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Journal of the Australasian College of Road Safety

Formerly RoadWise — Australia's First Road Safety Journal

In this edition —

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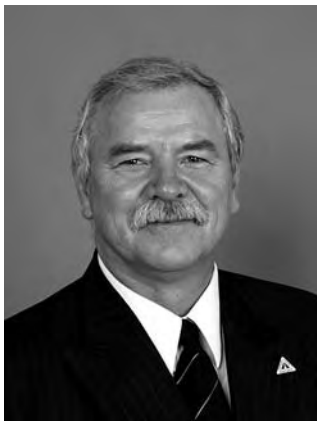
From the President



Dear Members,

This will be my last report before I hand over the reins to an incoming new President. I have enjoyed my term and have witnessed a genuine change in attitude and culture towards issues concerned with road safety. The shift from the "Blame the Driver" syndrome to a more holistic, smarter and forgiving perspective of "Safer Drivers in Safer Cars on Safer Roads" is heartening and I hope this thrust will continue. The recent excitement of the gains returned from installation of Electronic Stability Control (SEC) systems into cars in Europe and the USA are certainly encouraging. ESC is being touted as a "golden bullet". It will be interesting in a couple of years time to see if indeed ESC returns the thirty percent or so gains in road trauma reduction that many are claiming it will. Let's all hope so.

I was also encouraged by a recent road safety initiative by Premier Beattie to which I was invited. Concerned about Queensland's road toll he organised a Road Safety summit which was held at Parliament House in the Green room. A number of road safety experts were invited as keynote speakers to present their perspective and solutions of how the road toll could be reduced. In attendance was the Premier, the Minister for Transport and Main Roads (Hon. Paul Lucas), the Minister for Police and Corrective Services (Hon. Judy Spence) and the Minister for Emergency Services (Hon. Pat Purcell) as well as MP's from both sides of the house, road safety experts, crash victims, media and public. A white cross for every fatality in 2005 and a black cross for every fatality in 2006 was driven into the Parliament lawn. There were so many crosses it reminded Summit participants of a war memorial grave yard. It left a chilling impression and reminded all of why were at the summit.

Proceedings went for two days with the Premier, Ministers and MP's from both sides of the house in attendance. Premier Beattie then proceeded to read out a list of initiatives his Government would immediately introduce as a result of the outcomes of this summit. The proceedings from the summit and the outcomes can be found at http://www.roadsafety.qld.gov.au/qt/LTASinfo.nsf/index/rs_summit.

One of the key issues that became clear as the summit proceeded was that any road safety initiatives introduced needs to now focus not only on the driver but now on intervention through introduction of smarter engineering technology that will assist with protecting errant driver's against themselves and their victims, e.g. ESC, alcohol interlocks, safer road infrastructure that includes divided roads and forgiving roadsides, speed limiter and speed warning systems, safer crashworthy cars, etc.

Premier Beattie's initiative was discussed and praised by road safety stakeholders at the latest Australian Transport Safety Bureaus National Road Safety Strategy Panel meeting in Canberra last month. It was suggested to me that I should write a letter inviting all State Premiers to also hold such summits. I thought about this for a few days and instead decided to write a letter to the Prime Minister [Ed.: See after this article]. The various initiatives we are now beginning to consider as essential in regards to "Safer Vehicles" and "Safer Roads" requires leadership at this level if we are to truly begin to reduce road trauma in any significant manner. Already we are seeing an alarming rise in the national 12 month moving total to 8.2 fatalities per 100,000 population. This is compared to the target road toll of 7.2 fatalities per 100,000 population that was meant to be reached in February 2006. It is essential that we treat the issue of road safety in a bipartisan framework and at the highest political level.

Firstly, the whole nation must be united in its desire to rid road trauma. Secondly, reducing road trauma needs to be placed on the Council of Australian Governments (COAG) priority list. Thirdly, any national and international political and/or bureaucratic impediments to introducing known safety systems via Australian Design Rules and Australian Standards that reduces road trauma, requires leadership at the highest level in order for such impediments to be removed, and there are many impediments currently. Fourthly, a lot more money needs to be committed to solving the problem. We are capable of speeding hundreds of millions of dollars on sporting events that win us gold medals and I would be one of the first to shout "Go Aussie". However, I suggest that we also need to commit much higher levels of funding, effort, passion and focus on rewarding our nation's citizens with true gold medal performance of having the safest roads in the world where road trauma becomes a problem of the past. Let's hope our Prime Minster replies positively to this call.

Finally I would like to say it has been a great honour and a privilege serving the community and helping the College

achieve its objectives of reducing road trauma. I would also add that the College could not have achieved its objectives without the hard work and help of our Executive Committee. I am also very grateful to the office staff, namely our new Executive Officer Dr Margaret Clarke and our Executive Assistant Jackie Percival. I would like to particularly thank Geoff Horne, our past Executive Officer and now Manager of the Journal and Professional Register, for his tireless and invaluable help without which I don't think I would have been able to achieve as much as President.

Finally I would like to thank all of you, the members, for being such a committed and fabulous group of thoughtful and caring people. I have learnt a lot from you all as I am sure road users have as well. Well done to all of you for helping reduce road trauma and for supporting the College.

I wish you all a safe journey no matter where you are heading to or by whatever mobile means – stay safe.

Cheers

"Raph" Grzebieta
Outgoing President

Letter from the ACRS President to the Prime Minister

Dear Prime Minister,

I am writing to you as the President of the Australasian College of Road Safety on behalf of the Australian community and the victims of road crashes and their families and friends. I am appealing to your well known sense of caring and concern for the safety of us, your fellow Australians. I am respectfully asking that Road Safety is placed as a priority item on the Council of Australian Governments (COAG) list. I also ask that you lead a two day Road Safety Summit in Federal Parliament, desirably inviting the State Premiers, the relevant Federal and State Ministers for Transport, Police and Emergency Services and their equivalent shadow MP's, Road Safety experts, involved community leaders and seriously injured victims, to assist you with identifying the current issues and solutions to road trauma.

My work has exposed me to the personalised trauma and destruction that is occurring on our roads on a daily basis. Road Trauma is a significant issue for all Australians. Road safety usually falls under the Minister for Transport and Regional Services. However, the effects of road trauma are felt across a large number of portfolios such as education, health and aging, trade, defence, to name a few. Hence, it requires a whole of government approach. My reasons for such a request are outlined below.

As you are aware, last week six young Australian lives were tragically lost in Mildura in yet another road crash. We have been reading in our newspapers for the past week that the families and friends in Mildura will never be the same again. What a waste.

This week I again read in the paper of yet another five Australian lives extinguished in a car crash in Tasmania; a loving mother, three more much loved young girls and a young mother to be. All so much full of life and so much to live for. The newspaper reads "Five more die in new crash". In fact it was six lives lost if we count the driver's unborn child. The driver of the other struck vehicle has a serious spinal injury.

Both of these crash were preventable had the solutions we know that work had been implemented.

The total number of Australians killed on Australia's roads is almost as large as the 2004 Boxing Day Tsunami disaster. Since 1925, when vehicle crash statistics were first recorded, Australia has lost over 172,000 lives. This is almost twice the number of lives lost in all the wars Australians have been involved in (around 103,000) and four times the number of Australian lives lost in war since 1925 (around 40,000). For every life lost in a car crash there are 10-12 seriously injured with debilitating life-long effects (around 2 million injured so far). If we count all the Australian victims of natural and man-made disasters to date such as: Cyclone Tracy (77), all bushfires (Ash Wednesday, Black Friday, Canberra, etc, around 375), Thredbo (18), Bali bombings (206), Granville Train Crash (83), etc, the total number comes to around 850. This pales in number compared to road crashes. What is even more alarming is the road toll is now starting to trend upwards from the expected target of 7.2 per 100,000 population to 8.2 per 100,000. This means we are unlikely at this stage to reach the target of 5.6 road deaths per 100,000 in the National Road Safety Strategy by 2010 despite the good work by ATC and ATSB and Road Safety stakeholders.

If we consider the financial cost it is of the order of $15 billion per annum. This is equivalent to the respective budgets for defence and education and half the health budget.

The question I ask, Prime Minister, isn't road trauma much bigger than any war or disaster confronting Australian citizens? When six people die in one road crash is this any different in terms of consequences from a bomb blast going off anywhere killing Australians? Could we not also focus with more of our energy to help prevent this from occurring time and time again? Whilst I fully support and indeed applaud your Government's efforts regarding these other significant threats to Australia's security and well being, I commend that you also bring this level of leadership and commitment to your Government in tackling the road toll and serious injury crashes.

My road safety colleagues acknowledge that there have been a lot of good things that have been done in Road Safety in Australia, and that Australia has led the way in many instances. But we know this continued loss of life is unnecessary and is very much preventable if only we have the leadership to introduce more change. The current perception is that there are "no more silver bullets" in road safety to reduce road trauma. That it is all too hard. This view is quite wrong.

There are still significant opportunities as a number of strategies can still be implemented, hence, my appeal for you to prioritise Road Safety on the COAG list and lead a Federal Road Safety Summit. Such action would help focus Australia's leaders and the Australian community on how we can prevent an average of FIVE Australians being killed and a further SIXTY maimed for life each and every day.

Prime Minister, in your tenth anniversary year as leader of our great nation, what better gift could you give, I suggest, to Australians and their families than to prioritise Road Safety on the COAG agenda and hold a two day Road Safety Summit in Federal Parliament as the driving initiative to help rid Australia of road trauma.

I and my colleagues look forward to hearing from you.

Yours Most Respectfully

A/Prof. Raphael Grzebieta
President of the Australasian College of Road Safety

Diary

8th Australian Injury Prevention Conference – 'Working Together'

27 – 29 September 2006

The conference will be held at the Scientia Conference Centre, UNSW, Sydney. For futher information: www.aipn.com.au/AIPNconf2006/home.htm

International Traffic Medicine Association

16 -18 October 2006

The ITMA conference will be held at the Royal Automobile Club of Victoria conference centre in Melbourne. The congress will be of interest to anyone involved in preventing, treating or interpreting traffic injuries. It includes medical, engineering, legal, educational, political, policing and public health issues. One day of the congress will include a session wholly devoted to drugs and driving. Contact: ITMA 2006 Organising Committee Tel: (+613) 9887 8003; Fax: (+613) 9887 8773; Email: trafficmed@vifm.org .

Australasian Road Safety Research, Policing and Education Conference

25 - 27 October 2006

The Conference will be hosted by Queensland Transport, Land Transport and Safety Division, on the Gold Coast. With its theme of "Smarter, Safer", the conference will investigate how emerging technologies, and innovative education and enforcement practices can be applied to deliver improved road safety for all road users. The theme of Smarter, Safer is wide ranging and allows the program to accommodate a variety of presentation options. For further information visit:

http://www.astmanagement.com.au/rsrpe6/

ACRS Pedestrian and Cyclist Safety Conference, Melbourne

9 June 2006

For further information see www.acrs.org.au
or phone 02 6290 2509

The ACRS AGM will be held by teleconference on 25 May starting at 4.30pm Eastern Standard Time.

All members should have received the AGM agenda papers now. If you did not receive them, please contact Jacki at ACRS Head Office on 02-6290 2509.

QUARTERLY NEWS

College Chapter News

ACT and Region Chapter

It is anticipated that the Chapter will hold the Australasian series seminar 'Recidivist Drink and Unlicensed Driving' later in the year, and possibly a further seminar on speed and advertising issues.

NSW (New England) Chapter

The Chapter is considering changing its name to reflect more closely the region in which it is seeking to operate, namely the whole of Northern NSW. Advertising has gone out for two key Chapter events in June in Armidale – the Arrive Alive Expo for senior secondary students and the local area symposium on road safety issues specific to rural and regional Australia.

NSW (Sydney) Chapter

The Chapter held the Australasian series seminar on 'Recidivist Drink and Unlicensed Driving' on 10 February. This was well attended. A conference, attended by some 50 delegates, and entitled 'Road Safety – from Local to Global Perspectives, was held in Sydney on 4 April. The keynote speaker was Mr David Ward, Director General FIA (Foundation for the Automobile and Society). Other speakers presented papers on vehicle rollover, seat-belt wearing programs in China, heavy vehicle safety, benchmarking and key performance indicators for road safety, ANCAP (The Australian New Car Assessment Program) and AusRAP (The Australian Road Assessment Program). This conference was one of a series of chapter meetings sponsored by the MAA.

New Zealand Chapter

Some 30 members attended the Chapter meeting held in Wellington on 22 February, when the Minister for Transport Safety spoke about road safety management. He stressed the importance of having an independent voice in road safety, which he recognized that the College provided. On 17 March Dr Bhagwant Persaud, from Ryerson University, Toronto, Canada, spoke on road safety modeling and strategy analysis and evaluation. He outlined his work in the academic sector and also his involvement in working parties and committees in N. America. A meeting is planned with the Minister of Police on safety management issues prior to the College AGM by teleconference on May 25.

Queensland Chapter

The Chapter's AGM was held on 7 March in conjunction with a seminar on Fleet Safety, attended by some 35 people. Further meetings are scheduled for 6 June, 5 September and 5 December, with topics yet to be decided. Some Chapter members are involved in the planning for the Australasian Research, Policing and Education Road Safety Conference to be held at the Gold Coast in October.

South Australian Chapter

The Chapter continues to hold its bi-monthly lunchtime dialogue meetings for discussion of road safety issues. The next Dialogue and the Chapter's AGM is planned for 17 May, when the speaker, Professor Jack McLean, Head of the Centre of Automotive Safety Research, Adelaide, will present 'Reflections from 30 Years of In-Depth Crash Investigations'. The Chapter is planning to hold the Australasian series seminar on 'Recidivist Drink and Unlicensed Driving' in Adelaide on 14 June 2006. Another seminar on 'Electronic Stability Contro1' is being planned for mid-July.

Victorian Chapter

A seminar was held on 11 April entitled 'After the Crash', with contributions from Rural Ambulance, a trauma surgeon and a rehabilitation physician, examining the three phases for road crash victims. The Chapter executive has been working with the ACRS Head Office to plan the national one-day conference on 'Pedestrian and Cyclist Safety', to be held at Parliament House, Melbourne on 9 June 2006. A 'Hypothetical' on 'Driver Distraction' is planned for later in the year.

Western Australian Chapter

On 6 April some 35 people attended a meeting to hear Professor Judd Epstein (MUARC) speak on 'Legal Liability for Road Jurisdictions'. A Crash Investigation presentation is planned for May 17 at Melville City Council 1pm to 4 pm. The speakers will be A/Prof Raphael Grziebieta of DVExperts, Sgt Steve Potter from the WA Police major crash squad and a representative from the RACWA. The Chapter will be meeting on May 25 at 2.30pm for the Australasia-wide teleconference for the ACRS AGM."

Australian News

Governor General shocked by road trauma statistics

The following address was given by His Excellency Major General Michael Jeffery AC CVO MC, Governor-General of the Commonwealth of Australia on the occasion of a reception in support of the Australian Automobile Association Admiralty House, Sydney, 8 March 2006

Mr Ron Gray, President, Australian Automobile Association, Mr Alan Evans, Vice President, Mr Lauchlan McIntosh, Executive Director, Board members, Ladies and gentlemen - As patron of the Australian Automobile Association, it gives me great pleasure to welcome you all to Admiralty House this evening.

More than 100 years ago, in 1903, motorists in NSW, Victoria and South Australia formed kindred organisations to foster the then latest thing in applied technology – motor transport. And a little over twelve months later motoring enthusiasts in the other mainland states, Western Australia and Queensland, followed suit. The degree of shared commitment was remarkable given the limited number of vehicle owners. The founding state clubs could literally meet in each others lounge rooms.

The reasons for founding the clubs included protecting motorists against the view that their contraptions were a menace to society. Indeed, in some parts of Australia it was reported that members periodically requested police to act against gangs who pelted passing motorists with stones. Vehicles have of course become an essential part of our lives now, but tragically, an element of the 'menace' continues.

I am staggered that we now suffer nationally, an average of five road deaths a day and that serious injuries as a result of road accidents – paraplegia, quadriplegia, limb amputation and permanent brain damage – are suffered by more than 20,000 Australians a year. It is a terrible situation, comparable only to the combined annual mortality from smoking and alcohol related diseases. Ten years ago the dollar cost of road deaths alone was estimated at $15 billion. I am told the figure would now be double that. Thus I urge you to continue the fight on the road safety front, reminding both governments and drivers that this is a price too high by far.

The Association has contributed to safer roads and safer vehicle campaigns, to consumer education to ensure buyers are aware of what safety features to demand, and for better training for young drivers. And you must wonder how often you must repeat the warning that 40 per cent of car occupant fatalities occur in accidents involving roadside hazards, or that guard rails and safety barriers are proven ways of minimising death and injury. More recently you have been alerting authorities and the public to the benefits of safety features such as side air bags and electronic stability control in vehicles.

Let us hope post-licence driver education programs involving young drivers from New South Wales and Victoria will assist in finding a template on which we can put a stop to the shocking loss of life and injury on our roads among young people, particularly from regional areas. In 2004, 17-25 year olds accounted for 27 percent of all road deaths, even though they made up only 12.5 percent of the population. What a terrible statistic.

And what of the road rage phenomenon? As the Association's own commissioned poll showed last year, 48 per cent of motorists listed the behaviour and attitudes of other motorists as their primary safety concern, almost double the number of those concerned two years previously. The pollster Mr Rod Cameron found that bad behaviour on the road was an indication of how social pressures are impacting adversely on standards of courtesy, resulting in more impatient and selfish mindsets among drivers. Attention to this problem is relatively recent so the research commissioned by your Association is significant. To allow road rage to continue unchallenged is simply not an option. I find some of the suggested solutions fascinating. A new Japanese car, the Pod, monitors the driver's stress levels and will play soothing music and blow cool air if the stress levels rise too high. A system of flashing 's o rry' to other drivers has also been canvassed apparently. Both are interesting concepts.

I was also interested to note from your polling that the community is worried about vehicle advertising, particularly for new cars. Nearly one in two people had concerns about the emphasis on speed, and in particular, the targeting of young consumers. I believe we have to make a more concerted effort to look at the effects of advertising, which directly or subtly conveys messages that contravene even the most basic of safety messages. These advertisements can undo any good that might accrue from driver training.

The road toll and road safety are just two of the many issues with which the Association deals. I know you have also put considerable effort into studying fuel efficiency and its influence on global warming, but the road toll is especially challenging and urgent. Releasing survey results that showed a level of complacency and de-sensitisation in community attitudes to the road carnage, your executive director Mr McIntosh said, "We should not see death on our roads as inevitable." I couldn't agree more. He went on to note that the Federal Government's National Road Safety Strategy estimates that by 2010 around 332 lives could be saved each year through improved roads, 175 because of safer vehicles, 158 by better driver behaviour and 35 by the use of new technology.

