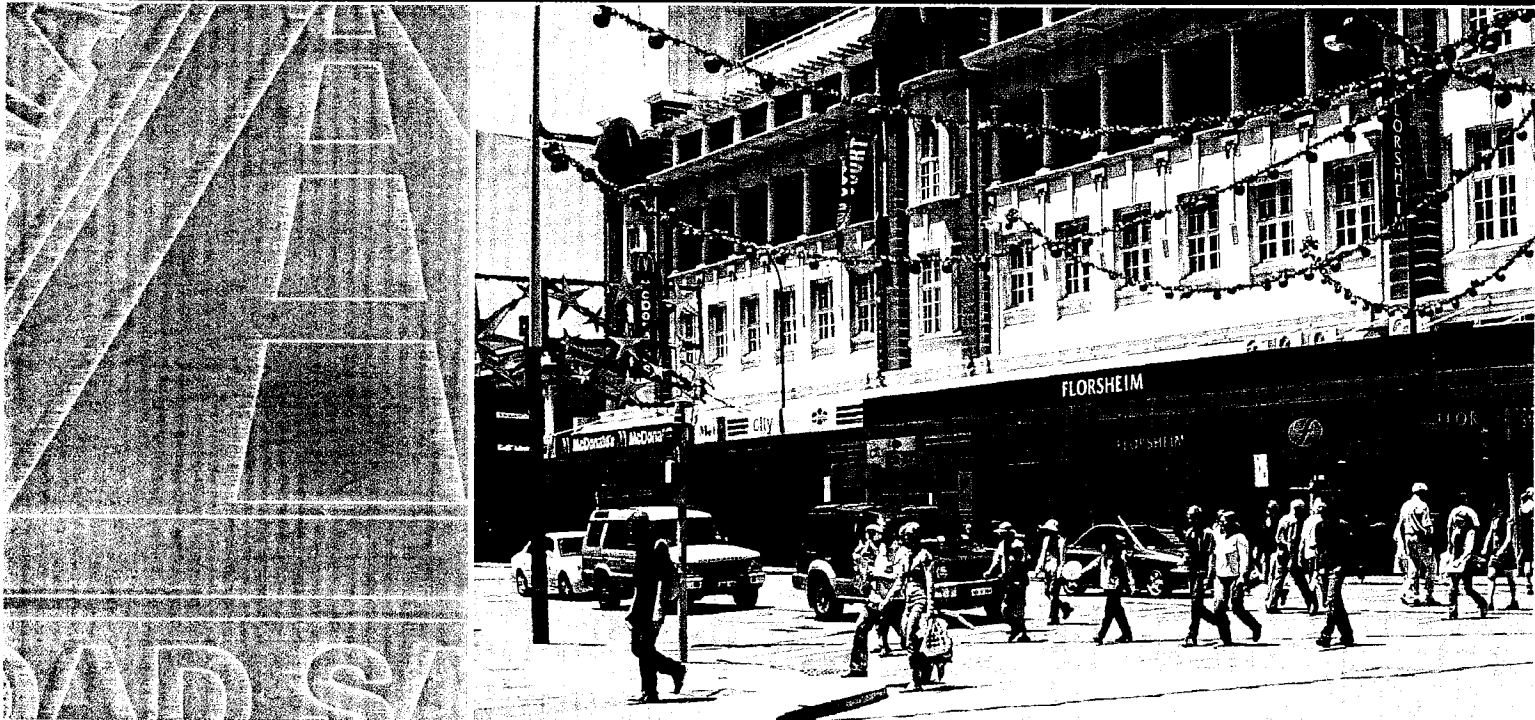




# Journal of the Australasian College of Road Safety

Formerly RoadWise – Australia's First Road Safety Journal



## In this edition —

### Contributed articles:

- The ATSB Answers Questions on the Australian National Road Safety 2010 Strategy
- Safer Vehicles for Young Drivers - Matching Vehicles to Drivers' Ability
- Road Advertising
- Illegal Road Racing and its Legal Implications
- Policies of the Australasian College of Road Safety

### Peer-reviewed papers:

- Views of the Verge: Roadside Memorials and Local Government Policies
- The Prevalence and Characteristics of Paediatric Driveway Accidents in Queensland
- A Comparison of Reported Driving Anger in Canada with USA, UK and Australia

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**Editorial Policy**

The policy of the publisher is to provide a medium for expression of views and for debate, within the traffic safety community, on a wide range of issues. The journal provides authors of papers with the opportunity to have their work submitted to the Editorial Board for peer review.

Encouragement also is given to interested persons and organisations to submit articles, photographs or letters for publication. The publisher reserves the right to reject submissions or, with approval of the author, edit articles. No payment is offered for articles submitted.

For the purpose of sharing ideas with professional colleagues, material in this Journal may be reprinted with acknowledgement of the full reference, including the author, article title and the year and Volume of the Journal. In these cases, a copy of the reproduction should be sent, please, to the Managing Editor.



Cover photo: Pedestrians sharing the road in Perth, Western Australia. The College's policy on pedestrian safety is discussed in this edition.

# Contents

From the Immediate Past President.....	2
Diary .....	3
<b>QUARTERLY NEWS</b>	
Chapter News .....	5
Australian News .....	7
New Zealand News .....	8
European News.....	9
North American News.....	11
Asian News .....	11
<b>CONTRIBUTED ARTICLES</b>	
The ATSB Answers Questions on the Australian National Road Safety 2010 Strategy .....	12
Safer Vehicles for Young Drivers - Matching Vehicles to Drivers' Ability - by Michael Paine .....	19
Road Advertising - by Ken Smith.....	22
Illegal Road Racing and its Legal Implications – translation by Max Pallivacini .....	23
Policies of the Australasian College of Road Safety - by Ken Smith .....	24
<b>PEER-REVIEWED PAPERS</b>	
Views of the Verge: Roadside Memorials and Local Government Policies - by Jennifer Clark .....	29
The Prevalence and Characteristics of Paediatric Driveway Accidents in Queensland - by J Davey et al .....	34
A Comparison of Reported Driving Anger in Canada with USA, UK and Australia - by Richard Tay .....	41
<b>ROAD SAFETY LITERATURE</b>	
New to the College Library.....	46
Recent Publications .....	46

## From the Immediate Past President



Dear Members

I have been asked by our President Kerry Fitzgerald to write the President's Report. Unfortunately Kerry has been unable to provide her report due to a serious illness in the family. I hope you, the members, do not mind my taking the liberty to express on your behalf to Kerry and her family that all of our

thoughts and prayers are with them at this trying time. We wish above all for a speedy recovery.

Kerry has asked me to mention meetings that she held with the Minister for Local Government, Territories and Roads, the Honourable Jim Lloyd MP and Liberal Member for Ferguson (NSW), and with the Shadow Minister for Transport, Roads and Tourism, The Honourable Martin Ferguson AM, MP, who is also the Labour Member for Batman (Vic). With the handing down of the budget in May and focus by the media and politicians on the election, it is time for ACRS members to help in whatever way they can to ensuring Road Safety becomes a key election issue later this year. However, it should be stated here that ACRS strongly believes Road Safety is a bi-partisan problem requiring all Australian's unreserved commitment to reducing road fatalities and serious injuries. ACRS will continue to advise all side of politics and assess trauma reduction proposals from any political platform and, if found to be worthwhile and effective, will strongly encourage and support the initiatives.

On the issue of the Federal Budget, it was pleasing to see parts of the budget speech by The Treasurer, The Honourable Peter Costello MP who is also the Member for Higgins (Vic), focusing on road trauma reduction. The following is an extract from his budget speech:<sup>1</sup>

*"Boosting investment in land transport infrastructure ... a high quality transport network underpins our nation's productivity, economic growth and prosperity. The Government has a strategic plan to develop this network called AusLink. We have invested \$15.8 billion in road and rail projects like the Pacific Highway, the Deer Park Bypass, and the Caboolture Motorway. Tonight I am announcing that the Government will boost its investment in road and rail infrastructure with the second AusLink plan and total funding of \$22.3 billion over five years from 2009 10. The National Network of road and rail is critical*

*to our economy and provides the link between Australia's major population and economic centres. It is the link for our exports to the world. AusLink 2 will help reduce accidents on Australian roads. The Black Spot Programme will increase to \$60 million per annum over the five years from 2009 10. The Roads to Recovery Programme constructs and maintains local roads and will be funded with \$1.8 billion. The Strategic Regional Programme supports the growth of regional industry and will be allocated \$300 million. In order to bring forward construction of some of these strategic regional roads I am announcing tonight an additional \$250 million of supplementary funding to be paid to local councils before June 30."*

Whilst ACRS welcomes the desperately needed funding for roads, particularly the amount for the Black Spot and the Roads to Recovery Programmes, the question we need to ask is, will these initiatives be enough to begin to reduce road trauma?

It must be pointed out that road crashes are costing Australia around \$17 billion per annum or 2.3% of GDP<sup>2</sup> (on top of the obvious devastating trauma to victims and family) whereas fuel excise and GST on fuel is of the order of \$11.5 billion.<sup>3</sup> Thus the \$60 million for the Black Spot Program represents only 0.5% of taxes paid by motorists and around 0.2% of the cost of road trauma. Obviously this is but a mere trickle of what revenue is available to make a significant impact on road safety issues. The Roads to Recovery budgeted fund appears to be impressive and again road users are grateful, but when put into perspective it is only 15.6% of motorist taxes paid and 12% of the cost of road trauma.

Whereas it is clear that ACRS and other Road Safety stake holder organisations have impressed on our Federal Government the importance of Road Safety for the Australian community, and they appear to be responding albeit by funding roads and rail transport, it seems that the initiatives proposed are simply helping Australia maintain the status quo. Despite the fact that both parties have pledged to continue the Auslink Black Spot programme, what is needed is for a much greater financial commitment to road safety itself, i.e. not only increasing substantially road funding but across the whole range of road safety issues.

When ACRS president Kerry Fitzgerald met with Shadow Minister Martin Ferguson AM, MP, she was asked if ACRS could make a submission to his office. The highlights of that submission were as follows:

- Leadership to ensure a safer Australia in regards to road safety should come either directly from the Prime Minister himself as in the case of France's President Jacques Chirac's commitment to road safety or via bi-partisan acceptance of a Parliamentary resolution similar to Sweden's "Vision Zero" act.
- The current situation is that road safety activities at the

<sup>1</sup> <http://www.budget.gov.au/2007-08/speech/html/Speech.htm> <sup>2</sup> [http://www.aaa.asn.au/issues/road\\_safety.htm](http://www.aaa.asn.au/issues/road_safety.htm) <sup>3</sup> <http://www.ptua.org.au/myths/petroltax.shtml>

Commonwealth level are now competing for attention in an agency which is also concerned with air and rail safety. Given the relative fatality and injury rates of road, air and rail, road safety issues should attract substantially more attention, staffing and funding. They should be an Agency entirely committed to road safety with substantial funding. Issues it should focus on among other things are: Young Drivers; Fatigue; Alcohol and drugs; Speeding; Vehicle Safety; Road Infrastructure; Statistics; and a Strategic Approach to road safety related research.

- 10% of road funds should be for road safety. Currently major road construction projects need only assign an amount of around 1% to Road Safety. This is grossly insufficient if the Commonwealth Government is serious about road safety. Furthermore, ACRS believes an investment of around \$600 million Australia-wide is needed annually to implement the following proven low-cost measures that would achieve significant results in reducing the road toll: Roadside hazard removal; Hazard protection; Shoulder sealing; Edgeline and audible edgeline; Road delineation; Roundabouts; Roadside pole replacement; and Road user separation.
- If all vehicles on our roads were upgraded overnight to be equivalent to the safest vehicles manufactured, it is estimated around 30 to 40% of lives would be saved. The Commonwealth needs to take charge of the DOTARS objectives, provide it with sufficient funding for crashworthiness research and ADR development, and encourage within its mandate strong initiatives to introduce Australian Design Rules that protect Australians involved in road crashes, both occupants and vulnerable road users. It is fair to say that we currently have the technology to save lives, but a lack of strong commitment and funding at the Commonwealth level.

Obviously road safety needs to be elevated in terms of an election issue. Current MP's and Federal election candidates need to be made aware that on average 5 people die on our roads and 60 are seriously injured and hospitalised each and every day. It is time for ACRS members to stand up and help in whatever way they can to ensuring road safety becomes a key election issue. A good start is to begin sending letters to your MP's. Highlight the various problems discussed in this and other Journal editions. If you, your family, or friends, have been touched by road trauma, be vocal and confront and ask your MP "What are you doing about road safety?" Send them copies of the front pages of past newspaper articles that report major road tragedies that have devastated families and friends. Ask them point blank "How are you going to fix this?" If there are enough of us asking and wanting change, it will happen.

In August the ACRS Office, assisted by the NSW (Sydney) chapter, will be holding a two day Australasian conference in

Sydney on ' Infants, Children, Young People and Road Safety. I hope that you will be able to attend this conference and perhaps also present a paper there.

On another issue, the College will shortly be advertising for a new Executive Officer, following the resignation in April of Dr Margaret Clarke. Margaret, who held the position for just over one year, achieved a great deal for the College in that short time, including arranging the first ever ACRS Fellowship presentation (to Lauchlan McIntosh) by the Governor General at Government House, Canberra, and later negotiating the appointment of the Governor General as Patron of the College. We will miss Margaret's administrative skills, but wish her every success as she follows a new direction in her career. In the interim, Mr Allan Armistead is assisting with the Executive Officer duties on a two-month contract and is available at the office on Mondays and Tuesdays.

Wishing you all a safe and enjoyable drive, ride and walk.

Raphael Grzebieta

*Immediate Past President.*

## Diary

**28 June to 1 July 2007: - The Annual Australasian Road Rescue Conference and Challenge**, conducted by the Australasian Road Rescue Organisation (ARRO) will be held at the Perth Convention Exhibition Centre, WA. Contact: Ron Adams tel: 08 9427 0866; email: roadrescue2007@casm.com.au.

**2 – 3 August 2007: ' Infants, Children and Young People and Road Safety' Conference**, run jointly by the ACRS and Australian Transport Safety Bureau in Sydney. For further information contact the ACRS office: eo@acrs.org.au

**31 Oct – 2 Nov 2007: Australian Institute of Traffic Planning and Management National Conference** at the National Convention Centre, Canberra. Enquiries: Kim Thomas, tel: 08 8372 7878 or aitpm@aitpm.com

**17 – 19 October 2007: Australasian Road Safety Research, Policing & Education Conference 2007 - ' The Way Ahead'**, Crown Promenade Melbourne. For more information and to register your interest visit [www.roadsafetyconference2007.com.au](http://www.roadsafetyconference2007.com.au)

**1 – 2 November 2007: New Zealand Cycling Conference 2007**, War Memorial Centre, Napier. For information: Email: [cycleconference@can.org.nz](mailto:cycleconference@can.org.nz).

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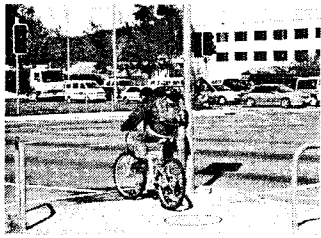
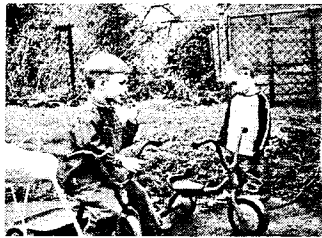
You are invited to a National Conference on  
**Infants, Children and Young People and Road Safety**

To be held in Sydney on Thursday 2nd and Friday 3<sup>rd</sup> August 2007

The primary objectives of the conference in relation to infants, children and young people are to: review indicators and trends in injury; examine current research; explore projections for the future development of the road transport system and its likely impacts; and discuss possible strategies for enhancing road safety.

Organised by the Australasian College of Road Safety in partnership with the Australian Transport Safety Bureau, with the support of the Motor Accidents Authority of NSW.

The ACRS is now calling for conference papers. Abstracts should be a maximum of 250 words and be submitted in Microsoft Word format as an email attachment by 13 June 2007 to the Executive Officer (eo@acrs.org.au). For further information call tel: 02-6290 2509



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## Executive Officer

(Permanent Part-time 15 hours per week)

The Australasian College of Road Safety Inc. is seeking an Executive Officer for its Canberra Office to commence work in July 2007.

### General Functions

The Executive Officer is responsible to the College Executive Committee for the management of the College's day to day affairs. These include:

- carrying out all routine administrative processes;
- managing staff and volunteers;
- planning and organising College events such as seminars and conferences;
- representing the College to government, business and the community; and
- encouraging the interest and enthusiasm of College members to pursue the cause of road safety.

### Selection Criteria

- An interest in improving road safety;
- A university degree or equivalent;
- Computer literacy with good knowledge of and experience in using the Microsoft Office Professional suite of programs;
- Writing and general communication skills of a high order;
- A good understanding of office procedures and administrative tasks;
- A basic knowledge of how to prepare a budget and to keep financial records;
- Ability to maintain a high standard of work without supervision
- Capacity to communicate at all levels with government, business, academia and community groups;
- Skill in planning and policy formulation

Applications should be submitted by 15 June 2007 to the ACRS, PO Box 198, Mawson, ACT 2607 or email: eo@acrs.org.au or fax: 02 – 6290 0914. For a more detailed Job Description and Terms and Conditions for the position call 02-6290 2509 or use the email or fax contacts as above.

# Quarterly News

## Chapter News

### Australian Capital Territory and Region

The Chapter held its AGM on 26 April. Driver distraction was identified as a strong candidate for the next in the Chapter's seminar series. The NRMA-ACT Road Safety Trust has funded a research project examining the available literature and the project report could form the basis of the seminar. The Chapter is mindful the College hosted an international Conference on 'Driver Distraction in Sydney in June 2005.. The papers from this conference would also be examined for possible speakers and themes. The proposed timing of the seminar is September 2007.

### New South Wales (New England)

The Chapter has been inactive for the past few months. A meeting is to be planned shortly to discuss the future of the Chapter.

### New South Wales (Sydney)

#### National conference

The NSW (Sydney) Chapter is currently involved in planning the National Conference, " Infants, Children and Young People, and Road Safety" , to be held on 2-3 August 2007 in Sydney, reflecting the theme of the inaugural 2007 UN Global Road Safety Week.

#### Seminar program in 2007

We are grateful to the Motor Accidents Authority for renewing funding for our seminar program for the 2007 calendar year. Two seminars have been conducted to date: The first seminar examined ' Road safety, transport planning and urban design issues' . It was held at Parliament House, Sydney, on Friday 23 February 2007. The speakers were: Professor Marcus Wigan (University of Melbourne), who spoke about the integration of transport planning and road safety; Dr Ray Brindle (Eldamar Research Associates), who spoke about land use planning and road safety; and Mr Ian Faulks (Safety and Policy Analysis International), who spoke about the policy and planning systems for linkages between the three areas. The seminar was facilitated by Ms Liz de Rome. Thirty six people attended.

The second seminar, on ' Current Australian initiatives in international road safety' was a partnership event with The George Institute for International Health in promotion of UN Global Road Safety Week. The seminar was held on 2 April 2007 at The Darlington Centre, Sydney University. The speakers were: Ms Liz de Rome (ACRS), who delivered introductory remarks; Professor Robyn Norton (The George

Institute), who outlined UN Global Road Safety Week; Ms Lori Mooren (The ARRB Group), spoke on collaborations for road safety; Professor Mark Stevenson (The George Institute) and Dr James Yu (The George Institute China), presented a paper on the China seat belt study in Guangzhou; Dr Rakhi Dandona (The George Institute India), discussed road traffic injuries and the road safety agenda of policymakers in India; Dr Hung Dang Viet (The George Institute), spoke on motorcycle helmet use in Vietnam. The seminar was chaired by Dr Rebecca Ivers, The George Institute. Forty people attended.

#### Media activities:

Ms de Rome was interviewed by the Australian Financial Review on corporate road safety, and by the Los Angeles Times on motorcycle safety. Professor Stevenson was interviewed by the BBC World Service on seat belt promotion in China. Mr Faulks was interviewed by the BBC World Service on intelligent speed adaptation.

### New Zealand

During the UN Global Road Safety Week in April, the Chapter held a Seminar on Young Drivers in Wellington. It was opened by the Minister for Transport Safety, and involved speakers from the Police, Ministry of Transport, and the Automobile Association.

