Investigating the consequences of vehicle accidents has been a core research activity for 20 years
The Monash University Accident Research Centre (MUARC) has a high public profile in both the national and international communities for its research in injury prevention and road safety. In 2008 a further development in MUARC’s engagement with the world was taken with the establishment of research nodes in Europe (July 2008), South Africa (August 2008) and Malaysia (October 2008). To support this development MUARC signed Memorandums of Understanding with INRETS (French National Institute for Transport and Safety Research), SWOV (Dutch National Road Safety Institute), Loughborough University and VTI (Swedish National Road and Transport Research Institute) and began discussions with injury research centres throughout Asia and Africa. MUARC hopes to enhance its ability to help the international effort to address the global injury burden. MUARC also took the opportunity in 2008 to begin to develop closer links with the other injury prevention research centres throughout Australia and greatly strengthen ties with faculties within Monash University itself.

The last year has also seen great changes in the environment in which MUARC operates particularly with the global financial crisis and its influence on the research capacity of the automotive industry. MUARC has taken advantage of this difficult financial environment to strengthen its relationships with a widening group of industry, government and community stakeholders. In particular MUARC has continued to champion the need for safety to be a key performance indicator for policies and practices in all sectors.

In 2008, the Centre continued to work with VicRoads, Transport Accident Commission, Department of Justice and Victoria Police to undertake research in support of the Victorian Government’s road safety strategy ‘arrive alive 2008-2017’. MUARC continued its close association with the Automotive Co-operative Research Centre to undertake a large range of research to improve road user safety. The Centre further enhanced its research capacity by purchasing a transportable driving simulator, developing an instrumented vehicle for on-road driver behaviour testing, and beginning extensive upgrades of its advanced driving simulator. Major new research projects such as the intersection design project were initiated. Work continued on the Marine Safety Victoria research program and the NHMRC funded ‘Exercise for Independent Living’ study.

This has been an exciting year for MUARC during which substantial developments have occurred. MUARC is now well positioned to make an increased contribution to local, national and international efforts to address the immense personal and social burden that injury imposes on the community. As an all-cause, all-injury prevention research centre, MUARC is one of the few centres of its kind in the world. It has dedicated expert staff committed to undertaking quality research that makes a difference to the community it serves. I thank the staff and the many sponsors and partners for their ongoing commitment to the cause.
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A cornerstone of scientific endeavour is the peer review of research outputs and the publication of these outputs in quality journals accessible to all. Dr. Lesley Day was appointed Deputy Director with a responsibility to encourage research excellence throughout the Centre. The Centre’s staff were restructured into small teams led by inspirational senior researchers and focused around specific areas of activity. Dr. Judith Charlton was appointed Associate Director (Education and Research Training) to develop the postgraduate training activities of the Centre and invigorate the atmosphere of energetic enquiry that comes with having large cohorts of PhD scholars in a centre. Academic independence at the team level has resulted in renewed enthusiasm for investigator driven research. In 2008 MUARC increased its peer reviewed journal publications by 80% compared to 2007.

Essential to the value of any research endeavour is the ability to translate this research into public health benefit. Translation and dissemination of research is all about engagement: with government; with industry; and with members of the public. While MUARC already has a strong track record in this area, 2008 saw MUARC begin the process of developing an overt capacity in knowledge transfer and research application. A significant number of the new projects begun during 2008 were designed to directly support policy development and prevention practice. A number of new ways of defining relationships with the community were explored that will lead over the next few years to the establishment of collaborative clusters to drive the research to practice transition. In 2008 MUARC increased its research grant income from industry and government by 60% compared to 2007.

Critical to MUARC’s reason for being is a clear focus on a single outcome - the elimination of serious losses from injury. While achieving outcomes is a product of doing the process properly, sometimes the choice of process can be improved by continuing to keep the outcome in one’s sights. In 2008 MUARC took another look at what we needed to do to achieve these reductions and rebalanced the portfolio of our efforts to make sure we were working in the areas most needed to achieve our goals. MUARC is now positioned to make a much bigger contribution to workplace and childhood injury prevention and injury outcomes research than in previous years.

In 2008, MUARC consolidated activity in our traditional areas of interest, developed expertise in a range of new injury prevention areas, increased the emphasis on developing research collaborations and opened new offices in Malaysia, Europe and Africa to better facilitate our engagement with the world. A measure of the quality of MUARC’s research training and emphasis on staff development is that the new Heads of all three of our new offices are long standing MUARC employees and Monash University graduates. It has been an exciting and productive year.

Amongst this frenetic activity, however, it is important to reflect on the extent to which the achievements of 2008 were consistent with the mission and core values that have defined our purpose and prescribed our approach over the 20 years since MUARC was established. MUARC’s mission is to i) undertake high-standard research ii) challenge and support citizens, governments and industries and iii) eliminate serious health losses due to injury. We are research-based, but we work collaboratively with the community to achieve a public good outcome - the elimination of serious health losses due to injury. In 2008 MUARC made several adaptations to improve its capacity to achieve its mission.
On the foundation of independent scientific research, MUARC makes evidence-based recommendations that form a cornerstone for injury prevention policy and preventive practice. The Centre identifies emerging injury problems, determines and evaluates solutions, advises on safety strategies and monitors progress. Staff work cooperatively with both public and private sector organisations to define the scope of research projects and encourage the adoption of recommended injury prevention measures. Senior researchers at MUARC are active and sought at both national and international levels and the Centre is regarded as one of the leading injury prevention research centres in the world.

The intellectual and academic basis for MUARC’s work is conceived as a coherent, integrated, unified model (see figure below). This model provides the mechanism for linking the small increments of knowledge that researchers create into an overall, Centre-wide program of research that is designed to answer the major questions facing society in the field of injury research (see cover image).

The functional unit of activity within this framework is the Research Team. The Research Team typically comprises half a dozen independent researchers from academic Levels A through to E, together with research assistants, students and support staff. Research teams are self-defining groups of academics joined by a common area of interest. MUARC teams may be complemented by external collaborators when additional expertise is required and typically these teams will come together to provide multi-dimensional capacity to provide complete solutions to high priority problems.

Research Teams in MUARC:
- Behavioural Safety Science - Team Leader: Judith Charlton
- Human Factors - Team Leader: Michael Lenné
- Injury Analysis and Data - Team Leader: Stuart Newstead
- Injury Epidemiology - Team Leader: Lesley Day
- Injury Surveillance & Research - Team Leader: Erin Cassell
- Safe Systems Strategy & Infrastructure - Team Leader: Bruce Corben
- Safety Science Biomechanics & Innovation - Team Leaders: Peter Hillard and Brian Fildes
- Vehicle Safety Test, Evaluation & Crash Research - Team Leader: David Logan

The work of these teams throughout 2008 is presented in this Report.
The Centre’s research and expertise is a great deal richer thanks to the continuing input from senior staff who are major contributors to MUARC, in changed capacities from their original roles within the Centre. We are grateful that all past Directors maintain an active interest in the Centre and an involvement in its research. The combined experience of these experts covers many decades of road safety, injury prevention and management. These senior members of MUARC act extensively as ambassadors for the Centre at both speaking engagements and in the media.