If anything requires a great national effort, it is this. It is awful to think that we have lost more people to road deaths than the number who died directly in battle in two world wars. Ladies and gentlemen. The time is now to go beyond and exceed the safety challenge; for the community, with the guidance and help of the Australian Automobile Association and its kindred

organisations, to make a greater commitment to safety. The Association has a wonderful history of putting its shoulder to the wheel, especially in relation to road safety. But we have to do more if we are to substantially reduce our tragic road toll record. And so I wish you every success with your public safety campaigns on behalf of all Australians. Thank you. *(Source: Office of the Governor-General – March 2006)*

Proposals to finalise truck fatigue policies

A number of National Heavy Vehicle Driver Fatigue (HVDF) Reform draft policy papers have been published on the National Transport Commission (NTC) website. The policy proposals, which address unresolved issues and variations from the 2004 HVDF package endorsed by Transport Ministers, include Advanced Fatigue Management; Two-up driving; Guidelines for Managing Heavy Vehicle Industry Driver Fatigue; Short rest breaks; Record Keeping and Work diary (draft design resulting from trials and consultation).

"The policy positions are based on advice from world-leading fatigue experts and grassroots industry experience," said NTC Chief Executive Tony Wilson. "We ' re releasing this information in advance of the draft legislation to provide additional time for industry and government stakeholders to consider the proposals."

The 'two-up' driving policy proposal addresses the inherent fatigue risk of poor quality sleep in a moving vehicle by requiring a minimum continuous stationary rest break

Close consultation with industry led to the development of Guidelines for Managing Heavy Vehicle Industry Driver Fatigue. Mr Wilson said the guidelines reduce the risk of conflict between Occupational Health & Safety (OHS) and road transport laws at a time when workplace safety agencies are taking a greater interest in heavy vehicle driver fatigue.

Variations to previously agreed HVDF policy include updated short rest break requirements and the removal of countersignatures from the proposed work diary. An information resource for the HVDF reform – with policy papers, useful links and fact sheets –has been created on the NTC website at www.ntc.gov.au. It is important to note that these policy proposals have not yet been endorsed by State and Territory agencies. Formal submissions from all stakeholders will be sought with the release of the draft Model legislation in August 2006. For more information contact Paul Sullivan – Communications Manager on (03) 9236 5027. *(Source: NTC – March 06)*

Queensland Government cracks down on drink drivers

Serial and high range drink drivers will immediately face licence suspension under tough new measures approved by State Cabinet for introduction mid-2006.

Serial drink drivers caught and charged by police will not be allowed back behind the wheel until the matter is dealt with by the courts. There will be a very limited right of appeal pending the court considering the disqualification at the final hearing, but this will not apply to the serial drink driver.

Drivers booked for drink driving with a reading of 0.15 and above will now face immediate suspension until the court determines the matter. Until now, the licence of any driver charged with a drink-driving offence is automatically suspended for 24 hours, after which time they can resume driving until the charge is finalised by the courts.

The changes will apply to drivers charged with a blood/ breath-alcohol concentration (BAC) of .15 or more, anyone who refuses to provide a breath specimen, and anyone who is charged with driving dangerously with alcohol involved.

State Cabinet has also approved a tough new measure relating to the supervision of learner drivers. The supervisors of learner drivers, who must hold open licences, will for the first time be subject to normal drink-driving restrictions, except driver training instructors, who must have a zero blood alcohol content (BAC). The new measures are in addition to a recent Queensland Government decision to confiscate the keys and cars of repeat drink drivers. *(Source: Queensland Transport 27 March 2006)*

Taking a break had an extra reward for Victorian drivers

Driver Reviver sites located all around Victoria, to encourage drivers to stop and take a break over the Easter long weekend holiday, had an added attraction this year. Drivers could fill in an entry form to go in a draw to win a Luxury holiday to Couran Cove Island Resort, Queensland plus one of 200 Petrol Cards, valued at $50 each. *(Source: www.tac.vic.gov.au)*

Paranoia – mobile random breath test (RBT) campaign

The NSW Roads and Traffic Authority is using a psychological approach in its latest drink driving campaign. The 'Paranoia' commercial targets fear and guilt in drink drivers, exploring their anxiety, restlessness and fear of getting caught. The campaign emphasises the unpredictability of mobile RBT. Post-production and special effects create the lead character's feelings of paranoia. After he leaves the pub he imagines seeing police wherever he goes. The Cruel Sea's hit song 'Better Get a Lawyer Son', is used to help deliver a powerful and lasting message. All standard police vehicles are mobile RBT units and can randomly pull drivers over to perform a breath test. Since the introduction of RBT in 1982, fatal crashes involving alcohol have dropped from 40 per cent of all fatalities in 1982 to the current level of 19 per cent. Last year police conducted 3.4 million breath tests in NSW. *(Source: www.rta.nsw.gov.au)*

Aboriginal road safety in WA

The WA Office of Road Safety is taking a number of initiatives to reduce the road toll among aboriginal communities. These initiatives include one day defensive driving courses, a Go-Kart project aimed at developing vehicle control skills, providing understanding of road craft and road rules and developing self-esteem, and a Vehicle Interlock project, aimed at discouraging the use of motor vehicles by those affected by alcohol. *(Source: WA Office of Road Safety)*

Gold Coast Police ambush mobile phone users

Queensland Police on the Gold Coast have recently been focusing on catching drivers using mobile phones. A policeman in hiding at the roadside radios to colleagues further up the road when he sees a driver using a mobile phone. The driver is then signalled to stop, and faces a $225 fine and the loss of three points. *(Source: Paul Weston, 'The Sunday Mail, 26 February 2006)*

WA Police encourages greater motorcycling safety

From December 2005 through to April this year the WA Police invited licensed motorcycle riders to join them in 'Rides for Road Safety' on the third Wednesday of each month. The rides, started at 7pm from a Burswood rallying point and ended at 8.30pm with special displays to show motorcyclists how they could enhance their safety and riding skills. *(Source: WA Police website*

SA decides horses need road safety too

Transport SA's 'Driver's Handbook' now contains a new section entitled 'Timid and Unsettled Horses' in its pages on 'Hazardous Situations', thanks to Horse SA's persistent requests to Transport SA. The Handbook states that when approaching a horse, drivers should always slow down and pass with care. "Do not sound your horn if there is a horse on or near the road." And if a horse appears unsettled, drivers are advised to pull in to the side of the road and switch off the engine. Riders on horseback are clearly very vulnerable and nothing should be done to endanger them. *(Source: http://www.horsesa.asn.au)*

Drug Testing in Tasmania

The testing of drivers for driving under the influence of drugs was introduced in Tasmania in 2005. Tasmania is the second state (after Victoria) to introduce drug testing of drivers. An initial assessment period was undertaken before Police implemented a complete testing program. Roadside drug testing is carried out using saliva tests with later confirmation using blood tests.

Since the introduction of the programme, more than 10% of drug tests by Police have returned positive results. Of the 134 saliva tests, 17 positively detected illicit drugs. Records show that drugs other than alcohol were detected in the blood of 22.4% of 109 drivers killed in motor vehicle crashes in Tasmania in the period 2000-2003. In Tasmania, drivers cannot be charged on saliva tests alone. Following suspected offences as indicated by saliva tests, drivers must also have blood tests. Penalties for those summoned to appear in court on the basis of saliva and blood tests are the same as for drink-driving penalties. Drivers refusing a test face a $500 fine and 12-month licence disqualification.

New Zealand News

Districts cooperate to reduce Canterbury road deaths

A cross-district operation has been launched to address the worrying spike in road deaths occurring in Canterbury between mid February and early April. Operation Impact began on 13 February and runs until 26 March 2006. Road Policing staff from Canterbury have been deployed with support at times from Southern and Tasman District staff.

"Canterbury road deaths have been doubling during the months February to April for the past three years and we are determined to prevent this continuing," says Inspector Derek Erasmus, Canterbury Road Policing Manager. Derek says deaths have occurred throughout the district but the State Highway network is a significant risk. "Our mission is to reduce the number of fatal and injury crashes on Canterbury

roads in comparison with the same period over recent years. The emphasis is on visibility, strict enforcement and publicity," said Derek.

Six-months planning went into Operation Impact, which is one of the three Tasman/Canterbury/Southern joint road policing operations held annually. It is targeting all forms of bad driving practice including speed, alcohol, intersections, restraints, licence breaches and general driver behaviour. Derek says a zero tolerance philosophy is being followed for all trauma-promoting offences, such as crossing the centre line/failing to keep left, overtaking another vehicle with insufficient clear road ahead, following too close, and failing to stop/give way at intersections. *(Source: Ten-One Community Edition March 06)*

European News

Plastic police aid speed war in Britain

Life-size plastic cut outs of police officers are being used on Britain's Isle of Man in a bid to slow down traffic. Two officers, each known as 'PC Flat', will be positioned at the roadside in hotspots, seemingly engaged on radar duties. It is expected that drivers will see the models from a distance and reduce their speed. Police said the plastic models will be deployed by officers on their way to carry out radar duty and retrieved on their return. They said that other speed enforcement measures will be used at problem areas in addition to the plastic officers. The models have been designed to be easily cleaned and can be secured to the roadside. *(Source: BBC March 2006)*

An independent four year report on camera effectiveness, examining over 4,000 camera sites, has concluded that safety cameras continue to be highly effective in reducing speeding, accidents and casualties at camera sites. On average, the number of people killed and seriously injured fell by around 50% at fixed sites, and by around 35% at mobile sites.

Speed camera effectiveness demonstrated in the UK

The National Safety Camera Program, an independent four-year evaluation report, analysed the effectiveness of 38 safety camera partnerships and over 4,000 camera sites across the United Kingdom. It found that:

- there was a 42% reduction in the number of people killed or seriously injured at sites where safety cameras were introduced - 1,745 fewer people killed or seriously injured each year;
- there were more than 100 fewer people killed at camera sites (32%)
- there was a 32% reduction in the number of children killed or seriously injured at camera sites; and
- there was a 29% reduction in the number of pedestrians killed or seriously injured.

(Source: Parliamentary Advisory Council for Transport Safety (PACTS) UK)

EuroRAP colour codes Europe's roads for safety

The European Road assessment Program (EuroRAP) presented its first 'Pan-European Progress Report: 'From Arctic to Mediterranean' in December 2005. The report shows how colour coded maps can be used to show the safety of roads to an international standard, and how improvements to risky roads can be tracked annually. The report gives details of each European country's efforts to make their roads safer and calls for risky roads to be upgraded using affordable safety features. *(Source: ETSC Safety Monitor 63, March 06)*

Pre-Christmas drink-drive campaign

The European Traffic Police Network (TISPOL) conducted Europe's largest ever drink driving enforcement operation in the week commencing 12 December 2005. Twenty two European police forces tested over 700,000 motorists for drink and drugs, of whom over 9,000 (1.3%) were found to be over the legal alcohol limit. Random breath testing is still not permissible in all EU countries. Countries that do not allow random breath testing include the UK, Ireland and Germany, although Ireland is soon to change. Nevertheless, over 130,000 breath tests were conducted in England and Wales in a four-week period December – January, resulting in 7% of those tested being over the limit and arrested. There were also positive approaches to the drink drive campaign, encouraging the idea of having a designated non-drinking driver when out partying. In Belgium the Belgian Road Safety Institute launched its tenth 'Bob' designated driver campaign, while in France a similar campaign asked the question "Who is Sam? – the one who drives, the one who doesn't drink." *(Sources: ETSC Safety Monitor 63, March 06 and Enforcement Monitor January 06)*

Drug testing in Britain

For the first time, the UK's Christmas 2005 campaign against drink driving included 'fit to drive' tests on drivers suspected of being affected by drugs. Of the 540 people tested, 178 (32.96%) were subsequently arrested for drugs offences. *(Source: Parliamentary Advisory Council for Transport Safety (PACTS) UK)*

Finland's tough stance on alcohol pays off

Thanks to a tough policy on alcohol offences, Finland had one of the lowest levels of drink driving in Europe in 2004 – only 0.16% of drivers driving under the influence of alcohol.

(ie BAC> 0.05%). Some 1.8 million alcohol tests are undertaken annually, so that 50% of drivers are tested each year. This is combined with legislation intended to deter drink driving, with penalties of up to two years in prison for offenders. Finland is also pioneering the use of alcohol interlocks and started a three year trial in 2005. *(ETSC Enforcement Monitor, January 06)*

Sweden's low level drink driving still costing lives

While the number of drink driving offenders is much lower in Sweden than countries such as France or the UK (0.4% compared with 4-5%), the police are still not satisfied with the result of their campaigns. Some 150 lives are still lost and 1,000 people injured as the result of drink driving, according to police spokesman Bengt Svensson. *(ETSC Enforcement Monitor, January 06)*

Spain pins its faith in speed cameras

A further 41 fixed safety cameras were introduced in Spain during December 2005, bringing the total number to 88. Between August and November 2005 over 100,000 offences were tracked using the cameras previously in place. In areas where safety cameras were active the number of vehicles travelling at over 140 kph was reduced by 40%. Spain plans to increase its fixed safety camera network to 500 by 2007.

European News in Brief

Adaptive Front-lighting Systems (AFS) may soon be approved for use in the EU. AFS are so-called clever car headlamps that can adapt their beam patterns according to changing road and traffic conditions.

- The 'eCall' emergency call action plan aims to equip all new cars in Europe with automatic emergency call technology by 2009.
- An EU-wide 0.5 BAC limit is now becoming more likely, although attempts to introduce the standard in 2001 failed.
- Every year over 40,000 people are killed on Europe's roads. Driving whilst under the influence of drink or drugs is a major contributing factor to the road toll.
- The number of vehicles in Russia grew by 9.2% from 1997 to 2004, while the number of accidents in this period increased by more than 30%, according to a report by President Putin in November 2005. (Source: ETSC Safety Monitor December 05)
- A farmer in Wiltshire, England, got a surprise when he received a speeding fine in his mail for doing 85 mph on his tractor. When he contacted the Mid and South Wales Safety Camera Partnership, they apologised that they had misread one letter in the registration plate on the film. *(Source: www.ananova.com/news/)*

American News

Ford cleared of negligence in air bag injury

A Fairfax County jury recently found that the Ford Motor Co. was not negligent in its design of an air bag that left a woman partially blind when it deployed in an accident.

Berta Benitez was on her way to work in 1999 when the 1995 Escort in which she was travelling was struck by a minivan. According to ophthalmologists who testified during the 13-day trial, Benitez's injuries caused permanent blindness in her left eye and cataracts in her right eye. Experts testifying for the plaintiff said the passenger air bag in 1995 Escorts deployed at a speed of about 200 mph and was not tethered as air bags were on the driver's side. Shorter women such as Benitez were particularly vulnerable because the air bag inflated in their faces, not in their chests as for larger people, they said.

Attorneys for Ford argued that the Escort air bags met contemporary Federal standards and were designed to prevent or minimize head and neck injuries. They argued that all air bags could cause eye injuries and that it was impossible to design an air bag system that was risk free. *(Source: Carol Morell, Washington Post, 15 February 2006)*

Obesity an added risk factor for men in crashes

The American Journal of Public Health has recently published a study by the Injury Research Centre, Medical College of Wisconsin, revealing that drivers who are obese are at an increased risk of dying if they are involved in a car crash. The risk increases for males who are very overweight or very slim. It was found that being moderately overweight, however, could actually reduce the risk of death in what the report's authors describe as a possible "cushioning effect". Weight or obesity did not appear to have a comparable effect on the risk of death for women.

Lead author Shankuan Zhu said that men with the highest body mass index* (BMI) were at greatest risk for death from front or side collisions, especially at high speeds.

"The increased risk for death due to motor vehicle crashes associated with a high BMI may be caused by some combination of momentum effects, co-morbidities (side effects) of obesity, and emergency post-operative treatment problems among the obese."

According to the study, which analysed over 22,000 crashes, males involved in car accidents are about twice as likely to be fatally injured as females, with death becoming more likely for those with a BMI below 22 and above 35. For more information visit http://www.ajph.org/

** BMI is obtained by dividing a person' s weight in kilograms by the square of their height in metres.*

Contributed Articles

ANCAP – Ensuring Safer Cars

Article contributed by SaferRoads www.aaa.asn.au/saferroads

The AAA Board pictured in the photo:

(L-R): Ted Best (Pres, RACT); John Fotheringham (CEO, RAA); Ron Gray (Pres, AAA); Julie-Anne Schafer (Pres, RACQ); Michael Tynan (V-P, NRMA); Tony Stuart (CEO, NRMA), Clive Hall (Pres, RACV); Lauchlan McIntosh (CEO, AAA); Alan Terry (CEO, RACQ); David Booth (Pres, AANT); Terry Agnew (CEO, RAC); Colin Jordan (CEO, RACV); Greg Goodman (CEO, RACT); Juliet Brown (Pres, RAA); Brian Gibbons (CEO, NZAA); Freda Crucitti (Pres, RAC); Alan Evans (Pres NRMA, V-P AAA).

The advances in vehicle safety and design were dramatically illustrated to the AAA Board at the NSW Roads and Traffic Authority's Crashlab, which was the venue for the March 2006 meeting. The Crashlab is a new, purpose-built facility by the NSW Government to undertake a range of vehicle and other tests – including car crash tests for the Australian New Car Assessment Program (ANCAP) partially sponsored by Australia's motoring organisation.

Board members saw the graphic results of a head-on collision between a 2005 Holden Astra and its 1989 model – both traveling at 60km/h.

Crashlab manager, Ross dal Nevo highlighted the advances in occupant protection in the last deacde or so and the accompanying photograph proves. "Occupants of the 2005 Astra had an injury rating which was unlikely to lead to permanent brain damage of death," Mr dal Nevo said. "The

driver and passenger of the 1989 Astra had injury ratings which almost certainly would have meant a double fatality for the occupants of the older car. "

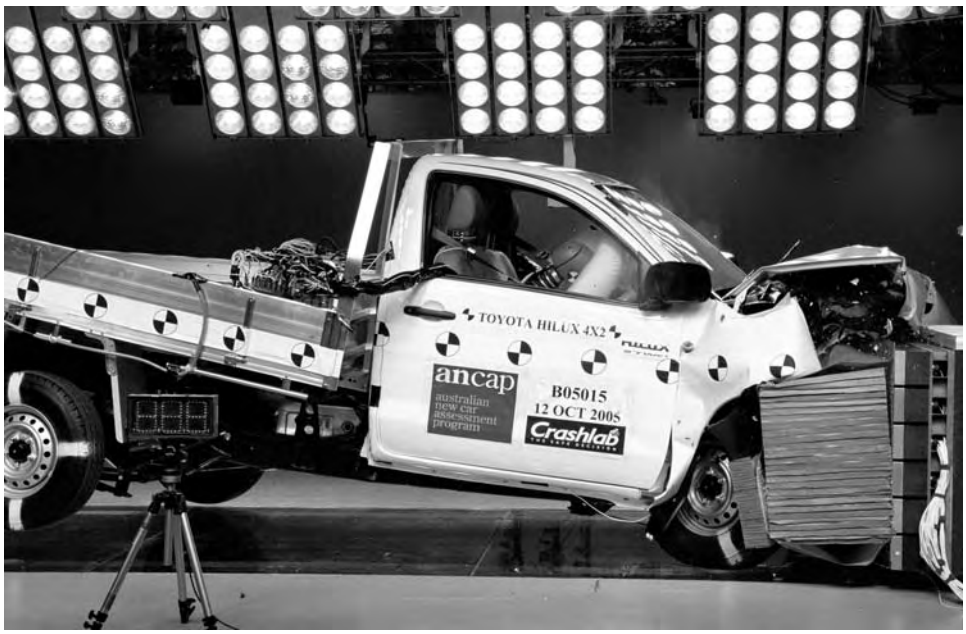
The AAA Board also witnessed the crash testing of a Mitsubishi Magna 380 at 60km/h, with a "family" of four inside including two "young"crash test dummies in child restraints. Preparations for the test are painstaking. It takes hours to simulate the split-second that all drivers dread. Computerised equipment is placed in the boot, attached to sensors and other tracking monitors on the car and the crash test dummies. The crash test dummies – each worth about $250,000 believe it or not – are placed in the car, taped into place where necessary (eg: hands on steering wheel) and attached to the tracking equipment. The vehicle is not driven but is pulled into the crash by a high-tech towing system. The engine remains off to ensure the focus is on the impact of the crash test – other tests involving fire safety are also conducted at the Crashlab.