### Queensland

The Queensland Chapter held its first meeting and seminar of the year on Tuesday 6 March 2007. It was the Chapter's AGM and the following people were elected to positions for 2007: Chairman: Barry Watson (CARRS-Q); Deputy Chairman: Peter Kolesnik (Queensland Police); Secretary/Treasurer: Maxine Nott (CARRS-Q); Committee Members: Bevan Rowland (CARRS-Q); Renae Moore (Queensland Transport); Lyle Scheffe (Roadcraft); Kerry Dunne (Queensland Police).

The Chapter also hosted a seminar with guest speakers Chief Superintendent Kerry Dunn and Mr Peter Kolesnik, State Traffic Support Branch, Queensland Police Service. The seminar "Innovation in traffic enforcement: where are we now and where will we be in 10 years time" focused on current practices in traffic law enforcement as applied by the Queensland Police Service, and drew on comparisons with other enforcement agencies, both internationally and within Australia.

As part of the First United Nations Global Road Safety Week, the Queensland Chapter co-hosted a breakfast forum at the Parliamentary Annex from 7:30am to 9am on Monday 23 April 2007. This event was held in partnership with the Queensland Parliamentary Travelsafe Committee, and focused on the UN

Week's theme of young road users. The forum featured presentations from: Mr Phil Reeves MP, Parliamentary Secretary (Transport); Associate Professor Ann Williamson, Acting Director, Injury Risk Management Research Centre, University of New South Wales; Associate Professor Barry Watson, Centre for Accident Research & Road Safety - Queensland (CARRS-Q), QUT. The event was well attended by key stakeholders in road safety. The next meeting and seminar for the Queensland Chapter is Tuesday 5 June.

### South Australia

The Lunchtime Road Safety Dialogue meetings have continued, thanks to the sponsorship of the Motor Accident Commission. The next Dialogue on Tues 22nd May with main speaker Phil Allan, Executive Director, Safety and Regulation Division, DTEI, will be on Level Crossing Safety and will be preceded by the Chapter AGM. This will be an important AGM as two of the core members of the inaugural Branch Committee will be retiring. Chris Thomson (Vice President) and Ross McColl (Secretary). We are extremely grateful for their contribution to the College over the last 6 years. It signals a "changing of the guard" and the need to have some new people on the committee. Adelaide hosted the 5th APEC (Asia-Pacific Economic Cooperation)

Transportation Ministers Meeting from 28 to 30 March 2007. The ACRS Chapter was invited to attend the Road Safety Summit, which was opened by Federal Transport Minister Mark Vaile.

The 20th June Lunchtime Road Safety Dialogue main speaker will be Joel Taggart, Chairman of the Salisbury Community Road Safety Group and Representative for SA for the World Youth Assembly, Geneva, April 2007. He will be reporting on the World Youth Assembly's Declaration for Road Safety

### Victoria

The next seminar in Victoria will be conducted between 4pm and 5.30pm on Tuesday, 29 May at the VicRoads Theatre, 60 Denmark Street, Kew 3101. The theme for the seminar is 'Best Practice Fleet Safety Forum' and will feature presenters from industry, academia and government. Key issues to be explored will include new and impactful safety technologies, trends in vehicle fleet safety and best practice in managing fleets within an Occupational Health and Safety framework. The seminar will be of great interest to fleet managers, OH&S officers, road safety professionals, researchers and insurance professionals.

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ROAD SAFETY  
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## Australian News

### ACRS Register of Road Safety Professionals – Announcement

The ACRS Executive Committee congratulates the following Associate Fellows of the College on being added to the Register of Road Safety Professionals: Mr Robin Anderson (RRSP in Administration and Policy); Dr Rebecca Ivers (RRSP in Research and Evaluation); Ms Maureen Kohlman (RRSP in Driver Education); and Mr Ken Smith (RRSP in Administration, Policy, Research and Evaluation).

To be recognised by the College as a Registered Road Safety Professional (RRSP), applicants must already be an Associate Fellow of the College and satisfy a panel of experts that they have acquired a high level of academic qualifications and experience applicable to their particular discipline. Application forms and minimum qualifications and experience details may be downloaded from the ACRS website – [www.acrs.org.au](http://www.acrs.org.au).

### Young Driver Study Results Due Soon

The George Institute, Sydney, expects to release results later this year of a young driver study, which will highlight the leading determinants of motor vehicle related crashes and injuries among young drivers. Over 20,000 young drivers have participated in the study. It is anticipated that the findings will contribute to further strategies aimed at reducing road injury and death among young drivers. Professor Mark Stevenson, Senior Director, Research and Development at the George Institute, said, “The George Institute welcomed the recommendations made by the NSW Government’s Young

Driver Advisory Panel in late 2006. Restricting passenger numbers, zero tolerance for speeding offences, banning the use of mobile phones in cars and encouraging parents to play an increased role in driver education are certainly steps in the right direction. I am particularly pleased that research from the Institute played a key role in the Panel’s recommendation related to a ban on mobile phone use – these significant changes to the licensing system have been well overdue.”  
(Source: Newsletter of the George Institute March 2007)



### Annual Cost of Road Traffic Crashes Runs to Billions

A 2006 report on ‘The Economic Costs of Road Traffic Crashes’ states that the annual cost of road traffic crashes (RTCs) in 2003 was approximately \$17 billion, or 2.3% of the Gross Domestic Product (GDP). There were, however, considerable regional variations in costs, ranging from approximately 0.62 to 3.63% of Gross State Product (GSP). The following table shows the State/Territory comparison of these costs based on year 2003 data.

Region	Estimated cost (Aust \$ millions) in 2003					
	Fatalities	Serious injuries	Minor injuries	Property damage	Total cost of RTCs	Cost of RTCs as % GSP
NSW	987.61	3522.98	260.90	925.60	5697.10	2.15
VIC	604.66	2653.15	214.38	673.55	4145.75	2.14
QLD	568.02	2276.80	168.31	584.50	3597.63	2.80
WA	329.82	1126.29	158.98	313.30	1928.39	2.33
SA	285.84	582.80	107.86	189.53	1165.93	2.32
NT	97.11	172.30	9.63	54.13	333.17	3.63
TAS	75.12	156.02	28.52	50.37	310.04	2.37
ACT	20.16	54.79	3.38	15.19	93.51	0.62

(Source: AAA Motoring Directions, page 6, Dec 2006 from a paper published originally by Connelly, L.B and Supangan, R (2006) ‘The Economic Costs of Road Trauma: Australia, States and Territories’ Accident Analysis and Prevention, Vol.38, pp1087-93, printed in Elsevier Magazine.)

## New Zealand News

### NZ Road Innovation Award

TRANSIT New Zealand is offering an award of \$2,000 for the best paper on roads presented at any conference in New Zealand or overseas, in the previous twelve months. The award includes a framed certificate and is open to New Zealand residents or citizens. The Judging Criteria include 1) Value of the paper; and 2) Quality and presentation of the paper. The objectives of the award are to a) encourage innovation in roads in New Zealand; b) strengthen continuous improvement in the road industry; and c) support excellence in research. Nominations for the award must include a copy of the paper as presented, a covering letter of up to 100 words explaining why the paper should be considered and be addressed to 'International and Business Services Manager, Transit NZ, PO Box 5084, Wellington, fax: (04) 496-6613 or email: douceline.vanarts@transit.govt.nz. The closing date for nominations is 30th June 2007.

### New Zealand Road Toll Drops to New Low

Last year 387 people died on the roads, 17 fewer than in 2005 and the lowest yearly road toll since 1960, when 374 died. More than 35,000 people have been killed on New Zealand's roads since the first known fatal crash in Christchurch in 1908. [Ed: By comparison, according to Internet sources, about 31,000 New Zealanders were killed in two world wars and other conflicts during the same period]. The worst year for fatalities was 1973, when 843 were killed. As recently as 1990, there were 729 road deaths. Since then, annual road deaths have dropped 47 per cent, in spite of a 42 per cent increase in the number of vehicles on the roads and a 21 per cent increase in population. (Source: Land Transport News, February 2007)

### 70th Anniversary Road Code to be Published

A new-look NZ Road Code is being published 70 years after the release of the first Road Code in 1937. The new Road Code has been split into two volumes – 'The Official New Zealand Road Code' and the 'Licence and Study Guide'. The latter contains driver licensing information and sample test questions. Updated versions of the heavy vehicle and motorcycle road codes are also to be released in the first half of this year. (Source: Land Transport News, February 2007)

### Safety Targeted

The New Zealand Police began the 2007 school year with a campaign to get drivers to slow down near schools. Speed

limits are being enforced within 250m of the boundaries of all schools and pre-schools. Drivers who exceed the speed limit by more than 4 kph will be ticketed. In general, speed enforcement and camera deployment times will be between 7.30am and 6.00pm during the week. The program extends the 'Speed Kills Kids' campaign introduced last year and is supported by national advertising. (Source: Land Transport News March 2007)

### Older Drivers Skills Boost

Older people across New Zealand are being encouraged to brush-up their driving knowledge and skills following the 1st February launch of a revised and expanded version of the popular Safe with Age driver refresher course. The revised course has redeveloped teaching materials, a new focus on self-assessment, suggestions on alternatives to driving, and the offer of a subsidised practical coaching and assessment session for participants. The course is free and is run by local groups coordinated by Land Transport NZ. Some 400 courses are run annually by 40 course providers across the country. Land Transport NZ is aiming to increase the participation from 5,000 to 8,000 participants annually. (Source: Land Transport News March 2007)

### New Rules for Heavy Vehicle Brakes

New safety requirements for heavy vehicle brakes were introduced in NZ on 1 March. The aim is to improve safety for all road users by improving heavy vehicle braking performance. The new standards are being phased in gradually, with newly registered heavy vehicles having to meet international brake standards by 1 July 2008. In addition, improved brake testing procedures will be phased in over two years as testing stations install new equipment. (Source: Land Transport News March 2007)

### More Signals Introduced for Motorway Ramps

Following a successful trial of ramp signals on Auckland motorways, peak hour traffic signals are being introduced as a permanent feature of Auckland's Western Ring Route. Nineteen on-ramps will be fitted with the signals, with preparatory work being done for a further fourteen ramps. Ramp signals are placed at the top of motorway on-ramps to manage the traffic flow onto the motorway. With each green light, two cars (one from each lane) are able to drive down the ramp to merge easily, one at a time, with motorway traffic. Separating the vehicles traveling down the on-ramp makes merging into the motorway easier and causes less disruption to motorway traffic flow. (Source: Land Transport News April 2007)

## European News

### ETSC Wants Uniform Enforcement

The European Transport Safety Council (ETSC)\* is pushing for a European-wide directive on enforcement standards for speeding, drink driving and seat belt use. Currently states in the European Union have varying standards of enforcement in these areas. The ultimate aim is to have all traffic offences covered by minimum legal standards that would apply throughout the Union. (Source ETSC)

*\*The ETSC, founded in 1993, is a Brussels-based independent non-profit organisation dedicated to the reduction of the number and severity of transport crashes in Europe. The ETSC seeks to identify and promote research-based measures with a high safety potential. It brings together 37 national and international organisations concerned with transport safety from across Europe.*

### Drink Driving Down

A new study published this April under the European Transport Safety Council's (ETSC) Road Safety Performance Index (PIN)\*\* indicates that in Europe, improvements in drink driving are contributing their share to enhancing road safety. However, in nine countries, insufficient progress on reducing drink driving deaths has slowed down overall improvement over the last decade. The greatest progress has been made in the Czech Republic where deaths from drink driving accidents dropped more than 11% per year faster than other road deaths. In Germany, drink driving deaths decreased more than 6% per year faster than other road deaths, and in Poland this is almost 5%. Slovakia, the Netherlands, Latvia, Austria, France and Greece also follow this positive trend.

(Source ETSC)

*\*\* The Road Safety Performance Index (PIN) is an instrument to compare European Union Member States' performance in road safety and spur them on to greater efforts. Rankings are published periodically.*

### Students Recruited for Black Spot Campaign

ETSC staff are planning lectures on improving road infrastructure safety at universities in Spain, Italy and Poland as part of a new Infrastructure Program named 'Roads to Respect'. Students from these universities will be recruited to attend a five-day road safety training course in Brussels. After returning to their countries, the students will be encouraged to identify a high risk site and develop their own campaign plan to get it treated. The best students will be invited to Brussels to attend an Award Ceremony and present their project results to road safety scientists, policy makers and private companies. If successful, the program will be extended to other EU countries. (Source ETSC)

### PEPPER Spices up Enforcement

The Police Enforcement Policy and Programs on European Roads (PEPPER) project is funded by the European Commission to improve traffic law enforcement. The PEPPER consortium consists of 18 organisations representing Europe's leading road safety research institutes. Various national traffic police forces that are members of the European Traffic Police Network (TISPOL) participate actively in the PEPPER project, which started in March 2006 and is due to end in August 2008

The PEPPER project looks critically at all relevant aspects of enforcement, such as target behaviours, the detection of infringements, administrative and legal handling after infringement, decisions concerning the volume, location and timing of enforcement, effects of enforcement on road user behaviour and accidents, enforcement methods and tools, collection of enforcement data, and enforcement in the social context. Speeding, drink driving and use of seat belts are especially targeted. The need for improved enforcement data and better understanding of the impacts is recognised, and the potential of innovative technologies in the different links of the enforcement chain is studied. The work is organised in five work packages (WP).

**WP1** (Strategic, legal, administrative and social context of TLE) studies the role of enforcement in traffic safety policies, and analyses the roles of different stakeholders. The results indicate how the enforcement chain could be strengthened.

**WP2** (Model for enforcement data collection systems and associated pilots) develops models for strategic enforcement monitoring databases. The results serve the development of enforcement methods and monitoring and planning of enforcement.

**WP3** (Innovative technologies and approaches for improving compliance with traffic laws) studies the possibilities and cost benefit ratio of modern machine vision and communication technologies in enforcement.

**WP4** (Good practices in traffic enforcement) defines good practices in traffic enforcement by studying current practices, producing scientific estimates of the effectiveness and efficiency of different enforcement methods, assessing monitoring and evaluation methods and surveying current realities in TLE.

**WP5** (Dissemination) concentrates on spreading the results across relevant stakeholders in Europe. To ensure maximum penetration and easy access, the results are disseminated also in targeted seminars, on CD-rom and in the internet, in addition to more conventional media. New member states are especially targeted to. (Source: <http://www.pepper-cu.org>)

## UK Government backs benchmarking for fleets

Fleet operators in the UK are being urged to sign up for a major project providing free benchmarking services by logging on to [www.fleetsafetybenchmarking.net](http://www.fleetsafetybenchmarking.net). [Ed: The organisers have informed me that Australian companies may also access this free service]. The project is being launched by the Fleet Safety Forum, a division of road safety charity Brake, in partnership with risk management specialists Interactive Driving Systems. Funded by the Department for Transport, it allows companies to anonymously compare their fleet safety procedures and crash data with that of other companies, to help them identify potentially life-saving improvements. Crash analysis, risk audits and benchmarking are crucial to effectively managing road risk, helping companies assess their fleet safety processes and policies and identify potential improvements. The project can help fleet managers to: a) carry out effective self-audits relating to their fleet safety policies and procedures; b) anonymously benchmark their company's crash data and safety standards with other organisations; and c) network with other fleet managers. Anyone with responsibility for a company fleet of any vehicle type can benefit from the project, as long as they have at least 20 drivers or vehicles that

are used for work purposes (whether the vehicles are owned by the company or employees). (Source: Brake, the UK's national road safety charity)

## An Internet Website Worth Visiting

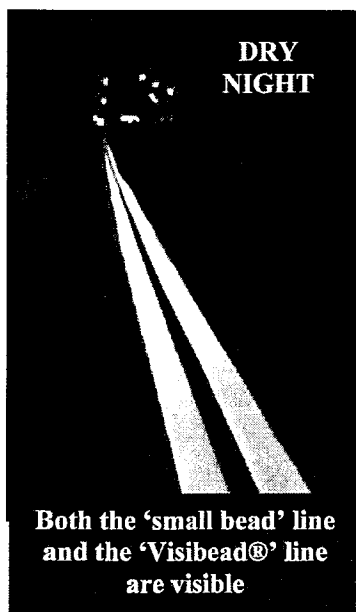
'Brake' is a United Kingdom road safety charity, which operates its own website at [www.brake.org.uk](http://www.brake.org.uk). The organisation has its headquarters in Yorkshire. So effective has been Brake's work for road safety that its Chief Executive Officer, Mary Williams, was awarded the Order of the British Empire in the year 2000. Brake has two main aims:

- To prevent death and injury on the roads through education of all road users and campaigning for Government improvements to road safety; and
- To care for people who are bereaved or affected by serious injury in a road crash through support services, including a helpline and literature distributed through police officers.

Brake founded and runs Road Safety Week as an annual flagship event to stimulate community involvement in promoting road safety awareness year-round. See the Road Safety Week website at [www.roadsafetyweek.org.uk](http://www.roadsafetyweek.org.uk).

Advertisement

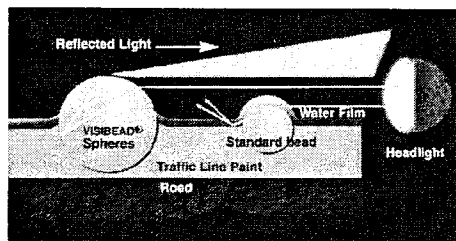
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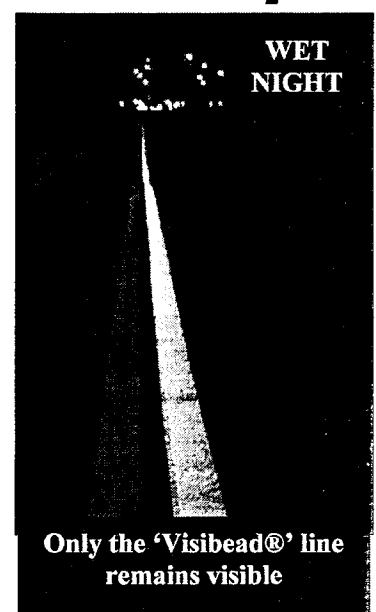
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[ Photographs taken at Potters demonstration site at Jerrabomberra Road, Canberra. Rain simulation by water-cart ]

## North American

### USA Runs Major National Seat Belt Campaign



The USA is running a nation-wide seat belt use campaign during May and June with the catchy title 'Click it or Ticket'. According to the National Highway Traffic Safety Administration, more than 15,000 passenger vehicle occupants died in traffic crashes between the night time hours of 6:00 p.m. and 5:59 a.m. in the USA during 2005, and 59 percent of those passenger vehicle occupants killed were not wearing a seat belt at the time of the fatal crash. The equivalent daytime figure for vehicle occupants killed while not wearing a seat belt was 44 percent. The NHTSA campaign includes the provision of a wide variety of posters that can be downloaded from the Internet by participating organisations (see [www.nhtsa.dot.gov/buckleup/ciot-planner/planner07/index.htm](http://www.nhtsa.dot.gov/buckleup/ciot-planner/planner07/index.htm)). The campaign includes strong back up from the law enforcement agencies.

(Source: National Highway Traffic Safety Administration)

## Asian News

### Oz Expertise Assists Chinese Road Safety

The George Institute, which recently opened a branch office in Beijing, has announced the results of a road safety initiative that it began in 2005 as a pilot project in Guangzhou, Southern China. With funding from BP-China, and with the support and involvement of Chinese authorities, the initiative was aimed at increasing seat-belt use by means of a comprehensive program. The seat belt intervention utilised a novel blend of scientific expertise with practical approaches including enhanced law-enforcement practices, extensive social marketing and health education. To date, the intervention in Guangzhou has included a social marketing campaign involving television, radio and newspapers; intensive enforcement; training of traffic police and internal management of taxi enterprises.

China accounts for around 15% of the world's total number of deaths from traffic accidents each year. Motor vehicle production has septupled since 1992 and despite the availability of seat belts in almost all passenger cars in China and laws requiring restraint use, the habitual use of seat belts is low. With the human toll alone from road traffic injuries in China around 100,000 deaths per year, there is an urgency to implement such interventions in the major cities.

