaigns that explain how driver behaviour plays a role in keeping child pedestrians safe.

   d) *Awareness of their role in supervising children for parents/carers*: We need to increase awareness of parents and carers of children about their primary role in keeping children safe around vehicles and roads. This includes the importance of active attention and direct supervision of the child and keeping physical contact with younger children when they are around roadways. Awareness campaigns for parents need to be a regular feature of the road safety programme as the group of parents with young children is continually changing with their children growing up and new children being added to the vulnerable population.

3. Data collections for understanding the causes of child pedestrian fatalities.

   We need to improve the quality of data available through the National Coronial Information System about the causes of fatal child pedestrian crashes. This includes:

   - developing systems that assist Police to collect as much information as is feasible about the circumstances and causes of the crash,
   - providing sufficient resources to the NCIS to ensure that all available information about a case is included in the case records and
   - encouraging and resourcing Coroners to seek out and review more information about the circumstances of child pedestrian fatalities in order to advocate for the strategic changes needed to reduce these tragic occurrences.