The Magna was towed along a runway of about 100m before it impacted head-on with a "honeycomb" barrier designed to simulate the front section of another car. The barrier was situated on the right front side of the Magna. The crash "site" is surrounded by a bank of floodlights and cameras to record the impact from different angles and complements the information picked up by the sensors and tracking equipment. Results from the test are collated and analysed under the ANCAP protocols, with vehicles receiving a star rating based upon performance.

The Crashlab tests around 10 vehicles a year through ANCAP. In addition, it also conducts tests on bus and ferry seating, child restraints and vertical (drop) testing for safety equipment Chairman of ANCAP, Lauchlan McIntosh, said the Crashlab tests are a major plank in the SaferRoads project established by the AAA and Constituents, along with partners including the Australasian College of Road Safety, the Australian Trucking Association and the Australian Local Government Association.

"The SaferRoads' philosophy is ***safer*** drivers in ***safer*** cars on ***safer*** roads," Mr McIntosh said. "ANCAP is about safer cars and has raised the bar on vehicle safety. The ANCAP program has pressured manufacturers to ensure Australian motorists, their families and passengers are protected by the best safety equipment and protection available. "Just looking at the crash test between the two Holden Astras clearly shows the advances made in vehicle design and manufacture. "It is programs like ANCAP and the Australian Road Assessment Program (AusRAP), which are both major elements of SaferRoads, that highlight road safety to motorists, governments and all stakeholders.

"AusRAP will shortly be announcing its first star ratings of Australia's national highway links in the same way that ANCAP rates these cars – it will give a clear indication of the safe and unsafe roads. "It is only through programs like these, that sit under the SaferRoads umbrella, that we can pressure governments, manufacturers and industry to ensure Australians can travel around the country by road without having to pay dearly for making an everyday mistake. "Five people die every day on Australian roads – that is a tragedy that can be prevented and SaferRoads is about doing that."



A recent ANCAP offest frontal crash test of a Toyota Hilux 4x2 ute conducted at 64km/hr.
The Hilux scored 4 stars in this test.

Curbing China's Road Safety Horror

By Raphael Grzebieta

I have now visited China on two occasions at the invitation of the Ministry of Public Security and the Asian Development Bank. I was asked to present a number of road safety and crash investigation related topics to an audience made up predominantly of Police from various Chinese Provinces. This is a brief outline of my impressions during those visits.

At the outset I must emphasise that I thoroughly enjoyed my brief stays. I learned a lot about China and its traffic problems from a first hand encounter. My hosts were most gracious, kind, and warm. They assisted me in whatever way they could to make my trip and stay as comfortable and pleasant as possible and my presentations run smoothly.

I should also emphasise that they too are just as anxious and committed to reducing their embarrassingly high road carnage as quickly and efficiently as possible alongside other road safety committed nations. Indeed, they have already implemented a number of significant road safety strategy solutions and they are searching for more.,[1,2] They have also provided a vision that embraces and concurs with the Swedish "Vision Zero " and Australia's "Safer Drivers in Safer Vehicles on Safer Roads" concepts. How to efficiently implement these concepts to what seems an overwhelmingly difficult and daunting task is what they are seeking and are keen to learn about.

China is undergoing rapid economic growth. Along with that growth is a massive increase in the number of vehicles sold and now driven in China. There has also been a huge increase in the transportation of goods and materials particularly in relation to the building boom. Gridlock traffic jams in the larger cities such as Beijing and Shanghai are now an every day occurrence with mobility and pollution becoming pressing issues of concern. Coupled to this is a horrific rise in fatalities and serious injuries resulting from: a lack of appreciation of what is a safe road system; under-developed primary and secondary roads and highways; vehicles with virtually no crashworthiness characteristics; and an over represented poor road safety aware vulnerable road users group. Mix into this the notion of an economically hungry and super active population and one starts to get a picture of what confronts the leaders of China.

The official road toll was 107,000 for 2004. Figures for 2005 have yet to be released. This is just over 300 people per day killed on the roads. The Ministry of Public Security spokesman, Wu Heping, told a press conference in Beijing in November this year[3] that "The death toll means traffic accidents are nothing less than war. Which modern war has claimed 100,000 lives?". This is a perspective that I strongly agree with and share, and likewise am vocal about in Australia in regard to our Australian road toll.

Figure 1 provides a further perspective of China's problem when the statistics are viewed in light of other countries statistics. When the top chart is viewed of fatalities per 100,000 population the resulting road toll appears on the surface to be equivalent to developed OECD countries. This is an anomaly because of China's massive population. However, if the statistics are presented using a different denominator, it immediately becomes clear from the values presented in terms of number of vehicles registered and kilometers traveled that driving in China is very dangerous. Comparing the three charts also highlights the potential rising problem confronting China as it develops and more people want to become more mobile and hence more cars and motorcycles are driven on their roads. The 8 deaths per 100,000 population will begin to rise very rapidly as demand for mobility begins to increase exponentially. I became acutely aware of this first hand on both of my visits to China. The following brief précis describes my road traffic related encounters from my second visit.

On landing at the airport in Shanghai at around 7 pm, I was greeted by a Chinese interpreter who then directed me to a vehicle where another road safety speaker from Canada, Mr Roy Buchanan[5], en ex police officer from Toronto, was waiting. We were then driven via a freeway (tollway) to Wexi in Jiangsu Province where the 4 day International Symposium on Road Safety was to be held. Everything seemed to go smoothly as we drove on the tollway through the night. The speed limit on the tollway was 110 km/hr.

When we left the tollway at around 10 pm and began to drive on the primary and secondary roads leading into Wexi city, a population of around 1.2 million, Roy and I began to notice and become involved in some frightening situations. This helped us suddenly understand in a way that I would have preferred not to, why China has a high road fatality problem. As we drove along a divided four lane road that had two lanes in opposing directions and a concrete and landscaped plant median between the lanes, we noticed a dump truck full of concrete driving straight towards us up the wrong side of the road at about the speed limit being 80 km/hr. We virtually screamed at the driver to pull over to the shoulder and let him go through.

After calming down from this event, we drove up to a major intersection about ? km along the same road. The lights were red and so we waited as a responsible driver would who complies with road laws. After about 40 or so seconds we

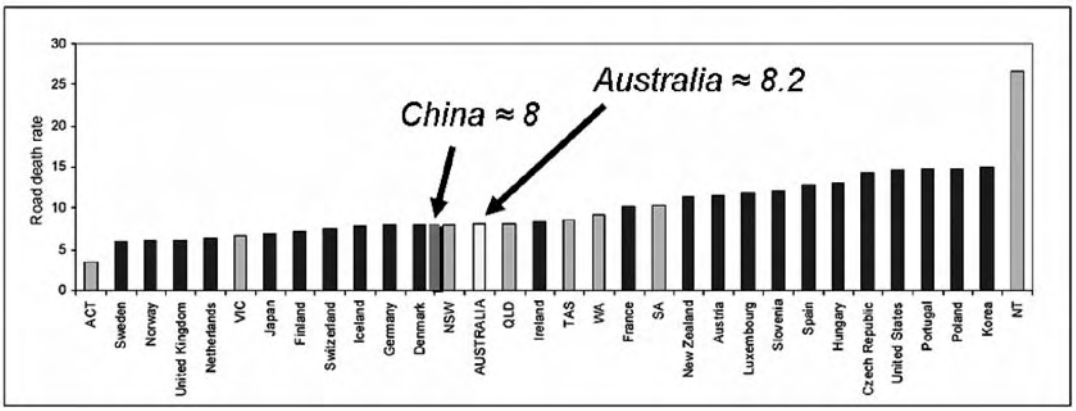
1 http://www.adb.org/media/Articles/2004/5378_PRC_safer_roads_a_public_good/default.asp?registrationid=guest

2 http://www.adb.org/Documents/TARs/PRC/36458-PRC-TAR.pdf

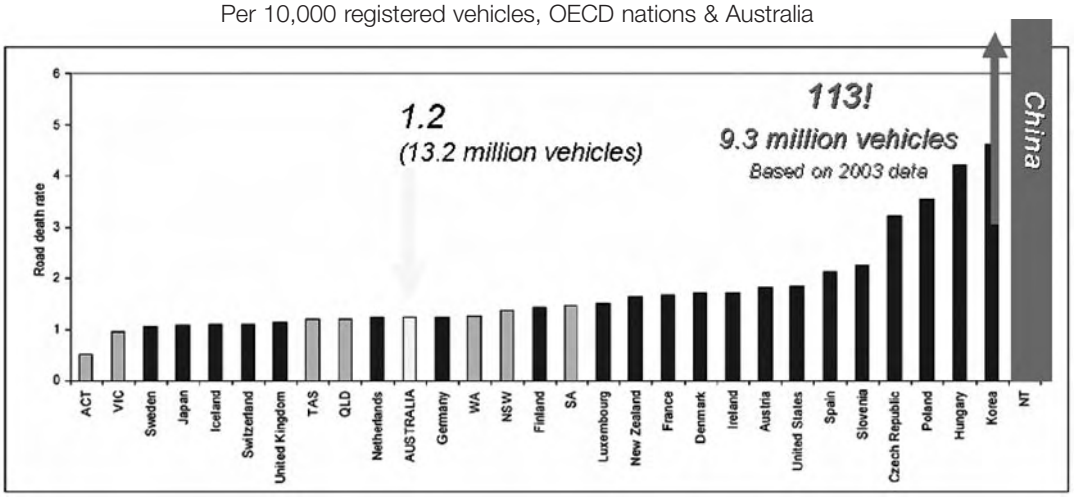
3 http://www.shanghaidaily.com/press/2005/11/17/traffic-death-toll-worse-than-war/

5 http://dynamicro-animations.com/

Per 100,000 population, OECD nations & Australia



Per 10,000 registered vehicles, OECD nations & Australia



Per 100,000,000 vehicle kilometers traveled, OECD nations & Australia

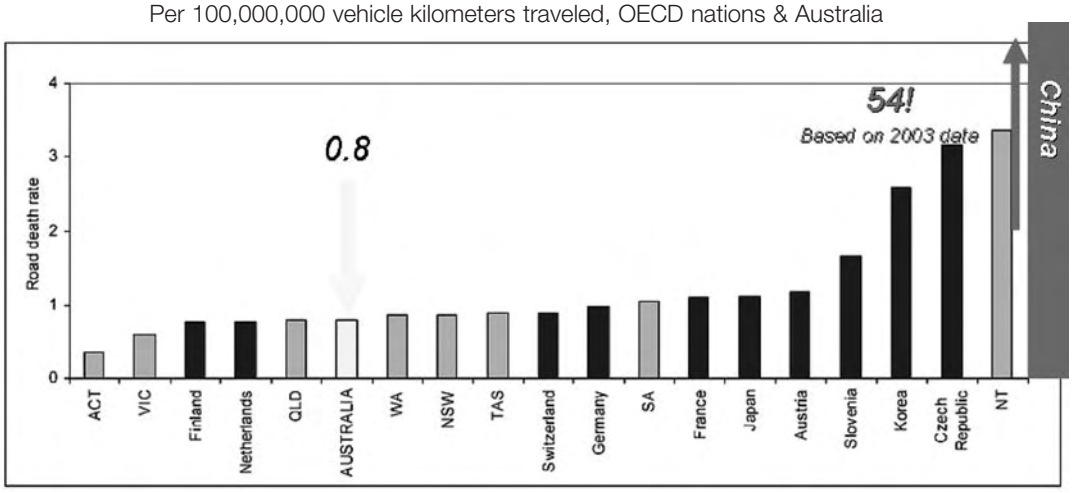


Figure 1 China's road safety record compared to other benchmark statistics.[4]

4 Source: Australian Transport Safety Bureau.

heard and then saw the equivalent of a large articulated truck (some 30 tonnes or more) hurtle past us through the red light again at around 80 km/hr. In utter disbelief we turned to our hosts and asked them "What the heck is going on here? Is this usual practice?" The reply was "It is late at night and there is little traffic and they are in a hurry." I muttered to Roy something along the lines that "It seems red lights are negotiable in China." Needless to say we arrived safely at the hotel though a little stunned.

The following day Roy and I were treated to a tour of Wexi. I was keen to be driven around in the traffic and see first hand what every day driving and road safety issues confronted Chinese citizens as they went about their business. We had a comfortable MPV, a driver and a translator provided to us. I was seated in the front taking photographs.

As soon as we got into the car I noticed the driver put on her seat belt. I sat in the front passenger seat and clicked my seat belt into its buckle housing. I looked over to Roy who was sitting in the rear driver's side searching for the buckle housing for his seat belt. The translator sitting behind me grabbed Roy's seat belt. She began to insist that he didn't need to put it on. "It's not the law. You don't have to wear it!" she persisted as she tried to tug Roy's seatbelt away from his hands. Roy and I looked at each and began to quietly laugh. I then responded to her that "It's not that he does not want to wear it. He wants to wear it for safety reasons" I tried in vain to explain. I drew a confused look from our translator and driver. Roy eventually found the buckle and clipped it in.

I then turned to our translator and said "Could you please buckle up so that you don't slam into my back and crush me up against my seat belt if we have a crash". She gave me a strange look and insisted in not wearing the seat belt and said she would brace herself in time. After some discussion we found out that her perspective of this issue was somewhat similar to the misguided notion Sydney taxi driver's have. It was a sort of weird misconceived pride that they are in a privileged position where compliance with the seat belt law is not required. I didn't press the point.

Of course we then began to observe if people wore seat belts in other cars. We noticed passengers in the majority were not. I decided then and there to highlight this point in my keynote lecture on the following day with some good visual graphics of crash dummies slamming into windscreens and being ejected from vehicles. It certainly made an impression on the Police attendees and a large number smiled as if saying "Now you know what is confronting us. How do we overcome it." I replied, "Enforcement and education".

I also showed them some of the Victorian TAC television advertisements dealing with seat belts. During the coffee brake I asked if they thought using advertising like the TAC may help them in educating their vehicle population to buckle up. They felt that there would be considerable resistance and abhorrence if advertisements showing people being hurt as a result of not wearing a seat belt. They felt enforcement would yield better results. Sound familiar?

After the Symposium, Roy visited Beijing and related these observations in a recent email. *"Remember the incident with the seat belt in the back seat when we went on our tour. No such problem in Beijing. The rear seat belts had been completely removed. I first thought perhaps the car had not been equipped with rear seat belts, but then I found the reclining slot. When I asked, my guide could not explain why the seatbelts had been removed from the back seat."*

As Roy and I proceeded with our tour of Wexi, we noticed motorcyclists not wearing helmets, some wearing construction helmets, and very few wearing complying motorcycle helmets (Figure 2). On asking why helmets were not being worn the reply was from our interpreter "It is too hot to wear a helmet". The temperature was pretty cool outside being autumn in the northern hemisphere.

The other quite scary observation was how pedestrians would cross the road. They would forcefully walk out in front of a car barreling towards them, playing 'chicken' and expecting the car to stop. Even more incredulous though were the people walking towards and into traffic in 80 km/hr zones and gardening on the tollways with cars traveling at 110 km/hr or faster (Figure 3). *Roy observed on his Beijing tour that "There is no such thing as driver courtesy with cars, bicycles, or pedestrians. The first one to reach a space is the one to occupy it. I believe it is very lucky that my driver didn't hit a pedestrian, cyclist, or one of those 3 wheeled enclosed vehicles that they have."* Indeed our tour driver in Wexi did not travel above 40 km/hr to her credit.

Of course there is an ulterior motive why pedestrians and cyclists are so cocky crossing the roads. They know the drivers

Figure 2 - Cyclists and a motorcyclists. Few wear helmets
Top: waiting to cross an intersection.
Bottom: driving in 60 km/hr zone

Figure 3 - Top: Worker tending to garden on 110 km/hr Tollway between Wexi and Shanghai. Bottom: 80 km/hr zone. Pedestrian crossed road and jumped fence. Note officer in background walking towards traffic.

Figure 4 - Top: 80 km/hr zone with blunt end barrier with no crashworthy end terminal. Bottom: block of concrete placed in front of W-beam guard rail ends with no terminals on 100 km/hr tollway.

are now particularly cautious in regards to ensuring they don't hit a pedestrian or cyclist. The new China Road Law has ensured appropriate compensation if a vulnerable road user is struck. The following extract from Wikipedia encyclopaedia explains why[6] *"A long-standing tenet has been for the larger vehicle involved in an accident to assume responsibility, e.g., if a car collides with a bicycle the car driver is at fault. If a bicycle and pedestrian collide it is the bicyclist's fault. Practically, this understanding emboldens pedestrians and cyclists to take liberties with cars and trucks, impeding their progress by moving into the flow of traffic under the assumption that larger vehicles will give way."*

Intersections were also very interesting. Pedestrians, cyclists and motorcyclists would congregate at the intersection, wait for the light to change and then scramble in all directions. The cars would wait until the intersection cleared and then would proceed.

Roy's experience in Beijing further underlined the problems with drivers disobeying road laws putting their lives at high risk. *"Imagine an intersection where there is an advance left turn (right turn in Australia) green arrow before opposite traffic gets a green light. In Canada, we often have a couple of cars continuing to turn after the advance green arrow turns off, and opposite traffic has a green light. In China, not only do a couple of cars at the front of the left turning line turn; but the cars behind that have not even reached the intersection cross the centre line and form a line of traffic in the on-coming lanes, effectively playing chicken with the on-coming traffic that now has a green light."*

Another issue that I became acutely aware of is the complete lack of appreciation of the amount of energy a vehicle possesses when traveling at high speeds, and the consequences when it crashes into something rigid or a device that can spear through it. Figure 4 shows two examples of poorly finished roadside barriers where end terminals were non-existent. This was a common sight on tollways and high speed arterial roads.

As China frantically moves head on towards a motorised society, its population will hopefully start to become more aware of the consequences of poor road design and inappropriate road user behaviour and that it leads to road trauma. Helping the Chinese population understand that road laws are enacted and enforced to help protect us is a key issue. Indeed, education and enforcement are seen as the two main areas that require immediate attention to help reduce their road toll. A lot of overseas specialists have already provided the Chinese government an overview of how reductions in the road toll can be achieved. They are keenly listening. The Asian Development Bank (ADB) have certainly recognised the issues and have begun to assist the Chinese in this regard.[7] Let's hope for the sake of the Chinese road users they quickly implement the known strategies that ADB is encouraging them to adopt and have worked in the OECD countries.