Prior to the intervention, around half of all drivers and 40% of passengers in Guangzhou used seat belts. Since implementation of the intervention, 62% of drivers and 53% of passengers in Guangzhou are wearing a seat belt (with an even greater improvement among taxi drivers - more than 20% increase in seat belt use). This translates into the equivalent of

530 Disability Adjusted Life Years (DALYs) saved as a result of the intervention." The China Seat Belt Intervention' has demonstrated how simple, cost-effective strategies can save lives in highly populous regions. The next challenge for the authorities will be to replicate the intervention in other Chinese cities. (Source: *George Research March 2007*)

### Indian Government Concerned over Road Toll

Rapid industrialisation in India is increasing the amount of traffic on India's roads, resulting in an ever-increasing road toll, with more than 90,000 people killed annually. In response, the Indian government has introduced a bill in parliament proposing a steep increase in fines for traffic offences. It is hoped that this will impact on the country's chaotic and undisciplined driving. The Indian road toll accounts for nearly 8% of the world's total fatalities.

The number of drivers in India is set to soar from seven in 1,000 today to 11 in 1,000 by 2010 - a doubling since 2000 when 0.5% of Indians had a car. Describing being a road user in India, BBC Correspondent Sanjoy Majumder writes that "Stepping out on the roads and highways of India is not for the faint hearted. At any given time, pedestrians compete for space with a dizzying variety of vehicles: buses, cars, trucks, three-wheel auto-rickshaws, hand-pulled carts and, of course, the occasional cow. Many drivers, however, simply disregard traffic rules and road accidents caused by reckless driving are quite common in India - among the highest in the world." (Source: *Sanjoy Majumder, BBC News, Delhi, May 2007*)

## World

### Statistics Show High Cost of Road Traffic Crashes

According to recent (2006) estimates, 1.2 million people are killed in road traffic crashes worldwide and 50 million are injured each year. The annual economic cost of this carnage for all age groups is estimated at between US\$65 and US\$100 billion. Latin America and the Caribbean have the highest road traffic deaths per capita, losing approximately 122,000 lives each year. East Asia and the Pacific region have the highest numbers of deaths: 188,000 in 2000, expected to rise to 337,000 per year in 2020, with most of these being in China. The highest anticipated growth is in South Asia—144 percent in road traffic fatalities by 2020, with India accounting for the bulk of them. Sub-Saharan Africa is projected to register an 80 percent increase by 2020— the same as predicted for East Asia and Pacific. It is only in high-income countries that the road toll is expected to decline.

(Source: [www.worldbank.com](http://www.worldbank.com) - October 2006)

# Contributed Articles

## The ATSB Answers Questions on the Australian National Road Safety 2010 Strategy

### Introduction

The Australian Transport Council (ATC), which comprises Federal, State and Territory Ministers responsible for transport, launched the National Road Safety Strategy in 2001. This Strategy is being implemented through a series of two-year Action Plans monitored and coordinated by the Australian Transport Safety Bureau (ATSB). A key objective of the National Strategy is to reduce the number of road fatalities per 100,000 population by 40% from 9.3 in 1999 to 5.6 in 2010. With approximately three more years in which to achieve this objective, it was felt appropriate by the College to seek an assessment of current progress from the ATSB. The College is grateful to the ATSB for providing the following responses to our questions:

**Question 1: The target set in the year 2000 for the National Road Safety Strategy was to reduce the fatality rate per 100,000 population to 5.6 by the end of 2010. What were the scientific and policy bases for choosing this target?**

The target was based on estimates of the likely effects of implementing known road safety measures. These estimates drew on a combination of empirical evidence and expert judgement and analysis. Estimates were derived for available measures in a number of areas, including improvements to road infrastructure, improved vehicle occupant protection, and measures to reduce high risk road user behaviour.

When the potential combined effect of all measures was estimated, adjustments were made to avoid double counting of benefits (that is, to allow for overlap between measures). An allowance was also made for the effect of expected growth in vehicle use.

This estimation process was intended to give an indication of the sort of improvement that was reasonably achievable, given a solid effort. On that basis, partners to the Strategy were able to agree on a target that was considered challenging, but realistic.

The estimates indicated that close to three quarters of the targeted 40% reduction in per capita fatality rates could be achieved from maintenance of existing real funding for road measures, and the flow-through effects of vehicle safety improvements that were already implemented or scheduled.

Most of the remaining improvement was expected to be achievable through improved compliance with existing rules on drink driving, speed and restraint use (achieved by

extending and refining enforcement programs, backed by public education and persuasion).

The original estimates have been reviewed a number of times. *The National Road Safety Action Plan 2005 and 2006* included the following summary comment, which is still relevant:

*A recent examination of underlying assumptions provided no grounds for revising these broad expectations. However, it has become clear that some of the specific assumptions in the behavioural area were incorrect.*

*For example, it is now evident that the original estimation of future gains from speed measures was highly conservative — this is borne out in both research-based evidence on the potential safety benefits of travel speed reductions ... and the large fatality reductions achieved in Victoria following the strengthening of compliance measures in 2001–02.*

*On the other hand, projected trauma reductions from improved compliance with drink driving and seat belt laws have so far not been realised.*

More details and discussion of the analysis and assumptions underlying the target are provided in the National Road Safety Action Plan 2003 and 2004, and later Action Plans (<http://www.atcouncil.gov.au/documents/atcnrns.aspx>).

**Question 2: Looking at the ‘ Road deaths per 100,000 population, rolling 12-month data’ graph (see Fig.1), there seems to have been an encouraging general downward trend in the road toll until the end of 2004. After this the general trend seems to have been level or slightly upward.**

**a) Are there any obvious reasons for this change? Is it a case of having implemented all the ‘ easy wins’ or ‘ low hanging fruit’ or are there other reasons as well?**

There are no obvious reasons for the change. It is worth noting that the change did not occur across all jurisdictions: fatality rates have continued to fall in some jurisdictions but have risen in others.

The perfect “ low hanging fruit” policy option would be one that was simple, obvious, inexpensive and immediately popular as soon as the idea was put forward. If such fruit ever existed, it must have been picked a very long time ago.

A lot of very successful measures were introduced in the 1970s, 1980s and 1990s. With the benefit of hindsight, some of these might look like obvious “ easy wins”. But it is very

difficult to think of a major successful measure that did not attract significant opposition at the time (on one or more of a number of grounds: too expensive, impractical, unnecessary, an unacceptable incursion on road users' freedom ...).

So the real question is not whether we have run out of easy wins, but whether we have run out of options that are worth implementing: options that are well supported by evidence and analysis, likely to be cost effective, and likely to have a substantial impact. The answer to that is a clear "no". The National Road Safety Action Plan 2007 and 2008 sets out a range of important options that meet these criteria.

**b) Is the economy increasing vehicle kilometres travelled (VKT) and therefore exposure?**

Aggregate VKT per capita has been growing at an average rate of about 0.8% per year since 1999. This is similar to the growth rate in the mid to late 90s.

There is no reason to believe that growth in total vehicle usage has accelerated sharply since the end of 2004. In fact, rising fuel prices have probably slowed the rate of growth slightly. So the fact that there has been no net reduction in the death rate from January 2005 to March 2007 (in contrast to the downward trend over the five years to December 2004) cannot be explained in terms of increasing total vehicle use.

A related question is whether growth in vehicle use accounts for the gap between the current fatality rate and the benchmark of pro-rata progress toward the 2010 target (see figure below).

The calculations on which the NRSS target was based assumed that vehicle usage would increase somewhat faster than the population growth rate, and that this would partly offset the effects of safety measures. In particular, predictions of rapid growth in VKT for heavy vehicles were taken into account.

The actual growth rate in VKT per capita has been higher than had been assumed when the NRSS target was developed. However the difference between expected and actual aggregate exposure growth only accounts for about one quarter of the current gap between the actual death rate and benchmark of pro-rata progress toward the target (even if we make the worst-case assumption that every one per cent increase in exposure tends to increase road deaths by one per cent).

One important exposure change, not predicted when the NRSS was developed, has been a substantial increase in motorcycle usage. Motorcycle deaths have increased by 25% since 2000. Without this increase, the total road fatality rate would have been appreciably lower – but still above the line representing steady pro-rata progress toward the 2010 target. (Further information on motorcycle trends is provided at Question. 4).

**Road deaths per 100 000 population**

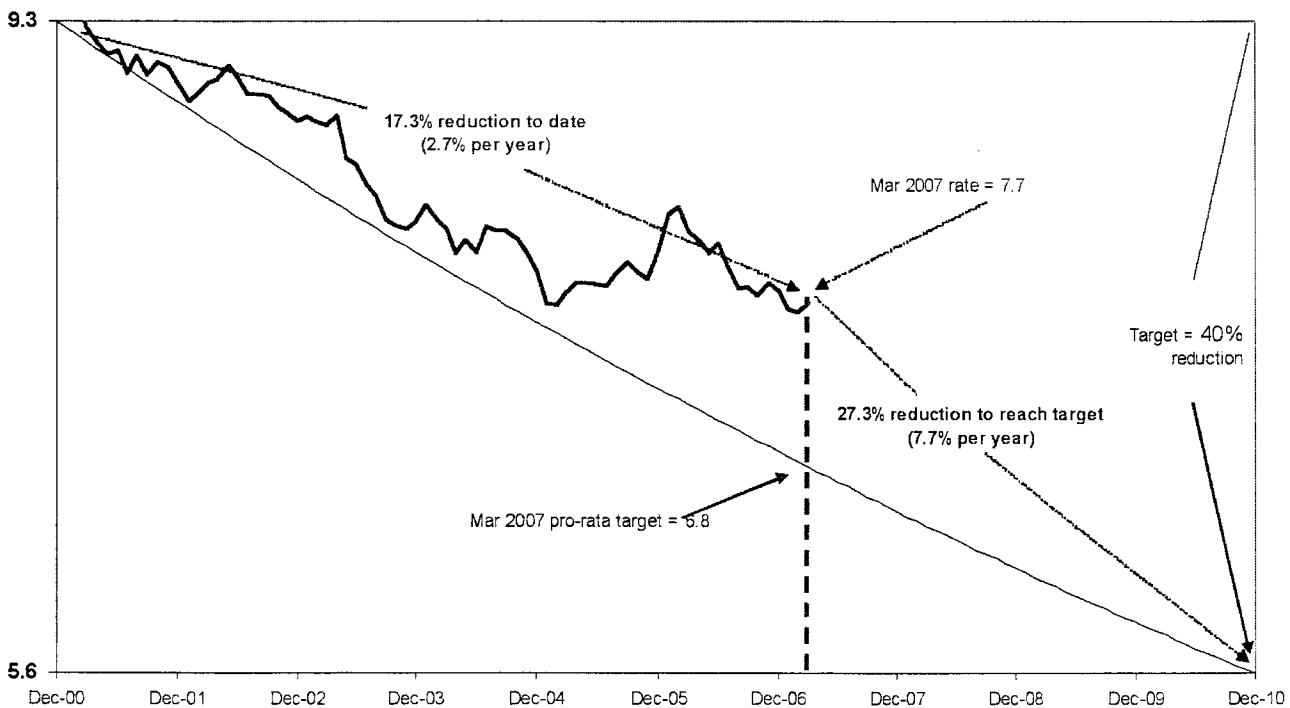


Figure 1: Progress toward the 2010 target

**Question 3:**

a) The ‘Deaths per 100,000 population’ graphs for the different States and Territories show marked differences. In particular it is noticeable that NSW, Queensland, Tasmania and WA all substantially failed to achieve their pro-rata targets at the end of 2006, and only one State (South Australia) achieved lower than its pro-rata target.

The NRSS does not specify targets for individual jurisdictions, but the criterion of pro-rata progress toward a 40% fatality rate reduction by 2010 does provide a benchmark for assessing progress.

Nationally, pro-rata progress would have involved a 27% reduction in the road fatality rate by the end of March 2007 (relative to the 1999 rate).

By the end of March 2007, two states were very close to this benchmark: NSW and SA both had reductions of 26%. Victoria (which had the lowest state death rate at the start of the decade) had recorded a reduction of 20%.

In terms of absolute rates, Victoria (6.5 deaths per 100,000) and NSW (6.6) have the best state results. A further reduction of around 15% would bring both these states down to the national target rate for 2010: no more than 5.6 deaths per 100,000 population.

The ACT’s figures need to be interpreted with caution (numbers are small and the road system atypical) but they are encouraging: a 35% reduction to March 2007, bringing the absolute rate for the ACT down to 3.9 deaths per 100,000 population.

Looking at the national figures to date, it is very difficult to be optimistic about the prospect of meeting the national target by 2010. At the same time, looking at the results for some individual jurisdictions, a target of a 40% reduction over 10 years does not appear to have been inherently unrealistic.

**b) Can any of the differences be attributed to different inclusion criteria for the jurisdictions?**

The ‘inclusion criteria’ determine which deaths are counted as road deaths. There are some minor differences between jurisdictions, but only a very small proportion of land transport deaths are affected. The effect on apparent road death rates would be minimal, and there would be no effect on trends over time within jurisdictions over the current decade (since the definitions have not changed).

**c) In addition, is it possible to determine any correlation between the success levels of the different jurisdictions and their commitment to reducing road trauma as evidenced by their funding commitment to road safety policies and programs?**

There is no historical data that could be used to address this question. Measuring total road safety related funding in a meaningful, comparable way across jurisdictions is extremely difficult. There are many different types of safety-related

expenditure, organisational and program structures differ, and judgements need to be made about how to quantify the safety component of expenditure on programs that address both safety objectives and other objectives (such as road construction or police patrols).

In the current Action Plan (covering 2007 and 2008), all jurisdictions have made a broad commitment to improving the range of road safety performance indicators that are available, including measures of both inputs and outcomes. Priorities endorsed by SCOT include working toward consistent collection, recording and reporting of data on safety-targeted road infrastructure spending, and the scale of enforcement efforts.

Even with improved data, a study of the correlation between aggregate inputs and aggregate outcomes, across eight jurisdictions, would probably not produce very useful results. There is already ample evidence (from other research) that investment in safer roads or better enforcement can improve safety outcomes. The aim of collecting input performance indicators is to monitor implementation (not to run dodgy correlation studies to determine whether implementation is a good idea).

**Question 4: The ‘Road User Index’ clearly shows a greatly increased level of motorcyclist deaths since the year 2000, whereas the trend for all other road users is either level or slightly downwards. Has there been an increase in motorcycle usage and in particular, are the baby boomers an increasing proportion of this population?**

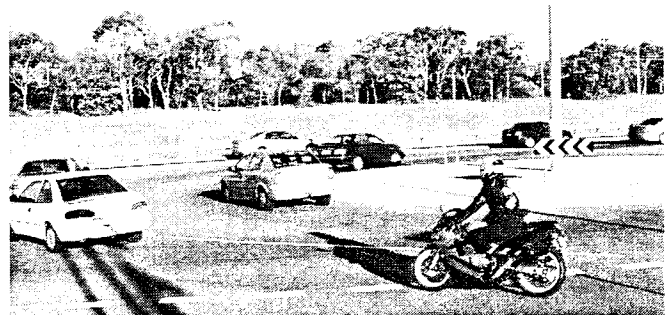
There has been a substantial increase in motorcycle registrations since 2000.

From 2000 to 2005, the average annual increase in motorcycle registrations was 4.2%, compared to average annual growth of 2.5% for total vehicle registrations.

Over that period, motorcyclist deaths increased by 23%. Total road deaths decreased by 10%.

The number of deaths per registered motorcycle decreased over this period, but not as much as the decrease in total deaths per registered vehicle. Table 1 provides more detail.

Deaths among motorcyclists of the ‘baby boomer’ generation have risen much more rapidly than for other age groups (Table 2 and Figure 2). However most motorcycle deaths still involve younger riders. Over the three years to March 2007, 74% of motorcyclist deaths were people aged under 42; 23% were aged 42 to 61.





Deaths per registered Motorcycle

	Motorcycle registrations	Motorcyclist deaths (all ages)	Deaths per Registered MC
2000	342,365 (est)	2000 191	5.58
2001	350,930	2001 216	6.16
2002	370,982	2002 224	6.04
2003	377,271	2003 188	4.98
2004	396,309	2004 196	4.95
2005	421,923	2005 234	5.55
average annual change	4.2%	1.6%	-2.5%

Deaths per registered vehicle

	Vehicle registrations	Total Deaths	Deaths per Registered Vehicle
2000	12,372,790 (est)	2000 1,817	1.47
2001	12,477,000	2001 1,737	1.39
2002	12,822,000	2002 1,715	1.34
2003	13,163,000	2003 1,621	1.23
2004	13,533,000	2004 1,583	1.17
2005	13,920,000	2005 1,627	1.17
average annual change	2.5%	-2.5%	-4.9%

Table 1: Motorcycle registrations, total vehicle registrations and deaths per registered vehicle  
(Source: ABS Motor Vehicle Census and ATSB Monthly Road Death Series)

Ages	Annual growth
<=21	0.0%
22-31	1.8%
32-41	3.9%
42-61	10.6%
>=62	2.6%
All Ages	3.7%

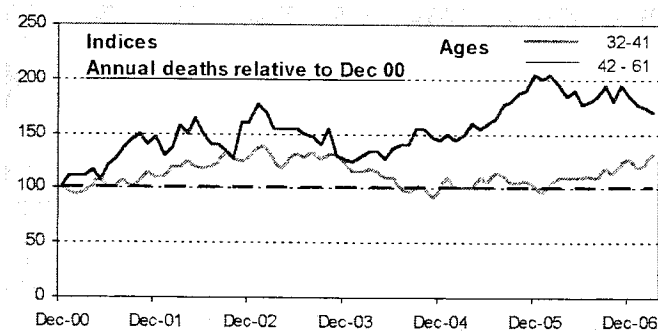


Table 2: Average annual increase in number of motorcyclist deaths, by age group (March 2000 to March 2007)

Figure 2: Motorcyclist deaths: selected age groups  
(Each data point represents the number of deaths in the preceding 12 month period)

**Question 5: The road toll data, when expressed as road deaths per 100,000 population, does not provide any indication of trends in various levels of injury. Is there, in fact, a fairly close correlation between the number of people killed and the number of people injured? For example, if there are fewer people being killed, are there fewer or more people sustaining serious injuries?**

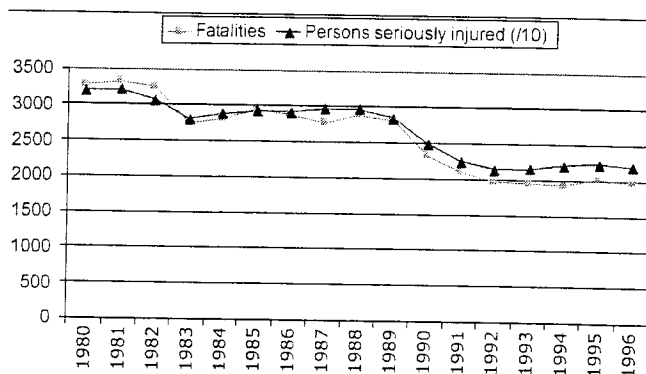
Historical data at the national level show a very close correlation between reductions in fatalities and reductions in police-reported serious injuries (see Figure 3 below).

The National Road Safety Strategy explicitly aims to reduce the burden of road injuries as well as road deaths. However, no injury reduction target was established because no national injury data series was available when the Strategy was developed. A national series of police-reported serious injuries was discontinued in 1997, when data from New South Wales ceased to be available.

Despite the absence of an explicit injury target, the Strategy was based on an expectation that, in general, measures that reduce fatalities will also reduce the number of serious injuries. The data support this assumption.

Moreover, the planning, implementation and evaluation of specific road safety initiatives is generally based on data for road injuries, as well as fatalities. Examples include black spot programs, traffic law enforcement campaigns, and improvements in vehicle safety design. Injury data are often the primary guide to planning and policy, because numbers are larger, and less subject to random statistical variation than fatality data.

**Figure 3: Number of fatalities and serious injuries, 1980 to 1996**



Note: Serious injury counts have been divided by 10 to facilitate comparison of the two trend lines

**Question 6: There has been a good response by car manufacturers in Australia, largely as a result of publication of the Australian New Car Program test results, to make vehicles safer for their drivers and passengers. Does the Federal Government have plans to also encourage the manufacturers to make vehicles safer for pedestrians and cyclists?**

For many years, the safety of vulnerable road users has been acknowledged as a serious road trauma issue. The Australian Government has been monitoring international research and regulatory developments regarding the safety of vulnerable road users. The most effective strategy, but with the highest infrastructure cost, involves separation of vulnerable road users from vehicular traffic to prevent the possibility for collisions between vehicles and people. Travel speed reductions are highly effective: even very small reductions in motor vehicle speeds can reduce pedestrian and cyclist deaths substantially. Other strategies have focussed on the design of the front of vehicles to reduce likelihood of injury to pedestrians in the event of a collision.