The central administrative staff provide support in the areas of human resources, finance, IT, web development, publications, internal university interaction and general administrative needs. MUARC would not exist without the efforts of these core staff who maintain the Centre’s capacity to function. MUARC works holistically and the contribution the Centre makes to reducing the burden of injury in the community is overtly acknowledged as the product of both the research and administrative staff of the Centre.

**Professor Rod McClure**
Throughout 2008, Rod McClure maintained an active research program across the injury continuum including investigating:
- Data systems, surveillance and injury coding issues, in collaboration with researchers from National Centre for Classification in Health at Queensland University of Technology,
- Population-based injury prevention policy and practice in collaboration with researchers from University of Queensland and Griffith University,
- Trauma system performance in collaboration with researchers from Auckland University of Technology, and
- Distribution and determinant of injury outcomes in collaboration with researchers from Griffith University and Auckland University of Technology.

His scientific publications and presentations for 2008 reflect this activity.

**Dr. Lesley Day**
Dr. Lesley Day was appointed Deputy Director with a responsibility to encourage research excellence throughout the Centre. Full details of her personal research program are listed on page 28.

**Dr. Judith Charlton**
Dr. Judith Charlton was appointed Associate Director (Education and Research Training) to develop the postgraduate training activities of the Centre. Full details of her personal research program are listed on page 11.

**Professor Max Cameron**
Appointed as a Professor in December 2007, Max Cameron has continued as part-time Principal Research Fellow with MUARC during 2008. His important contributions include being an advisor and mentor for the Injury Analysis and Data Team and leading and undertaking a number of specific projects of his own. Highlights included completion of a speed enforcement strategy for Western Australia which was endorsed by the WA Road Safety Council and recommended to government. A paper based on this work won Best Research Paper prize at the Joint Australasian College of Road Safety and Queensland Parliamentary Travelsafe Committee conference “High Risk Road Users – Motivating behaviour change: what works and what doesn’t work?” Parliament House, Brisbane, in September.
Max commenced the development of a speed camera enforcement strategy for Queensland during 2008, and led research on a new traffic enforcement model for Victoria Police to assist their contribution to the ‘arrive alive! 2008-2017’ road safety strategy for Victoria. He also carried out significant research on the relationship between speed and road trauma, that was presented at the 2008 Australasian Road Safety Research, Policing and Education Conference, Adelaide, in November.

**Adjunct Professor Mike Regan**

In April 2007 Adjunct Professor Mike Regan commenced a 3-year secondment as a Research Director with the French National Institute for Transport and Safety Research, (INRETS) in Lyon, France. He is affiliated with two of INRETS’ laboratories – the Laboratory for Ergonomics and Cognitive Sciences Applied to Transport (LESCOT), in Lyon, and the Modelling, Simulations and Simulators (MSIS) laboratory in Paris. Mike is based in Lyon with his family and prior to moving to Lyon managed MUARC’s Human Factors and Simulation group. The aims of Mike’s secondment are: (a) support INRETS/MUARC involvement in EU-funded FP7 projects; (b) identify, initiate and undertake new collaborative research activities; and (c) facilitate broader, enduring collaborations between INRETS, MUARC and other research institutes.

In December Mike was appointed as Adjunct Professor in the Department of Applied Mechanics at the Chalmers University of Technology in Gothenburg, Sweden. In this role he is helping the SAFER Centre (which is similar to the Australian AutoCRC) develop a Road User Behaviour research and teaching program, and is working on a range of human factors and advanced driver assistance system-related projects funded by government and industry. As senior editor and co-author, Mike completed the first book on driver distraction which was published in October 2008 (Regan, M.A., Lee, J.D. & Young, K.L. (Eds) Driver distraction: Theory, Effects and Mitigation, Florida, USA: CRC Press.) He also initiated, as Co-convenor and Chair of the Scientific Committee, the ‘First International Conference on Driver Distraction and Inattention’, which will be held jointly by INRETS and Chalmers University in Gothenberg, Sweden, between 28-30 September, 2009.

Mike was nominated in December 2008 for the ‘2009 Cumming Memorial Medal’ – awarded by the Human Factors and Ergonomics Society of Australia for “highly esteemed human factors and ergonomics-related research or application in a relevant area of human factors and ergonomics”.

**Professor Tom Triggs**

Emeritus Professor Tom Triggs continued his association with the Centre and its Human Factors Group in 2008. Projects he was associated with in 2008 include the Australia Post motorcycle safety project, the Yarra Trams tram driver training simulator project, and the Development of A Driver Training Syllabus project. He continued as a member of the VicRoads New Driver Licensing program. Tom continues as Chair of the Board of Management for the Victorian Problem Gambling Research and Treatment Centre, and is a member of the Research Degrees Committee of the Monash School of Psychology, Psychiatry and Psychological Medicine. Tom is involved in the supervision of three PhD students at the Centre, while a DPsych student he supervised in the School of Psychology, Psychiatry and Psychological Medicine graduated in November 2008.

Tom gave the opening address at SAFEX 2008 - Driver Education World Conference in London in May 2008 and was invited speaker at the Australian Compulsory Third Party Conference - Crash! in Adelaide in November 2008.

**Dr. Eric Wigglesworth**

The Centre is privileged to have had Dr. Eric Wigglesworth as an Honorary Senior Research Fellow. Eric’s broad experience over many forms of injury prevention adds considerably to the knowledge pool available, particularly in the areas of level crossings and OHS. The highlight below emphasises the important impact that the most experienced Australian researchers make when major life saving issues are being considered.
The excellent response made to Eric’s evidence presented in May 2008 to the members of the ‘Inquiry into Improving Safety at Level Crossings’ conducted by the bipartisan Road Safety Committee of the Parliament of Victoria is a testament to his high quality inputs to rail safety. The Committee’s Report, which was tabled in Parliament in December includes this statement: “The Committee heard evidence from representatives of government departments, rail and road transport industries, as well as specialists in rail and road safety, Intelligent Transport Systems and developers of new technologies. It also heard evidence from Dr. Eric Wigglesworth, Honorary Senior Research Fellow, Monash University Accident Research Centre”.

