From the Director

This edition of Big Impact highlights a number of recently published studies that focus on children, who are some of the most vulnerable users of our road network. In a recent editorial in the Journal of the Australasian College of Road Safety, I highlighted that over the past 10 years, road fatalities involving children in Australia have declined by 5%. Yet despite this decline, children, whether a toddler in a child restraint, a child walking to school or a teenager cycling, remain at an increased risk of injury when actively engaging in the road transport system. The reported decline in child road fatalities hides the fact that fatalities, as a measure of success in relation to child road safety, is not a robust measure. This is due in part to the small numbers but also this trend does not reflect changes in travel exposure over the period. In the absence of comprehensive exposure data, the reported decline in fatalities may merely reflect a reduced exposure to transport modes such as walking and or cycling.

Ongoing research, such as reported in this edition of Big Impact, is needed as well as a broader research emphasis on the role urban form can play in reducing child road injury. We are well aware that low-density, single use, large area zoning (usually found in most suburbs across large cities) limits the ability of children and adults to walk or cycle for their daily travel requirements. The location of suburban developments away from major activity centres also results in reliance on the private car, decreasing the use of other travel modes, particularly public transport and active transport opportunities. Given the relationship between urban form and other non-injury health outcomes (such as obesity and cardiovascular disease) more effort needs to be placed on ensuring urban form is conducive to safe active transport for children.

As for all editions of Big Impact, I encourage you to follow-up with the researchers who are undertaking the research and importantly, to utilise the findings from our papers and reports to assist you in translating the science to policy and practice.

Professor Mark Stevenson
Director, MUARC

Recent publications

MUARC has produced 7 journal papers over this period. A selection of these papers are below:

Cameron, MH 2012, ‘Optimum speeds on rural roads based on “willingness to pay” values of road trauma’. Special Issue on Safe Speeds, Journal of Australasian College of Road Safety, Vol. 23 (3).


In addition MUARC has released four reports which are available for download at the MUARC website.


Child restraint systems - the challenge of the toddler

Child passengers in a sub-optimal position in their child restraint pose serious implications for restraint effectiveness in the event of a crash.

There is considerable research supporting the premise that child restraint systems (CRS) offer a good level of crash protection during an impact. Estimates put the reduction of risk of serious injury of children protected by CRS as high as 70% compared with unrestrained children and 60% compared with wearing adult seat belts.

However, these estimates are based on the assumption that children are appropriately fitted into the CRS and remain in the optimal position for the duration of their trips.

Associate Professor Jude Charlton with Dr Sjaan Koppel and team recently concluded a naturalistic driving study to observe children in CRS to determine whether these assumptions are correct.

For this study, 12 families with at least one child between one and eight years old, were recruited to drive the MUARC study vehicle for a period of three weeks. The study vehicle was a luxury model large family sedan equipped with four observational cameras providing views of the road and forward traffic scene, the driver and front seat passenger, and the rear seat (child) passengers. Cameras were connected to a PC based recording system which automatically activated when the car doors were opened and shut down after the journey.

The CRS were checked by a specialist and where possible the specialist ensured that the CRS was used appropriately for each child. At the end of each three week observational period, the car was returned to MUARC and the video recordings were analysed.

Researchers viewed the videos and coded a number of variables including trip details and the nature and duration of children’s out of position (OOP) status. OOP status was further sub-coded to describe whether the limbs (and which limb), head or torso were out of position.

A total of 621 discrete trips were undertaken by the 12 families, yielding 165 hours of naturalistic driving data. The mean trip duration was 19 minutes with most trips taken in urban areas, in daylight on suburban roads and streets and with the mother driving.

Ninety-two trips were analysed and at least one out-of-position event was observed on all (100%) of the trips. On average, children were OOP 70.6% of the journey time. The most frequently observed OOP types were head/torso leaning forward out of the restraint, lateral shifts of head/torso to the right or left, arms outside of the CRS or feet on the CRS or car seat. Children were also incorrectly restrained on 48 occasions.

This study has provided some new insights into the behaviour of children in cars indicating that they are frequently in sub-optimal positions whilst in their CRS. This has serious implications for restraint effectiveness in the event of a crash.

Further research is being carried out by Charlton, Koppel and a team of international experts under an ARC Linkage Grant to expand their work on child safety in cars.

This project was funded through the Australian Cooperative Research Centre for Advanced Automotive Technology (AutoCRC) in collaboration with GM Holden Australia.

Driver distraction associated with kids in cars

A recent naturalistic, observational driving study on child vehicle occupants conducted by Dr Koppel, Associate Professor Charlton and team yielded considerable information about how children really behave in the rear seat of a vehicle, potentially being a significant source of driver distraction.

Using naturalistic driving methods, ninety-two trips were analysed to record any potentially distracting activities undertaken by the driver. The definition of distraction encompassed all activities that distracted the driver or competed for their attention while driving, including looking away from the forward roadway for more than two seconds while the vehicle was in motion.

Drivers were observed engaging in potentially distracting activities whilst driving in 90 out of the 92 trips. The most frequent types of distracting activities included: touching their head or face (35%), interacting with child vehicle occupants in the rear seat (12%), and engaging with the front seat passenger (9%).

The drivers spent longer engaged in potentially distracting activities with front seat passengers (average = 7s) than engaged in potentially distracting activities with child occupants (average = 5s). The presence of a front seat passenger did not significantly affect the way in which drivers engaged in potentially distracting child occupant-related activities both in terms of frequency and duration.

Further research is required to determine the extent to which drivers’ performance could be adversely affected by child occupant-related or other potentially distracting activities. Even though there were no crashes or near crashes observed, the level of driver distraction was significant and indicates the need for education about potential crash and injury risks associated with distraction.

This project was funded through the Australian Cooperative Research Centre for Advanced Automotive Technology (AutoCRC) in collaboration with GM Holden Australia.


Saving pedestrian lives through “Dwell on Red”

In 1996, MUARC released a report examining the environmental factors associated with alcohol-related pedestrian crashes and proposing countermeasures to reduce the incidence of alcohol related pedestrian casualties. One of the recommendations was that, during periods of high crash risk and low traffic activity, the traffic light sequences be modified to display red in all vehicle directions when there is no approaching traffic. This is to encourage slower and therefore safer approach speeds, not only for the pedestrian, but for road users in general.

Trials of the Dwell on Red strategy were carried out in Ballarat and Melbourne in-between 2002 and 2006 with the results published in Accident Analysis & Prevention in 2007. The Ballarat trial found an 11 km/h reduction in speed for 28% of vehicles 30m out from the intersection and substantial reductions in the proportion of vehicles travelling at threatening speeds with regard to the severity of pedestrian injury.

The Dwell on Red strategy has now been implemented in several provincial cities throughout North East Victoria including Wangaratta, Wodonga and Benalla as well as being proposed for Shepparton, parts of Sydney and regional NSW. At selected high risk sites, such as near hotels and licensed venues, traffic lights are reprogrammed to dwell on red from 9pm to 5am. It is expected that this initiative will have a substantial effect on reducing the number casualties involving intoxicated pedestrians crossing in the vicinity. It is also included within VicRoad guidelines for its Safer Road Infrastructure Program treatments.
Leading transport safety research

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