Japan and the European Union have recently introduced requirements intended to improve the protection afforded to adults and children when struck by a vehicle. The Japanese and EU requirements are not the same, and some research has suggested shortcomings in both of these regulations.

In 1997, the Australian Government provided funding for the development of test equipment capable of conducting headform impact tests on the bonnets of vehicles. The Australian Government has also contributed to research into pedestrian safety through the International Harmonised Research Activities (IHRA) Pedestrian Safety working group. The work of this group has been fed into the development process for a Global Technical Regulation for pedestrian safety, which is being sponsored by Japan. The Australian Government will consider the case for regulation for the safety of vulnerable road users once an agreed set of international requirements has been established.

As part of its test regime, the Australasian New Car Assessment Program (ANCAP) conducts pedestrian safety impact tests on vehicles and provides this information to consumers along with frontal and side impact crash protection ratings. However, to date, only a small number of vehicles have achieved very good results in these pedestrian safety impact tests.

**Question 7:**

**a) It is inevitable that cost considerations must affect policy decisions on road safety expenditure at both a jurisdictions and national level.**

Yes.

For additional comment, see answer to question 9.

**b) How is funding currently allocated?**

Funding relevant to road safety is provided by three levels of government (Federal, state/territory and local) through budget allocations relating to road construction and maintenance, road use regulation, law enforcement, vehicle standards regulation, health, education, land use planning and related activities, including research, consultation and policy development. Private sector organisations also allocate funding to relevant activities.

**c) What is the progress with and future of the Federal Black Spot Program?**

The Auslink Black Spot programme has been funded continuously since 1996. Funding for the programme has been extended several times since it was first introduced. By June 2008, it will have fixed 4,200 road hazards around Australia. On conservative estimates it will have prevented at least 130 deaths and around 6,000 serious crashes. Benefits will continue to accrue over the life of the treatments. Evaluations have shown that the programme is highly cost-effective.

Current funding is \$45 million a year. This had been scheduled to finish in June 2008, but in April 2007 the Australian Government announced that funding is to be extended and increased. An additional \$345 million over six years will be provided for the program. Funding will be increased to \$60 million a year from 2009-10, and continued at this level until at least 2013-14.

For further information, see:

[http://www.ministers.dotars.gov.au/mv/releases/2007/April/057MV\\_2007.htm](http://www.ministers.dotars.gov.au/mv/releases/2007/April/057MV_2007.htm)

**Question 8: How can the amount and detail of data on crashes in Australia be improved?**

It is currently not possible to obtain nationally consistent road injury data from road transport sources – the ATSB used to maintain a national series of police-reported serious injuries, but this was discontinued in 1997 when data from NSW ceased to be available.

To fill this gap, the ATSB has established a funding agreement with the Australian Institute of Health and Welfare (AIHW) to provide data extracted from the National Hospital Morbidity Database; this will not be suitable for short-term monitoring [there is an inherent two to three year time lag in the data], but will allow analysis of long term trends, including the relationship between trends in serious injuries and trends in road deaths. The first series of reports based on this data are currently being prepared for joint publication by the ATSB and the AIHW.

At the September 2006 meeting of SCOT, members considered a proposal for improving the collection and collation of other road safety data from jurisdictions, to extend the national data currently available. SCOT agreed that national road crash statistics collections should include more timely monitoring data on:

- alcohol test results for drivers and motorcycle riders killed in road crashes
- occupant restraint usage (seatbelts, child restraints etc) by vehicle occupants killed in road crashes
- fatalities and fatal crashes involving rigid trucks.

The ATSB is liaising with states and territories on the best way to progress these items.

**Question 9: Some countries are following Sweden's lead and adopting the 'Vision Zero' policy on road safety, that is, a strategy aimed at making it virtually impossible for a person to be killed or seriously maimed as a result of a road crash. Is the Government considering adopting this policy in Australia? If not, why not?**

That's a good succinct summary of Vision Zero: "a strategy aimed at making it virtually impossible for a person to be killed or seriously maimed as a result of a road crash". In addition, the Swedish Vision Zero approach includes an explicit commitment to the principle that safety cannot be 'traded off' against competing social objectives. In effect, that means that any measure that would have safety benefits should be implemented, even if the estimated costs exceeded the expected benefits (cost-benefit analysis has no place under Vision Zero: it involves an assessment of tradeoffs between safety and other objectives).

The ATSB is not aware that any country other than Sweden has made a commitment to Vision Zero in this form. Let's take a concrete example of what a serious commitment to Vision Zero means in practice. On an undivided rural road, there will inevitably be head-on collisions between vehicles. At current rural open road travel speeds, many of those collisions will be fatal. From a Vision Zero perspective, this can be, and must be, prevented from happening. One option is to separate opposing lines of traffic, using wide medians and/or barriers. Unless and until this engineering solution has been applied to all rural roads, traffic speeds need to be reduced, so that head-on crashes will be survivable, without risk of permanent major injury to vehicle occupants. If all the vehicles using a road were of the same mass, and provided the best occupant protection currently considered feasible, speeds up to about 70 km/h would be compatible with Vision Zero. If there were some older vehicles still on the road, or a mix ranging from small passenger vehicles to large trucks, Vision Zero principles would require speeds substantially lower than 70 km/h. If the traffic mix included motorcycles, the maximum speed of all vehicles would need to be limited to about 30 km/h.

Similar considerations apply to off-road-into-object crashes. Unless (or until) all roadside hazards can be removed or protected by barriers, Vision Zero requires speed reductions to the point where impacts would not cause death or lasting disability. This would mean speeds under about 70 km/h.

In urban areas, there are similar issues under Vision Zero: either the road network must be re-engineered to eliminate the possibility of events like vehicle-to-vehicle side impacts and vehicle-pedestrian impacts, or speeds must be reduced so that the risk of death or permanent major injury is effectively eliminated. Speeds around 30 km/h would be the maximum.

It would be necessary to find a way of ensuring compliance with such speed limits; intelligent speed limiting devices (suitably tamper-proof) might be a technically feasible option.

A serious commitment to Vision Zero would mean a serious commitment to implementing the necessary measures, regardless of direct financial costs or other social costs (such as increased travel times).

The Swedish Government endorsed Vision Zero in principle, but made it clear that this was a long-term in-principle commitment, with no specific timetable for implementation. Sweden has not, for example, reduced rural speed limits to meet Vision Zero principles, and has not announced any plan for doing so (let alone a timetable). In other words, the practical implementation of road safety in Sweden still involves processes of tradeoffs, compromise and cost-counting (not unlike those that apply in other countries).

Critics have presented a number of arguments against Vision Zero.

The first is pragmatic. It is very difficult to imagine any government actually taking the action needed to put Vision Zero principles into practice.

It is also difficult to see the benefit of endorsing the principles without an intention to implement them (and there are other problems with that option).

The second is also pragmatic. Many potentially cost-effective measures have not been implemented. Therefore, abandoning

the test of cost-effectiveness would bring no immediate safety benefits. In fact, it is arguable that a strong focus on identifying and implementing the most cost-effective measures is a good way of optimising the rate of progress in improving safety outcomes.

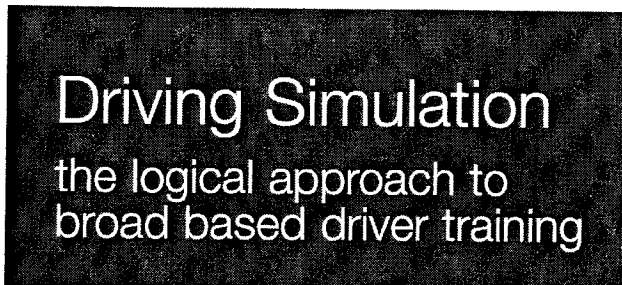
The third relates to the broader consequences of abandoning the test of cost-effectiveness: if safety is to be given absolute priority over all other social objectives, then at some point the achievement of other objectives will inevitably be compromised. That could mean a reduction in overall community welfare, or even overall community health and longevity.

The question of a commitment to Vision Zero principles was debated when the current National Road Safety Strategy was formulated. There was a consensus among all jurisdictions not to include such a commitment in the Strategy.

The Safe System principles set out in the last two National Road Safety Action Plans incorporate some of the more positive, constructive and practical elements of the Vision Zero perspective, without abandoning the principle that policy choices need to take into account considerations of practicality and cost-effectiveness.

**For further information please contact: The General Manager Road Safety, ATSB, tel: 1800 621 372**

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# Safer Vehicles for Young Drivers - Matching Vehicles to Drivers' Ability

by Michael Paine, Manager Vehicle Design & Research Pty Ltd

This article was contributed by the SaferRoads Program

*Automotive safety consultant Michael Paine looks at the role of the vehicle in young driver crashes and the new technologies that will eventually save many young lives.*



Take a young, inexperienced driver and combine with a car that has twice the serious injury rate of a typical modern car – this should make for a deadly cocktail. And yet that is precisely the mix that is occurring on Australian roads.

Road safety campaigns around the world have, quite rightly, targetted the behaviour of young drivers and tried to make them “safer drivers”. However, a strategy missing from most of these campaigns is “safer vehicles for young drivers”.

The Used Car Safety Ratings are a measure of the safety of vehicles, based on actual accident statistics. The ratings are published by a group of government and motoring

organisations. A “serious injury rate” is calculated for each vehicle based on the percentage of all crashes where the driver is seriously injured. The statistics are adjusted to eliminate the effects of driver’s age, location of crash and the like.

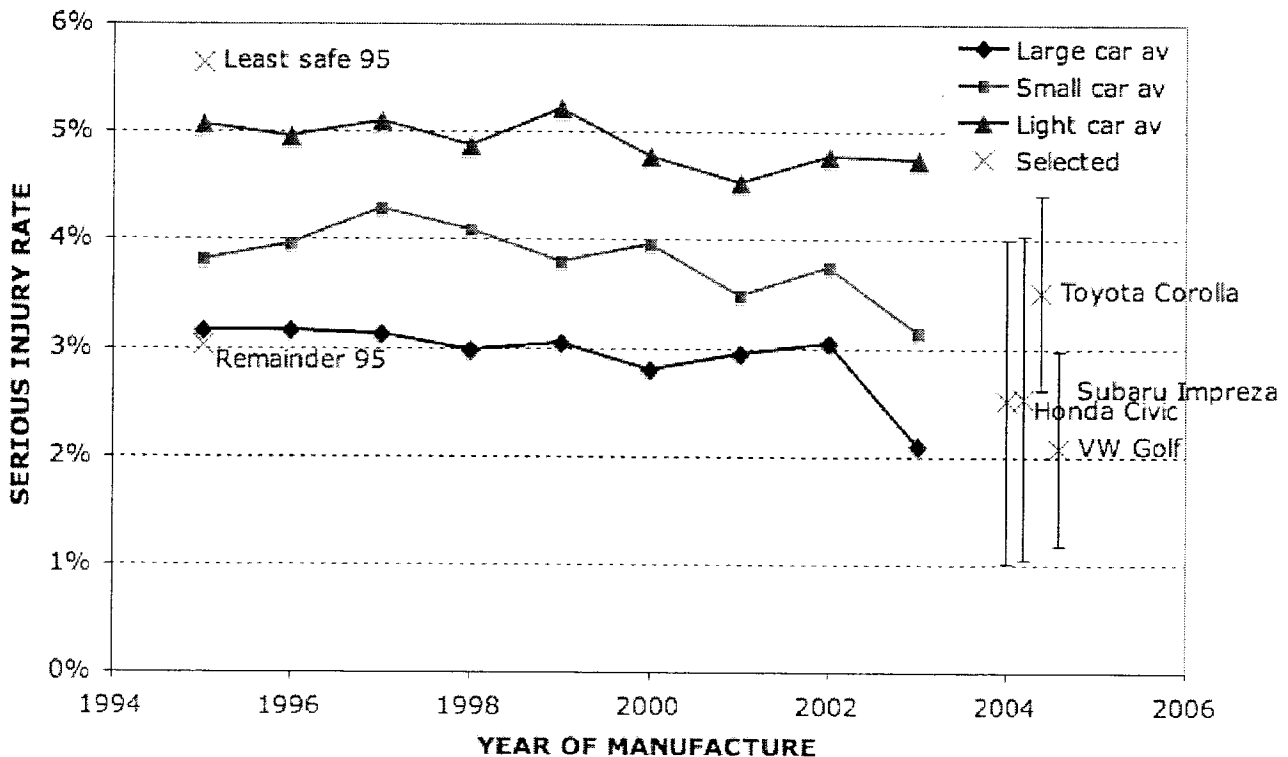
These ratings are used to assess and classify cars in the interests of consumers.

## Vehicle Types Driven by Young Drivers

Three years ago I carried out an analysis of the West Australian car fleet and found that small cars made up one third of all cars built in the 1990s. On average, these small cars had twice the serious injury rate of all cars of that age (and three times that of the latest cars).

This means that about 60% of seriously injured drivers in 1990s cars are in small cars. More than half of the small cars on the WA register that were manufactured in 1995 have a serious injury rate in excess of 6%. These models became very popular during the 1990s and, being cheap used vehicles, they are now being bought by young drivers.

## USED CAR SAFETY RATINGS



## Strategies for Discouraging this Deadly Mix

Early scrapping of the least-safe vehicles is one option. If these vehicles are not scrapped then they will end up being driven by drivers older than 25 - a less desirable outcome. However, since these drivers are at less risk of having an accident there are net savings to the community.

It is possible to give a rough estimate of the benefits of a strategy to reduce the number of young drivers in the least safe vehicles:

- Based on WA vehicle registrations, 17% of the light vehicle fleet has a serious injury rate of 5% or more. The average serious injury rate for this group is 5.64%. The average of the remaining group (serious injury rate less than 5%) is 3.02%. This indicates that about half (5.64/3.02) of the young drivers who died in a vehicle that is in the least safe group would be alive today if they had been driving a vehicle from the safest group.
- If it is assumed that currently the proportion of least safe vehicles that are driven young people is the same as other age groups (17%) then replacing these vehicles with safer vehicles will result in a serious injury rate of 3.02, or a saving of 13% in young driver serious injuries and fatalities.
- It is more likely that young drivers have a higher proportion of the least safe vehicles than older drivers. Assuming that 30% of young driver vehicles are in the least safe category, then there is a potential saving of 21% in young driver serious injuries and fatalities.

Of course, it would be best if all of the least safe vehicles were removed from the road, in which case there would be a 14% decrease in all driver fatalities. That will eventually happen as vehicles age and are scrapped.

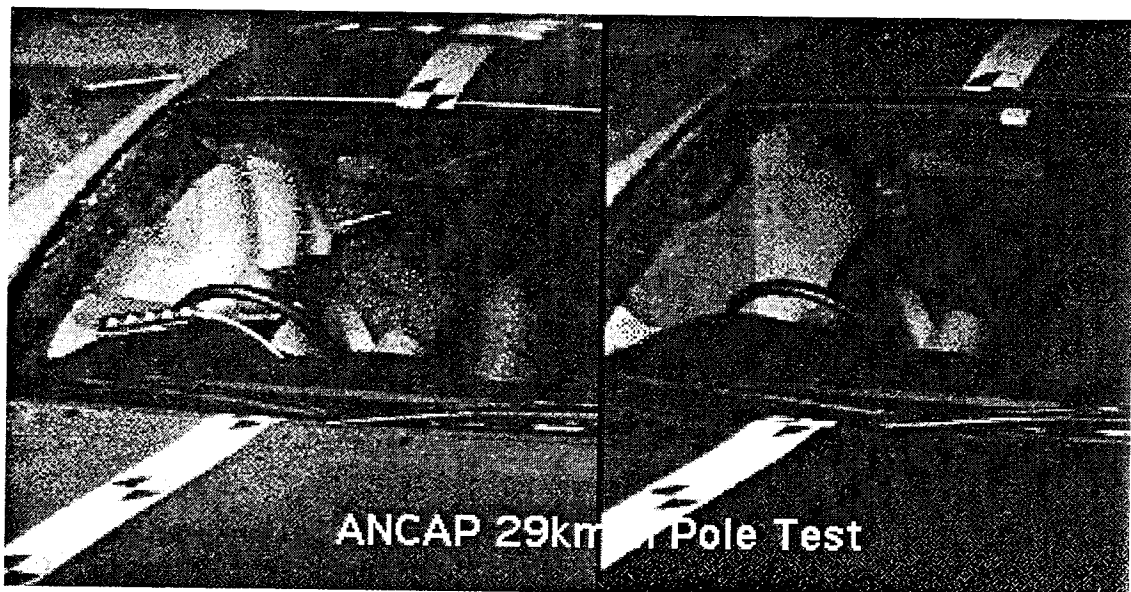
## Safety Features on New Small Cars

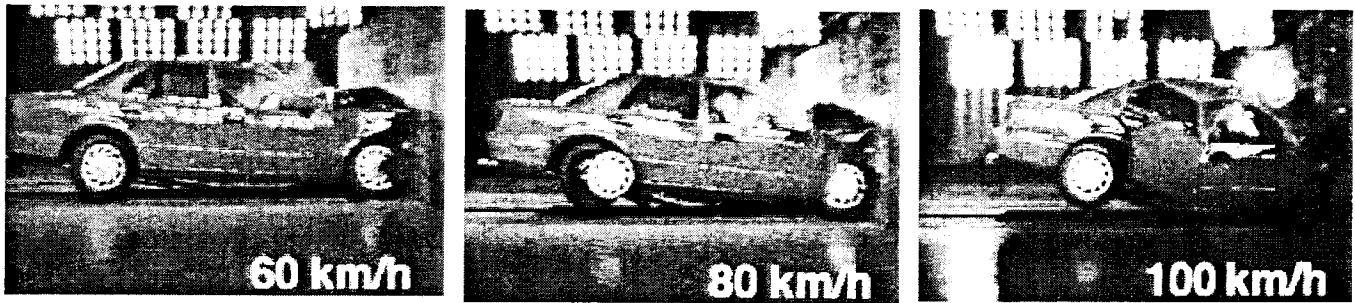
Crash tests by the Australian New Car Assessment Program (ANCAP) have shown huge improvements in the crash safety of new small cars in the last few years. Driver and passenger airbags are now standard on many small cars, along with seat belt pretensioners and other safety improvements.

These life-saving features should be encouraged as these will be the cars that are popular with young drivers on the secondhand market in several years.

In the case of small cars, a very recent development is head-protecting side airbags. Many models in Europe and North America now have these as standard. The ANCAP pole crash test has shown that a sideways slide into a pole or tree can be deadly at an impact speed of just 30K (km/h) without this protection. A side curtain or airbag that protects the head makes it an easily survivable crash. US research indicates that these devices could prevent nearly 50% of fatalities in intrusive side impacts. The head injury reading without the curtain indicated a fatal impact. With a curtain, the crash was easily survivable.

This leads to the next issue that needs to be stressed to young motorists...





## Most Fatal Crashes are Low Speed

Newspapers and TV are keen to use dramatic pictures of cars torn in half during high-speed fatal crashes. Crash statistics tell a different story. **More than half of all fatal crashes occur at impact speeds under 60km/h and a typical side impact fatality occurs at less than 40km/h.**

In a modern car, travelling at 65 in a 60 zone feels quite safe. But unfortunately that is an illusion. When things get out of control, such as a car suddenly appearing from a side road, those few km/h can make a big difference. **South Australian research has found that each 5km/h above the speed limit doubles the risk of being involved in a serious crash. This means that travelling at 70 in a 60 zone quadruples the risk.**

This arises from Newton's laws of physics and these cannot be broken!

RTA video on crash tests

## Controlling Speeds

In Europe and Australia, very promising trials of Intelligent Speed Adaptation (ISA) are underway. With these systems, the vehicle automatically "knows" the posted speed limit and takes action if the vehicle is exceeding that speed limit. The action can be as simple as making the accelerator pedal stiffer or making it vibrate, or the vehicle can be prevented from exceeding the posted speed limit.

These clever systems are likely to become available in Australia during 2007. It will be many years before the typical vehicles bought by young drivers have ISA as standard but retrofit kits could be encouraged for young drivers.

The technology does not even need to be built into the vehicle. During 2006 an intelligent speed advisory system ("SpeedAlert") was launched in Sydney. This uses a pocket computer (PDA) with built-in GPS receiver to determine location and speed and beeps if the posted speed limit is exceeded.