The report includes 18 citations of Eric’s publications and evidence to the Committee. The report strongly supports the two main themes of Eric’s submission. The first was his “concern over the lack of scientific evidence to underpin current and proposed countermeasures”. In its Report, the committee writes “The Committee agrees with Dr. Wigglesworth’s call for research”. The second main theme of the submission was for a comprehensive data bank. The Report recommends that “(DOT) regularly publishes up-to-date statistics that would assist rail and road authorities to gain a greater understanding of level crossing vehicle and pedestrian crashes”.

Eric passed away on 23 March 2009. His tremendous contribution to injury prevention and his happy personality will both be greatly missed within the Centre.

Dr. Diana Samarakkody

Diana joined the Centre in 2008 as a postdoctoral scholar for two years. Diana is working on a manuscript for a book aimed at grass root practitioners on injury prevention. She is also undertaking a number of research projects including an indigenous injury prevention project in Queensland; an international, multi-level, multi-intervention randomised controlled community trial on child injury prevention, and a birth cohort study called Environments for Health Living – The Monash Study of Population Health.

Presentations

- Cameron, M. (2008) ‘Further development of strategies for best practice in speed enforcement in Western Australia’, Enhanced Speed Enforcement Steering Committee, Western Australia, 12 March and 7 May
Following the devastating and destructive crashes at railway level crossings at Lismore and Kerang in Victoria, the Legislative Council on 18 July 2007 asked the Standing Committee on Road Safety (which includes seven Members of Parliament drawn from all political parties and both Houses) to conduct an Inquiry into and report on “existing, new and developing technologies for implementation to improve safety at level crossings.” The Committee Report was tabled in the Parliament on 8 December, 2008.
Other Conference Publications


MUARC Report Series


Staff membership of boards and committees

- Accident Analysis & Prevention, Associate Editor (I. Johnston)
- Australasian College of Road Safety (Victorian Chapter) Committee, (M. Regan)
- Australian e-Safety Working Group, Chair/Member (I. Johnston, M. Regan)
- Commonwealth Working Party on Truck Driver shortages, Member (I. Johnston)
- IET Intelligent Transport Systems Journal, Editorial Board (M. Regan)
- Injury Prevention Research Institutes of Australasia (I. Johnston (Member))
- International Organisation for Standardization (ISO) Technical Committee 22, Sub-Committee 13 – Ergonomics Applicable to Road Vehicles (M. Regan)
- Injury Prevention, Editorial Board (P. Vulcan)
- International Task Force on Vehicle Highway Automation, Member (M. Regan)
- International Working Group on Speed Control, Member (M. Regan)
- Journal of the Australasian College of Road Safety, Editorial Board, Member (M. Regan)
- Journal of European Transport Research, Editorial Board, Member (M. Regan)
- Journal of the Australasian College of Road Safety, Editorial Board, Member (M. Regan)
- Journal of the Australasian College of Road Safety, Editorial Board, Member (M. Regan)
- International Organising Committee: 8th International Level Crossing Symposium and Managing Trespass Seminar, Sheffield, England, Member (E.C. Wigglesworth)
- Monash University Research Graduate School Committee, Student Representative (J. Killian)
- Road Engineering Association of Asia and Australasia, Past President (and Life Member) (I. Johnston)
- Road Safety Sub-Committee, Amy Gillett Foundation (M. Cameron)
- Standards Australia Committee SF 21*: Human Factors (M. Regan)
- Standards Australia Committee IT23*: Traffic Information and Control Systems (M. Regan)
- Transport Industry Safety Group, Member (I. Johnston)
- Transportation Research Board of the U.S. National Academies Committee AHB60 on Highway-Rail Grade Crossings, Washington D.C., Member (E.C. Wigglesworth)
- Trauma systems performance improvement and registries sub-committee, Trauma committee, Royal Australasian College of Surgeons, Member (R. McClure)
- Victorian Institute of Forensic Medicine Research Advisory Group, Member (R. McClure)
- Victorian Neurotrauma Initiative Evaluation Committee, Member (R. McClure)
- Victorian Road Trauma Committee of the Royal Australasian College of Surgeons, Member (I. Johnston)
- Victorian Trauma Committee, Royal Australasian College of Surgeons, Member (R. McClure)
The Behavioural Safety Science Team was launched early in 2008 and assembled selected MUARC researchers into a single administrative unit with the capacity to address relevant behavioural themes in injury research. The research activity of the team focuses on understanding and managing human behaviour to meet the challenge of preventing injury and improving safety.

Under the leadership of Senior Research Fellow Dr. Judith Charlton, the team’s research priorities focus on the vulnerable road user and particularly the safety of seniors, youth and children as drivers, pedestrians, cyclists and vehicle occupants. It is estimated that around 90 per cent of road crashes involve road user related variables, hence, the research undertaken by this group has the potential to make a major contribution to the reduction of road crashes and injury severity.

A feature of the team’s activity is the safe transportation and mobility of the ageing population and community members with impairments that impact on their safety as road users. The team has a strong commitment to independent and evidence-based approaches and engages a range of research methods and techniques to study human performance including driving simulation; instrumented vehicles and real-world observation; survey and interview techniques; and mass data analysis.

Expertise
The team comprises researchers with multidisciplinary expertise in Psychology, Applied Health Sciences, Epidemiology, Education and Social Sciences. The combined researchers’ capacity represents a depth of scientific knowledge and practical capability related to safety issues in transportation, work place and community settings. Team members have respected reputations amongst sponsors and funding organisations for high quality research outputs. The researchers actively engage with government, industry and professional groups locally, nationally and globally through project activities and participation in conferences, seminars, committees, school programs and community-based public health and safety initiatives.

Highlights
The team’s first year was highly productive. In 2008, there were new roles for some and promotions for others. Dr. Charlton accepted the position of Associate Director (Education and Research Training) within the Centre. Dr. Jennie Oxley accepted the position of Associate Director of MUARC Malaysia, that necessitated her relocation to the Monash Sunway campus in Kuala Lumpur. While representing the University and the Centre in KL, Jennie retains her role and research activities as a significant member of the team. Senior Research Fellow, Jim Langford was awarded a prestigious 3-month fellowship at the Gerontology Institute, University of Massachusetts, Boston to assist in developing a range of collaborative projects, including a dementia and driving evaluation. These international postings gave the team the opportunity to use internet-based communication technology to effectively maintain intra-team contact and project continuity. Michelle Whelan and Megan Bohensky were promoted to Research Fellow Level B.

The team’s achievements included the completion of several significant projects in older driver safety, young
driver training and child occupant protection. An important feature of this work has been new knowledge translation through scientific publications and presentations, including 15 peer reviewed journal papers. Team researchers also communicated their scientific findings through: seminars and workshops to the motor vehicle industry and health professionals; presentations to teachers and parents; and regular communication with relevant State and Federal government departments. Several members of the team were regularly called upon by print and electronic media for comment and feature articles.