6 http://en.wikipedia.org/wiki/Rules_of_the_road_in_the_People%27s_Republic_of_China

7 http://www.adb.org/Projects/PRCRoadSafety/road-safety.asp

The NRMA – ACT Road Safety Trust: A Road Safety Success Story

by Eddie Wheeler, Secretary/Manager of the Trust

The Australian Concise Oxford Dictionary defines 'prevent' as to '*stop or hinder*'. It goes on to define 'success' as '*accomplishment of what was aimed at*' .

By any definition the evidence clearly demonstrates that the NRMA – ACT Road Safety Trust has been a high achiever in reducing the potential for crashes in the ACT and region. To understand the unique role the Trust plays in road safety in the ACT it is necessary to trace its history.

The Trust was established in 1992, as a statutory public charitable trust with its principal objective *to enhance road safety for the benefit of the ACT road-using community.*

Additional objectives include:

- promote and stimulate research on road safety and implementation of accident and injury counter measures, especially in the area of accident prevention;
- encourage and promote the education of the ACT road-using community; and
- assist in the care and rehabilitation of persons injured or traumatised as a result of road accidents.

A Board of five honorary part-time Trustees administers the work of the Trust. These comprise an independent Chairperson, two representatives appointed by NRMA Insurance and two by the ACT Government. The Secretary/Manager manages the day-to-day affairs. The Trust normally meets three times during the year and conducts its activities completely independently of both the ACT Government and NRMA Insurance, while maintaining excellent relations with them.

The initial funding source for the Trust was a sum of $10 million made available by NRMA Insurance Ltd as a result of surplus third party premiums arising from lower than expected compulsory third party insurance claims. Wise investment strategies resulted in an amount of $12 million becoming available for allocation to road safety initiatives.

The Period 1992 to 1998

While the enabling legislation had no sunset clause, the Trust was established on the understanding its original funding would eventually expire and its work complete. The 'old' or 'original' Trust allocated its $12 million funding between 1992 and 1998 to some 110 wide-ranging initiatives including four 'Landmark' projects viz:

- A perpetual Chair of Road Trauma and Emergency Medicine at the Canberra Clinical School at a cost of $3.5 million. This position has been occupied by Associate Professor Drew Richardson since November 1998;
- The ***Road Ready*** novice driver education program introduced into the ACT in 2000 at a cost of $2 million;
- An Independent Living Unit Complex for acquired brain injury patients many of whom are victims of road trauma at a cost of $799,000; and
- A Prolonged Care Cottage for the National Brain Injury Foundation, which cost $750,000.
- These 'Landmark' projects were seen as substantial and long-term beneficial legacies to the ACT region.

The 'New' Trust

With the original funding of $12 million fully committed the Trust was expected to cease operations by the end of 1998. However, the introduction of a Road Safety Contribution by the ACT Government raised in association with motor vehicle registration fees provided the Trust with a new funding source. This $2 levy is matched by NRMA Insurance and gives the Trust some $600,000 annually for road safety initiatives.

While the work of the Trust continues to be underpinned by the annual grant program, Trustees have been proactive on a number of fronts. Six universities with established credentials in road safety research have accepted a Trust funded Postgraduate Research Scholarship. The aim of the scholarships is to encourage innovative and substantial research into road safety and its value puts it at the top end of available scholarships. Already three high quality students have been approved to undertake research and the remaining scholarships are expected to be awarded later this year.

Offering postgraduate scholarships to selected interstate research institutions is in keeping with the Trust's recent decision to advertise nationally for research proposals under its Grant Program. It is still the Trust's preferred option that its funded research be undertaken within the ACT - with the benefits shared nationally. Clearly the ACT already benefits from other funded research and the Trust believes the selective commissioning of research outside the ACT increases the opportunity for benefits to flow back into the Territory.

Road safety does not end at the ACT border. A commissioned report by the ARRB Group released by the Trust in May 2005 was a sobering reminder of the extent of road trauma ACT motorists/passengers are involved in interstate. It reaffirmed an earlier study's findings that speed and fatigue are issues for ACT drivers when undertaking a journey outside Canberra.

The Trust has forged a strong partnership with the ACT and Region Chapter of the Australasian College of Road Safety. With the Trust providing the necessary funds, a number of very successful seminars have been staged in recent years. The National Museum of Australia was the venue for seminars on Speed and Drug Driving while Professor Claes Tingvall from

Sweden delivered a compelling address on Vision Zero at the CSIRO Discovery Centre. This partnership will continue to provide opportunities to discuss topical road safety issues. It is also worth noting that the establishment of the Head Office of the Australasian College of Road Safety in Canberra was made possible by a Trust grant of $209,000 in 1994.

Victoria's Transport Accident Commission (TAC) is another eminent organisation with which the Trust has established strong links. TAC's reputation for producing powerful and persuasive road safety messages is well established and the Trust is fortunate in being provided access to its range of material. As a result, the Trust has funded the showing of the award-winning short film Anything in Hoyts cinemas prior to the feature film. Further funding is allowing the current showing of the film Harsh Reality. Both films target risk taking behaviour by young drivers and have been widely lauded in Victoria. The speed reduction commercial 'SloMo' is another in the stable of TAC resources the Trust has shown to effect on local television.

The ACT has a well-established reputation for being in the vanguard of road safety innovation – a reputation aided and abetted by Trust initiatives and funding. The Road Ready novice driver program is an excellent example and it remains the envy of other jurisdictions. The Mature Aged Skills Training for Experienced Riders (MASTER) course developed by the ACT Motorcycle Riders Association (MRA) and heavily subsidised by the Trust is another example of innovation attracting interest from interstate.

The MASTERS course was the subject of a presentation by the MRA at the 2005 Australasian Road Safety Research Policing Education Conference in Wellington New Zealand, where it attracted numerous inquiries. With the death of eight motorcyclists on ACT roads in 2005, the range of motorcycle safety initiatives currently being funded by the Trust under its Grant Program is timely.

Assessment of Success

Since it was established in 1992, the Trust has committed $16.3 million to 260 innovative road safety projects. Many of these initiatives such as assistance to Kidsafe to purchase additional baby capsules for their loan scheme have an immediate and tangible impact. Others such as road safety campaigns on television and in the cinema are more difficult to measure but undoubtedly increase road safety awareness in the community. Clearly the pay-off in relation to many Trust-funded initiatives resides in the future and the extent that attitudes and behaviours are changed.

The potential for the Trust's successes to be realised in the longer term was confirmed in an independent evaluation of the Trust's first six years of operation by Dr Michael Henderson, a leading road safety consultant and the then Chairman of the Australian Advisory Committee on Road Trauma. Dr Henderson concluded that 'the cost of the Trust's activities has been returned in value to the ACT community and many project outcomes will be realised in the long term'. There is little doubt the work of the Trust in the intervening years since Dr Henderson made that comment would reaffirm its continued veracity.

The National Road Safety Strategy aims to achieve a forty percent reduction in the number of fatalities per 100,000 population in the period 2001-2010. The Strategy adds that the "target will require strenuous effort by all parties involved in road safety…."For its part, the Trust will continue to work with the Department of Urban Services, the Australian Federal Police and the community to ensure the ACT makes its contribution towards this national goal.

The Australian Concise Oxford Dictionary defines 'optimism' as having a hopeful disposition. The continued work of the NRMA – ACT Road Safety Trust in the community gives genuine cause for optimism in relation to the future prospects of road safety in the ACT.

Road Versus Rail

by Colin Grigg

There is justification for a major, high level investigation into the construction/maintenance of, and incentives for use of railways rather than roads. Case studies of the use of both modes have been presented in Tasmania. However, the need exists nationally.

Despite a 25 tonne weight limit, it is reported that trucks, some overloaded, have been invading the main streets and historic bridge of the historic town of Richmond. There have been strong calls for a bypass from the Clarence Council, the Richmond Residents' Association and a recent tourism forum in Hobart.

Richmond has 77 heritage-listed buildings. The town attracts 300,000 visitors per annum (third most-visited place in Tasmania).

On the other hand, the future of the Tasmanian rail network is uncertain. The operator, Pacific National, has claimed that the Tasmanian service is not viable. In addition, Pacific National is a joint venture of Toll Holdings and Patrick Corporation, which have recently decided to merge. This uncertainty provides an impediment to government offers for future development of the rail network. In late 2005, Federal and State governments made an offer of a $118 million rescue package for Tasmanian railways. This is available to a current or future operator.

The proposal is for government investment of $118 million ($78 m Federal; $40m State – over 10 years) for infrastructure and $30 million in the first three years by the operator for upgrading locomotives and rolling stock.

The existence of incentives for provision and use of rail transport, especially freight, is an important matter. It is needed not only for the amenity of cities, towns and villages but for relief of road transport in the interest of traffic safety.

Community Capacity Building as a Fleet Safety Tool

By Paul Galea
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At the peripheral of the driver training market is a segment that seeks safety programs not readily available from mainstream service providers. Aside from the standard features generally evident in such programs - audience relevance, technical expertise, quality support material and best practice accident avoidance advice - there is one element that they require as a priority - participant inclusiveness.

And there is evidence that the market segment is growing as fleet and safety managers seek to identify driver education and training programs that involve staff beyond previously accepted benchmarks.

Developing such programs is what I do and it relies on a methodology not normally associated with driver safety and training. The methodology is Community Capacity Building and its use represents a critical point of difference in the quest to maintain and sustain safe driver performance. The equation is a simple one: the higher the involvement, the greater the ownership, the more likelihood of compliance and or sustained change.

Community Capacity Building is in simple terms, interpersonal communication and relationship building at its best aimed at supporting individuals to identify and modify their risk taking behaviour as drivers.

I am not averse to advanced driving courses, simulators or off the shelf training courses. I just do not believe that in themselves they go far enough. To be effective they have to be part of a total package. The one size fits all type of training program may be cost effective but ultimately their value is compromised by the fact that they do not cater for the individual and the reality that is the shop floor environment.

The Learning Driver is a concept that encourages all drivers to accept and seek driver learning as a constant. In a business framework there are three important "communities" for the Learning Driver concept –

1. the individual;
2. the team (work unit) and
3. the organisation.

Critically, it is subtly distinct from Driver Education which is often touted as the best way to respond to the road toll. I do not agree that it (Driver Education) is the "must have" as some would suggest. Associated images of formalised road safety education leave me disappointed by the lack of understanding of the complexities associated with driver safety improvement and by the wasted opportunity. The quick fix just does not exist in the world we drive in.

Such standards are aligned to management thinking that supports road safety messages featuring bold, black and white printing, authoritarian messages and personas. Stereotypical representations of the world today went out with black and white television!! Such standards and thinking are part of a suite I call Old Road Safety. Formal training and authoritarian benchmarking have a place in driver safety standards and education but are not the only answer.

New Road Safety

The Learning Driver is representative of a proactive learning environment that provides opportunity for genuine engagement and interaction with individuals.

This is Community Capacity Building by another word. This is what my vision of New Road Safety is about. Participants are encouraged to talk and discuss risk and safety issues of relevance and build their capacity, not just listen like stunned mullets. They have to be engaged and given necessary technical and interpretative information about driving and safety standards as part of a focused process of encouragement and action.

The New Road Safety and the Learning Driver concepts should be seen as the response to what the spirit and intention of the words "driver responsibility and ownership" mean. Quite correctly, government requires drivers to be more responsible and take greater responsibility for their actions behind the wheel. We all want increased driver ownership of safety standards. But what systems are there in place that help to achieve it in a coordinated and systematic way? Relying on the individual to make the necessary changes themselves isn't enough.

For many the commitment to avoid road trauma places a heavy reliance on on-road experience and, either consciously or unconsciously, good luck. The bottom line is that once the licence is in hand the individual is largely left alone to find their way through the safety maze.

New Road Safety is not about discarding the old. Its emphasis and urgency on inclusiveness as a valid education strategy has a place in the suite of support available today for road users. It represents a conscious thinking process. It is not a soft approach representing "leniency." The road rules of the land are there for a reason and are there to be enforced. Drivers have to comply with road rules and accept them as standards that require respect. To complain about a speeding fine is a waste of time in my book.

My approach recognises three elements - the 3 Cs - that are key delivery benchmarks for my New Road Safety approach to transport and industry safety. They are Communication, Capability and Commitment. Each has value and implications for the individual, team and organisation. Holistically, these

three levels link to provide the broadest possible context for positive driver safety interaction to occur.

Communication

Clearly there is a predominant focus on quality informal communication activities pitched at the individual employee. They are more credible if designed with the specific work environment in mind. So, depending on the audience, there is a place for example for toolbox sessions and tea room meetings as opposed to classroom lectures.

Capability

The identification of Capability levels and inherent potential for both having or avoiding a crash in each individual is an on-going process. Reflection and reassessment of individual driving strengths and weaknesses in participants is the aim. Assisting the process is a series of standards that provide a benchmark, a minimum standard of performance expectation. Critically, ownership of the benchmark, validation and justification for it must include all three organisational levels. If it does not, the credibility of the process can be compromised.

Commitment

Commitment begins with the individual becoming aware they are part of a road safety process quite different from the expectation they may have initially held. Trust then becomes a key issue as well as the issue of incentive. Goodwill in itself is not enough. If there is a problem safety issue amongst individuals or across a workforce there has to be some resolve to minimise or eradicate it.

Management commitment is a significant determinant in long term driver safety standards. The process of change can be started by an outside consultant but momentum must continue after the outsider has left. The answer lies in organisational culture and structure. Driver safety improvement is not about "quick fixes" but long term commitment. There is no "one size fits all" approach. The training programs I have described and the 3 Cs elements within them are not "off the shelf" productions. Allowance must be made for individual environment factors as no two worksites or two workforces are identical. To maximize effect, the consultant has to adapt and deliver to the client needs and not vise versa.

Peer Reviewed Papers

The speed paradox:

the misalignment between driver attitudes and speeding behaviour

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Abstract

This paper reports on a study investigating preferred driving speeds and frequency of speeding of 320 Queensland drivers. Despite growing community concern about speeding and extensive research linking it to road trauma, speeding remains a pervasive, and arguably, socially acceptable behaviour. This presents an apparent paradox regarding the mismatch between beliefs and behaviours, and highlights the necessity to better understand the factors contributing to speeding. Utilising self-reported behaviour and attitudinal measures, results of this study support the notion of a speed paradox. Two thirds of participants agreed that exceeding the limit is not worth the risks nor is it okay to exceed the posted limit. Despite this, more than half (58.4%) of the participants reported a preference to exceed the 100km/hour speed limit, with one third preferring to do so by 10 to 20 km/hour. Further, mean preferred driving speeds on both urban and open roads suggest a perceived enforcement tolerance of 10%, suggesting that posted limits have limited direct influence on speed choice. Factors that significantly predicted the frequency of speeding included: exposure to role models who speed; favourable attitudes to speeding; experiences of punishment avoidance; and the perceived certainty of punishment for speeding. These findings have important policy implications, particularly relating to the use of enforcement tolerances.

NOTATION

ATSB	Australian Transport Safety Bureau
DT	Deterrence Theory
SLT	Social Learning Theory

Introduction

Excessive speed has been identified as a long-standing and significant contributing factor to death and injury on the road in motorised nations worldwide. Australasia is no exception [1]. The consequences of speeding, in terms of both crash incidence and severity, are well documented and include: increased crash risk due to reduced reaction time of the driver, increased risk of the severity of the crash, greater difficulty with vehicle control, increased stopping distance after application of brakes, greater impact forces in the event of a crash, and decreased reaction times for other road users [2-4]. Despite extensive research linking excess speed with road trauma, the prevalence of speeding remains high, and the behaviour remains pervasive, and arguably socially acceptable [5-7].

This presents an apparent paradox in relation to the mismatch between beliefs and behaviours, in that drivers may subscribe to one belief (that speeding is wrong or dangerous) yet regularly exceed the posted speed limit. This paradox highlights the need for a greater understanding of what the term 'speeding' actually means to drivers if interventions are to be successful in changing driver behaviour and community perceptions in relation to travel speeds.

A recent Austroads report highlights that Australian speed limits are among the highest in the world, particularly when compared with European nations that utilise harm minimisation principles as the basis for setting speed limits, and further, that many Australian jurisdictions indicated that they were currently reviewing speed limits "with a view to lowering posted speeds" [2, p. iii]. The current study sought to gain a greater understanding of driver perceptions of posted speed limits (60km/hour and 100 km/hour) and further, how this in turn affects speed choice. It also sought to identify the relative importance of various factors in predicting frequency of speeding across two speed zones. Information of this nature will be vital if authorities are to successfully implement a downward change in posted speed limits and driving speeds [2].

Previous research has identified the misalignment between attitudes to speeding and speeding behaviour [8]. The most recent Australian Transport Safety Bureau's (ATSB) Community Attitudes to Road Safety survey (2004) reveals that speed is still the most frequently cited contributing factor to crashes. Overall, 59% of respondents named it as one of the three main causal factors, and 39% identified it as the primary contributor to road crashes. Further, 96% agreed that an accident at 70 km/hour would be more severe than one at 60 km/hour [7]. This level of agreement has increased steadily

over the past decade from 80% in 1985. This clearly shows a growing recognition of the risks associated with speeding among the general community. Three quarters of the same sample however, reported exceeding the speed limit by 10 km/hour or more (ranging from Just Occasionally to Always). What remains unclear is how people define and view speeding in relation to posted speed limits, as results in relation to actual and reported speeding behaviour seem contradictory to the attitudes expressed above.

While many studies use self-report measures, observational and follow up interview techniques have revealed similar findings. Fildes, Rumbold, and Leening reported that a surprisingly high number of motorists (28%) believe exceeding the speed limit by 30 km/hour was not dangerous, regardless of whether they reported driving regularly above or below the posted speed limit [1]. Together, these results suggest that while speeding is recognised as a significant contributor to crashes, the actions of many road users indicate that they remain unconvinced, undeterred, or perhaps, that they perceive speeding as acceptable until it reaches a certain threshold, or that it is a behaviour that is different to the way that they drive. There is clearly a need to better understand the factors that contribute to this mismatch of driver attitudes and behaviour.

Factors influencing speeding

A multitude of factors that impact on speed choice have been identified from previous research, making behaviour change a very complex undertaking. Four broad categories can be used to summarise these factors: legal, social, person-related, and situational factors. Legal factors include a range of enforcement initiatives (e.g. speed cameras and related sanctions) which aim to influence the perceived risk of detection and punishment [9]. Social factors include the influence of others and can incorporate pressure from family, friends, passengers, and the media, exposure to role models, and the behaviours and travelling speeds of others on the road [10-12]. Person-related factors relate to the individual characteristics of the driver including previous crash involvement, gender, age, attitudes and values, and personality characteristics such as a predisposition to sensation seeking [13,14]. Finally, situational factors refer to the circumstances of a particular driving episode including: running late, keeping up with flow of traffic, purpose of trip, and the opportunity to speed [13]. The first three factor types are explored in the current research. The exploration of situational factors is limited to investigating driving speeds across two speed zones - 60 and 100 km/hour.