There are also several spin-offs from this technology that could be applied to young drivers:

- Top speed limiting – preventing prolonged travel in excess of a set speed. Most modern cars have an electronic engine management system with a built-in top speed. They are all set way too high but it should be easy for manufacturer's to reprogram the chip to a sensible value. A bonus for car

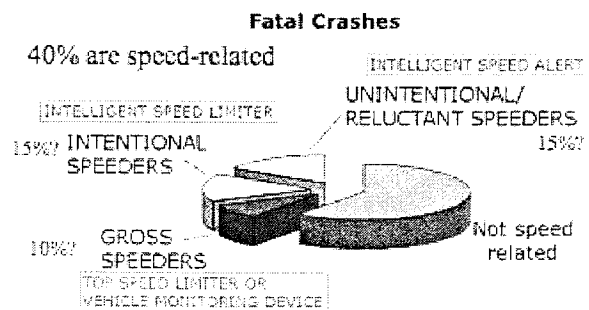
owners is that top speed limiting is a great deterrent to car thieves and joy-riders. Aftermarket kits are available for top-speed limiting older vehicles and have been used in the mining industry for decades.

- A more sophisticated top-speed limiter could have a coded override that allows the driver to temporarily exceed the set speed. Even fancier is a smart card system that sets the top speed according to the driver, who is identified by an electronic ignition key (that also automatically adjusts the driver's seat and mirrors). But that is getting away from our concern about young drivers who cannot afford to buy a brand new BMW.
- Monitoring speeds: Black-box recorders can be fitted to vehicles to record speed and other parameters. Later, the data is downloaded to a computer and analysed. Speeding violations can then be detected. Drivers who are repeatedly convicted of speeding could be required to only drive vehicles with such a black box recorder (their vehicles should also be speed-limited).
- Most GPS receivers that are used for bushwalking are capable of recording in a car. The resulting "track" can be later analysed by computer and the speed driven along various sections of road can be displayed. Systems that use a mobile phone in a similar way are also available.

## Seat Belts

Smart seat belt reminder systems are becoming common on new vehicles. These detect when the driver or front seat passenger is not wearing a seat belt while the vehicle is moving. They sound a distinctive alarm if this happens. A retrofit kit would be a good idea for older vehicles, particularly

## Speed-related Crashes



Estimated effectiveness of 80% (Jörgan 2003) gives 30% saving

those driven by young drivers, since non-wearing of seat belts is often a factor in their serious crashes.

### Electronic Stability Control

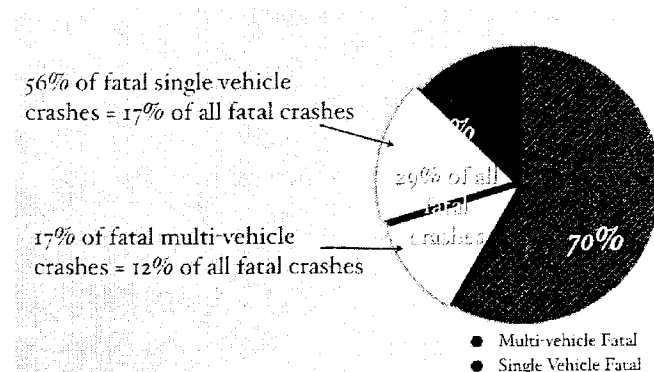
In September 2004, a preliminary study of the effectiveness of Electronic Stability Control (ESC) was released in the USA. ESC works to prevent the vehicle's handling limits from being exceeded. The study found that vehicles fitted with ESC were much less likely to have single-vehicle crashes (such as running off the road) than the same models without ESC.

The benefits were particularly evident with sports utility vehicles (SUVs – four-wheel-drives) - a 67% drop in accident rate. So far, ESC is only available on luxury vehicles. It could be expected to be very effective for inexperienced drivers but they don't usually drive these vehicles.

### Conclusion

Vehicle engineering provides plenty of ways to discourage risk-taking by drivers and to make cars more forgiving of human error. Young drivers, in particular, could do with this assistance.

This would be far more positive than campaigns that try to use scare tactics, blame and punishment.



Estimated benefits from Electronic Stability Control

### More information

[http://idisk.mac.com/mpaineau-Public/paine\\_young\\_drivers.pdf](http://idisk.mac.com/mpaineau-Public/paine_young_drivers.pdf)

Road Safety web links:

<http://www4.tpg.com.au/users/mpaine/roadsafe.html>

Used Car Safety Ratings

[http://www.mynrma.com.au/used\\_safety\\_ratings.asp](http://www.mynrma.com.au/used_safety_ratings.asp)

## Road Advertising

by Ken Smith RRSP, ACRS Fellow

You're driving along, quietly minding your own business and concentrating on the road and traffic conditions (naturally), when suddenly your attention is caught by the logo or symbol for a well known family restaurant, a soft drink, or any of the myriad of other products and services that are brought to our attention every day. Nothing very unusual about that – except that this time it's painted on the road surface in front of you. This could be in our future, although not if ACRS' views prevail.

Your College has been approached about this question over recent weeks, and some members of the ACRS National Executive have been interviewed by the media.

It appears that some local government authorities in NSW have been approached by advertising agencies proposing painting of advertisements on road surfaces. We understand that this has been proposed as a means of boosting Councils' road maintenance funding, and that some Councils have been giving the idea favourable consideration.

ACRS opposes painting advertisements on road surfaces, for several reasons. Our overriding concern is that it is a potential safety hazard. ACRS believes painting advertising signs on road surfaces is undesirable because of

*Distraction:* symbols or logos on the road surface could provide a hazard by distracting the driver's attention from other, necessary features of the road environment. For

example, a pedestrian could pop out from between parked cars at the instant your attention was on an advertisement.

*Confusion:* At present the only markings on road pavements in traffic lanes are zigzags on approach to pedestrian crossings, speed limits, merge and give way warnings and similar safety messages. These messages should not be diluted by signs and symbols that are nothing to do with safety or direction messages.

*Glare:* There is a risk that painting on road pavements could create glare in headlights at night or in wet weather. To be effective, signs and symbols would have to be in strong colours with reflective beads in the paint.

*Skidding:* Like other pavement markings, paint on road surfaces creates a risk of skidding when wet, especially for motorcyclists.

ACRS recognises that there is always need for more road funding than is available. One of our policy statements deals with improving road system black spots and road safety audits, which imply more funding, and we join with other groups such as the Australian Automobile Association and the SaferRoads partnership (see [www.aaa.asn.au/saferroads](http://www.aaa.asn.au/saferroads)) in lobbying for safer roads in every aspect. However we consider that this way of raising funds is inappropriate and creates an undesirable precedent.

If you hear of the matter being raised, please support your College's view.



# Illegal Road Racing and its Legal Implications

The ACRS thanks the copyright holder of the original article, Journal Polizei Verkehr Technik, for access to this material.

This is an edited version of a report of a Swiss Federal Court decision, written in German and translated by ACRS member Max Pallavicini.

## Introduction

The following description deals with a road crash resulting from a race between two young drivers. The crash led to the deaths of two teenage pedestrians. The resulting court case was of particular interest in that it clarified issues regarding the extent of the responsibilities of drivers involved in road racing.

## The Accident

Driver A drove on 3 September 1999 at 10.50 pm in his VW Corrado car in the direction of the town of Gelfingen. A second VW Corrado, driven by Driver B caught up with him at a roundabout. Each driver had a passenger.

Driver A felt provoked by Driver B, who followed him closely. He therefore accelerated and drove at excessive speed in the direction of Gelfingen. Driver B responded by tail-gating him at a distance of 1.5 to 4 m. After passing through the village of Baldegg Driver B overtook Driver A



and some other vehicles at a speed of 100 – 140 kph. Driver A took up this challenge and on the straight road at the entrance to Gelfingen he commenced to overtake Driver B. Both drivers raced each other at a close distance and even drove side by side at between 120 and 140 kph into the town, with Driver A in the oncoming lane.

Towards the end of his passing manoeuvre, Driver A commenced to re-enter the correct traffic lane ahead of Driver B. However, he lost control and went into a swerve. His car went into a spin and collided several times with a wall on the wrong side of the road. Finally, the car collided with two pedestrians on the footpath and catapulted them about 30 m ahead, causing fatal injuries. During the collisions with the wall the car's bonnet was flung open, and this may somehow have contributed to the great distance the pedestrians were propelled forward.

Driver B, meanwhile, slightly reduced his speed after entering the town and braked when he saw Driver A's car swerve. On rounding the bend and seeing that Driver A had crashed, he reduced his speed further to 20-30 kph and continued without stopping at the accident scene. Driver B was later arrested in a nearby district.

## Expert Witness

A traffic specialist testified that the speed of Driver A's vehicle at the time it started to swerve was approximately 130 kph. During impact with the wall, the entire rear axle of the car had been torn away. The entire distance the car travelled, from the first pressure imprint of its left front wheel to its final position was 143 m.

The Prosecutor "warranted the case should be considered at the same level as that for homicide offences committed with dangerous weapons."

## State Prosecutor

Because there was suspicion that Drivers A and B had been involved in a road race, the Prosecutor and Coroner decided to investigate the case in accordance with the principle that this was, ultimately, a planned homicide. They decided that it would be inappropriate to try the case under the usual indictment of 'culpable driving occasioning death', which normally resulted in a custodial sentence of 10 to 15 months. Supported by the Coroner's findings, the Prosecutor assessed the senseless speeding amounting to a contest of driver dexterity. He warranted the case should be considered at the same level as that for homicide offences committed with dangerous weapons. He applied at the Criminal Court of Lucerne for sentences of 6 and 7 years to be applied to Drivers A and B respectively.

## The Sentence

The Lucerne Criminal Court, in March 2002, declared Driver A guilty on the following counts:

- \* Multiple eventual intentional manslaughter
- \* Incompetent handling of the vehicle
- \* Multiple contravention of the legal and displayed maximum speed limit within and outside the urban areas as well as not adapting the speed to the road and traffic conditions
- Multiple tail-gaiting when driving in a formation; and
- Multiple unlawful overtaking.

Driver B was also found guilty on similar charges except for the incompetent handling charge and with the additional charge of “A conduct contrary to the legal norms in a traffic accident.” Both drivers were given custodial sentences of six and a half years.

“The point at issue was whether Drivers A and B could be considered responsible for the pedestrian deaths when they were merely involved in a road race.”

## Manslaughter with Special Ultimate Intent

Both men appealed to the Lucerne Supreme Court in June 2003. The Court dealt in great detail with ‘Specific Manslaughter’ and ‘Ultimate Intent’. The point at issue was whether Drivers A and B could be considered responsible

for the pedestrian deaths when they were merely involved in a road race. The Supreme Court decided that they could be held responsible, because they should have foreseen that a crash was a likely or possible outcome of the race and this could involve other parties. By participating in the race, both drivers were acquiescing to the possibility of dangerous consequences, such as actually occurred.

## Appeal to the Federal High Court

Driver A argued that the Supreme Court should not have relied on the expert traffic opinion. He argued that he had not swerved because of his high speed, but for unexplained, probably technical reasons. Driver B argued that there was no proof that he had been involved in a road race and that he had not caused Driver A to swerve. The Federal Court, however, rejected their appeal, arguing that they had been racing and should have recognised that there was a high probability that one or both of them would crash. The drivers had acted with reckless indifference to the possible consequences of their actions. Driver B was equally guilty, because he had cooperated with Driver A in creating the conditions that caused Driver A to crash and kill two people.

## The Future

Based on the decision of the Swiss Federal High Court, a general strengthening of the penalties with reference to speeding offences is likely.

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# Policies of the Australasian College of Road Safety

by Ken Smith RRSP, ACRS Fellow

## Pedestrians

### ACRS Policy Position

ACRS supports measures that take full consideration of the needs and desires of all road users in urban centres, local streets, shopping and community centres, and that improve urban amenity by separating pedestrians and vehicles while recognising the rights of both groups to urban space and freedom of movement.

The needs of elderly and young pedestrians, both of which are over-represented in pedestrian casualties, deserve special consideration.

### Objective

To reduce the risk to adult and child pedestrians posed by the movement of motorised vehicles.

### Discussion

Pedestrians are vulnerable road users and comprise the largest

single road user group. Within resource constraints, the management of pedestrian movement should be aimed at maximising safety without undue infringement on attractive environments and high-quality urban design. Because of the vulnerability of pedestrians, for maximum safety the pedestrian network should be separated from the motorised transport system. However, it must be integrated with it. Pedestrians must therefore be able to cross the road in some way to maintain the coverage and continuity of the network.

Pedestrian safety is a complex issue because of the highly variable characteristics of walkers and their behaviours and attitudes. It is well recognised, for example, that pedestrians will attempt to minimise walking distances by taking short cuts. Some traffic engineers, however, tend to consider pedestrians as being analogous to controlled vehicles operating on a network consisting of footways, stairs, tunnels and so on.

ACRS considers that planning for all pedestrians has to take account of people with disabilities. People with impaired vision have difficulty picking up visual cues and need strong contrast and delineation between roadways and pedestrian areas. Wheelchair users have difficulty with uneven surfaces and steep slopes. The ability of young children to cope with traffic is extremely limited until the age of about 12 years. Older pedestrians are at particular risk. Not only do older pedestrians have a lower than average walking speed, they take longer to make decisions on crossing roads, and they are more vulnerable to injury if involved in a crash than other adult pedestrians.

Numerical warrants using such factors as vehicle volumes and gaps, pedestrian crossing volumes, speed limits, local geometry and so on are specified by Australian Standard AS 1742.10 1990, which is used as a (non-mandatory) guide by all State and Territory road and traffic authorities. ACRS supports the use of this document, but in rural areas warrants should be used as a guide only because population numbers do not reflect the conditions that apply in urban areas.

ACRS recognises that grade separation for pedestrians provides the highest degree of priority for both walkers and for vehicles. However, reasons against providing such facilities include a high capital cost, and it has been shown in most countries that in general they are poorly patronised on roads where traffic is already interrupted by traffic signals. Further, there are difficulties in encouraging the use of overpasses and underpasses by the aged and the physically disabled.

Pedestrian overpasses or underpasses are not normally employed except where large numbers of pedestrians have to cross freeways and high-speed, high-volume trunk roads. Such cases may justify the high costs involved, or address specific matters of community concern such as the proximity of a large school or railway station.

ACRS believes that as a matter of principle, both pedestrians and drivers should approach any pedestrian crossing with care. Any device giving a pedestrian an illusory sense of safety can add to danger.

## Older Road Users

### ACRS Policy Statement

All older road users, whether pedestrians, drivers, riders or passengers, share similar characteristics of declining functional capacities and increased fragility associated with ageing which place them at increased risk during mobility - risks which undeniably increase with increasing age.

The ACRS recognises the need for research into the physical limitations of older road users, the mobility needs of this growing population sub-group, and for broader scoping research into how these factors may combine to affect the safety of all road users. ACRS considers that applicable design standards need to be reviewed to accommodate the mobility limitations of older road users.

### Discussion

Demographic changes associated with progression of the post-war generational cohort into old and older age over the next 20-30 years will have a significant effect on transportation in terms of independent mobility and the wider traffic environment. In social planning terms, the "baby-boomer" generation represents a challenge of proportions which cannot be ignored, yet which will also be of relatively short duration.

Measures that might be applied to help vulnerable groups include:

- Education of younger children about the dangers of crossing roads
- Education and increased awareness of parents of the limitations of children in traffic and the dangers to children as pedestrians
- Education of older pedestrians about the increased danger they face because of reduced mobility
- Providing better facilities to compensate such as median refuges, pelican/puffin crossings, improved land use planning, traffic light phasing.

### Comment

This policy statement is perhaps more a statement of principle than an action plan. Much of the principles of pedestrian safety are codified in traffic planning and management manuals that are used by all Australasian road authorities, and where followed do not present significant problems.

The policy statement does not cover alcohol affected pedestrians. This is a growing problem and very high BACs are a particular concern. There is a need to consider engineering solutions to reduce the vulnerability of alcohol affected pedestrians, and also public education programs.

Future generations of older drivers may not perpetuate patterns of ageing seen today, particularly in terms of the age of onset of physical health and mobility changes. People may live considerably longer, and expect to be mobile for considerably longer, but the ageing process may not follow the same pattern as that seen today because of better nutrition, improved access to health services, and the diagnosis and treatment for diseases at much earlier stages.

The current generation of older Australian drivers (ie those over 70 years of age) were born in the 1920s - at about the same time as the automobile. They have survived the Depression of the 1930s and World War II. They have experienced arguably the most significant expansion of mobility and of technology in history. During their lifetimes, antibiotics came into use for the first time, work patterns changed from highly physical to noticeably sedentary, and diets have changed from home or farm-grown produce to mass-produced and packaged materials. The pattern of diseases has changed, as have health practices and treatment technology.

Post-war "baby-boomers" now in their 50s, have experienced peace and plenty. They have had access to better and longer education than their parents, and are prepared to assert and defend their perceived rights. Most have grown up with the car as part of the family, and learned to drive from either or both their parents and a driving school. They learned road

rules before gaining a provisional driving licence. They have grown up with, and indeed formed a large part of the increase in traffic density. They expect the cars they drive to have a significant number of safety features, and are comfortable with rapid technological change. Their health problems are not due to poor nutrition in infancy or childhood, or from exposure to inhalation of noxious fumes (other than tobacco), but are more those of excess - diabetes and cardiovascular disease - both of which are currently undergoing major advances in diagnosis and treatment.

A more concerning illness in an ageing and mobile population is dementia. Almost always associated with increasing age, the disease characteristically includes lack of insight resulting in denial, is progressive, and is not fatal. The transport consequences of this disease alone, across a larger than previous aged cohort, living into extended old age, and which is also markedly more mobile, cannot be over-estimated.

However, although the way we age physically may change, the process cannot be denied. Ultimately everyone will confront the undeniable physical evidence of advancing age. Ageing is a physiological process of slowing down and approaching mortality. There are some clear indicators of such physiological changes in vision, and physical-functional capacity which can be measured, and may frequently be treated. However, declining cognition is both more difficult to detect and to treat. Increasing fragility of the skeleton, external and internal tissues cannot be reversed, and must be accepted as a given - making the "old" old very high risk participants in all forms of mobility.

In summary then, we have an ageing, educated and mobile population, still largely in denial of their approaching old age and its implications, technologically pushing back the barriers of ageing, who will nonetheless become frail older road users in need of support and protection in the foreseeable future.

Thus three key research and practical, policy areas emerge:

1. Clear identification of road users who present an unacceptably high risk to themselves and other road users - via a physical/functional screening process
2. Identification of a range of Engineering solutions to separate and protect vulnerable pedestrians from vehicular traffic
3. Implementation of alternative transport solutions to meet the needs of non-drivers to access services and maintain a healthy, involved lifestyle.

These areas apply to all road users, regardless of age, but present an opportunity to address the specific needs of older road users, through the adoption of sound road safety measures which will benefit everyone. As such they should form the basis of all transport policy.

## 1. Identification of "high-risk" road users

Once drivers over 70 years of age reach the predicted >25% of the driving population, it makes good sense to know that they have acceptable standards of vision, physical-functional control, and cognition to be able to safely drive a motor vehicle on a public road.

Clear and objective separation is required of the physiological limitations of ageing from the practical skills, habits and experience acquired over a lifetime of driving.

Since there is currently no available "tool" to measure or collect standardised data on the health status of drivers, it is premature to claim that there is no place for such information in policy planning, or that such processes are not effective in reducing crash rates. Only when a standard assessment tool has been developed and has been in use for some time can valid arguments be made or policy formed.

The existing negative perception of medical assessment processes for older drivers can be turned around, by focusing on the positive aspects, such as the diagnosis of developing conditions before they become licence-threatening. Annual assessment of fitness to drive can also positively reassure the capable driver, and provide information from which the competent driver can start planning to retire from driving.

Society in general clearly benefits from regular screening for treatable health conditions - this is clearly recognised for cancer of the breast or cervix - where all women over a certain age are screened bi-annually. It also makes sense that such processes are conducted by trained health professionals. Regardless of local (state) policy relating to when older drivers are screened for "fitness to drive", or who refers them for assessment, health professionals need appropriate tools to be able to achieve their task effectively. They need to be trained in the use of the screening tools. Pathways of care are needed from health professionals into the community, to ensure that those who lose their license are supported through the process and guided into appropriate transport options.