Early in the year the Federal Minister for Innovation, Industry, Science and Research, Senator Kim Carr, launched MUARC’s new portable driving simulator. The simulator is a primary tool in the team’s current program of older driver research on behalf of the AutoCRC. High quality simulator data on many hundreds of drivers were collected and analysed using this facility. Driving simulator data are valuable to inform the motor vehicle industry and policy makers on development of vehicle technologies, highway design and driver performance to better manage safety.

Complementing the simulator-based research, a number of projects were conducted using instrumented vehicles to study real-world driving behaviour. Supported by a large Australian Research Council Linkage Grant, drivers’ performance in controlled on-road settings was compared with their driving performance in the simulator to examine the simulator’s relative behavioural validity. Additionally, naturalistic on-road study methods were used in instrumented vehicles fitted with discrete video and data logging technologies. The study, funded by the AutoCRC in collaboration with GM Holden, monitored older driver behaviour over a period of weeks, focusing on their ability to negotiate intersections. A similar technique was developed and used to observe children’s behaviour in child restraints.

During the year the team hosted visiting scholars and researchers including Lisa Molnar from the University of Michigan’s Transportation Institute. Lisa has joined the team as a PhD candidate and will undertake her thesis on self regulatory behaviour of older drivers. Dr. Virginie Etienne from INRETS in Lyons, France came to work with the team on a prestigious Endeavour Foundation Postdoctoral Research Fellowship. She examined the impact of ageing and cognitive impairment on driving. Natalie Para and Emilie Briela, also from INRETS, visited the Centre, participating in Virginie’s project. Strong collaborative links were established with Dr. Shawn Marshall from Ottawa during his sabbatical visit to the Centre in April. A significant outcome of this visit has been the development of a MUARC collaboration with Canada’s CanDrive project in a world-first, multi-site, longitudinal study of older drivers.

Dr. Charlton represented the University and the Centre on an invited visit to Taiwan to present the potential for road safety research collaborations to the ROC Government, universities and the National Health Research Institute. The visit was highly successful with ongoing discussions to explore the specific role that the team and the Centre can play in this international collaboration.

Also joining the team during the year were undergraduate scholars Didi Zhao from the University of Melbourne’s Advanced Medical Science (AMS) program and Alice Barnett, a third year Monash University Science student. These undergraduate practicum placements provide selected students with insights into our scientific community and an opportunity for the Centre to contribute to the development of the next generation of researchers.

Research highlights

Older road users

With the baby boomer cohort about to enter old age, there is an urgent need to understand more about the next wave of older road users and how to effectively manage their safe mobility. To address the older (and impaired) driver ‘problem’, the team has identified three broad research questions: (1) “How do we identify at-risk older drivers?; (2) What are
the most effective solutions for managing at-risk older drivers?; and (3) What is the full societal impact of reducing/stopping driving on the mobility, health and economic well-being of older drivers?”. A significant highlight of 2008 was a program of work addressing older driver safety, sponsored by Austroads and conducted in partnership with the State Government of Western Australia’s Department of Planning and Infrastructure, Insurance Council of Western Australia and the Injury Control Council of Western Australia.

Older Driver Model Assessment Program: Stage 4 - Validation of screening tests to assess at-risk older drivers

The overall aim of Austroads’ Older Driver Model Assessment Program was to develop a more effective and acceptable procedure for re-licensing older drivers. The key features of the proposed licensing model include: (i) older driver testing based on functional ability rather than chronological age; (ii) targeted identification of older drivers suspected to have an increased risk of crashing using a community referral mechanism; (iii) the introduction of a screening test to reduce the need for all drivers to undergo an on-road driving test; (iv) the establishment of a case officer position to facilitate the re-assessment process on behalf of older drivers; and (v) the provision of advice on alternative transport options for those who are no longer able to drive. To be operable, the model requires a set of valid assessment protocols able to distinguish between safe and unsafe drivers, with the required measure of validity varying according to the level of assessment.

The aim of Stage 4 of this program of research was to assess the capacity of a series of cognitive and other screening instruments to distinguish between safe and unsafe drivers. A case-control study design was employed, comprising 62 cases and 62 controls. Each case was aged at least 75 years, resident in or near to the Perth metropolitan area, involved in a recent casual crash and judged by insurance assessors to be responsible for the crash. Controls were matched as closely as possible for age, gender and area of residence and had a recent crash-free history. Sixteen assessment protocols were used, ranging from self-rated driving ability through to formal psychometric tests especially of cognitive functioning to clinical and on-road ratings of driving fitness. No evidence was found that any of the protocols were able to distinguish between safe (controls) and unsafe (cases) drivers. It was therefore concluded that they are unlikely to be useful to licensing authorities. It follows that, in the absence of more valid and reliable assessment protocols, the Austroads model is currently inoperable. However in reaching this conclusion, it was also recognised that the mandatory licensing assessments currently being conducted in eight of the nine Australasian jurisdictions similarly lack demonstrable validity. As these procedures affect all older drivers reaching a threshold age, it was recommended that the development of more effective assessment protocols and associated processes be continued. To this end, the MUARC Behavioural Safety Science Team is currently developing a proposal to join an international older driver cohort study that, among other tasks, aims to identify or develop and evaluate a battery of both on-road and off-road assessment protocols.

Younger road users

Young people under the age of 25 represent another important group of vulnerable road users. Researchers are studying young drivers and working to improve their licensing, training and road user behaviour. They are also looking at improving the safety of young drivers by increasing parental involvement during the P-plate period, and investigating safety initiatives for other young road users including pedestrians and cyclists.

Going Solo – a guide for parents of P-plate drivers: follow-up research and United Kingdom and New Zealand adaptations

The overall aim of this project was to identify effective ways to raise awareness of young driver risks among parents and to encourage discussion between parents and their young drivers about risky behavior and the potential consequences. As a result of this research, the Going Solo resource was developed – a booklet designed to inform parents of the risks that their newly licenced son or daughter will face, particularly in their first year on a P-plate licence. The resource was launched nationally in Australia in 2007 and is available for free download from the MUARC website. An evaluate study is currently underway to examine the effectiveness of the resource. This work is being conducted by 3rd year Advanced Medical Science Student, Didi Zhao as part of a one-year project experience with the team. Follow-up work on the resource has also been undertaken in partnership with the Cheshire Safer Roads Partnership in England to adapt the Going Solo booklet for parents of newly qualified drivers in the UK. The adaptation of Going Solo
for the UK audience was achieved in collaboration with all Cheshire Safer Roads partners including local councils, Cheshire Constabulary, Cheshire Fire and Rescue, Highways Agency, and Her Majesty’s Courts Service. The new resource incorporated all the key messages from the original resource concerning the overall crash risk of young drivers. However, specific points were adapted for the UK audience regarding licensing requirements and enforcement messages. The adaptation was completed in 2008.