Theoretical framework

While research into the prevalence and nature of speeding has been somewhat piecemeal and largely descriptive in nature, the lack of theoretical application has received the most criticism [15]. As such, two theoretical models were used as a framework for the current research to examine self-reported speeding.

1. *Deterrence theory* (DT) has underpinned the development of many countermeasures in road safety and focuses specifically on the perceived risk of punishment (determined by a combination of the perceived risk of being apprehended and the perceived certainty, severity, and swiftness of legal sanctions) [9]. DT has been criticised for ignoring the social implications of speeding, the intrinsic rewards associated with speeding (e.g. thrill), the discrepancy between knowing something is wrong yet still performing the behaviour, the vicarious processes involved in learning about enforcement, and the role of successful law breaking in shaping behaviour [16]. To address some of these concerns, Stafford and Warr expanded DT to include punishment avoidance and vicarious learning concepts [17]. Punishment avoidance refers to performing a behaviour and escaping punishment (e.g. exceeding the speed limit without detection or consequence). The experience of avoiding punishment is said to undermine perceptions of the certainty and severity of punishments. Vicarious learning refers to the influence of other people's experiences of speeding and apprehension on an individual. Stafford & Warr's (1993) reconceptualised form of DT was used in the current study.

2. *Akers' Social Learning Theory* (SLT) is grounded in criminology and draws on the psychological principles of operant conditioning [18]. It suggests that the primary reason a person engages in deviant or illegal behaviour is the presence of an excess of favourable attitudes towards law breaking over unfavourable ones, primarily gained from a close group of intimate associates. Further, that deviance or conformity is learned the same way; with a balance of influence stemming from the way behaviour is punished or rewarded. Personal attitudes (definitions), models of behaviour (imitation), normative influences of significant others (differential association), and the balance of actual and anticipated rewards and punishments (differential reinforcement) are the key components of the theory.

SLT has been applied to a range of deviant behaviours (e.g. computer crime, substance abuse) with good predictive success [19], yet there has been limited application to road safety. DiBlasio studied factors that influence the choice of pre-driving adolescents to ride with a drinking driver [20]. Results indicated strong support for SLT with almost half the variance accounted for by SLT variables. Watson [16] compared the predictive capacity of DT and SLT in a study of unlicenced drivers. Results indicated that SLT offered a more comprehensive framework for predicting intention to drive unlicenced than did DT.

METHOD

Participants and procedure

A convenience sample of 320 participants was recruited from the Queensland University of Technology (QUT) psychology student pool (approximately 1/5 of total participants) and from the driving public of south east Queensland (via associates of the research team) in mid-2004. The sample included an equal number of males and females (i.e., 160 of each gender) and had a mean age of 37.25 years (SD = 15.28) with ages ranging from 17 to 79 years. Sample representation across age groups was: 15-24 years (28.8%), 25-39 years (27.8%), 40-59 years (35.9%), and 60-80 (7.5%). The sole criterion for inclusion in the study was that participants held a current Australian driver's licence. In line with approval from QUT's Ethics Committee, all participants completed an eight-page questionnaire and returned it to the research team anonymously.

Measures

Self-report measures have been criticised for potential inaccuracy of responses due to poor recall and the social desirability effect (i.e., reporting more favourably to present in a positive light) [6]. Others argue they are a valuable methodological tool for exploring illegal behaviours, particularly speeding, as they have been validated by independent measures (e.g., speed cameras), and because speeding behaviour is widespread and arguably socially acceptable [21]. The current study therefore, utilised a self-report methodology.

A 113-item questionnaire collected demographic data and used a range of scales constructed specifically for this study (see below). Four outcome variables were examined: 1) *Total frequency of speeding* was measured as a composite of how often, on Urban roads (50 and 60 km/hour) and on Open roads (100 and 110 km/hour), people reported exceeding the speed limit by less than 10 km/hour, more than 10 km/hour, and more than 20 km/hour (1 = *Never*, 2 = *Just Occasionally*, 3 = *Sometimes*, 4 = *Most Occasions*, 5 = *Nearly Always*, 6 = *Always*); 2) Preferred driving speeds was measured by asking participants to nominate the speed at which they preferred to drive in a 60 km/hour and a 100 km/hour zone, given fine weather and light, flowing traffic; 3) *Expectations of apprehension* was measured by asking participants to nominate the speed at which they would expect to be booked for speeding in a 60 km/hour and a 100 km/hour zone; and 4) *Expectations of permissible speeds* was measured by participants nominating the speed that people should be allowed to drive in a 60 km/hour and a 100 km/hour zone.

The deterrence variables listed below were measured, drawing on constructs within the classical and the reconceptualised forms of DT :

- perceived risk of apprehension if speeding (measured on seven-point Likert scale);
- direct exposure to speeding enforcement (number of speeding offences in past 3 years);
- vicarious exposure to speeding enforcement (number of family/friends with speeding offences in past 3 years);
- perceived certainty, severity and swiftness of sanctions for speeding (each one measured on a seven-point Likert scale);
- direct exposure to punishment avoidance – frequency of avoiding detection if speeding due to a range of strategies e.g. listening to radio broadcasts of speed camera locations (measured on six-point Likert scale);
- vicarious exposure to punishment avoidance – number of people known to have avoided detection if speeding (measured on five-point Likert scale).

The operationalisation of the social learning variables was based on the work of Akers [18,19] and Watson [16] and included:

- personal attitudes to speeding (13 items measured on a seven-point Likert scale with a Cronbach's alpha of .88);
- imitation (models) – the number of people they know who regularly drive at 10 km/hour or more over the speed limit (measured on a five-point Likert scale with a Cronbach's alpha of .73);
- differential association[8] (norms) – attitudes of family and friends to exceeding the speed limit and to speed enforcement (12 items measured using a seven-point Likert scale with a Cronbach's alpha of .79);
- anticipated rewards and punishments (social and non-social) for speeding (7 items per scale, measured using a seven-point Likert scale with Cronbach's alphas of .86 and .84 respectively).

RESULTS

Attitudes to speeding

Two thirds of participants (66.6%) mildly to strongly agreed that exceeding the speed limit is not worth the risks. Similarly, 62.2% mildly to strongly disagreed that it is OK to exceed the posted speed limit. More than half the sample (58.2%) mildly to strongly agreed that exceeding the speed limit under any conditions is dangerous, while 56% mildly to strongly disagreed that exceeding the speed limit is OK as long as you are careful. Together, these results suggest that the majority of the sample held unfavourable attitudes towards speeding.

8 Whilst in previous studies differential association generally included both a normative and behavioural dimension, it was limited to measurement of only the normative component in this study, as the behavioural component was reflected in the imitation (models) construct (Akers & Jensen, 2003).

Table 1 - Mean Response for Questions Relating to Frequency of Speeding*

	Urban Roads	Open Roads
Exceed limit by less than 10km/hr	3.09	3.41
Drive 10 km/hr or more over the limit	2.05	2.40
Drive 20 km/hr or more over the limit	1.34	1.52

*Measured using the following scale: 1 = Never, 2 = Just Occasionally, 3 = Sometimes, 4 = Most Occasions, 5 = Nearly Always, 6 = Always.

Table 2 - Percentage of Drivers Reporting their Preferred Driving Speeds in Both Speed Zones

Preferred speed	In 60 km zone	In 100 km zone
At limit or below	65.6	41.6
Less than 10 km/hr above	24.4	25.0
10 km/hr or more above	9.3	28.2
20 km/hr or more above	0.7	5.2

Table 3 - Expectations of the Speed at which You Would Expect to be Booked

	Mean reported speed	SD	Range
60 km/hour zone	66.85	3.3	60-80
100 km/hour zone	109.39	4.5	100-130

Expectations of permissible speeds

Frequency of speeding

The mean responses for each question reported in Table 1 indicate that participants reported exceeding both the 60 and the 100 km/hour speed limits less frequently as the speed increments increased. Overall, frequency of speeding was greater in the faster speed zone.

Preferred driving speeds

The preferred driving speeds reported by participants in the 60 km/hour zone ranged from 50 to 80 km/hour (M = 61.97 km/hour, SD = 4.09) and in the 100 km/hour zone, from 80 to 140 km/hour (M = 104.93, SD = 6.37). Overall, these mean preferred speeds seem to indicate that this sample of drivers prefer to drive above the speed limit (albeit remaining within close proximity to the posted limit) when the driving scenario indicates fine weather and light flowing traffic. Table 2 reports the percentages of preferred speeds for both speed zones.

Table 2 shows approximately one third (34.4%) of participants preferred to drive above the limit in the slower speed zone (60 km/hour). Interestingly, more than half (58.4%) indicated that they preferred to drive faster than the limit in a 100 km/hour zone. Similarly, more drivers reported preferring to speed excessively in a 100 km/hour zone than in the 60 km/hour zone (10% prefer to drive 10 – 20+ km/hour above in 60 km/hour zone and 33.4% in the faster speed zone). These findings suggest that there is a difference in the way that exceeding the posted speed limit is viewed across the two speed zones.

No significant gender differences in preferred driving speeds in a 60 km/hour zone were found, $t(318) = .382$, $p = .703$. *Males* however, reported preferring to drive at significantly faster speeds in the 100 km/hour zone than did *females* ($t(318) = 3.416$, $p = .001$). Age was negatively related to preferred driving speeds, such that younger drivers preferred to drive faster in both 60 and 100 km/hour zones ($r = -.34$ and $r = -.33$, $p < .001$ respectively). Both of these findings are consistent with the findings of previous research.

Expectations of apprehension

Participants nominated the speed at which they'd *expect to be booked* for speeding in a 60 km/hour and 100 km/hour zone.

Figure 1 - Speed that People Should be Allowed to Drive in a 60 km/hour zone

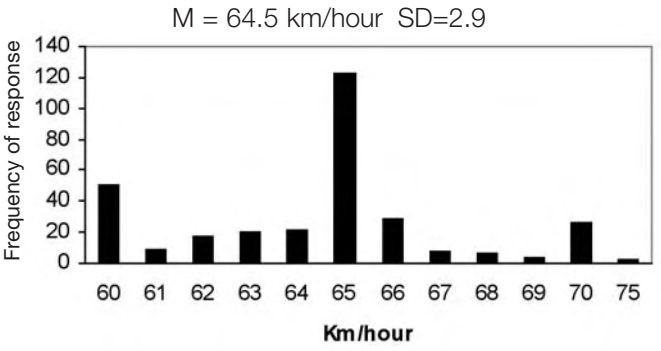
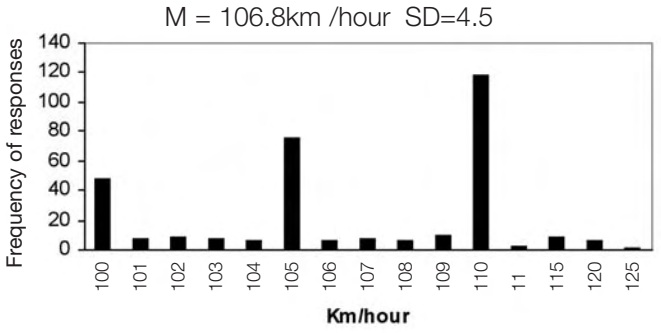


Figure 2 - Speed that People Should be Allowed to Drive in a 100 km/hour zone



Results from Table 3 suggest that people appear to "build-in" to their expectations a tolerance of approximately 10% of the posted speed limit (i.e. 66 and 109 km/hour in the 60 and 100 km/hour zones, respectively).

Participants nominated the speed that *people should be allowed to drive without being booked for speeding* in both speed zones. Figures 1 and 2 provide information on the distribution of actual reported speeds and means and standard deviations for each question.

Figures 1 and 2 show mean reported speeds (64.5 and 106.8 km/hour) are less than the 10% reported for the previous question on expectation of apprehension. Results indicate however, that drivers tend to nominate speeds of 4-7 km/hour above the posted limits. This suggests that actual posted speeds are not perceived as something to be strictly observed[9].

Factors predicting frequency of speeding

The results of a hierarchical regression undertaken to study the relative capacity of DT and SLT in predicting total frequency of speeding are reported in Table 4. DT variables were entered in Step 1 of the analysis, followed by SLT variables as Step 2. Deterrence variables as predictors accounted for 33.5% of the variance in total frequency of speeding, F (8, 311) = 19.6, p < .001. Table 4 shows the significant deterrence predictors were Perceived Certainty of Punishment (, = .11, p < .01) and Direct Punishment Avoidance (, = .19, p <.001) which uniquely accounted for relatively small amounts of the variance in total frequency of speeding (1% and 2% respectively). This suggests that the more certain a person is of being fined or losing points if apprehended for speeding, and the more frequently they had avoided punishments in the past, the more frequently they reported speeding. Social learning variables as predictors accounted for a significant additional amount of variance (25.3%) in total frequency of speeding, RÇ Cha = .253, F (5, 306) = 37.57, p < .001. All social learning variables emerged as significant predictors. Models and Attitudes were the most important predictors (, = .36, p <.001 and .24, p <.001 respectively). Punishments and Rewards also made important contributions (, = -.22, p < .001 and .13, p < .01 respectively). The squared semi-partial correlations (srÇ) in Table 4 show the social learning variables contributed the following amounts of unique variance in predicting total frequency of speeding: Models (9%), Attitudes (2%), Punishments (2%), Rewards (1%), and Norms (1%)10. Results indicate that participants reported more frequent speeding when they: held more favourable attitudes towards speeding, reported a greater number of family members and friends who speed, and have experienced rewards and lack of punishment for speeding.

DISCUSSION

Factors affecting speeding

Results of this study provide some insight into the speed paradox (the apparent misalignment between attitudes and behaviour related to speed choice) and confirm that a range of factors influence speeding behaviour. Results suggest that drivers may perceive 'degrees of speeding', depending on the speed zone. For example, overall, drivers reported exceeding the speed limit more often, and by greater speed increments in the 100 km/hour zone than in the 60 km/hour zone. This suggests speeding is perceived by some as 'more acceptable' or perhaps 'less dangerous' in the faster zone. Similarly, in relation to speed preferences, more than half the sample reported preferring to exceed the speed limit in the 100 km/hour than in the 60km/hour zone (one third), with three times as many drivers reporting a preference to do so by 10-20 + km/hour above the speed limit in the faster zone than the slower zone. Even though holding attitudes favourable to speeding (that it is okay to speed) was a

9 The 2004 ATSB Community Attitudes survey reports that 49% of respondents believed that people should be able to travel at 64 km/hour in a 60 km/hour zone, and 30% believed that one should be able to drive at 110 km/hour in a 100 km/hour zone without being booked [7].

Table 4 - Hierarchical regression of deterrence and social learning variables on frequency of speeding

Variables	M	SD	B	SE B	ß	sr^2	R^2	Adj R^2	Δ R^2
Step 1 – Deterrence									
Perceived Certainty of Punishment	12.51	2.2	.25	.09	.11*	.01			
Perceived Severity of Punishment	9.02	3.1	.01	.07	.004				
Perceived Swiftness of Punishment	10.18	2.3	-.14	.09	-.07				
Direct Punishment Avoidance	16.02	5.7	.17	.05	.19**	.02			
Indirect Punishment									
Avoidance	18.39	5.6	.06	.04	.06				
Direct Punishment	.56	1.02	.17	.20	.03				
Indirect Punishment	4.09	6.5	.003	.03	.004				
Perceived Risk of Apprehension	4.77	1.7	-.10	.12	-.03				
							.34**	.32	
Step 2 – Social learning									
Models	7.54	2.2	.84	.11	.36**	.09			
Norms	45.23	10.7	-.07	.02	-.15*	.01			
Attitudes to Speeding	45.33	14.8	.08	.02	.24**	.02			
Rewards	19.88	9.4	.07	.03	.13*	.01			
Punishments	31.93	8.7	-.13	.03	-.22**	.02			
							.59**	.57	.26**

*p < .01 **p < .001

10 Interestingly, Norms (the normative component of differential association) contributed significantly to the prediction, but in an unexpected direction. Despite this anomaly in the regression model, the bivariate relationship (r = .38, p < .001) confirms the influence of others' attitudes was in the direction predicted by SLT.

significant predictor of frequency of speeding, together these results indicate that drivers may perceive it as more 'acceptable' and 'tolerated' to travel above posted speed limits in faster speed zones.

Speed tolerances

Mean preferred speeds of approximately 10% above the posted limit across both speed zones suggest that the posted limit may be used as a baseline, or starting point from which to determine a speed. Although tolerances vary across jurisdictions, driver responses regarding perceived tolerances at a national level are reflected in the current findings – that mean speeds of up to 4-7 km/hour above posted limits are seen as the level at which drivers believe they should be allowed to travel without apprehension [7]. This highlights the need to re-consider what speed tolerances effectively communicate to the driving public. Elliott has outlined the potential legal ramifications of abolishing speed tolerances and has argued for tolerance levels to be made explicit [22]. Further, he suggested that attaching harsher penalties to those exceeding the tolerance level might achieve increased compliance with speed limits, and act to challenge the notion of speeding as socially acceptable in the longer term. To balance harm minimisation principles with public mobility, a recent Austroads report indicates that adopting minimal tolerance levels could assist in the reduction of casualty crashes without actually having to revise current posted limits [2]. As the driving public continue to demonstrate (through research findings such as the current study) that they operate within perceived tolerance levels, this strategy seems appropriate. Further, education strategies to convince drivers of the dangers of driving above the speed limit, regardless of the signed speed zone, should continue.

For those drivers who drive at or below the posted limit and express attitudes towards speeding that are congruent with this, no misalignment between beliefs and behaviour is evident. Other drivers however, may experience no dissonance between their seemingly opposing attitudes and actions (i.e., believe it wrong to speed yet still exceed posted limits regularly) for a number of reasons. Firstly, they may view speeding as something other than the legislated definition. That is, according to them, speeding does not refer to exceeding a posted limit, but rather, to something that is unsafe once it reaches a particular threshold, and may vary according to the speed zone in which they are travelling. Secondly, the results confirm that there are a range of factors, over and above personal attitudes to speeding, which influence speed choice. In other words, some may prefer to exceed the posted speed limit due to the perceived rewards (or lack of punishments) associated with the behaviour, despite holding attitudes that are negative, or at least neutral to speeding.

Detection and punishment

Punishment avoidance was a significant predictor of total frequency of speeding, suggesting that detection methods need to be improved if speeding behaviour is to be curbed. Opportunities for drivers to avoid detection, and therefore, punishment, need to be diminished. Stafford and Warr suggest that occasional episodes of apprehension and punishment may not act as an effective deterrent when the experience of punishment avoidance is common [17]. The influence of punishment avoidance on certainty of punishment may lead a person to perceive that they are immune to apprehension and punishments, even though they many have occasionally experienced them. Current results support this.

Exposure to role models who speed, and holding favourable personal attitudes to speeding also contributed significantly to predicting frequency of speeding in this study (and the wider literature). As Models was the most predictive factor, the impact of the speeding behaviour of family, friends, and others cannot be overlooked in the campaign to reduce driving speeds. Actual and anticipated rewards and punishments from speeding were also significant factors in predicting frequency of speeding. Public education campaigns may benefit by focussing attention on these areas. Messages that negate the rewards of speeding (e.g. arriving on time vs. losing licence) and increase the awareness of punishments for speeding (particularly social punishments such as public and peer disapproval) may assist in addressing the paradoxical nature of the speed phenomenon on the roads.