However, it must be recognised that such health screening cannot necessarily predict which drivers will, or even might, crash. Road crashes are multiple-factor events. Data on road crashes is typically collected by police officers at the scene, and focuses on whether or not any traffic violation occurred to cause the crash, rather than any pre-event health condition which may have contributed.

Medical practitioners are in a unique position to review the health status of their patients, but again, it may be misleading to assume that in future, all GPs will know their older patients as well as they do now. With changing patterns of practice, more part-time practitioners, and multiple-doctor, multiple-site practices, it may not be possible for the same patient to see the same doctor on each occasion.

It is important that a standard screening process exists which does not rely heavily on the doctor-patient history, or on long-term knowledge of social and familial history. An objective record of assessment acceptable to all practitioners can provide a more informed basis for decision-making, than anecdotal evidence or review by a familiar and trusted family doctor.

Evidence suggests that patients do respect information and advice from doctors, even when it is unwelcome. However, all health practitioners would benefit from raised awareness of the effects that ill-health and disease processes can have on the critical factors required for safe driving, including the effects of medications.

Again, the current generation of 50+ drivers are typically better informed, more educated, more likely to ask questions before taking medication, and may require less medication than the previous generation due to improved health status. This generation has grown up knowing and accepting mass screening, and are perhaps less likely to view it as a threat.

## 2. Road environment

Changing baselines for the visibility of signs, lighting and delineation from that of a fit young male to an ageing driver can benefit all road users through increased sight distances and warnings.

Reduced speed limits may provide an "easy" engineering solution to what may become a difficult situation when 25%+ of all drivers are aged over 70. Reduced speed limits could decrease trauma and thus improve outcomes for all road users. Although the poorer outcomes of fragile participants cannot be changed, reduced speed of impact may help to change injuries sustained from "life-threatening" to survivable.

## Bicycle Helmets

### ACRS Policy Position

ACRS acknowledges that bicycle helmets substantially reduce the risk of head injury in a crash. This is shown by biomechanical and epidemiological evidence. Scientific research has provided evidence on the benefits of bicycle helmet wearing, quite independent of issues related to the acceptability and effects of legislation.

ACRS supports legislation that requires the wearing of Australian Standards-approved protective helmets by all bicycle riders, adults and children. There should be effective, high profile enforcement of helmet wearing laws, together with appropriate publicity. There is a need for uniform advice regarding the correct method of wearing approved bicycle helmets.

### Objective

To encourage and support the wearing of bicycle helmets by riders at all times.

### Discussion

Bicycle riding is a world-wide activity and an important means of transport for millions of people. Head injuries have emerged as a serious problem for bicyclists involved in crashes, and for the community as a whole because in large part the cost of an individual's injury is a cost to the community.

Rural drivers have special needs for access to essential services. However they are also likely to be living on roads carrying heavy traffic - therefore rural areas have other road users at increased risk. This is particularly difficult for drivers with invalid partners, and whose family support may not be available locally.

Again, caution should be taken against assuming that the next generation of older road inhabitants necessarily reflect the attitudes of the current cohort. The "young" aged (retirees from 55+) are selling up their home and moving into inner city apartments and retirement villages with more transport options. Whilst this may add to the density of larger regional centres, it may also reduce the provision of alternative transport to manage.

Finally, the current generation of ageing Australians is far more likely to demand to be involved in discussions and planning surrounding their mobility options. It makes good political sense to ensure that their views are canvassed and encouraged.

### Comment

There has been a good deal more research in recent times on the problems of older road users, of which the most recent is the research and review by ACRS member and Churchill Fellow Roland Anderson. This statement could benefit from updating to take account of recent research and up to date knowledge.

Over the 20 years 1970 to 1990, bicyclist fatality rates per 100,000 people have fallen by an average of 1.0% each year. This is a rate of fall less than one-third of that shown by other user groups. Further, non-fatal injuries resulting from bicycle crashes are grossly under-reported in official road crash statistics. Injury rates are especially high in children and in males.



A cyclist negotiates a difficult intersection with traffic on at the most vulnerable road user in the picture, his cycle helmet prevent life-threatening head injuries in the event of a crash.

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Rural drivers have special needs for mobility to access essential services. However they are also likely to be driving on roads carrying high-speed traffic - thereby putting themselves and other road users at increased risk. Typically rural areas have little or no access to alternative transport. This is particularly difficult if the driver lives alone, or cares for an invalid partner, and where family support may not be available locally.

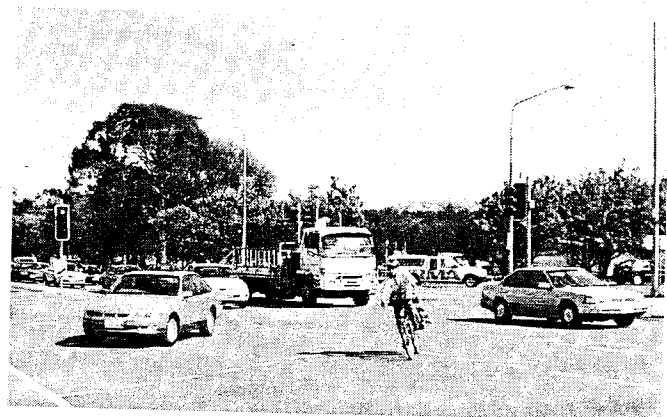
Again, caution should be taken against assuming that the next generation of older rural inhabitants will necessarily reflect the attitudes of the current cohort. Already the "young" aged (retirees from 55+) are selling up the family home and moving into inner city apartments and retirement villages with more transport options. Whilst this may further add to the density of larger regional centres, it may also make the provision of alternative transport easier to manage.

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A cyclist negotiates a difficult intersection with traffic on all sides. While he is the most vulnerable road user in the picture, his cycle helmet would help prevent life-threatening head injuries in the event of a crash.

# Peer Reviewed Papers

## Views of the Verge: Roadside Memorials and Local Government Policies

by Jennifer Clark, School of Classics, History and Religion, University of New England, Armidale, NSW, 2350

### Abstract

When road deaths occur it is common for those who mourn to erect roadside memorials. This development challenges the traditional view of the verge as merely a peripheral space adjacent to the transit way. In response, some local government authorities have formally considered their position on roadside memorials and developed policies to regulate the erection, maintenance and removal of roadside memorials. This paper examines local council policies to detect trends, concerns and perceptions about the presence of roadside memorials in local government areas.

### Introduction

The erection, maintenance and removal of roadside memorials can be highly contentious and emotive. Local government authorities have administrative control over the road reserve but these areas are increasingly targeted as sites of grief and mourning in the aftermath of traffic crash fatalities. With legal and administrative responsibility over public health and safety comes an obligation to consider a response to any changes taking place in the way the community views the verge. This is not always an easy task nor a simple one, but increasingly some local government authorities are deciding that it is necessary.

The area from property line to property line, which includes the carriageway and the verges, falls under the jurisdiction of local or state government depending on the classification of the road. The Roads Act of 1993, Section 138 in New South Wales, for example, specifically states that ‘ A person must not: (a) erect a structure or carry out a work in, or over a public road, or (b) dig up or disturb

the surface of a public road, or (c) remove or interfere with a structure, work or tree on a public road . . . otherwise than with the consent of the appropriate roads authority’ (1). Although this Act and others like it across Australia, clearly gives power to regulate the verges to government, public attitude towards these areas is becoming increasingly complicated and contested and the demands for access and control of certain sections of the verge can be strident. This development has come about because of the increasingly frequent desire of some grieving families and friends to build roadside memorials at the sites of fatal traffic crashes.

The idea of marking the side of the road, of course, is not new. A variety of roadside markers are recorded in the ancient world as well as throughout the American Southwest and Europe dating from the 17th and 18th centuries. They identified burial sites, murder sites, prayer places for safe travel and routes that had been blessed by a priest. Journeying then, as now, was inherently dangerous. However, in the twentieth century, roadside markers are almost exclusively associated with traffic deaths. There is evidence that certain parts of the United States in the 1940s were dotted with roadside memorials (2), so much so that Kenneth E. Foote argues that ‘ particularly dangerous stretches came to resemble small cemeteries, with rows of crosses marking dozens of fatalities’ (3). Foote suggests that as the interstate highway system was developed in the 1950s and 1960s the memorials began to disappear. ‘ The remedy for a crash’ , he suggested ‘ was a new guard rail, a wider shoulder, or a banked turn, not a small cross’ (3). Clearly the engineering solutions as suggested by Foote have not eliminated road death, although they have contributed significantly to the falling road toll, but some road users have reverted to more traditional, personal and symbolic ways to respond to danger and loss. In the last 15 years or so the concept of roadside memorialisation has grown in popularity so that a revival of this age-old tradition has occurred, in Australia, as much as it has overseas. Hartig and Dunn, examining memorials in the Greater Newcastle region of New South Wales, estimate that some 20% of all traffic fatalities occurring there were marked with a roadside memorial (4).

It is impossible to say conclusively why those who grieve now see memorialisation by the roadside as a desirable way to respond to sudden and tragic loss. It may be, as Haney, Leimer and Lowery suggest, that death has been sanitised and removed from everyday life so that when it occurs tragically, suddenly and violently our current mechanisms for dealing with the





associated grief seem inadequate and barren (5). They suggest that spontaneous memorialisation, of which the erection of roadside memorials is a part, is one way to respond more actively and immediately to such loss. Gerri Excell, studying roadside memorials in Britain, suggests that perhaps the renewed interest in roadside memorialisation is simply a return to the more involved, more elaborate and participatory mourning of the past (6). Majella Franzmann and I have argued in turn that roadside memorials may in fact reflect an inadequacy on the part of the state and the church in mediating grief and mourning and, that roadside memorials actually represent an authority taking by the mourners, an assumption of control over both the process of grief and the place of death (7). If there is some truth to any or all of these interpretations, then what we have is a pattern of assumption of the public verge for private use and a reclamation of the roadside for a different purpose from that of simply facilitating mobility.

The road verge, as Rebecca Kennerley suggests is a 'between space', that is, it sits between the roadway and the property lines of shops, houses, businesses or farms (8). On the one hand this makes the verge an empty space, a passing through space and on the other hand its very emptiness offers itself to interpretation and assumption. When road trauma occurs that claims a life it is the place where death was caused which takes on a new significance. A piece of roadside, a tree or a stretch of fencing can then be seen as a sacred place separate from the unclaimed surrounding space. It is there that a memorial is built, rituals performed, and communication with the deceased undertaken. This site then becomes special, an identified place on a placeless roadway. As poet Graeme Miles writes, 'The road in the rear-view mirror at night/ is sad as an abandoned toy,/ is transit distilled/ with no claim to placehood/ except the ad hoc shrines where the cars squealed' (9).

This between space, the verge, is now a place of multiple meanings. To the bereaved it is a special place where life was lost. In some cases that place becomes so significant that it is specifically claimed by friends and family for the deceased alone. By the Kakahu River in the South Island of New Zealand, for example, where Conor and Adam were killed, their friends have left messages, including one by Possum which reads 'This will always be your spot'. That claiming of 'the spot' can become quite insistent. When Kristopher was killed by Loch

Glascarnoch in Scotland, his mother wanted to build a memorial as close as possible to the scene of the tragedy. She complained when the local council 'didn't want us to put it on the actual spot, but on a boggy area well off the road. We kicked up a fuss', she explained 'and they eventually gave us permission to put it near where he was killed' (10).

It is not uncommon for arguments to ensue over rights to the verge. In the United States of America some states have banned the erection of roadside memorials altogether, locking out multiple uses of the verge and retaining the primacy of purposeful modernity that highway travel represents (11). Some local areas have brought down restrictions on the length of time memorials can remain, their size and their construction materials. On the freeway into Atlantic City, for example, the lifetime of a memorial is limited to 10 days (12). Local government authorities operate legalistically while the grieving families and friends often demand accommodation. In California, one grieving father was ordered to remove a large and growing memorial site or else face a fine of \$1000 and six months in gaol. The County Deputy Director of Public Works explained his position: 'We're not in the memorial business', he said, 'we're in the road business. I'm not insensitive but I have got to enforce whatever the rules and regulations are' (13). In the United States, the verge has become a battleground with adversaries even resorting to the courts for settlement. It is not inconceivable that such a development could occur in Australia as well.

Locally, government authorities are beginning to realise that the verge can become disputed territory, between opposing parties involved in a traffic incident as much as between council and the bereaved. It may not always be possible or wise simply to advise disagreeing parties to discuss memorialisation amongst themselves. A growing number of local councils in Australia believe they need to formulate policies to deal systematically, consistently and sensitively with the growing trend to claim pieces of the verge for private mourning.

## Methodology

In 2003 I surveyed 217 local government authorities across Australia, chosen at random, to investigate whether or not they had formulated a roadside memorial policy and if so, what form it took and upon what principles it was based. All sampled councils were contacted in writing and asked whether council had formally considered the issue of roadside memorials and if so, could they supply their council policy documents on roadside memorials. I wanted to know what were the determining factors in developing the policy? What directions did the councils take? Was there a pattern in the responses to the roadside memorial issue across local government areas and of course, the extent of the trends. This study is based on an examination of publicly available council policy documents formulated in response to growing concern over the issue of roadside memorials. This study does not include discussion of roadside marker post programs which are

<sup>9</sup> Although policy documents are publicly available I have decided not to identify the policies of individual councils but rather to focus on patterns and trends illustrated by relevant examples from the documents.



used in South Australia and available for local councils to use in Tasmania.

Of the 217 surveyed councils, 31% of all councils in Australia, 158 replied giving a response rate of 73%. 119 or 75% were from rural authorities and 39 or 25% were from urban authorities. 33 of those that replied or 21% were in Queensland, 63 or 40% were in New South Wales, 20 or 13% were in Victoria, 4 or 2% were in Tasmania, 14 or 9% were in South Australia, 22 or 14% were in Western Australia and 2 or 1% were in the Northern Territory.

Of the 158 councils surveyed 122 or 77% had not considered roadside memorials in any formal way. 36 councils or 23% had considered the issue of roadside memorials and their response to it in some form. The outcomes were quite mixed. In some cases a formal policy was adopted, either purposely formulated or adapted from their state's policy. Other councils considered the issues and then simply agreed to permit roadside memorials if they were requested without developing any formal policy. In that sense council would deal with each application on its merits. Other councils discussed the issue but were not prepared to make any lasting decisions about it.

Discussion of roadside memorials in the sampled councils took place between 1995 and 2003. The peak year for discussion was 1999 (7 councils) followed by 2001 (5 councils). No council appeared to have considered the issue before 1995. Even with an early start the process could still take some years to see through. Dumaresq Shire Council in North Western New South Wales was the earliest in my sample to consider roadside memorials, which it did in 1995, in response to a request from a local service club to erect crosses as part of their service to road safety. The council decided against the proposal. The adjoining Armidale City Council considered the issue in 1999. After amalgamation of the two councils a policy was finally adopted in September 2000. At the broader state level, for example, the Roads and Traffic Authority in NSW and VicRoads did not bring down their policies until 1998, Main Roads Western Australia in 2003 and ACT in 2004.

In 2006, I surveyed the same councils to see if they changed their policies or introduced policies where they had not existed before. Six councils had introduced new policies since 2003, three indicated an intention to introduce a new policy and two, one in Queensland and one in Western Australia had made amendments to old policies. Only one Queensland council in the original sample prohibited the erection of roadside memorials, established in their 1997 policy which was direct and to the point: 'That Council not authorise the erection of roadside memorials, including temporary crosses, in the road reserves under the control of Council in the Shire as it considers that, on balance, it is not appropriate given the legal, safety and maintenance issues involved'. By 2004 that council had softened its position to allow 'a simple white cross' for no longer than 6 months.

This amendment to the policy occurred simply in response to public demand. The community serviced by the council expected to be able to erect roadside memorials and the council received several requests to do so. It is clear from the 2006 data that councils are continuing to consider roadside memorials as an issue needing policy direction, albeit at a slow pace, resulting in a total of 27% of surveyed councils developing policies on roadside memorials, an increase of 4% since 2003. This emerging pattern reached a new administrative level in March 2006 when members of the Local Government Association of South Australia passed a resolution calling on the association to develop a policy on roadside memorials that could guide individual local councils trying to deal with this issue (14).

## Principles found in the policies

When councils did develop a policy to guide their decision making they usually acknowledged the sensitivity of the issue for families and friends in the opening paragraphs, saying quite specifically, for example, that the 'Shire will deal sensitively with requests for the establishment of roadside memorials' or 'the Policy recognises and respects the wishes of a bereaved family and friends to place Roadside Tributes at the location of a fatal accident site'. At the same time councils recognised their duty both to manage public space for the whole community and to work towards the pursuit of road safety. This dualism gives the roadside memorial policies an inherent tension. One council in Western Australia, for example, made these three elements immediately explicit in its policy where the objective was 'to be sensitive to people's grief and maintain road safety' but also to consider 'the concerns of other road users and nearby residents.' It is not always possible to satisfy all of these purposes but calling for sensitivity is a way of ensuring the council is alive to the heavy emotional investment in building a roadside memorial. Sensitivity is given such priority in policies that the Roads and Traffic Authority's Corporate Policy Statement No 37 on Roadside Tributes, Revised 21 October 1998, specifically stated that before any action was taken on removing a roadside memorial 'in all cases, the Manager, Media Unit must be advised' (15).

Legal, safety and maintenance issues vex councils deciding to implement policies. The legal ramifications have been addressed by one Western Australian council by including a clause in the policy that 'the applicant indemnifies Council against any action or damage claim arising from the installation of the markers'. Although this council is the only one in the sample with an indemnity clause, councils that have formulated policies are concerned about their duty of care to the public regarding roadside memorials. This involves a number of separate areas. Most obviously councils are concerned that roadside memorials will form a safety hazard either because they are too close to the carriageway or built of materials that will cause injury on impact or because visitors attending to the memorial may themselves be hit by passing traffic. Memorials

may become a distraction for drivers. Poorly maintained memorials could also become a safety and drainage hazard. Personal items could blow away and become roadside litter. Memorials have become hazards for road maintenance crews who either have to work around the memorials or sometimes damage them in the course of their operations. One council undertook an annual review of memorial sites in order to ensure they had not become hazards. All of these reasons present councils with public liability concerns. It may seem easier to ban roadside memorials altogether and yet the one council that did that rescinded its policy. The next best thing is to regulate the substance, duration and of course location of memorials in order to balance sensitivity with concerns for public liability.

## Regulating roadside memorials in council policies:

### *Limiting the duration of memorials*

Councils recognise that the desire to erect a roadside memorial stems from grief, however, grief mediation is not the business of council. Council manages assets and it is with that in mind that roadside memorial policies take on a regulatory role. One council in New South Wales, for example, makes regulation the primary objective of its policy, which is ‘ To develop appropriate standards for the installation and maintenance of roadside memorials.’ One of the most common regulations imposed by councils is to limit the amount of time a memorial can remain on the verge. The length of time deemed appropriate is quite diverse and, superficially, quite arbitrary from three months in one case in the Northern Territory, to a six month period ‘ subject to review’ in Western Australia, to 12 months for a council in New South Wales. Another NSW council also suggests a period of 12 months or ‘ until such time as a Coronial Inquest has taken place (whichever is longer)’ . One Council in Victoria and one in Queensland allow a period of 2 years, a draft policy in one NSW council proposes a two year limit whereas another in NSW does not impose a time limit at all. One Victorian council acknowledged that ‘ The length of the grieving period will vary with each situation. In general, a time limit of up to twelve months will be allowed for memorials of a temporary nature’ . There seems to be no justification offered for any of these chosen time limits except for the one where the memorialisation process is linked with the possible waiting period for a Coronial enquiry.

Those who erect memorials however, do not always accept the largely arbitrary limitations of council decisions regarding time limits. When memorial makers were interviewed in 2004 about their memorialisation practices, and keeping in mind that these interviews were drawn from different local government jurisdictions, still 81% said they intended to leave the memorial there until the council said to take it down.<sup>b</sup> There is a strong sense in written testimony as well that memorial makers believe they should have control over the memorial process including the length of time a roadside memorial remains. In Ormeau, in Queensland, for example, Daniel’ s memorial was

repeatedly vandalised. The perpetrator left a note to explain his reasons: ‘ The Community of Ormeau have endured this memorial site for one year and two months and we felt that is by far long enough’ Daniel’ s parents replied that ‘ it’ s not always going to be there, but it should be up to us take it down when we’ re ready’ (16). The memorial site can take on enormous significance that may override any government ordinance. In the United States, for example, the father of a boy killed on the road said he would chain himself to the memorial he built rather than take it down after asked to do so by the local government authority. The boy’ s mother responded by saying ‘ This memorial is so important to us, it’ s just not right to remove it’ (17).