In mid-2008 the AA Driver Education Foundation in New Zealand approached MUARC to adapt the Going Solo booklet for parents of restricted drivers in New Zealand. The adaptation of Going Solo for the New Zealand audience was sponsored by Mobil Oil New Zealand Limited, and was completed in collaboration with AA Driver Education Foundation and the Traffic and Road Safety research group at Waikato University. The adaptation involved working closely with key New Zealand transport organisations including the New Zealand Automobile Association, New Zealand Transport Agency and Ministry of Transport. Consistent with the UK adaptation, the messages concerning the overall crash risk of young drivers were similar to the Australian Going Solo booklet. However, NZ-specific licensing requirements and a revised form of the parent-teen driving contract were included. The adaptation will be completed in 2009.

**Children in cars: what children are really doing in the rear seat of cars**

Child restraint systems (CRS) for vehicles are designed to provide specialised protection for child occupants in the event of a crash. However, children do not sit perfectly still and upright while travelling in vehicles. At times children squirm, slide, sleep, play and attempt to unharness themselves while travelling in their CRS, potentially leading to inappropriate seating positions throughout their journey. As a consequence, this behaviour may reduce or nullify the safety benefits associated with CRS. In a world-first study, this project used a naturalistic, observational approach to examine how children are restrained and seated in their CRS and how they interact with drivers while travelling in a car.

Families with at least one child aged between 1 and 8 years were recruited into the study and were asked to drive an instrumented ‘study vehicle’ on their regular trips for 3 weeks. All children used their regular CRS. The ‘study vehicle’ was fitted with a discrete 4-camera-recording system, providing images of the driver and front seat passenger, the rear seat child passengers and the traffic ahead.

Video-recordings were viewed, coded and analysed to examine the children’s behaviour in their CRS in the study vehicle.

This study provided the first real-world data on the behaviour of children in vehicles using a naturalistic, observational approach. Preliminary analyses revealed that children were out-of-position and hence likely to be sub-optimally restrained for around 60 percent of the time during trips. The results of this study also highlight the need to raise awareness amongst parents that sub-optimal restraint use has serious implications for their child’s CRS effectiveness in the event of a crash. The study has provided a rich data source for further analyses including the influence of children’s travel behaviour on driver distraction.

**Presentations**


Oxley, J., Charlton, J. & Langford, J. (2008) Older drivers, driving strategies, vehicle and road design improvements to maintain safe mobility. International Conference on Aging, Disability and Independence, February 21-23, St Petersburg, Florida USA


**Publications**

**Peer Reviewed Journals**


**Edited Book Chapters**


**Peer-reviewed Conference Papers**


**Reports**

An older driver training session was held in Canberra as part of an NRMA ACT Road Safety Trust project to develop an older driver education resource

Staff membership of boards and committees

- Amy Gillett Foundation, Road Safety Advisory Committee (M. Johnson)
- Association for the Advancement of Automotive Medicine, Chicago, Illinois, Scientific Program Committee, Member (J. Charlton)
- Association for the Advancement of Automotive Medicine, Membership and Credentials Committee (J. Charlton)
- Association for the Advancement of Automotive Medicine, Member (J. Oxley)
- Australasian College of Road Safety (Victorian Chapter) Committee, (J. Charlton)
- BrainLink (formerly Brain Foundation Victoria), Board of Directors (J. Charlton)
- Monash Ageing Research (MonRAS) Advisory Committee (J. Charlton)
- Scientific Committee, VISION Congress (for Vehicle and Infrastructure Safety Improvement in Adverse Conditions and Night Driving) (J. Charlton)
- Standing Committee on Ethics in Research involving Humans (SCERH), Management Committee (M. Johnson)
Human Factors is concerned with the application of what we know about people, their abilities, characteristics and limitations to the design of equipment they use, environments in which they function, and jobs they perform. The human factors team at MUARC applies models of system safety to the analysis of transportation safety issues to provide robust research outputs and policy recommendations for our stakeholders and clients.

Expertise
Sound, theoretically-based models of system safety underpin our research, that focuses on factors that shape and constrain operator behaviour, and investigates how broader task, environmental and organisation factors influence task performance. The projects conducted within the human factors team in 2008 typically covered the following themes: the development and evaluation of training systems for car drivers and motorcyclists; driver impairment associated with drowsiness; organisational influences on safety; the design and evaluation of in-vehicle systems; and driver distraction.

The team uses a variety of methods to support the conduct of these projects, including: human factors-based analyses of accident data; systematic observation of behaviour in the field; detailed analysis of operator behaviour using human-in-the-loop simulation; development and administration of surveys, including on-line surveys. The team also uses conventional survey methods such as: safety climate surveys; focus groups; human error identification and task analysis methods; knowledge elicitation methods such as structured interviews with senior management and stakeholders; and usability analysis. The advanced driving simulator at MUARC continues to be our key research platform.

Highlights
2008 was a fantastic period of growth for the team, in both its size and the scope of its work. The team expanded in size by one-third as we welcomed researchers from New Zealand and France and graduates from the Centre's PhD program. While continuing to develop our core road safety expertise, the team's portfolio of research expanded to encompass human factors issues in other surface transport modes including rail and tram operations, while also continuing our work in aviation safety. Team members also applied their human factors expertise to the analysis of safety issues in other industries including mining.

Of particular note in 2008 was the team's involvement as partners in two European Union projects. These projects are examining human factors issues in motorcycle safety, and the influences of in-vehicle technologies on driver behaviour. Each project involves over 12 European partners and will be conducted over the next three years. These partnerships will allow us to exchange state-of-the-art expertise and methodologies with other leading researchers in the field, and will provide a stronger empirical base with which to shape policy in these areas within Australia.

One of our team members, Kristie Young, provided a highlight in the area of team publications through the co-editorship of the first comprehensive book on driver distraction. The book, entitled *Driver Distraction:*...
Theory, Effects, and Mitigation, is edited by Michael Regan, John Lee and Kristie Young. It outlines the underlying theory of distraction, the major sources of distraction inside and outside the vehicle and their effects on driving performance and safety and the available ergonomic methods, guidelines and checklists for the measurement and mitigation of driver distraction. It also includes recommendations on ways to manage distraction through enhanced data collection and analysis, driver education and training, driver licensing, legislation and enforcement, vehicle design, road design, company policies and future research.

Projects

Driver training

One risk factor for road crashes that appears to be unique to young drivers is the carrying of passengers, with a number of studies having shown that young drivers are more likely to crash when passengers are present. This project aimed to train communication skills between young drivers and their passengers. The training program involved a two-hour facilitated discussion workshop, which aimed to fill some of the gaps in traditional driver education. To evaluate the effects of this novel training program, we compared the group of trained drivers with a group of untrained drivers on various measures including simulated driving behaviour, in-vehicle communications and self-reported driving behaviour.