Limitations of the study

Several limitations must be considered when interpreting the results of this study including the use of self-report measures, a convenience sample that may not be representative of the general driving community, and a predominantly urban sample. As such, there is a need to replicate this study on a broader scale to achieve more general results. Despite these limitations, the findings of this study are consistent with the social/behavioural literature and the annual Community Attitudes surveys undertaken by the ATSB.

Conclusions

This study suggests that a range of factors appear to contribute to the apparent misalignment of attitudes and reported speeding behaviour including: unclear definitions of what is perceived as speeding; the use of posted limits as a baseline for speed choice based on perceived enforcement tolerance levels; the influence of others who model speeding; previous rewards and lack of punishments from speeding; and the perceived certainty of sanctions if detected. The influence of others (role models and normative pressures) and the costs/benefits of speeding all require further investigation to more fully understand the nuances of their contribution to the speed paradox.

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Utilising the Driver Behaviour Questionnaire

in an Australian Organisational Fleet Setting: are modifications required?

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Abstract

This study reports on the utilisation of an adapted Manchester Driver Behaviour Questionnaire (DBQ) to examine the self-reported driving experiences of a group of Australian fleet drivers (N = 443). Surveys were posted to participants who agreed to participate in the study. While exploratory and oblimin factor analysis did not produce clear factor loadings, a three factor solution, using parallel analysis, was obtained that supports previous research demonstrating the distinction between different driving conduct (e.g., errors, highway code violations and aggressive driving violations). The questionnaire appeared to remain psychometrically robust despite minor word modifications to reflect the Australian driving environment. However, a larger number of items traditionally related with highway code violations were found to be associated with aggressive driving acts among the current sample. Further analysis exploring factors associated with self-reported traffic violations revealed that DBQ factors were negatively related with aberrant driving behaviours, although at a multivariate level only the number of kilometres driven each year (e.g., exposure) proved to be predictive of incurring fines/demerit points. Taken together, the results indicate that the DBQ can be successfully implemented within an Australian fleet setting to examine professional drivers' behaviour(s).

Key words: Driver Behaviour Questionnaire (DBQ), fleet drivers, road safety.

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Present Context

A growing body of research is indicating that a considerable proportion of motorists are being exposed to aggressive, violent and/or reckless behaviours on public roads (Automobile Association, 1995; Lajunen, Parker & Stradling, 1998; Underwood et al., 1999). These behaviours are of concern as research is now demonstrating a link between aggressive driving violations and increases in the risk of crash involvement (Dobson et al., 1999; Parker et al., 1995; Reason et al., 1990; Underwood et al., 1999). For instance, intentional driving violations have been found to be a significant predictor of involvement in accidents (Parker et al., 1995; Xie, Parker & Stradling, 2002). As a result, research is presently focusing on identifying the causes of aggressive and violent driving behaviours (Lajunen & Parker, 2001; Lajunen et al., 1998; Underwood et al., 1999) and the subsequent impact these behaviours have on road safety (Parker et al., 2000; Parker et al., 1995; Sullman et al., 2002).

Driver Behaviour Questionnaire

One of the most widely implemented measurement scales to examine self-reported aberrant driving behaviours is the Manchester Driver Behaviour Questionnaire (DBQ) (Lajunen & Summala, 2003). The DBQ is essentially an assessment tool designed to identify and classify aberrant driving behaviours into specific categories, which can be utilised by both researchers and industry personnel (i.e., fleet managers) to investigate drivers' behaviours as well as examine the factors associated with crashes and infringements. While the original DBQ only focused on two distinct behaviours that were named errors and violations (Reason et al., 1990), the scale has been continually modified to now include "slips and lapses" (Lajunen & Summala, 2003), as well as a greater level of distinction between ordinary and deliberate violations that are now identified as Highway code violations and Interpersonal aggressive violations. For example, Highway code violations consist of behaviours such as speeding and running red lights, while Interpersonal aggressive violations focus on specific aggressive behaviours that include sounding one's horn or chasing another motorist when angered (Lawton et al., 1997).

In conjunction with the considerable modifications to the DBQ, the scale has been successfully implemented in a number of countries including; Finland (Bianchi & Summala, 2004), Netherlands (Lajunen et al., 2003), UK (Parker et al., 2000), New Zealand (Sullman, Meadows & Pajo, 2002), China (Xie & Parker, 2002) and Australia (Dobson et al., 1999). Researchers have utilised the DBQ to focus on a range of research areas including; the genetics of driving behaviour (Bianchi & Summala, 2004), driving age groups (Dobson et al., 1999), issues associated with self-report bias (Lajunen & Summala, 2003), cross cultural studies (Lajunen & Summala, 2003) and associations with the likelihood of being involved in an accident (Dobson et al., 1999; Parker, Reason et al., 1995; Reason et al., 1990). This body of research has identified various factor structure patterns that have either confirmed the original three factors of errors, violations and lapses (Aberg & Rimmo, 1998; Blockey & Hartley, 1995; Parker, Reason et al., 1995; Xie et al., 2002) four factors that are errors, lapses, aggressive and ordinary violations (Sullman et al., 2002), or five factors (Parker et al., 2000). Notwithstanding the general consistency of the factor

11 A professional driver in the current context is defined as a person whose requirement to drive is a central component of their work role.

structure, cross-cultural implementation of the DBQ has highlighted different "national scoring keys" and changes in the number of items used in the scale, as well as the wording of some questions (Lajunen et al., 2003).

Professional Drivers and Fleet Safety

In contrast to the above mentioned quantity of studies, a smaller body of research exists that has endeavoured to examine the self-reported driving behaviours of professional drivers and individuals who drive company sponsored vehicles and/or spend long periods of time behind the wheel (Newnam et al., 2002; Newnam et al., 2004; Sullman et al., 2002; Xie & Parker, 2002)[11] . Despite this, a growing body of research has demonstrated company car drivers are at a greater risk of accident involvement (Newnam et al., 2002; Sullman et al., 2002), not only through higher levels of exposure to the road environment, but also time and scheduling pressures, and other distractions (Stradling et al., 2000). In addition, research that has focused on occupational driver assessment has begun to examine the relationship driving performance has with physical activity (Taylor & Dorn, 2005), driver stress (Dorn & Matthews, 1992; Matthews et al., 1998), information systems (Saricks, Schofer, Soot & Belella, 1997) as well as methods to accurately measure risk assessment (Murray & Dubens, 2001; Rea et al., 2004).

Similar to above, one issue to emerge from the current research is the variation in the number of identified DBQ factors. For example, research that has focused on taxi, bus, and company drivers have identified three factors (Xie & Parker, 2002), truck driving research has demonstrated four factors (Sullman et al., 2002), and earlier research that has focused exclusively on drivers of company vehicles have reported six factors (Dimmer & Parker, 1999).

In regard to fleet safety within Australia, research has yet to utilise the complete DBQ to examine large groups of professional drivers' self-reported driving to; (a) determine drivers' self-reported driving behaviours and (b) the relationship such behaviours have with accident involvement rates. What remains evident is that considering the tremendous amount of kilometres driven by professional drivers within Australia each year, there is a genuine need to examine the usefulness of the DBQ scale to assess driving behaviours, as well as determine the relationship DBQ factors have with the likelihood of crash involvement and traffic offences. As a result, the present research aimed to utilise a modified version of the DBQ to investigate the self-reported driving behaviours of a group of Australian drivers within a fleet setting. More specifically the study endeavoured to:

(a) determine whether the DBQ is psychometrically robust to accommodate for small changes to some items to reflect Australian fleet safety driving conditions;

(b) examine the factor structure and generalisability of the DBQ to a sample of professional Australian drivers; and

(c) investigate the relationship the DBQ has with self-reported crash involvement and traffic offences.

METHOD

Participants

A total of 443 individuals volunteered to participate in the study. There were 345 (78%) males and 98 (22%) females. The average age of the sample was 44 years. Participants were located throughout Australia in both urban and rural areas. The largest proportion of vehicles driven by participants were reported to be for tool of trade (56%), although vehicles were also salary sacrificed (43%), and a small proportion were leased or participants' own vehicle (1%). Vehicles were reported to be sedans (85%), four wheel drives (12%) or other (3%). The majority of driving by participants was reported to be within the city (46%), or in the city and on country roads (40%). On average participants had held their licence for 26 years, had been driving a work vehicle for approximately 5 years, with the largest proportion driving between 11 and 20 hours per week (43%).

Materials

Driver Behaviour Questionnaire (DBQ)

The Driver Behaviour Questionnaire (DBQ) was utilised that aims to measure three main forms of aberrant behaviours that are errors, highway and aggressive violations. However the DBQ version in the current study consisted of 23 items, as questions relating to lapses were omitted due to previous research indicating that this factor is not associated with crash involvement (Lawnton et al., 1997). In addition, the authors of the current paper modified the wording of 12 items to make the measures more generalisable to Australian driving conditions e.g., remove specific references to either turning right or left in some items.

Furthermore, as researchers have previously noted that interpretation difficulties may exist between ordinary and aggressive violations due to the intention behind the act (Lajunen & Parker, 2001; Lajunen et al., 1998), the authors of the current paper expanded three items to specifically address this issue. That is, questions relating to speeding on highway/residential roads and disobeying stop signs were

12 Sullman et al. (2002) examined the self-reported aberrant driving behaviours amongst New Zealand truck drivers.

duplicated to examine the differences between intentional and unintentional versions of the offence. The aim was to attain a clearer definition of the aberrant behaviour and attempt to examine the underlying intention behind the behaviour i.e., deliberate vs unintentional. Respondents were required to indicate on a six point scale (0 = never to 6 = nearly all the time) how often they commit each of the errors (10 items), highway code violations (9 items) aggressive violations (4 items).

Demographic Measures

A number of socio-demographic questions were included in the questionnaire to determine participants' age, gender, driving history (e.g., years experience, traffic convictions) and their weekly driving experience (e.g., type of car driven, driving hours).

Procedure

A large Australian motor vehicle insurance company expressed interest in participating in the program of research. A letter of introduction, the corresponding questionnaires and a reply paid envelope were distributed through the company's internal data base to all employees, who were encouraged to participate in the research project. In total 1440 were mailed out and 443 were returned indicating a 30% response rate.

RESULTS

Factor Structure and Reliability of the Driver Behaviour Questionnaire for an Australian Sample

The internal consistency of the DBQ scale scores were examined through calculating cronbach's alpha reliability coefficients, which are presented in Table 1. Similar to previous Australian research (Blockey & Hartley, 1995; Dobson et al., 1999), and research on professional drivers (Sullman et al., 2002), the factors appear to exhibit relative internal consistency. The results also suggest that the scale is relatively robust to minor wording changes to items to reflect Australian driving conditions. A closer examination of the questionnaire reveals that the items traditionally associated with highway code violations demonstrate the highest reliability coefficients (.80) while aggressive violation, which consist of only 4 items, have the lowset reliability (.60).

Table 1. Alpha reliability coefficients of the DBQ scale

	Current Sample	New Zealand Study[12]
Errors (10 items)	.77	.71
Highway Code Violations (9 items)	.80	.62
Aggressive Violations (4 items)	.60	.57

Table 2 depicts the overall mean scores for the three factors, revealing that participants reported a similar frequency for each of the driving categories, although highway code violations appear to be exhibited most regularly. The means are higher than previous research that has focused on college students (Bianchi & Summala, 2004) elderly drivers (Parker et al., 2000), and professional drivers (Sullman et al., 2002; Xie & Parker, 2002). In addition, table 2 depicts the mean and standard deviation scores for the three highest ranked items, which were: Exceeding the speed limit on a highway without realising it (M = 2.62, SD = .94), Exceeding the speed limit on a residential road without realising it (M = 2.26, SD = .83), and Intentionally disregard the speed limit on a highway (M = 2.19, SD = 1.14). The results indicate that speeding is the most common form of aberrant behaviour reported by the fleet drivers in the current sample, and similar to previous research on professional drivers (Sullman et al., 2002), speeding remains one of the major road safety concerns. Secondly, speeding remains the most common aberrant driving behaviour, regardless of whether it is intentional or unintentional.

Table 2. Mean Scores for the DBQ factors

	Sample M	SD
Errors (10 items)	1.61	.37
Highway Code Violations (9 items)	1.70	.58
Aggressive Violations (4 items)	1.53	.48
Highest Ranked Items	2.62	.93
1. Unintentionally exceed the speed limit on highway		
2. Unintentionally exceed the speed limit on a residential road	2.26	.83
3. Intentionally exceed the speed limit on a highway	2.19	1.14

13 Cronbach's alpha reliability coefficients for the three factors were calculated to be: Aggressive violations (10 items) = .82, Errors (7 items) = .71 & Highway violations (6 items) = .77, which is moderately higher than the original factor structure reported in Table 1.

14 However, it is noted that participants may have not noticed the subtle difference between the two items (e.g., intentional vs unintentional), which may have accounted for the similar loadings.

Table 3. Factor structure of the modified DBQ

Description	F1	F2	F3
Become impatient by slow driver and overtake on inside	.72		
Sound your horn to indicate your annoyance at another driver	.70		
Become angered by another driver and show anger	.69		
Race away from traffic lights to beat car beside you	.61		.38
Drive especially close to the car in front to signal drive faster	.60		
Stay in a closing lane and force your way into another	.52		
Skid while breaking or cornering on a slippery road	.41	.32	
Become angered by another driver and give chase	.40		
Pull out of a junction and so far that your disrupt traffic	.36	.36	
Cross junction knowing traffic lights have already turned	.35		.35
Fail to check rear view mirror when changing lanes		.63	
Miss stop or give way signs		.62	
Fail to notice pedestrians are crossing in your path of traffic		.62	
When overtaking underestimate speed of oncoming vehicle		.60	
Nearly hit a cyclist while turning		.52	
Attempt to overtake someone you hadn't noticed turning		.47	
Nearly hit another car while queuing to enter a main road		.44	
Exceed the speed limit on a residential road without realising it			.75
Exceed the speed limit on highway without realising			.74
Intentionally disregard the speed limit on highway			.71
Intentionally disregard speed limit on a residential road			.63
Drive even though you suspect you are over legal limit			.30
Amount of variance explained	28.7	7.5	6.6

A series of factor analyses were implemented to determine the factor structure of the scale for a group of Australian fleet drivers. A Principal Components Analysis (PCA) with varimax rotation produced five factors that were moderately correlated (>.3 - .7). A direct oblimin rotation also produced a five factor structure that was inherently unstable and uninterpretable. In order to determine the best possible solution of the 23-item DBQ, the number of factors to retain was determined by the use of parallel analysis at both the mean and 95th percentile eigenvalues (see Table 3). PCA with oblique rotation revealed a three-factor solution that accounted for 43% of the total variance.

The first factor accounted for approximately 29% of the total variance and contained ten items relating to a combination of aggressive driving behaviours and some highway violations. Firstly, the four aggressive items loaded on the factor, with three aggressive items identified as the strongest contributors to the factor e.g., becoming impatient, angry and sounding one's horn. Secondly, four traditional highway code items also loaded on the factor. However, it is noted that all four items may also be considered to be an aggressive act in some circumstances such as forcing one's way into traffic and driving especially close to another vehicle. Taken together, this factor was labelled aggressive violations due to the predominant focus on antagonistic aberrant driving behaviours.

The second factor accounted for approximately 7.5% of the total variance and contained 7 items all relating to driving errors, such as missing a stop or give way sign, failure to check rear vision mirror, and failure to notice pedestrians crossing in front of a vehicle. As a result this factor was labelled driving errors. The third factor accounted for approximately 6.6% of the overall variance and comprised items relating predominantly to highway code violations such as intentionally and unintentionally speeding on a highway as well as residential roads. This factor was labelled highway violations as the main focus of the collective items remains on speeding in a variety of situations[13] . It is important to note that four items cross-loaded on more than one factor, with three of these items cross-loading to such an extent that they contained similar weightings across factors. Furthermore, one item failed to load on any one factor e.g., intentionally disobey a stop or give way sign. All items and factors for the 23-item DBQ are reported in table 3.

Expansion of three items

It is of interest to note that although the authors included items relating to intentional and unintentional speeding, the observed factor loadings did not indicate these items reflect driving behaviours relating to highway code violations and errors respectively. Instead, these items were essentially interpreted as a violation regardless of whether the behaviour was intentional or not. Thus, it appears that while speeding may possibly be an error in some circumstances, it seems this aberrant behaviour is a violation among the current sample .[14] Similarly, the possible distinction between intentionally and unintentionally missing a stop sign was also not evident and may result from the item not being specific enough to distinguish between an aggressive act versus a simple error.

Prediction of Offences

Finally, additional analyses were undertaken to determine the relationship between the DBQ factors and involvement in work crashes as well as accumulating demerit points. Only a small proportion of the sample (n = 48, 11%) reported being in a crash within the last year, which resulted in difficulties reliably identifying factors associated with the event. In contrast, 88 drivers (20%) reported incurring fines or demerit points in the past 12 months, and bivariate analyses identified a number of relationships between this event and aberrant driving behaviours. Specifically, positive correlations were identified between participants admitting incurring demerit points and the three DBQ factors, speeding (r = .11*), errors (r = .12*) and aggressive violations (r = .10*), as well as driving a greater number of kilometres per year for work (r = .15**).

To further investigate the relationship between incurring fines/demerit points and fleet safety drivers' aberrant behaviours, a logistic regression analysis was performed to examine the contributions of participants' recent driving experience(s) (e.g., years, kms driven) and their DBQ scores to the acknowledgement of incurring fines or demerit points in the past 12 months while at work .[15] While the overall model was significant (Chi square = 20.69, p = .000), only the number of kilometres proved to be a significant predictor of traffic offences (Wald = 11.80, p = .001), as not surprisingly, individuals who drive greater distances per year are more likely to be involved in traffic violations. Thus, the element of exposure appears to heavily influence the likelihood of drivers incurring fines/penalties. Several additional regression models were estimated to determine the sensitivity of the results. Controlling for kilometres driven, nor inclusion of only the DBQ factors failed to identify further significant models. Forward and Backward Stepwise Regression identified the same predictor. Finally, inclusion of gender, type of work vehicle or driving location did not increase the predictive value of the model. Possible reasons for the failure to identify additional significant factors will be examined in the discussion section.

15 Self-reported crashes was not utilised as a dependent variable as only a small number of participants reported being involved in a crash during the previous year.

ÍDISCUSSION

The present research aimed to utilise the DBQ to investigate the driving behaviours of Australian motorists within a fleet setting, and in doing so determine whether modifications to the scale to more accurately reflect the Australian driving experience influenced scoring outcomes. A 23 item DBQ scale was implemented in the current study, which expanded three questions from the original scale in an attempt to more accurately distinguish between intentional and unintentional violations and errors (i.e., two speeding items and one item on give way/stops signs).