Majella Franzmann and I have argued elsewhere that memorial makers assume an authority to erect roadside memorials sometimes in defiance of local government regulations because of an empowerment of purpose gained through the experience of deep grief, the sense they have of the significance of the place where death was caused and a belief in the presence of the dead at the memorial sites (7). Memorial makers can feel strongly motivated to attach a symbolic structure to a section of the roadside and to imbue that place with lasting and substantial meaning. When memorial makers were surveyed 62% said they felt as strongly about the memorial as when it was first built.

### *Limiting the type of memorial*

The second most common area of regulation found in council policies is the type of memorial to be permitted. One urban council in NSW restricts memorials to trees planted by council staff, a regional council in New South Wales, among others, follows the policy of the Roads and Traffic Authority in allowing nothing more than flowers or a lightweight wooden cross of a similar size to flowers. A Western Australian shire council allows white crosses and an urban council in Victoria is even less prescriptive simply saying that memorials ‘ must be constructed of materials or installed in a way that will not cause injury if struck by a vehicle’ . One Western Australian shire council specifies that white crosses are ‘ no more than 450mm in width and to be less than 600mm in height.’ A draft NSW policy sets a maximum dimension of 0.5 metre. A Western Australian shire council was the most prescriptive of all specifying white, non-reflective wooden crosses 40mm x 20mm and no larger than ‘ 850mm long (600mm out of ground) and 400mm wide’ or plants native to the local area, or a decal 160mm x 130mm to attach to a street light column or a power pole. Additionally, no memorial should consist of loose mementos of any kind nor be encircled with rock or brick borders, kerbs or edges.

Restrictive regulations exist in the policies of only 8% of councils. Most local government areas have no regulations on the nature of the memorial tributes at the roadside. As a consequence there is a vast array of memorial designs on Australian roads, including everything from small white crosses and floral tributes to large, permanent structures and those that grow with the addition of mementos, flowers, cards and letters. When memorial makers were interviewed 56% said the

<sup>b</sup> Interviews were undertaken with 16 memorial makers in 2004. University of New England. Human Ethics Approval number: HEO4/104.

# The Prevalence and Characteristics of Paediatric Driveway Accidents in Queensland

by J Davey and J Freeman of the Centre for Accident Research and Road Safety - Queensland University of Technology, and G A Dingle, M J Clark, T C Johnston, S D Woods and J White of the Australian Centre for Prehospital Research.

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## Abstract

**Objectives:** This study was designed to investigate the incidence and characteristics of non-traffic child pedestrian accidents in Queensland to which the Queensland Ambulance Service (QAS) responded between January 1998 and December 2000.

**Method:** Both quantitative and qualitative data from ambulance report forms were utilised in the analyses. Cases were selected on the basis of the child's age (up to 15 years) and the location of the incident (non-traffic areas). The main outcome measures were the child's Glasgow Coma Scale (GCS) score, respiratory rate and ambulance dispatch code (life-threatening or non life-threatening) recorded on arrival by the paramedics.

**Results:** In total, 76 driveway incidents out of a total of 1105 paediatric accidents were identified over the three-year period. The incidents predominantly involved vehicles reversing at low speed out of driveways, often with a parent driving. Four-wheel drive (4WD) and heavy vehicles were over-represented in the statistics and were associated with more severe injuries to the child. Peak times for the incidents were afternoons and during holiday months, when children were more likely to be playing around non-traffic areas. The incidents were also more likely to involve males (57%) and 51% involved children under the age of four years. In regards to severity, one child was deceased and six were unconscious on arrival of the ambulance.

**Conclusions:** Non-traffic pedestrian accidents in Queensland remain a considerable risk for children under four years of age. A number of strategies may prove effective at reducing this risk, however greater driver awareness in non-traffic locations and the use of methods to enhance driver visibility when reversing may prove to be important factors in preventing these accidents.

**Keywords:** paediatric, pedestrian, drive-way, injuries.

## Introduction

### *Paediatric pedestrian injuries and deaths*

Pedestrian incidents represent a major cause of injury and death among Queensland children [1]. Such incidents usually involve a moving vehicle striking an individual either on a public road or private property. Pedestrian fatalities are most often classified into either traffic or non-traffic categories under the International Classification of Diseases coding ICD-9-CM [2]. Traffic pedestrian accidents are usually defined as those that occur on a public street or highway, while non-traffic pedestrian accidents are defined as those that occur in driveways, parking lots, and laneways [3]. It is this latter accident type that remains a considerable risk to young children, as previous research has reported a higher paediatric mortality rate for this form of accident [4]. Furthermore, 1 in 4 child pedestrian hospitalisations result from injuries sustained on home driveways [5], and paediatric pedestrian accident rates have remained relatively stable over the past decade [6].

### *Circumstances of the injuries and deaths*

The elevated risk of a young child being struck by a vehicle may be explained by the corresponding developmental stage, as young children are more likely to experience difficulty in recognising environmental hazards [4], and are relatively small size in comparison to the vehicles. Furthermore, current research has demonstrated a clear relationship between the child's age (e.g., developmental stage) and the likely location of an accident. Infants and toddlers are more likely to be struck in driveways while older pre-school and school-aged children tend to be struck when they run out in front of vehicles in traffic locations [7,8,9,10]. For example, a Californian study reported a median age of two years for driveway injuries, four years for parking lot injuries, six years for mid-block injuries and 10 years for intersection injuries [11]. Similarly, two New Zealand studies have observed that a majority of driveway injuries occurred at homes where there were no physical separations between the driveway and children's play areas [5, 12].

Although boys are at a higher risk of traffic pedestrian accidents than girls [6,13], there appears to be a relatively equal gender distribution in driveway pedestrian incidents [4,8]. Research has continually demonstrated that a parent or older sibling of the child is most likely the driver of the vehicle in driveway accidents [4,5,6,8,9,14,15,16,17]. Typically the vehicle is moving in reverse at low speed and the driver is unaware that the child is present. Commercial utilities and 4WD vehicles are over-represented in the data on driveway accidents, particularly in the more severe and fatal accidents [18,8,5,17]. Research has suggested that this is probably due to the height of the vehicles, which often results in poor driver

visibility when reversing [4].

Children injured in driveway accidents typically sustain soft-tissue injuries to the head, neck, torso, or limbs as well as fractures to the pelvis and limbs [6,8,15]. In addition, reported mortality rates vary between 6% [8], 10% [12] and 16% [4], although fatalities are more common in children under the age of five years [4].

#### *Australian Research*

There have been a number of Australian studies that have focused on the prevalence of paediatric pedestrian non-traffic accidents. A nation wide investigation into the incidence of low-speed motor vehicle driveway deaths during 1996 to 1998 indicated 12 deaths on average per year [19]. The study revealed that most incidents resulted from young toddlers positioning themselves behind large stationary vehicles e.g., 4WDs. While most toddlers were old enough to be mobile, they were generally too small to be easily visible. The immediate location of the incidents was usually a residential driveway, although no cases involved shared driveways. A similar Victorian study that examined mortality rates from slow-speed, non-traffic accidents that occurred between 1985 and 1995 identified 28 fatal paediatric pedestrian accidents over this period, with an increase in the rate during the later years of the study e.g., 79% occurred between 1992-1995 [9]. The majority of fatalities involved 4WD and heavy vehicles, 57% of vehicles were in reverse, 79% incidents occurred in driveways, and most resulted in head injuries. Incidents were more common in the morning, on weekends, and during the warmer months (November – April), as children are more likely to be outside playing. Furthermore, relative risk of a driveway fatality was estimated to be greater in rural than in urban areas of the state.

A similar New South Wales study examined the number of paediatric pedestrians admitted to the New Children's Hospital (Sydney) over the period November 1995 to February 2000, and entries into the NSW paediatric trauma death registry over the 12-year period from January 1988 to December 1999 [15]. The results indicated there were 14 driveway-related deaths over the 12 years, which accounted for 8% of all paediatric pedestrian deaths in that period. Furthermore, there were 42 hospital admissions over the same period of time. Once again, the majority of these incidents involved male children, struck by a reversing vehicle driven by a parent or friend, during the afternoons. Four-wheel drive and light commercial vehicles were responsible for 42% of all incidents, even though they accounted for only 30% of all registered vehicles in New South Wales at the time. A closer examination revealed that driveways not protected or separated by a fence or building from a child's play area had three times the number of accidents compared to protected driveways [15]. A similar Adelaide study reported emergency department statistics on 35 pedestrian accidents involving

one-year-old children and highlighted that 11 of the incidents (30%) involved a reversing vehicle, and a majority of these incidents occurred in driveways and car parks [18].

Many of these trends are consistent across states, although it is noted that past research has demonstrated that Queensland records a significantly higher rate of slow speed runovers than the rest of Australia; 2.4 per 100 000 for children aged one to four years [1]. Between 1994 and 1996 in Queensland, 76% of the pedestrian fatalities involved a truck, utility, or 4WD. The majority (78%) of the vehicles were reversing at the time of the incident and 69% were driven by immediate family members of the victim, with most (67%) of the fatalities occurring in or around the residential driveways.

#### *Present Study*

Despite the above statistics, it remains generally difficult to gather accurate and consistent information on non-traffic accidents as they occur on private land and are not always reported to the police. Figures usually vary according to the source and whether the data included all incidents or fatalities only, as research into non-traffic accidents often utilise a variety of information from police data, hospital emergency departments, hospital trauma registries to coroner's offices.

In regards to the present context, the Queensland Ambulance Service (QAS) is in a unique position to provide state-wide data on non-traffic injuries in children. The QAS responds to approximately 370 paediatric vehicle-related trauma incidents every year [20]. QAS paramedics complete ambulance report forms for each call-out that include information about the date and time of the accident, patient demographics, vehicle details, and the nature and severity of injuries.

The current study has three main aims, which are to:

- investigate the incidence of driveway-related child pedestrian incidents in Queensland to which the QAS responds;
- examine the characteristics of these incidents with a view to identifying potential risk factors; and
- examine the general severity of the injuries and determine the factors, if any, that are associated with the severity of injuries.

## **Method**

### *Selection of cases*

The study comprised of a population-based, retrospective analysis of all childhood non-traffic pedestrian accidents that occurred throughout Queensland over a three-year period from 01/01/1998- 31/12/2000. QAS data were gathered from the ambulance report forms that were fully audited for accuracy, and were stored under secure conditions on the Queensland Ambulance Information Management System (AIMS) database. Cases were primarily selected on the basis of the child's age (under 15 years), and the corresponding

criteria regarding the location e.g., non-traffic

*Data collection*

AIMS data was abstracted from microfilmed ambulance report forms that had been completed by ambulance officers required to attend the scene of an accident. Demographic information included address, age and sex of the patient. The dispatch code designated whether the emergency was of a life-threatening or a non life-threatening nature. The respiratory rate and GCS readings used in the analyses were the first assessments carried out upon arrival of the ambulance. In addition to coded information, notes written by the paramedics on the ambulance report forms were analysed for further details of the incident such as the type of vehicle, section of vehicle in contact with the child, person in control of the vehicle, detailed location of the incident and the severity and location of the injuries sustained.

*Variables for investigation*

The primary outcome variables for investigation were the respiratory rate, GCS score, and ambulance dispatch code (e.g., life-threatening versus non life-threatening). Respiratory rates were divided into three categories: normal = 10 - 29, absent= 0, or abnormal >29. GCS scores were divided into five categories: 3 (deep coma or death), 4-5, 6-8, 9-12, and 13-15 (neurologically intact). The predictor variables were the age and sex of the child, the type of vehicle, speed, direction of travel, person in control of vehicle, location of incident (e.g., rural versus urban, private versus public, and a more detailed location), time of day, day of week, and month of year.

**Results**

*Overall incidence of paediatric non-traffic accidents*

During the data analysis period 01/01/1998 to 31/12/2000, QAS attended 1105 incidents involving a paediatric pedestrian injured by a car, heavy vehicle, bicycle, motorcycle or other vehicle such as skateboard or ride-on mower. Of these incidents, 76 cases were identified as having occurred in a non-traffic area, including educational centres, shopping centres, place of work, recreational and sports centres, parks, campsites and the beach.

*Characteristics of the patients and injuries*

Of the 76 incidents, 57% involved male victims and 51% involved children under the age of four years. A further 32% were aged between 5 and 10, while 17% were older than 10 years of age. The majority of patients (91%) were conscious at the time of arrival of the paramedic, one victim was deceased while six were unconscious (Table 1). The mean GCS score was 13.7 (3.2). The majority of patients were in the neurologically intact category, six per cent in the deep coma / dead category and 10% in categories with intermediate levels of consciousness (Table 1). The mean respiratory rate was 23.8 (7.4), while respiratory rates were normal for 27% of

patients, absent in 3% of cases, and abnormally high in 69% (Table 1). Furthermore, 83% per cent of the patients were treated at hospital, five per cent were treated in non-hospital locations such as a medical clinic, and 12% of patients did not

Impact on child pedestrian	Frequency	Percentage
<b>Status of patient</b>		
Conscious	69	91%
Unconscious	6	8%
Deceased	1	1%
<b>Total</b>	<b>76</b>	<b>100%</b>
<b>Glasgow Coma Scale scores</b>		
3 (deep coma or death)	4	6%
4 - 5	1	1%
6 - 8	1	1%
9 - 12	6	8%
13 - 15 (neurologically intact)	60	83%
<b>Total</b>	<b>72</b>	<b>100%</b>
<b>Respiratory rate</b>		
0 (absent)	2	3%
10 - 29 (normal)	17	27%
> 29 (fast)	43	69%
<b>Total</b>	<b>62</b>	<b>100%</b>
<b>Treatment destination</b>		
Hospital	63	12%
Other medical setting	4	5%
No treatment required	9	12%
<b>Total</b>	<b>76</b>	<b>100%</b>

require any further treatment (Table 1). In summary, ambulance dispatch codes indicated that 88% of the incidents were life-threatening, and 12% were non life-threatening.

*Table 1. Characteristics of the impact of pediatric pedestrian non-traffic accidents in Qld between January 1998 and December 2000.*

*Characteristics of the vehicles, locations and times*

As depicted in table 2, 61% per cent of the vehicles involved in the incidents were cars, however the ambulance report forms did not indicate whether these cars were large, medium or small. Twenty per cent of the vehicles were 4WDs, utilities or heavy vehicles. In 46% of incidents, the vehicle was in reverse although this figure could be higher due to the fact that the

direction of movement was not recorded in 22% of cases (Table 2). This is consistent with the finding that indicates the rear section of the car hit the patient in 46% of the cases. The vehicle was moving at low speed in 55% of incidents and an unknown speed in 45% of incidents. A parent was in control of the vehicle in 28% of cases, although once again, this figure could be higher as the relationship of the driver was

Characteristics	Frequency	Percentage
<b>Type of vehicle:</b>		
Car	46	61%
Four wheel drive	11	15%
Utility	1	1%
Heavy vehicle	3	4%
Other	5	7%
Unknown	10	13%
<b>Total</b>	<b>76</b>	<b>100%</b>

#### Direction of Movement:

Reverse	35	46%
Forward	24	32%
Unknown	17	22%
<b>Total</b>	<b>76</b>	<b>100%</b>

#### Section of vehicle hitting child:

Rear	35	46%
Front	24	32%
Side	2	3%
Unknown	15	20%
<b>Total</b>	<b>76</b>	<b>100%</b>

#### Person in control of vehicle:

Father	15	20%
Mother	6	8%
Neighbour	1	1%
Idle vehicle	4	5%
Unknown	50	66%
<b>Total</b>	<b>76</b>	<b>100%</b>

unrecorded in 66% of cases (Table 2). In contrast, an idling car moving out of control caused 5% of the incidents.

Table 2. Characteristics of the vehicles involved in paediatric pedestrian non-traffic accidents in Qld between January 1998 and December 2000.

In regards to accident location, a private or residential area was identified as the location of the accident in 55% of the cases (see Table 3). Precise incident locations were not sighted on arrival by the paramedic in 31% of cases due to the vehicle or the patient being moved to another location, however, a driveway was recorded as the place of incident in 40% of cases. Twenty-nine per cent of incidents occurred in the Brisbane metropolitan area and 52% in other urban areas of the state (Table 3).

An investigation into time of accidents revealed that incidents

were most likely to occur between 2 pm and 6 pm (43%), and on Mondays (24%) and Saturdays (21%). The periods of December to January (21%) and July to October (47%) were peak times of year for paediatric pedestrian incidents in

Characteristics	Frequency	Percentage
<b>Private vs Public area:</b>		
Private or residential	42	55%
Public area	27	36%
Unknown	7	9%
<b>Total</b>	<b>76</b>	<b>100%</b>

#### Detailed location:

Driveway	30	39.5%
Educational setting	6	8%
Sports centre	5	7%
Cinema	1	1%
Shopping centre	8	10%
Beach	2	3%
Unknown	24	31%
<b>Total</b>	<b>76</b>	<b>100%</b>

#### Regional location:

Metropolitan	22	29%
Other urban	40	52%
Rural / remote	12	16%
Unknown	2	3%
<b>Total</b>	<b>76</b>	<b>100%</b>

Queensland.

Table 3. Characteristics of the location of paediatric pedestrian non-traffic accidents in Qld between January 1998 and December 2000.

#### Tests of association

Finally, a series of chi-square analyses indicated that the age of the child was not significantly related to the impact of the accident as measured by GCS, respiratory rate or ambulance dispatch code. However, the sex of the child was related to the dispatch code as, girls were more likely than boys to be placed in the "life-threatening" code X ( $1, 76 = 4.34, p < .05$ ).

In regards to vehicle type, there was a significant relationship between the type of vehicle and severity of injury as measured by GCS severity ( $p < .001$ ) as heavy vehicles were more likely to cause more severe injuries. More specifically, of the seven patients with some loss of consciousness (indicated by a GCS rating of less than 13), four were hit by 4WD, two by heavy vehicles, one by an "other" vehicle and one by a car (Table 3). In contrast, measures of the severity of impact (GCS, respiratory rate or dispatch code) were unrelated to the location of the incident, the driver of the vehicle, direction of the vehicle, time of day, day of week or time of year (see table 3).

Predictor	(cell size)	GCS 3%	GCS 4- 5 %	GCS 6-8 %	GCS 9-12 %	GCS 13-15 %
<b>Age (years)</b>						
0 to < 2 (17)	0.0	0.0	0.0	17.6	82.4	14.74, NS
2 to <5 (24)	12.5	4.2	4.2	12.5	66.7	
5 to <10 (20)	5.0	0.0	0.0	0.0	95.0	
10 - <15 (13)	0.0	0.0	0.0	0.0	100.0	
<b>Child' s Sex</b>						
Male (41)	7.3	0.0	0.0	7.3	85.4	3.21, NS
Female (33)	3.0	3.0	3.0	9.1	81.8	
<b>Vehicle Type</b>						
Car (45)	0.0	0.0	0.0	0.0	2.2	97.852.6***
4WD (10)	10.0	0.0	0.0	30.0	60.0	
Utility (1)	0.0	0.0	0.0	0.0	100.0	
Heavy (3)	66.7	0.0	0.0	0.0	33.3	
Other (5)	0.0	20.0	0.0	0.0	80.0	
<b>Location</b>						
Private (40)	7.5	2.5	0.0	10.0	80.0	5.42, NS
Public (26)	3.8	0.0	3.8	0.0	92.3	
<b>Driver</b>						
Father (15)	6.7	0.0	0.0	13.3	80.0	1.75, NS
Mother (5)	0.0	0.0	0.0	20.0	80.0	
Neighbour (1)	0.0	0.0	0.0	0.0	100.0	
Idle car (4)	0.0	0.0	0.0	0.0	100.0	
<b>Direction</b>						
Reverse (32)	3.1	3.1	3.1	9.4	81.3	3.97, NS
Forward (23)	4.3	0.0	0.0	0.0	95.7	
<b>Time of Day</b>						
MN- 6am (2)	0.0	0.0	0.0	50.0	50.0	16.68, NS
6- 10am (12)	16.7	0.0	0.0	0.0	83.3	
10am- 2pm (15)	0.0	0.0	0.0	13.3	86.7	
2 - 6pm (31)	6.5	3.2	0.0	6.5	83.9	
6pm - MN (12)	0.0	0.0	8.3	8.3	83.3	
<b>Day of Week</b>						
Monday (16)	6.3	0.0	0.0	12.5	81.3	20.38, NS
Tuesday (8)	0.0	0.0	0.0	12.5	87.5	
Wed (11)	18.2	0.0	0.0	9.1	72.7	
Thursday (7)	0.0	14.3	0.0	0.0	85.7	
Friday (8)	0.0	0.0	0.0	0.0	100.0	
Saturday (16)	6.3	0.0	6.3	6.3	81.3	
Sunday (6)	0.0	0.0	0.0	16.7	83.3	
<b>Time of Year</b>						
Summer (19)	10.5	0.0	5.3	10.5	73.7	8.27, NS
Autumn (11)	0.0	0.0	0.0	9.1	90.9	
Winter (23)	4.3	0.0	4.3	91.3		
Spring (19)	5.3	5.3	0.0	10.5	78.9	

Table 3. Tests of association between characteristics of paediatric pedestrian non-traffic accidents and patients' Glasgow Coma Scale score.