When tested in pairs in the driving simulator, the participants who received the training showed signs of safer driving evidenced by the adoption of longer headways to a lead vehicle. Furthermore, when presented with an emergency vehicle turning across at an intersection i.e. an unexpected hazard, trained participants approached this intersection at a slower speed than did untrained participants. These improvements in safe driving behaviour were accompanied by improved communication between drivers and passengers. In particular, trained passengers made more safe comments and fewer unsafe comments than did the untrained passengers. Trained and untrained participants also differed on their self-report of driving behaviour. Overall, the evaluation of the pilot program was promising and confirms the conjecture that young passengers can be trained to become a more positive influence in the vehicle.

Driver distraction

Driver distraction is now widely recognised as a significant road safety concern and continues to be a core area of research for the team. A recent project aimed to derive fundamental knowledge about driver exposure to technology-based distracting activities and conditions in which distraction is experienced. An Internet survey of nearly 300 Victorian drivers was conducted to determine: the extent to which drivers reportedly are exposed to technology-based sources of distraction; factors that influence willingness to engage in distracting activities; and strategies used to manage distraction. The survey found that almost 60% of drivers use a mobile phone while driving and over one-third of these drivers use the phone in hand-held mode. Young drivers (18-25 years) also SMS more frequently than middle-age (26-54 years) and older (55+) drivers, with 88% of young drivers reading SMS and 77% sending SMS while driving. A high proportion of drivers use audio entertainment systems but few use in-vehicle visual displays such as DVD players. Most drivers (84%) believe they drive in a less safe manner when engaged in distracting tasks and, importantly, take steps
to avoid distractions. Based on the survey results, recommendations were offered regarding how to better target distraction policy and countermeasures. We are working with the sponsors to assist in the further development of these ideas.

**In-vehicle technology and the Human-machine interface (HMI)**

Technological advances in in-vehicle information and communication systems and concerns about the effects of such systems on driving performance and safety have prompted research to support the design, development and evaluation of the human machine interface (HMI) of such systems. This is to ensure that future systems are usable and minimally distracting to users. Funded through the Cooperative Research Centre for Advanced Automotive Technology, MUARC completed research to evaluate the usability of several prototype HMI design concepts for in-vehicle information and communication systems. The philosophy underlying this body of research was that of user-centred design, that involves applying knowledge about representative users to create and produce systems that match users’ expectations and requirements. The iterative nature of user-centred design means that a system progresses through several phases of refinement before its eventual full-scale manufacture and deployment. At each phase, issues concerning the usability of the system can be identified and rectified as part of the system's next release.

A cognitive walkthrough approach involving human factors experts was adopted to identify the usability issues inherent in an early version of the HMI design concepts. The outcomes of this evaluation led to recommendations for design improvement that were addressed by automotive system designers in preparation for a subsequent phase of usability testing. This subsequent phase of laboratory testing involved evaluation of the HMI design concepts with participants who performed representative tasks using the systems while also performing a simulated driving task. The recommendations deriving from the outcomes of this research fed directly into the next design iteration of the HMI concepts under study, and provided useful information in the form of general guidelines for the design of the HMI of future systems.

An important outcome of the current research was the development of a specific methodology for evaluating the usability of HMI design concepts for in-vehicle information and communication systems.

**Presentations**

Edquist, J. ‘Visual clutter in road environments’, Department of Main Roads Queensland, Brisbane, 8 July [invited presentation]

Lenné, M. Panel session entitled ‘The road ahead to safer road use’, The Australian Roads Summit, Sydney [invited speaker], March


Edquist, J. ‘Visual clutter and driving’, Monash University Accident Research Centre seminar series, Melbourne, 26 June


**Publications**

**Peer review journal articles**


**Peer review conference papers**


**Books**


Staff membership of boards and committees

- Centre for Research Excellence in Patient Safety (CRE-PS) Reference Group (K. Stephan)
Injury Analysis & Data

Team Leader:

Dr. Stuart Newstead PhD, MSc, BSc(Hons)  
Senior Research Fellow (C)

Dr. Irene Bobevski DPsych(Clin), BAppSci,  
BA(Hons), Research Fellow (until June)

Professor Max Cameron PhD, MSc, BSc  
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Belinda Clark BA, BBSc(Hons)  
Research Fellow (A)

Angelo D’Elia BE(Hons), BSc.(Hons)  
Research Assistant

Kathy Diamantopoulou MSc, BSc(Hons)  
Research Fellow

Vicky Ribas  
Group Administration Officer

The collection, management, analysis, interpretation and presentation of data underpin a wide range of critical research areas in the safety sciences. The Injury Analysis and Data (IAD) Team comprises researchers with specialist training in the fields of numerical and behavioural sciences and has a strong focus on safety science research requiring a high degree of numerical acumen. The team also focuses on road safety research but also has broad experience in other safety science-based research.

Expertise

The IAD team has high level specialist training in numerical sciences including applied statistics and applied mathematics as well as training in mechanical engineering and psychology. The team has specific topic-related expertise in safety program and policy evaluation, policy and strategy advice particularly in the areas of police enforcement programs, vehicle safety rating evaluation and monitoring through mass data analysis, and the collection, management, linkage and high level statistical analysis of injury data systems. The team also has expertise in providing high level statistical analysis and research design advice both within and outside MUARC.

Highlights

Vehicle safety research

A strong program of vehicle safety research, based on the analysis of mass data sources including police crash reports and injury insurance compensation claims across Australia and New Zealand, continued to be conducted by the IAD team. August saw the annual launch of the Used Car Safety Ratings, a major output from the research program that provides consumer advice on relative vehicle safety in the event of a crash. Past updates of the Used Car Safety Ratings rated vehicles on two dimensions of injury protection, the first being their ability to protect their own occupant in a crash (crashworthiness) and the second being their ability to protect other road users with which they collide (aggressivity). One concern with this rating format was that people would only consider vehicle crashworthiness when choosing a car and give no or low weighting to aggressivity, hence potentially leading to suboptimal vehicle choices from a whole of society injury reduction perspective. In response to this, the IAD team researchers developed a new index for vehicle safety giving the combined crashworthiness and aggressivity performance of a vehicle with appropriate weighting given to each component based on its relative importance in leading to overall trauma outcomes in a crash. This new single index, called the Total Secondary Safety Rating, now forms the bases of the information published as the Used Car Safety Ratings and will hopefully lead to better consumer choices in terms of vehicles that protect both their own occupants as well as other road users in a crash.
Late in the year the results from the IAD team’s evaluation of the effectiveness of electronic stability control in Australasia were published in the prestigious road safety research journal Accident Analysis & Prevention. Results of this study confirmed the effectiveness of this vehicle technology in reducing single vehicle crash risk across Australia and New Zealand, particularly for four wheel drive vehicles. Results of this study have supported the continued push by road safety authorities to encourage consumers to purchase vehicles with this potentially life saving technology and, as in the case of the Victorian Government, to mandate its fitment to all cars in the future.