Firstly, reliability analysis of the DBQ indicated coefficients that were relatively robust and similar to both the small amount of previous Australian research (Blockey & Hartley, 1995; Dobson et al., 1999) and recent fleet safety findings (Sullman et al., 2002). Encouragingly, despite the subtle alterations to the DBQ to reflect Australian driving conditions, the factor reliability of the scale appears acceptable. Secondly, examination of the overall mean scores for the original DBQ factors revealed similar scores between the constructs, although highway code violations appear to be exhibited most frequently. This finding is consistent with previous research that has indicated speeding to be the most regularly reported aberrant driving behaviour on public roads (Parker, West, et al., 1995; Sullman et al., 2002). Given the time pressures often placed on professional drivers, it may not be surprising that speeding violations are the most common form of aberrant behaviour both exhibited and reported by fleet drivers. This result may also reflect a general belief that minor speeding violations are acceptable in some circumstances and do not pose a serious road safety risk.

A series of factor analytic techniques ultimately identified 3 factors that generally consisted of errors, highway violations and aggressive violations. The three factor model was relatively consistent with previous research that has found distinctions between the different aberrant driving behaviours (Lajunen et al., 2003; Sullman et al., 2002). While driving errors and general highway violations were the clearest factors to interpret, aggressive violations in contrast consisted of a mixture of emotion-oriented responses to driving situations and traditional highway code violations. However, it is noted that the four highway violations that loaded on this factor may be interpreted as aggressive violations, especially for experienced professional drivers. Thus, behaviours traditionally viewed as highway violations may be classified as aggressive and aberrant, or at least, may originate from emotions associated with frustration. Given that fleet drivers spend considerably longer periods of time on the road than the general driving population, this group may be prone to experience and/or exhibit a wider range of aggressive acts, and thus a greater number of items may be required to examine this factor.

A further component of the study aimed to determine whether additional questions that focused on differentiating between intentional and unintentional speeding violations would increase the utility of the scale. For example, researchers have previously noted that interpretation difficulties may exist in different countries as items that focus on violations may be problematic, because the distinction between "ordinary " violations and "aggressive" violations is solely based on the intention behind the act (Lajunen & Parker, 2001; Lajunen et al., 1998). Therefore, the researchers in the current study attempted to more specifically define and measure possible differences and effects of intentions behind the act. However, it appears that the item structure may not have been sufficiently specific to distinguish between violations (i.e., intentional) versus simple errors (i.e., unintentional). Conversely, questions remain whether participants recognised the conceptual difference between the items e.g., deliberately running a stop sign vs unintentionally driving through the signal. Finally, the lack of research into fleet drivers combined with the difficulties interpreting the factor structure may indicate that individuals who drive for work, especially fleet drivers, are a special population who may experience and exhibit different driving behaviours to the general motoring population. Despite this, what appears evident is that while speeding may be an unintentional error in theory, the behaviours remains aberrant among this population.

The third section of the study focused on predictors of traffic offences. At the multivariate level, only the number of kilometres driven per year proved to be a significant predictor of such offences, which suggests that the element of "exposure" to the driving environment is a powerful influence on driving outcomes. While researchers have suggested that individuals who spend longer periods on the road are at a greater risk of crash involvement (Sullman et al., 2002), the current study has indicated that spending longer periods on the road is also associated with a greater risk of incurring fines/demerit points.

In practical terms, the findings of the research project have the potential to assist in the development of targeted interventions aimed at addressing factors contributing to crashes as well as the cumulation of demerit points. Presently, fleet databases predominantly consist of crash statistics and associated data that are usually collected after the event (i.e., crash), with little information collected that may contribute to understanding what driving behaviours contributed to the crash. Utilising the DBQ and other assessment tools provides a proactive organisational method to investigate the type of behaviours exhibited by company drivers as well as offer the potential to identify the types of specific behaviours associated with offences and crashes e.g., speeding violations vs aggressive acts. Importantly, the use of such measures may assist in the development of targeted interventions for professional drivers aimed at reducing the likelihood of a crash before the event occurs, rather than on the traditional post hoc basis. In regards to this study's results, while exposure to the road is not surprisingly the greatest predictor of accumulating demerit

points, the findings also indicate that the professional drivers in the current sample were most likely to engage in speeding behaviours, which may at some level, also contain an aggressive element. In addition, the three DBQ factors of speeding, aggression and errors were all positively related to accumulating a higher number of demerit points in the past year, with each of the three factors appearing to have a similar relationship with being detected for an offence.

Limitations

A number of limitations should be taken into account when interpreting the results. The response rate of participants was not extremely high, but consistent with previous research utilising the DBQ scale in Australia (Dobson et al., 1999). Previous research that has focused on professional drivers has used the 28-item DBQ, while the current study expanded the 20 item scale. Similar to research in this area, concerns remain regarding the reliability of the self-reported behaviour, such as the propensity of professional drivers to provide socially desirable responses. As a result, future research may benefit from linking self-report data with participants' driving records. Questions also remain about the representativeness of the sample as participants were mainly corporate fleet drivers (e.g., involved in insurance sales) and such driving styles may not be easily transferable to other fleet driving populations. Expanding on this point, further research may also attempt to stratify the data in such a way as to focus on particular groups of individuals within a fleet setting e.g., high vs low risk.

Conclusions

In summary, further research is required to establish the reliability and validity of the DBQ scale for the Australian setting and further endeavours into identifying the factors associated with traffic offences and crashes involvement among both private and professional drivers can only benefit current road safety initiatives.

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Issues of Child Occupant Protection: A Literature Review

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Abstract

Though there have been considerable reductions in child mortality and morbidity due to motor vehicle crashes in the past twenty years, road trauma is still a leading cause of death for children in motorised countries and thus an important health and safety issue in Australia. This review identifies key issues of child occupant protection such as the use of age-appropriate child restraints, effects of misuse of restraints, and rear seating of children. Current research findings, with particular emphasis on Australian data, are discussed in relation to avenues that offer potential for enhancing levels of protection.

Introduction

Australia has long been concerned with protecting car occupants generally and has led the world more recently in child-specific car safety through legislation in relation to the design standards and mandatory use of approved child restraints[1]. However, road trauma is still a leading cause of death and serious injury among children under 15 years of age in Australia[2], responsible for killing 66 children in 2004[3] and seriously injuring over 900 more[4]. Clearly, while much progress has been made over the past decades, there are still outstanding issues to address. This paper sets out to identify the key issues and review the current state of knowledge in relation to them, with particular emphasis on the Australian perspective and experience.

Child Restraints

One of the most effective ways of protecting light vehicle occupants is the wearing of seat belts. Australia was the first country to legislate the compulsory wearing of seat belts for occupants aged 8 years or over in 1970 in Victoria, with other states quickly adopting similar requirements[5]. For younger passengers, legislation was set in place during the 1970s and early 1980s[5] and has recently become more uniform with the national adoption of the Australian Road Rules during 1999 and early 2000. Currently, all States and Territories require that infants under 12 months old be restrained in an approved child restraint[6]. These incorporate a six point harness and are secured to the vehicle by both an adult seat belt passed through the frame of the restraint as well as a top tether attached to an anchor point in the rear of the vehicle[1]. For newborn babies, restraints are rear-facing until the infant reaches the weight limits specified for the restraint (9-12 kg depending on type)[7]. After this, forward-facing child restraints must be used until the child is at least 12 months old. All other passengers travelling in motor vehicles in Australia are required to be appropriately restrained in either approved child-specific restraints or seat belts[6].

Risks associated with adult seat belts use for children

Although children aged between 12 months and 16 years are required to use an approved restraint, the type of restraint is not specified. Once a child is 12 months old, this means that adult seat belts may be worn and still comply with current Australian legislation. While the use of adult seat belts is associated with reduced risk as well as severity of injury for children, compared to being *unrestrained*[8-10], evidence is accumulating that the protection offered by adult belts is far from optimal for most children.

Analysis of US child-specific crash data bases which monitor the injuries sustained by children in real crashes reveal that children aged under 8 years are at elevated risk of injury when using adult seat belts rather than dedicated child restraints[11, 12]. Recent Australian research found that suboptimal restraint, including misuse of the restraint (for instance, harness too loose) or use of the wrong size (inappropriate) restraint, particularly adult seat belts for smaller children, results in significantly higher risk of serious injury to these children[13].

These findings underline that children's physical dimensions and less mature anatomy are generally not compatible with the configuration of restraints designed for use by adults[13]. Optimum performance of seat belts depends on good fit, meaning that the lap portion sits low across the abdomen or across the upper thighs, and is secured by mature anterior superior iliac crests (the top front parts of the pelvis). The shoulder portion should cross the shoulder, collarbone and chest without resting against or touching the neck. The American Academy of Pediatrics[14] suggests that these fit requirements are generally not possible for a person who is less than 145cm tall, which only 5% of children have achieved at 8 years old and most don't reach until 10 or 11 years old[15].

Australian in-depth studies of child injuries in real crashes show that most children involved receive only minor injuries, however, the head is the most commonly injured area and the area most severely injured[16]. For this reason, good protection of children must limit head excursion. However, children's smaller size when using adult belts results in greater risks of serious injury from head contact with the vehicle interior due to excessive head excursion[12, 13]. Abdominal injuries may also result from poor fit of lap belts, and contact of the child's neck with a poorly fitting sash portion may result in neck or spinal injuries[12].

For all the above reasons, children should use restraints designed specifically to suit their sizes.

Protective effect of child-specific restraints

Several different types of child-specific restraint are available on the Australian market. Each type is specific to a particular size range. They are designed to absorb or to spread the forces during a crash onto the sturdier parts of the body as well as reduce the extent to which the occupant's body, particularly the head, comes into contact with vehicle structures[1]. Also important is the principle of securing the restraint tightly to the vehicle and the child to the restraint in order to allow the child to "ride down" the crash with the vehicle[16] (see Brown and colleagues[16], for a detailed discussion). The restraints most commonly used are: rear-facing infant restraints (for infants 0-9kg or 12kg); forward-facing child restraints (CRS) designed for children 8-18kg and incorporating a chair and six-point harness; and convertible restraints which can be used as rear facing until the child is 9kg then 'convert' to forward-facing for children up to 18kg. Children over 14kg can use belt-positioning booster seats (BPBs), with or without high backs, or a convertible CRS/booster seat until they reach 26 kg. Child harnesses, suitable for children 14-32 kg, convert lap-only belts into four-point belts (with the upper two straps joining as a top tether), and may be used in conjunction with booster seats for children too small to wear the adult belt alone.

Performance of dedicated child restraints, particularly those designed for younger children, has received considerable research attention in Australia and internationally. For infants under 12 months and smaller children, US Fatality Analysis Reporting System (FARS) crash-database analyses suggest that rear-facing and forward-facing CRS reduce the risk of fatality by 71% and 54% respectively[17, 18]. More recent research using crash data from US insurance claims records suggests that forward-facing CRS may be much more effective than this, reducing injury and death by as much as 78%[19]. Australian research on forward-facing CRS has shown that the requirement for a high-mounted top tether produces considerable reduction in frontal-impact head excursion in dynamic testing using different restraints and under a variety of configurations (eg. tight, firm and loose tether adjustments)[20], thus providing very good protection to children wearing them properly[16]. Moreover, CRS may be more protective in higher speed crashes. Unpublished RTA crash barrier test findings (cited in [16]) showed that child dummies in top-tethered CRS, when tested at crash speeds varying from 40kph to 100kph, experienced a levelling off of head injury criteria (HIC) values at about 60kph. In comparison, for adult dummies restrained in seat belts, HIC values rose exponentially with increasing impact speed. .

Further to Australia's experience with sled tests and laboratory performance, two comprehensive Australian studies of child restraint performance under real-world conditions have been conducted. The first, by Henderson in 1993

included 131 crashes involving 247 children aged 14 years or under[21]. Around 92% of these children were using a restraint of some kind and most received no injuries or only minor injuries. Of the children using forward-facing CRS (n = 38), only 1 was killed and this was deemed to be due to gross misuse of the restraint: the adult belt was used over both child and seat. Similarly, the other four cases of serious injury in this group were also due either to gross misuse or to severe intrusion into the occupant space.

Very recently another in-depth study of children aged 2-8 years presenting to two hospital emergency departments after crashes also found very high (93%) levels of restraint use[13]. Case review of 152 children and in-depth crash analyses of a smaller sub-sample of 47 were conducted. As in the previous study, there were few fatalities (5%) in this sample, and around 20% of children sustained serious injury. All the fatalities and a high proportion of the severe injuries occurred in the highest impact crashes. Notably, when restraint type was classified as optimal or sub-optimal (discussed below), no optimally restrained child was either killed or seriously injured, even in the more severe crashes.

Taken as a whole, the evidence cited above has led to the assertion that forward-facing CRS, particularly as used in the Australian context, are very effective in protecting those children for whom they are designed (ie up to 18kg/approximately 4 years old) in frontal crashes[22]. For side impact crashes the protection offered by CRS is highly dependent on how well the restraint is fitted to the vehicle. This is because in side impacts, bottom anchorages are thought to be more critical influences on sideways movement, which in turn affects passenger movement and contact with the vehicle interior. Although CRS already perform well, recent research has suggested that fully-rigid fixing of the bottom anchors gives superior coupling of the restraint to the vehicle[23] and thus may offer room to improve performance. In dynamic testing this fully-rigid system was the only one which prevented dummy head contact with the test door for both 6 month old (CRABI) and 3 year old (Hybrid III) dummies.

Another aspect of CRS that has shown capacity for enhanced performance is the degree of protection offered by the side 'wings' which sit at jaw/head height to support and retain the head. Currently, very few restraints on the Australian market offer any energy absorption in these side structures. Moreover, dynamic testing suggests that current side-wing designs may not be sufficiently long to fully retain the heads of children at the upper limits of the height range for which they are intended[23] exposing children to head impact. Addition of energy-absorbing padding between the outer and inner surfaces of the side-wing has been shown to reduce the test-dummy HIC significantly, but this was only the case when the head was retained within the restraint[23]. This suggests that side impact protection offered by CRS could be improved by focus on these two design areas.

Protecting primary school-aged children

Belt-positioning booster seats

Though the evidence cited above demonstrates that CRS suiting children approximately 0-4 years old are very effective in protecting younger children, protection of older children appears to be less effective. Analyses of mass crash-data bases in the US have shown that seat belts are less effective at protecting older children than the CRS are at protecting 1-4 year olds, with reductions of injury calculated to be 38% and 60% respectively[24]. For older, taller and heavier children, the belt-positioning booster seat (BPB) was developed in order to lift, or boost, the child to a position where the adult seat belt system fits adequately and can thus offer similar crash protection to that afforded an adult[25].

BPBs on the Australian market are designed for children 14-26kg and come in three types: high-backed models, high-back child car seat/booster combinations and 'cushions' which have no back[26]. Combination seats are made from hard plastic, while the other types may be made of hard plastic or moulded polystyrene. All variations allow the adult belt to stay low on the child's hip/thigh. High-back BPBs (and some cushions) have adjustable clips, slots or tabs that hold the sash portion of the belt so that it can be correctly positioned across the shoulder, collarbone and sternum. Many high-back BPBs have deeper side-wings to retain the head. These wings are also helpful in maintaining a sleeping child's position within the seat and seatbelt.

BPBs are capable of improving the safety of older children. Child-specific crash surveillance data from the US focussing specifically the 4-7 years age group revealed that using BPBs lowered the odds for injury by 59% compared to children secured in adult seat belts[11]. Moreover, children in BPB seats were significantly less likely to suffer injuries to the abdomen due to the lap belt riding up over the child's abdomen. Case analysis and in-depth Australian research of children presenting to an emergency department after a crash, though involving small numbers, confirms the protective effect of BPBs for 5-8 year old children: children in BPBs were significantly less likely to suffer serious injuries than were their counterparts in adult seat belts[13].

While these real-world data tell us that there are important advantages for early school-aged children in using BPBs, dynamic testing reveals considerable room for improvement in design to increase the protection offered in side-impact crashes[27]. In sled tests of right-angle side impacts, high-back BPBs did not prevent head contact of the Hybrid III 6 year-old dummy with the side door window any better than did adult seat belts. Further, at this angle of impact, dummy head contact occurred in every test[27]. As Australian data suggest that around 30% of impacts may be side-on[13], and US research has shown that children involved in side impacts are more than three times as likely to sustain a serious head

injury[28], further development of BPBs to include side wings of appropriate size with energy absorbing characteristics could offer important protection to children in this age bracket during side impact crashes.

Sub-Optimal Restraint

Though it appears that children can be well protected by using approved dedicated restraints, evidence is accumulating that restraint misuse or use of the wrong sized restraint for the child (inappropriate use) is common, resulting in many children being sub-optimally restrained. In addition, children are generally better protected when they are sitting in the rear seats of vehicles when there is a crash, so that front seated children are also sub-optimally protected.

Misuse

Restraint misuse is related to the fitting of the restraint to the vehicle and of the child to the restraint. Misuse can take a variety of forms from the less risky, for example, having the internal harness adjusted slightly loosely, to the potentially life-threatening, which includes failing to secure the restraint to the vehicle[21]. Misuse is the most serious form of sub-optimal restraint apart from being unrestrained, and has been associated with greater risk of injury or death, particularly in more severe crashes[13, 19, 21, 29].

Concern about the effects of misuse of restraints has led to various studies designed to gauge how widespread misuse practices are and estimate the impact of various types of misuse. In the US, one study reported a very high level of misuse, with nearly 90% of restraints observed to suffer from at least 1 fitting fault[30]. Similarly, a large (n = 2965) multi-state study also found substantial levels of misuse, with only around 20% of the observed child safety seats for 0-4 year olds correctly used[31]. Although the levels of misuse of restraints for older children 18-27 kg was much better at around 50%, few children in this weight range actually used child restraints (6%), with most either secured in adult belts (75%) or unrestrained altogether (19%)[31].

While not as marked, Australian studies show high rates of misuse. One car park survey in 1998 of 1,177 CRS found installation to be incorrect in 39% of the cases, with lack of top tethers forming one third of the faults in capsule installations and incorrect adult belt-threading a similar proportion in forward-facing CRS installations[32]. Other State-based studies have found fitting errors in 21% to 73% of restraints for children up to age 4 years[33]. Though BPBs have been found to be less prone to poor fitting[32], it should be noted that these surveys were carried out on parked cars without children in the seats, and are likely to underestimate the real level of misuse.

Surveys of parents suggest that these high rates of misuse may be due in part to the widely-held perception that fitting child restraints is an easy task[33, 34]. Perhaps as a result, only a small percentage of parents avail themselves of the advice and services offered by restraint fitting stations or specialists. It is likely that few parents really understand the forces involved in a crash, the necessity for tight coupling of passengers to the vehicle or the critical nature of even small amounts of slack in the restraint system to the protection offered by the restraint. These factors may be exacerbating parental complacency or overconfidence of their ability to adequately fit restraints. So, too, experience with earlier children, where restraint use has not resulted in any ill consequences, may indirectly reinforce parental unsafe behaviour or beliefs that such details are unimportant.

Vehicle and restraint design play parts in the propensity for a restraint to be misused. Though there have been many advances over the decades of child restraint use making them easier to use and harder to misuse by provision of features such as single adjustment points on CRS, there is still room for improvement. Particular problems include the degree of compatibility between rear vehicle seat design and restraint geometry, seat belt geometry, and the relative degree of difficulty of anchoring the restraint correctly to the vehicle. Some progress towards addressing these issues has been made. Recent revision of AS1754 to include a simulated door in side impact testing has meant more stringent requirements for side impact protection of CRS and high-backed BPBs[1].