Note: \*\*\* p < .001, \*\* p < .01, \* p < .05, NS = not significant

## Discussion

The present study aimed to report on an investigation into the incidence of paediatric pedestrian non-traffic accidents in Queensland to which the QAS responds. In addition, the study aimed to examine the characteristics of these incidents and the general severity of the injuries.

Firstly, the study revealed that the QAS responded to 76 driveway accidents involving paediatric pedestrians over the three-year study period. A higher percentage of the accidents involved boys than girls, however similar to previous research [4,8], the gender distribution was relatively even. Accidents were also more likely to occur in the warmer months in the afternoon (to late afternoon) when children are likely to be active.

The research findings indicate that non-traffic pedestrian accidents clearly affect preschool-aged children, with over half the accidents involving children under the age of four years. This finding is again consistent with previous studies which have demonstrated that young children are at a heightened risk of being struck by vehicles [8,17, 21], and may suggest that children aged less than five years lack recognition of environmental hazards [9].

An examination into the severity of injuries revealed one patient died and six were unconscious upon arrival of the ambulance. Importantly, analysis of ambulance codes revealed that 88% of the incidents were considered “life threatening”. The average GCS score of 13 was consistent with previous research [8] as less than a third of patients demonstrated respiratory rates within the normal range. Over 80% were treated at hospital and a further 5% received treatment elsewhere. Although this study does not report follow-up information from the hospitals, the apparent mortality rate (1 in three years) is lower than that cited in a previous Victorian study (2.8 per year) [9].

In regards to vehicle type, cars rather than 4WDs had the highest rate of involvement with driveway accidents, although this may be likely to the greater proportion of cars than 4WDs currently being driven. However, accidents involving 4WD and heavier vehicles tended to result in more severe injuries as indicated by the patients' respiratory rate and GCS ratings. This finding is again similar to previous research that has found 4WD and heavier vehicles are over-represented in the statistics for driveway accidents [1,8,9,15,17,22]. Moreover, a reversing vehicle was involved in the majority of the private or residential cases in Queensland. These findings are again consistent with those of previous studies [15,17,22], and suggest that poor driver visibility and lack of awareness are major risk factors in driveway accidents.

Incidents were most common between 2pm and 6pm, which corresponds to the after-school period when children are most likely to be playing and moving about in non-traffic locations. However, there appears to be some level of variability in the peak accident times. For example, a New Zealand study reported the peak time for driveway accidents was between 4pm and 6pm [23], while a Victorian study of fatalities indicated fatalities were most likely to occur in the morning hours [9]. Furthermore, for the current study Saturdays and

Mondays were the days when most accidents occurred, while previous research has indicated week days are the highest risk times [9,23]. Taken together, the findings indicate that children are at risk of being injured whenever a motorist moves a vehicle in a driveway, regardless of the time or week of day.

Furthermore, there was no relationship between severity of injury and time, day or season. However, more accidents occurred in the months of July to October, and in December and January (roughly corresponding to winter holidays, 3rd term holiday and summer holiday months in Qld). A Victorian study also noted a peak in driveway accidents in the warmer months [9]. Rather than a direct relationship between season and risk, this pattern may simply reflect a greater frequency of vehicle use while children are at home playing during school holidays.

### Limitations

Some limitations of the study were identified. The data presented in the current study is over six years old, however more recent statistics also indicate a similar level of prevalence, and type, of paediatric crashes in Queensland [24]. The severity of injury data was not uniformly collected, and thus questions remain regarding the relationship between injury severity and other environmental factors remain uncertain e.g., such as driving direction & location. Additional missing data regarding vehicle type and driver characteristics for specific incidents make firm conclusions difficult to achieve.

### Driveway accident countermeasures

Regardless of the relationship between the driver and victim, the results highlight the importance of being aware of the whereabouts of children before moving a vehicle. Furthermore, the data confirms that children remain at risk of being injured by vehicles on or near property driveways. This study has identified that vehicles moving in reverse out of driveways, in particular higher-set vehicles with poor visibility, pose a high risk for paediatric pedestrian incidents. Children under the age of five are particularly at risk. Such accidents are most likely to occur after school hours and during school holidays, when children are more likely to be playing in non-traffic areas while vehicles are in motion. Since the majority of such accidents cause considerable trauma to both the child and family, the appropriate response is to focus on prevention [6].

Researchers have suggested that interventions should incorporate a holistic approach and involve addressing the driveway environment, the driver and vehicle, as well as the appropriate supervision of children [6,19]. Given the unpredictable nature of children behaviour, special emphasis being placed on environmental controls (e.g., fencing) may prove to be of considerable benefit. While not always feasible, the erection and maintenance of fencing and physical barriers have proven successful in reducing the likelihood of paediatric accidents [6]. For example, a case study reported the absence of barriers between play areas and driveways increases the risk



of driveway-related injuries by a factor of 3.5 [5]. A less expensive option may be to install additional vehicle safety mechanisms on high risk vehicles (e.g., 4WDs) such as extended mirrors to visualise small children. In addition, parental supervision which reinforces children not being permitted to play in the driveway or near cars also has the potential to be a productive prevention mechanism. However, it appears that a combination of well publicised public health campaigns to increase motorists' awareness, as well as safer driveway design and the possible fencing of domestic rental properties have the greatest potential to prevent injuries [6].

Taken together, the process of reducing the high incidence of paediatric driveway injuries is most likely to be found in improving public awareness as well as the safety of driveways. While fencing every driveway may prove an expensive and unrealistic target, raising the public's perceptions regarding the serious risk of driveways may prove an essential first step in improving child safety. Given that such accidents are often predictable and thus preventable, continued research into effective safety campaigns will only serve to reduce the likelihood of a child sustaining a serious vehicle-related injury in a driveway.

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# A Comparison of Reported Driving Anger in Canada with USA, UK and Australia

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## Abstract

Driver anger and aggressive driving is a topic of continued interest and receives constant public attention, especially in the media. Although there are many situational and person-related factors contributing to aggressive driving behaviours, the most widely recognised among them is driver anger or frustration. Many studies in aggressive driving are thus devoted to measuring the anger aroused in a variety of anger provoking situations. Although the results obtained in the several previous studies were quite consistent in general, there are substantial variations across samples due to difference in the social, economic and political environment. This paper presents the results of a survey of a convenient sample of college students in a Canadian university on their driving anger using the Driver Anger Scale and compares the Canadian results with those from UK, USA and Australia.

## Introduction

Driver anger and aggressive driving is a topic of continued interest and receives constant public attention, especially in the media [1, 2, 3, 4, 5]. The media, however, prefer to use the term 'road rage' to refer to a wide variety of behaviours on the road but tended to focus its attention on the more extreme behaviours [5, 6, 7, 8]. Traffic researchers, however, prefer to use the term 'aggressive driving', which includes a much wider variety of road user behaviours that may be considered aberrant [9, 10].

Although there are many situational and person-related factors contributing to aggressive driving behaviours, the most widely recognised among them is driver anger or frustration [10, 11, 12, 13, 14, 15, 16, 17]. To date, a substantial number of characteristics have been found to influence the amount of anger experienced by drivers in road incidents including personality, congestion, type of vehicles involved, a sense of being pressed for time, the anonymity one may experience in a vehicle, and the gender and age of an 'offending driver' [11, 12, 13, 14, 18, 19, 20]. Therefore, there appears to be a complex relationship between the personal and situational characteristics of an anger provoking road situation and any resultant feelings of anger and subsequent aggressive driving behaviour.

Many studies in aggressive driving have therefore included some measures of the anger aroused in a variety of anger provoking situations. Although there are many instruments used to measure anger arousal [21], the most widely used instrument in road safety is the Driver Anger Scale (DAS) developed by Deffenbacher and colleagues [3]. This instrument has been applied to measure driver anger in many countries including America [3], the United Kingdom [14] and Australia [22], and has been found to exhibit a high degree of validity and reliability. In particular, the scores on the DAS have been found to be significantly correlated with trait aggression and self-reported aggressive driving in various studies [2]. It is interesting to note that although these three countries are very similar economically, socially and politically, there appears to be some differences in the level of anger aroused or at least reported by the drivers across these countries. Therefore, replication of these studies in similar countries such as Canada will still provide a useful comparison and valuable insights can be gained from such replication.

## Method

The participants in this study were mainly third and fourth year college students in a Canadian university. With the permission of the professors, the survey was administered by an undergraduate student to the participants during the lecture breaks in two transportation related courses. Of the 89 students who participated in the survey, 52 (58.4%) were male and 37 (41.6%) were female. The age distribution of the participants was as follows: 16-20 year old (40.4%), 21-25 years old (38.2%) and 26 years old and above (21.3%). It is worthwhile to note that 56 (62.9%) drivers reported that they had been issued at least one traffic violation ticket in the past three years while 13 (14.6%) had reported being involved in at least one crash in the past three years. Although quite high, these statistics are not unexpected since the sample consists of mainly young drivers. Also, 52 (58.4%) respondents reported that they drove a sedan, 12 (13.5%) reported driving a convertible or sport car, and 25 (28.1%) reported driving a van, utility vehicle or truck.

Consistent with the three previous studies, the Driver Anger Scale (DAS) was used to measure the level of frustration and anger reported by the Canadian sample. Twenty nine of the 33 items from the original DAS [3] were thus used to gauge anger arousal and these items included the hostile gestures, illegal driving, slow driving, traffic obstructions and discourtesy subscales. The four items on police presence were omitted in the survey for two reasons. First, Lajunen and colleagues found that the items in this subscale were insufficiently anger provoking and were dropped from further analysis [14]. Second, significant differences in traffic enforcement practices across countries make it difficult to compare the results which seem to vary substantially across countries.

The participants were required to record the amount of anger they would experience under each potentially anger provoking driving situations. The responses to each item were recorded using 5-point rating scale ranging from 1 = 'not at all angry' to 5 = 'very angry'. The measure of internal reliability for the DAS for this sample was very high with a Cronbach-Alpha of 0.92 and comparable with those obtained in the other studies that were used as comparisons; specifically, the Cronbach-Alphas obtained in an American study was 0.9 [3], 0.87 in a British study [14] and 0.94 in an Australian study [22].

## Results

The means and standard deviations of the 29 items from DAS used in this study are presented in Table 1. It is interesting to note that tailgating is considered by the majority of the respondents to be the most anger provoking incident, followed by someone cutting in and taking a parking lot that the respondent has been waiting for. These incidents were reported to provoke more anger than all the hostile gestures such as obscene gesturing and shouting. In fact, most of the situations involving discourtesy in driving were reported to provoke more anger than the three hostile scenarios. On the other hand, road construction and detours is rated as the least frustrating of the potentially anger provoking driving situations.

**Table 1****Canadian Driver Anger Scale**

Items	Mean	SD
<i>Discourtesy</i>		
Someone is driving very close to your rear bumper	4.17	1.01
Someone cuts in and takes the parking spot you have been waiting for	4.06	0.98
Someone speeds up when you try to pass	3.92	1.04
Someone backs out right in front of you without looking	3.85	0.98
At night someone is driving behind you with bright lights on	3.84	1.08
Someone cuts in right in front of you on the motorway	3.82	1.08
Someone coming towards you does not dim their headlights at night	3.53	1.12
A cyclist is riding in the middle of the lane and slowing traffic	3.40	1.40
Someone pulls out right in front of you when there is no-one behind you	3.16	1.27
<i>Hostile Gestures</i>		
Someone makes an obscene gesture towards you about your driving	3.45	1.35
Someone beeps at you about your driving	3.04	1.30
Someone shouts at you about your driving	2.99	1.34
<i>Illegal Driving</i>		
Someone runs a red light or a stop sign	3.33	1.37
Someone is weaving in and out of traffic	3.15	1.34
Someone is driving well above the speed limit	2.93	0.41
Someone is driving too fast for the road conditions	2.87	1.23
<i>Slow Driving</i>		
Someone is driving more slowly than is reasonable for the traffic flow	3.55	1.20
Someone is driving too slowly in the outside lane, and holding up traffic	3.49	1.24
A slow vehicle on a winding road will not pull over and let people pass	3.20	1.06
Someone in front of you does not move off straight away when the light turns green	2.85	1.11
Someone is slow in parking and holds up traffic	2.71	1.19
A pedestrian walks slowly across the middle of the street, slowing you down	2.52	1.32
<i>Traffic Obstruction</i>		
A truck kicks up sand or gravel on the car you are driving	3.45	1.18
You hit a deep pothole that was not marked	3.08	1.27
You are driving behind a vehicle that is smoking badly or giving off diesel fumes	3.06	1.23
You are driving behind a truck which has material flapping around in the back	3.01	1.27
You are stuck in a traffic jam	2.94	1.29
You are driving behind a large truck and cannot see around it	2.64	1.25
You encounter road construction and detours	2.45	1.22

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Note: Mean and standard deviations calculated using 'not at all angry' = 1 to 'very angry' = 5.

The mean scores for the five subscales included in this study are reported in Table 2 together with similar scores reported in previous studies for America [3], United Kingdom [14] and Australia [22]. In general, the Canadian sample reported a slightly lower overall average (3.23) in the driver anger scales than the American sample (3.26) but higher than the Australian (2.64) and British (2.26) samples. The only subscale in which the Canadian sample reported the most anger among the four countries reported is illegal driving, with a mean subscale score of 2.95 to means of 2.7, 2.6 and 2.3 for the

American, Australian and British samples respectively.

It is interesting to note that the Canadian sample reported discourteous driving as the most anger provoking driving situations, followed by hostile gesture, illegal driving, slow driving and obstructions. This relative ranking is similar to that obtained in the Australian sample but different from those obtained in the American and British samples. It also should be noted that the only subscale that has a consistent ranking (most anger provoking) across the four countries is discourteous driving.

**Table 2**

*Comparison of Mean Driver Anger in Four Countries*

Subscale	Canada	United States <sup>1</sup>	Australia <sup>2</sup>	Britain <sup>3</sup>
Discourtesy	3.75	3.9	3.1	2.7
Hostile Gestures	3.16	3.2	2.8	2.3
Slow Driving	3.05	3.2	2.4	2.0
Traffic Obstructions	2.95	3.3	2.3	2.0
Illegal Driving	2.95	2.7	2.6	2.3

Sources: 1. Deffenbacher et al (1991); 2. O'Brien et al (2002); 3. Lajunen et al (1998)

In addition, we also tested for differences in the reported driver anger scale between male and female respondents using the one-way analysis of variance procedure. The results for the different gender are reported in Table 3. In contrast to the samples from the other three countries, female respondents in this sample reported higher level of anger in all subscales relative to male respondents although these differences are not statistically significant at  $\alpha = 0.05$  or even at  $\alpha = 0.10$ .

Finally, the means and standard deviations of the driver anger scores for the three different age groups were also computed and reported in Table 4. It is evident that whereas the overall mean level of reported anger decreases with age, the same can not be said of some of the subscales. However, none of these differences were statistically significant at  $\alpha = 0.5$  or 0.10 when tested using the one-way analysis of variance procedure.

**Table 3**

*Gender Differences in Canadian Driver Anger*

Subscale	Canada	United States <sup>1</sup>	Australia <sup>2</sup>	Britain <sup>3</sup>
Discourtesy	3.75	3.9	3.1	2.7
Hostile Gestures	3.16	3.2	2.8	2.3
Slow Driving	3.05	3.2	2.4	2.0
Traffic Obstructions	2.95	3.3	2.3	2.0
Illegal Driving	2.95	2.7	2.6	2.3

Sources: 1. Deffenbacher et al (1991); 2. O'Brien et al (2002); 3. Lajunen et al (1998)

**Table 4***Age Differences in Canadian Driver Anger*  
16-20 yrs old

Subscale	16-20 yrs old		21-25 yrs old		26 yrs old & above	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Discourtesy	3.94	0.69	3.64	0.75	3.59	0.77
Hostile Gestures	3.15	1.23	3.39	1.14	2.27	1.10
Slow Driving	3.19	0.91	3.07	0.88	2.77	0.87
Traffic Obstructions	3.13	0.82	2.82	0.93	2.83	0.85
Illegal Driving	2.96	1.06	2.84	0.90	3.04	1.07
Overall Anger	3.37	0.61	3.19	0.68	3.24	0.67

*Note: One-way Anova found no difference in the means at  $\alpha = 0.10$  for all subscale*

## Discussion

On average, the Canadian drivers sampled reported more anger in response to discourteous driving behaviours exhibited by the other drivers than hostile gestures, illegal driving, slowing driving and traffic obstructions. Among all the 28 potentially anger provoking driving situations, it is not surprising that "someone driving very close to your rear bumper" or tailgating is considered by the majority of the respondents to be the most anger provoking driving situation. Tailgating is considered by most drivers not only as a discourtesy but also a very intrusive and highly unsafe driving behaviour.

It is interesting to note that road construction and detours is rated as the least frustrating of all the twenty eight potentially anger provoking driving situations. This result is somewhat surprising given the high media coverage about the effect of construction delays and road rage in the city surveyed. One possible explanation is the relatively more frequent occurrences of road construction versus other potentially anger provoking situations because the City of Calgary is booming and there are many road construction projects on-going during the time of the survey. However, the likelihood of this scenario is not very high because there are many other relatively common potentially anger provoking driving situations, such as discourtesy and slow driving, that are included in the survey. Another possible explanation is that construction delays provoke relatively less anger because there is no specific person to blame, unlike most of the other scenarios included in the DAS.

In general, the Canadian sample reported a slightly lower overall average in the driver anger scales than the American sample [2] but higher than the Australian [22] and British [14] samples. It should be noted that the British sample consists of a broader and larger sample of drivers whereas the Canadian, Australian and American samples consist of a smaller sample of younger drivers. It is not surprising therefore that the British respondents reported relatively lower mean scores on all the anger subscales measured.

As expected, the mean anger scores for the Canadian sample is much closer to the corresponding mean scores for the

American sample because their proximity and similarity in driving culture. This inference is further supported by the finding that the relatively ranking of the means of the subscales for the Canadian drivers are the same as the corresponding mean scores for the American drivers but they are different from those of the Australian and British samples.

## Limitations of Study

Although the sample contains a very important segment of the target population (young drivers), it consists of a relatively higher portion of the more educated segment of the population. Since the effects of education level on the perceptions of anger provoking situations and the reported level of anger aroused have not been well researched and documented, we are unable to judge if any systematic bias exists due to our sampling framework. This study should thus be regarded as a useful comparative study that provides some valuable insights to understand driver anger and aggressive driving behaviours in Canada relative to three other major Anglo-Saxon countries. It should be noted that two of the three previous studies used as a comparison for this study also used a convenient sample of college students. Since the main purpose of the survey is to compare driver anger measured in a Canadian sample with those obtained from comparable countries, this targeted sample is thus deemed to be appropriate.

The moderate sample size (89) used also limited the extent of the analysis that could be done in this study. Even though the sample could be considered as sufficiently large for simple statistical tests like the one-way analysis of variance, it was too small for other methods such as factor analysis which would be useful to explore the underlying factor structure of the items used instead of assuming the same subscales used in previous studies. However, this limitation did not significantly affect the main aim of this study, which is to compare the reported driving anger in Canada with those obtained in USA, UK and Australia. Nevertheless, the sample is drawn only from one city in Canada and may be representative of drivers from other parts of the country.

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