Results from a major IAD team project estimating the benefits of better fleet vehicle choices with respect to safety performance were also published by AustRoads during 2008. Results from the project quantify both the injury reduction and economic benefits to fleet owners and society more broadly when choosing to buy fleet vehicles with the highest possible safety performance. Specific analyses were conducted to assess benefits in terms of both primary safety, through inclusion of crash avoidance technologies such as electronic stability control, and secondary safety through choosing vehicles with the best crashworthiness and aggressivity performance.

Road safety infrastructure program evaluation

Another of the research highlights of the year was the team’s invitation to evaluate three major road safety programs aimed to improve the safety of the road infrastructure at sites deficient in the level of protection they offer road users. These were Stage 1 of the Safer Road Infrastructure Plan (SRIP1), the Strip Shopping Centre Program and the Motorcycle Blackspot Program. VicRoads completed the infrastructure work of each of these programs in the period from 2003 to 2008 at an aggregated cost of approximately $124 million. Each of the programs differed in terms of the types of sites treated and the types of infrastructure improvements implemented. SRIP1 involved the treatment of 110 sites that had a history of serious casualty crashes, with a particular focus on country roads with a run-off-road crash problem and dangerous intersections in outer metropolitan areas. The Strip Shopping Centre Program aimed to improve the safety of eighteen strip shopping centres located in Metropolitan Melbourne (identified based on poor crash history) by introducing variable speed limit signs. The Motorcycle Blackspot Program involved the treatment of 95 sites over the period 2003 to 2008 with a crash history of being especially dangerous for motorcyclists. Treatments include countermeasures such as the installation of warning signs, improved delineation and making roads more consistent.

Evaluation results showed positive benefits for each program in terms of reducing crashes and injuries and providing positive economic returns to the community. SRIP1 was estimated to have delivered crash reductions of 19% for casualty crashes and 21% for serious casualty crashes with a community cost-benefit ratio in excess of two. The strip shopping centre evaluation showed that the program reduced casualty crashes overall by only 8% and casualty crashes involving pedestrians by 17%. Whilst these returns seemed modest, the evaluation estimated positive economic benefits to the community reflecting that implementing relatively low cost (but effective) treatments at sites that receive large volumes of traffic are likely to deliver favourable economic returns. The Motorcycle Blackspot Program also showed the potential for success of highly targeted programs. The evaluation identified casualty crash reductions amongst motorcyclists of 24% with a high benefit-cost ratio of 15.1. This showed that it is possible for infrastructure programs to deliver favourable economic returns even if they are focused on preventing crashes involving a specific type of road user or a specific type of crash.

Results from each of these evaluations provided impetus for further investment in infrastructure safety improvements in Victoria with specific results helping to establish the focus of future programs to maximise potential safety and economic benefits.
On-road alcohol survey program in Melbourne

On-road behaviour is a key variable in road safety research for both the design and evaluation of road safety initiatives. Annual New Zealand roadside survey data assisted in the identification of the problem of drink driving in the mornings after high alcohol hours and also the trend of drink drivers using local streets to avoid detection by the random breath testing (RBT) units on the arterial roads. While RBT is used extensively across Victoria, especially with the high volume testing conducted through the use of booze buses, evaluation of the current drink driving patterns in Victoria have not been conducted for several years.

A major research highlight for the team was a project commissioned by the Baseline Research Program Committee to explore the current drink driving patterns across the Melbourne metropolitan region. The overall aim of this project is to measure the current levels of drink-driving on the road in Melbourne by exploring three specific objectives:

1. Monitoring changes in drivers’ BAC levels over time, for the purpose of evaluating drink-driving countermeasures;
2. Design of strategies and tactics for countermeasure operations, e.g. locations and times of drink-driving enforcement; and
3. Understanding factors influencing drink-driving behaviour, e.g. comparative demographics and attitudes of drink-drivers, places of drinking.

On-road data collection was facilitated through extensive support for the project from the Victoria Police in the form of allowing the research team to accompany both Traffic Management Unit and Traffic Drug and Alcohol Section staff to designated booze bus sites around Melbourne to collect the data necessary for this project. Results of the survey will be published early in 2009 and will provide valuable advice to Police on further enhancing the effectiveness of drink driving enforcement in Victoria.

Disqualified drivers in Victoria: literature review and in-depth focus group study

This study was conducted as part of the MUARC Baseline Research Program to investigate the profile of disqualified drivers and the extent and patterns of disqualified driving in Victoria. Focus groups were conducted with disqualified drivers, their spouses and parents. The results showed that approximately 60% of the driver participants continued to drive during disqualification. A number of factors were found to be key influences on the decision to drive during disqualification including negative attitudes towards the sanction; denial of the risk of one’s own driving behaviours; very low perceptions of the risk of detection; personal and vicarious experiences of punishment avoidance; and negative attitudes towards alternatives. The most common reason provided for the decision to continue driving was to maintain one’s employment, although driving for family and social reasons were also commonly reported. Most participants described personal hardships caused by the sanction, with this impact being greatest for those who adhered to the sanction and stopped driving. The majority of partners/parents also reported being negatively affected, as the sanction resulted in extra burdens for them and often created relationship tensions. Many partners/parents expressed concern about their partner’s/children’s dangerous driving behaviours and the ineffectiveness of the sanctions in deterring illegal driving behaviours.

As a result of this study the authors were invited to participate in an expert panel on disqualified driving with the Sentencing Advisory Council whose Discussion Paper (2008) frequently references this MUARC Report.