Two further amendments to the Standard are also being considered. The first would require provision of alternative anchorage systems such as ISOfix and LATCH[35]. If approved, this could see restraints manufactured with the ability to be fully rigidly attached to vehicle bodies. Australian testing has demonstrated that fully rigid anchoring, where both the vehicle and the restraint have rigid attachments, significantly improves the side impact protection offered by CRS when compared with semi-rigid anchorage or the current flexible anchorage[23, 36]. Fully rigid anchorages may also offer improved performance for high-backed BPBs in side impacts, provided the design allows for retention of the child's head under impact conditions[27], as discussed above.

The second amendment under consideration is to include booster seats for larger children[35] (as currently available in the US) which may go some way towards bridging the gap in protection for those children too large for boosters but as yet too small for seat belts.

Inappropriate restraint use

Because of the high protection they offer when used properly, traffic and safety organisations recommend that parents keep children in each type of dedicated child restraint until the child outgrows it. However, a mounting body of evidence suggests that children are moved prematurely or "graduated"[12] to the next restraint type before they reach maximum size for the smaller restraint. Premature graduation includes children moved to booster seats or adult seat belts before they reach the weight/height limits for forward-facing CRS and children

who are moved into adult seat belts while they are still able to use booster seats. This is termed inappropriate restraint and may present nearly twice the risk of injury to children involved in crashes than those who are appropriately restrained[37].

Studies in the US have repeatedly demonstrated that children of booster seat size (4-8 years old approximately) are at great risk of premature graduation into adult seat belts rather than being placed in size-appropriate BPBs[37-41]. In addition, the older the child, the greater the risk of inappropriate restraint use, with 6 year olds only half as likely as a 4 year old to use a booster, and 8 year olds almost never using them[39].

It appears that this pattern of BPB use among children of appropriate age is similar in Australia. An observational survey found similar levels of seat belt use among children aged 4-7 years, with 58% using the belt alone compared with 36% of children this age secured in a BPBs[33]. Results from an unpublished intercept interview survey of parents (n = 371) carried out at the Centre for Accident Research and Road Safety-Queensland suggest that more than 50% of Australian children are using adult belts regularly by the time they are 6 years old.

Risks of front seating

As early as 1977 studies demonstrated that passengers in the rear seat are at significantly reduced levels of risk for injury or death than those who sit in the front seats of vehicles[42]. More recent figures based on analyses of large USA crash databases such as FARS, National Automotive Sampling System and the General Estimates System provide further evidence for the associated dangers of front seating. Analyses of these databases for 1998-2002 revealed that a much higher percentage of restrained children seated in the front seat were fatally injured when compared to children seated in the rear seat[43]. When children were unrestrained, whilst the relative protection from sitting in the rear is reduced, children were still at reduced risk of fatality when sitting there rather than the front seat.

Similarly, using FARS data for 1988-1995, in vehicles without a front passenger airbag, restrained rear-seated child passengers were found to be about 35% less likely to be killed[44] than front seated children. Other analyses have demonstrated increased protection for rear seated children regardless of whether they were restrained[42, 43], though the addition of a restraint enhanced the protection[43, 45].

As well as being at lower risk of death, rear-seated children are also at less risk of serious injury than front seated children[8, 37, 46], though the effect of seating is not as great as that of appropriate restraint use[37]. However, these effects are interactive in nature: children appropriately restrained in the rear seat were found to be at least risk of injury[37].

The in-depth Australian study of children presenting to an emergency department cited previously[13] displays similar patterns to those reported above: front seated children were about two and half times more likely to be injured and to suffer more severe injuries than rear-seated children.

Crash data analysis can provide information on where those passengers who were injured or killed were sitting. Similarly, studies of children presenting to emergency departments has given valuable insight into the nature and extent of injury after crashes as well as some gauge of the extent to which children are uninjured from involvement in crashes[13]. However, in terms of estimating the extent to which rear seating may benefit children, some measure of exposure, or the proportion of children who actually travel in the front seat is needed. This has generally been gauged using observational studies, where researchers directly observe vehicles and their passengers from roadsides or locations where numbers of child passengers are likely to be high. One study of this nature carried out in Queensland in 2005 has estimated that around 60% of vehicles carrying child passengers 12 years and under had a child sitting in the front seat[47]. Proportions in the USA are estimated to be much lower at around 40%[48], and in one comparative study conducted in European as well as US cities, children were only observed in the front seat in 9-22% of European vehicles compared with 25-27% of US vehicles[49].

Several factors are thought to influence the rate of front seating. In Australia, exposure for younger children may be reduced by the requirement for top tethers on forward-facing CRS, since the anchor points are almost always in the rear of the vehicle. Another influence may be the presence of passenger-side airbags, which in the US experience were found to represent greater risk of injury and death to children[17]. However, in Australia passenger side airbags have not been mandated for new vehicles, but may be provided as an optional feature by manufacturers. There are also critical differences in the style of airbags fitted to vehicles on the Australian market: Australian airbags are designed to work with restrained passengers and hence fire later and with less force than the earlier airbags designed to protect unrestrained passengers. They also have larger vents making the overall cushioning softer[50]. These features resulted in an assessment by the Federal Office of Road Safety (FORS)[50] that the phenomenon of airbag-induced death or injury to children would not be seen in Australia, and this prediction appears to have been borne out. However, NSW has legislated against the use of any child-specific restraint in the front seats of vehicles where a passenger airbag is designed to deploy[51].

Another factor that may influence where parents seat their children is the level of perceived risk parents associate with having a crash generally, and more specifically, the risk of injury associated with sitting in the front in the event of crash. In studies related to why caregivers appear complacent about the misuse of child restraints, Will and Geller[52] suggest that aspects of the driving situations, such as its voluntary nature and everyday occurrence, coupled with fundamental cognitive characteristics of being human, such as optimism bias, fundamental attribution error and belief in a 'just world'

lead to underestimation of risks associated with driving. People are also generally poorly equipped to assess risk accurately and may have trouble translating the meaning of risk assessment communicated to them by experts[53].

Better awareness or assessment of risk may lead to more safety conscious behaviours. In a qualitative exploration of barriers to booster seat use, parents who were more aware of the risks of crashes to their children were also more concerned to protect them through use of booster seats and by seeking information than were parents who were less aware[54]. All in all, parents seating their children in the front seat may be either unaware of the increased risk, or wrongly believe that a crash will not affect them or their children.

Discussion and Conclusions

It seems that a number of issues specific to enhancing protection of children travelling in cars are still deserving of attention. While in Australia we seem to have progressed well in protecting our youngest passengers through the use of infant restraints and legislation to maximise use, many of our toddlers and primary school aged children are not optimally protected when they travel. Improvements for the protection of these children can come from a number of directions.

Firstly, it would seem that parents need better education on what constitutes optimal protection and how best to achieve it for their own children. For parents, the message to buckle children up appears to be overshadowing any messages about the critical nature of fit or the need to place children as far away as possible from the site of potential crashes. Moreover, the evidence above suggests that while almost all parents know when to use infant restraints and most know when to move their children into forward-facing CRS, there is a gap in understanding about what the next stage should be and when it should occur. This is complicated by the emphasis on weight/mass limits provided by restraint manufacturers for forward-facing restraints and BPB. Thus there is a need to enhance parental risk perception and to draw attention to the other dimensions of booster and belt fit such as seated height, body width and leg length and to encourage better choices. A more active form of reaching parents may be needed to achieve this, with parents given advice specific to their circumstances.

Secondly, restraint design offers avenues to improve protection. BPB seats dedicated to protect larger children are urgently required. Design needs to address side impact protection as well as risks of the child slipping out below the belt (submarining). While currently harnesses are designed to meet the needs of these children, they are not always a valid option because some larger children are too wide to wear them without neck contact with the straps and they offer no protection against submarining or side impact. Better design of restraints for younger children is also needed so that they include head protection in side impacts and ways of minimising incorrect use. One suggestion has been to include a visual indicator for the user that shows correct instalment[55]. In addition, there is room for research on vehicle performance with restraints, methods of securing restraints to vehicles, as well as on the dynamics of crash effects on children using these restraints. As called for by others[13] this may involve development of more biofidelic child dummies as well as dummies of older children. It may also require more attention to vehicle-restraint compatibility.

Thirdly, changes to legislation can both guide parents as to what restraints to use as well as draw their attention to critical safety dimensions. In this respect, legislation could mandate the use of dedicated child restraints for children aged 10 years and under. While cost may appear to be a barrier to this sort of move, evidence cited above shows that most parents are already using CRS for children between 6 months and 2 years old (and these are usually more expensive than other types), and many use boosters beyond this. It is the discontinuation of use at ages earlier than advisable that appears to be at issue rather than the outlay to buy a restraint. There is also a clear need to emphasise, and indeed mandate, rear seating for all children under age 12 wherever possible. This is a zero-cost, no-technology avenue to reducing risk particularly for our primary-school aged children. These children are the least well protected by existing legislation and restraint design and the most likely to be placed at additional risk by front seating. Clear guidelines for parents would help reduce these risks. Such changes to legislation may be more successful in a climate where parents are both well-informed of the need for, and positively disposed towards, the changes. This may mean education interventions as an early step, supported by evidence of parental attitudes and opinions about issues of child occupant safety.

Finally, as well as research on crashes, we need to know more about the human side of the use of restraints and what factors influence the decisions parents make about protecting their children in cars. For instance, we know little about whether parents are ignorant of the risks of premature graduation to larger restraints or whether other considerations govern this behaviour. We also know very little about parents' knowledge of other child protection issues or what it is that is of most concern to them about protecting their children when travelling. Information of this sort would be a good first step to best practice in education and intervention efforts

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New to the College Library

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Recent Publications

Hosking, S., Young, K. & Regan, M. (2006) **"The effects of text messaging on young novice driver performance"**, Monash University Accident Research Centre, Report No. 246 http://www.monash.edu.au/muarc/reports/muarc246.html

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Lay, Max, et al., **"Transport Innovation: a New Era for Australia"**, (Information from admin@its-australia.com.au)

Bibliography of Recent Research

American Journal of Public Health, March 2006
Obesity and Risk for Death Due to Motor Vehicle Crashes
Shankuan Zhu, Peter M. Layde, Clare E. Guse, Purushottam W. Laud, Frank Pintar, Raminder Nirula, Stephen Hargarten, Medical College of Wisconsin

Abstract

Objectives. We examined the role of body mass index (BMI) and other factors in driver deaths within 30 days after motor vehicle crashes. Methods. We collected data for 22107 drivers aged 16 years and older who were involved in motor vehicle crashes from the Crashworthiness Data System of the National Automotive Sampling System (1997-2001). We used logistic regression and adjusted for confounding factors to analyze associations between BMI and driver fatality and the associations between BMI and gender, age, seatbelt use, type of collision, airbag deployment, and change in velocity during a crash. Results. The fatality rate was 0.87% (95% confidence interval [CI]=0.50, 1.24) among men and 0.43% (95% CI=0.31, 0.56) among women involved as drivers in motor vehicle crashes. Risk for death increased significantly at both ends of the BMI continuum among men but not among women (P<.05). The association between BMI and male fatality increased significantly with a change in velocity and was modified by the type of collision, but it did not differ by age, seatbelt use, or airbag deployment. Conclusions. The increased risk for death due to motor vehicle crashes among obese men may have important implications for traffic safety and motor vehicle design.

Key Words: Epidemiology, Gender, Injury/Emergency Care/Violence, Obesity, Overweight, Underweight, Mortality

Clapham KF, Stevenson MR, Lo SK, 2006, **"Injury profiles of Indigenous and non-Indigenous people in New South Wales"**, Medical Journal of Australia, pp. 217-220, Vol. 184, No. 5.

(Injury Prevention and Trauma Care Division, The George Institute for International Health, The University of Sydney)

This investigation compared the injury profiles of the Indigenous population in New South Wales with that of the non-Indigenous population. The study was based on:

(a) Descriptive analysis of NSW Health data - obtained from the Health Outcomes Information and Statistical Toolkit (HOIST) database.

(b) Hospitalisation data - collected for the period 01/07/99 to 30/06/03.

(c) Mortality data - collected for the period 01/01/99 to 31/12/02.

The main outcome measures were:

(a) Hospitalisation and death rates due to injury by age, sex, injury mechanism and Indigenous status.

(b) Rate ratios for comparison between Indigenous and non-Indigenous populations.

The rate of death from injury was higher for all age groups in the Indigenous population, except people older than 65 years. Indigenous people aged 25-44 years were twice as likely to be hospitalised as their non-Indigenous counterparts, and five times as likely to be hospitalised for interpersonal violence. From the data it was concluded that the higher rates of injury-related hospitalisation and death in the Indigenous population in NSW are consistent with data reported for other parts of Australia. Of particular concern is the number of Indigenous deaths and hospitalisations due to interpersonal violence.

Holland AJ, Ross FI, Manglick P, Fahy FE, Cass DT, 2006, **"Driveway motor vehicle injuries in children: a prospective review of injury circumstances"**, p.311, Medical Journal of Australia, Vol. 184 No.6.

Details of this study could be obtained from the authors at:

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Small TJ, Sheedy JM, Grabs AJ, 2006, **"Cost, demographics and injury profile of adult pedestrian trauma in inner Sydney"**, pp. 43-47, ANZ Journal of Surgery, Vol. 76, 1-2.
(University of New South Wales, Sydney)

Despite substantial morbidity, mortality and cost, resulting from pedestrian accidents, there has been limited, recent published work on this topic in Australia and New Zealand. The objective of this study was to examine the demographics, injury profile, outcomes and cost of pedestrian versus motor vehicle accidents in an inner city Sydney hospital.

To accomplish this objective, identification of pedestrians, injured by impacts with motor vehicles and admitted as hospital inpatients during the years 2002-2004, were identified from a trauma registry. The retrospective review included patient profiles (age, sex, time of injury and blood alcohol), injury pattern, cost, morbidity and mortality.

A total of 180 patients (64% men and 36% women) with a mean age of 46 and mean injury severity score of 14.1 were identified.

It was concluded that pedestrian accidents in inner Sydney are common. Two peak injury periods were observed: one between 17.00 and 18.00 hours and the other between 20.00 and 22.00 hours. Also, significantly more injuries occurred on Friday and during autumn months. Predominant victims of injury were intoxicated adult males. Forty-nine per cent of patients tested positive for consuming alcohol, with an average blood alcohol concentration (BAC) of 0.22%. Alcohol consumption was associated with the worst outcome in terms of hospital and intensive-care unit stay, morbidity and mortality. Mortality rate was 8.9% but was higher in the elderly group (22.7%). In most cases injuries were sustained to the head and lower body extremities. The cost of each hospitalisation was high because of necessary lengthy admissions (average length of stay 13.4 days).

Townsend M, 2006, **"Motorists' use of hand held cell phones in New Zealand: An observational study"**, Accident Analysis and Prevention

(Faculty of Education, University of Auckland)

Many similar countries to New Zealand treat the use of mobile phones by vehicle drivers as an offence. But New Zealand has no specific legislation that restricts the use of cell phones in vehicles. There are indications that legislation may be introduced in the near future.

This study investigated current use of mobile phones by motorists. A total of 8700 vehicle drivers were observed for use of hand-held phones as they passed a fixed location in Auckland, New Zealand. The use of hand-held phones was double that of an Australian city, where these phones are banned. Use of mobile phones, while driving, by male and female drivers was similar.

Watt K, Purdie DM, Roche AM, McClure R. J, 2006, **"Acute alcohol consumption and mechanism of injury"**, pp. 14-21, Studies in Alcohol, Vol. 67, No. 1.
(The University of Queensland).

The aim of the study was to determine whether the injury mechanism among injured patients is differentially distributed as a function of acute alcohol consumption (quantity, type, and drinking setting).

A cross-sectional study was conducted between October 2000 and October 2001 in the Gold Coast Hospital Emergency Department, Queensland, Australia. Data collection was carried out quarterly over a 12-month period. Every patient requiring treatment for an injury sustained less than 24 hours prior to presentation to the emergency department, during the study period, was approached for interview. The final sample comprised 593 injured patients including 377 males. Three measures of alcohol consumption in the 6 hours prior to injury were obtained from self-report: quantity, beverage type, and drinking setting.

There were six categories of injury mechanism [Injury intent was also measured (intentional vs. unintentional)]:

- road traffic crash,
- being hit by or against something,
- fall,
- cut/piercing,
- overdose/poisoning, and
- miscellaneous.

No previous analytical studies have examined the relationship between injury mechanism and acute alcohol consumption (quantity, type, and setting) across all types of injury and all levels of injury severity while controlling for potentially important confusing elements (demographic and situational factors, risk-taking behavior, substance use, and usual drinking patterns). After controlling for these relevant confusing variable elements, neither quantity nor type of alcohol was significantly associated with injury mechanism. However, drinking setting (i.e., licensed premise) was significantly associated with:

- increased odds of sustaining * an intentional versus unintentional injury; * an injury through being hit by/against something versus other injury types; and
- reduced odds of sustaining an injury through a road traffic crash versus cause other than a road traffic crash, compared with not drinking alcohol prior to injury.

It was concluded that these data suggest that among injured patients, mechanism of injury is not differentially distributed as a function of quantity or type of acute alcohol consumption but may be differentially distributed as a function of drinking setting (i.e., road traffic crash, intentional injury, being hit). Therefore, prevention strategies that focus primarily on the quantity and type of alcohol consumed should be directed generically across injury mechanisms and not limited to particular cause of injury campaigns.

ATSB Document CR 226: **"A pilot study of the effects of macrotexture on stopping distance"** by: Peter Cairney and Anthony Germanchev, ARRB Consulting

This pilot study was undertaken to investigate whether presently available methods were capable of generating useful information on the relative contribution of microtexture and macrotexture to stopping distance at different speeds.

All trials were conducted using the same late model Holden Commodore Station Wagon fitted with anti-lock braking (ABS), a Global Positioning System (GPS), an accelerometer and a computer. Testing was carried out at four sites with different combinations of macrotexture and skid resistance. Data were analysed using a full factorial Analysis of Variance (ANOVA) design, i.e. four levels of site x four levels of speed x two levels of conditions, with five replications at each site.

Significant effects were found for all speed variables, all two way interactions and the three way interaction. However, it was clear that by far the largest effect was speed, based on the mean squares and the Partial Eta Squared statistic. The next largest effect was the three way site x speed x condition interaction, which is probably due to the large increases in stopping distance in wet conditions at site 3, which only occurred at higher speeds. Site 3 had low macrotexture and was the only site to have low skid resistance. It may have been possible to obtain better combinations of skid resistance and macrotexture for testing purposes if the minimum length specified for sites (300 metres) had been shorter. The test results suggest that 80 metres of road with consistent surface characteristic would be sufficient. Further investigation of the relation between crash occurrence and road surface characteristics, taking into account geometric characteristics and travel would seem to be the most productive direction for the immediate future. Publication Date: 06/04/06; ISBN: 0 642 255296; ISSN: 1445 4467

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