Projects

Vehicle safety research

Vehicle safety is one of the cornerstones in the Safe Systems strategic approach to road safety. By improving vehicle safety through the implementation of new technologies and safety features it is possible not only to reduce the risk of a crash occurring but also to improve the injury outcomes to both vehicle occupants and other road users involved. The IAD team has a strong vehicle safety research program focused on assessing the crash risk and injury mitigation performance of vehicles both from a historical and
future potential perspective based on the analysis of mass crash data sources such as police crash reports and injury compensation claims. Specific research projects during 2008 included:

- Estimation of the injury reduction and economic benefits of safer fleet vehicle choices (Austroads)
- Benchmarking trends in light vehicle safety performance in New Zealand to assess the benefits of vehicle safety policy and consumer programs in improving secondary safety of the NZ fleet and to quantify the contribution of improved vehicle secondary safety to reducing road trauma (New Zealand Ministry of Transport)
- Estimation of the safety implications of young driver vehicle choices through examination of secondary safety performance of vehicles owned and crashed by young drivers in comparison to vehicles owned and crashed by other demographics (RACV)
- Used Car Safety Ratings Research Program:
  - Ongoing estimation of vehicle secondary safety performance in Australia and New Zealand in terms of crashworthiness, aggressivity and total secondary safety by vehicle make and model, market group and year of manufacture
  - Estimation of crash risk associated with vehicle market group for both motorcycles and light passenger vehicles and investigation of potential for optimising the light vehicle fleet with respect to crash risk characteristics of motorcycles and cars
  - Quantification of the contributions of vehicle secondary safety improvements to improvements in overall road trauma over time in Australia and New Zealand
  - Investigation of the interaction between driver age and gender and relative vehicle secondary safety performance.

Queensland Transport, RACQ, WA Office of Road Safety, RACWA, RAA SA, AA NZ, New Zealand Transport Authority

Road safety program evaluation

Thorough scientific evaluation of road safety programs is vital to ensure programs are achieving their desired outcomes and providing the best possible outcomes for the investment in them. The outcomes from rigorous program evaluations are also useful for fine tuning the performance of existing programs as well as prioritising future program expenditure. The IAD team research program in 2008 has included a number of evaluations of major road safety programs including:

- Preliminary evaluation of the Safer Roads Infrastructure Program (SRIP1), a $130M blackspot program undertaken in Victoria which targets improvement of country road locations with frequent run-off road crashes as well as dangerous intersections in outer metropolitan areas (VicRoads)
- Evaluation of the crash reduction and the economic benefits of the Victorian Motorcycle Blackspot Program which involved the treatment to date of 95 sites that had a crash history indicating they were especially dangerous for motorcyclists
- Ongoing assessment of the crash reduction effects of the Queensland Mobile Speed Camera Program introduced in Queensland in early 1997 (Queensland Transport)
- Evaluation of the Victorian Vehicle Impoundment Program from a road safety perspective. The Program has been underway for approximately 2 years and this will be the first formal evaluation of the program. The overall aim of the project is to evaluate the effectiveness of the Vehicle Impoundment legislation in reducing the occurrence and recidivism of “hoon” driving behaviour using focus group sessions comprised of individuals who have been convicted under the Victoria Vehicle Impoundment Legislation (Victoria Police)

Road safety data systems and trend analysis

High quality data systems underpin high quality research and ensure the best possible research outcomes across all domains of injury prevention research. The IAD team have a wide range of projects aimed at enhancing the scope and quality of data available in the road safety research field including the following major projects:

- Ongoing updates of the Countermeasure Monitor System, a collection of data of various types and from various sources on a regular basis to be used in evaluation studies of road safety enforcement and publicity programs. This data collection system includes Police operational data, Police crash data, road safety advertising data, demographic data and socio-economic data (Baseline)
- Feasibility of linking Victorian road safety injury data sources that underpin much of the injury prevention research carried out by MUARC. These data sets include: the State Traffic Accident Record of all police-reported road crashes in Victoria, Transport Accident Commission claims data, Australian National Crash In-Depth Study and the Victorian Admitted Episodes Database covering all admissions to Victorian hospitals (Baseline)
- Re-assessment of High Alcohol Driving Times to enable police to provide the strategic deployment of booze buses for the detection of drink-drivers. High alcohol times are defined as the time periods of the week when illegal drink-driving is more likely to occur. It is believed that alcohol consumption habits have changed substantially in recent years and in turn there may
have been a change in the high alcohol times of the week (Victoria Police)

- Design of an on-road driver alcohol and drug survey program in Melbourne subsequently conducted in the Melbourne Statistical Division during late 2008 (Baseline)
- Feasibility of assessing motorcycle crash risks in Victoria from existing or prospective data sources including speed monitoring and traffic count data with a focus on the separate effects of inappropriate and excessive motorcycle speed and changes in traffic speed on motorcycle crashes (VicRoads)
- Design of a roadside observation survey program within the Melbourne Statistical Division to obtain data on seatbelt and child restraint wearing rates and adherence to correct fitting protocol; mobile phone usage while driving; and the presence of bull-bars (Baseline)
- Examination of major factors influencing road crash and injury trends in NSW and projection of future trends in key road safety target areas and road user groups (Insurance Australia Group)

**Strategic analysis and advice**

Lessons learned in conducting evaluation research and data analyses often put researchers in a strong position to provide strategic advice and targeted strategic analysis to agencies developing road safety policy and programs. Through its extensive experience accumulated in the research areas listed above, the IAD team has been involved in a range of projects during 2008 offering strategic advice to a range of government authorities including:

- Development of a framework for evaluation of the Queensland road safety strategy to accurately monitor and report on the outcomes of the Queensland Road Safety Strategy for 2004-2011 and associated action plans (Queensland Transport)
- Development of strategies for speed camera enforcement in Queensland covering mobile speed cameras, speed/red-light cameras at intersections, and fixed speed cameras on major roads including point-to-point average speed camera systems (Queensland Transport)
- Further development of strategies for best practice in speed enforcement in Western Australia (Office of Road Safety, WA)
- The review of the traffic enforcement program and strategy in Region 1 of the Victoria Police which aims to support the establishment of a multi-agency intelligence capacity to collect, analyse and disseminate road safety intelligence. The intelligence-led approach is heavily dependant on “intelligence systems that enable police to predict where trauma is most likely to occur and direct resources accordingly for preventative enforcement” (Victoria Police)
- Research into aspects of a new Victoria Police traffic enforcement model to support Victoria’s new road safety strategy ‘arrive alive! 2008-2017’ and beyond. The three objectives of the project are to review national and international enforcement activities and models comparable or applicable to Victoria, identify the best methods to measure the effectiveness of enforcement activities and, in the road safety enforcement context, establish the basis and requirement for dedicated “traffic” police as opposed to general duties police only (Victoria Police)

**Presentations**

- Cameron, M. (2008) ‘Further development of strategies for best practice in speed enforcement in Western Australia’, Enhanced Speed Enforcement Steering Committee, Western Australia, 12 March and 7 May

Random Breath Testing is used extensively around Victoria. A major research highlight for the team was a project to explore the current drink driving patterns across the Melbourne metropolitan region. On-road data collection was facilitated through extensive support for the project from the Victoria Police in the form of allowing the research team to accompany both Traffic Management Unit and Traffic Drug and Alcohol Section staff to designated booze bus sites around Melbourne to collect the data necessary for this project.
**Publications**

**Peer review journal articles**

**MUARC report series**

**Peer review conference papers**

**Austroads report series**
- Monash University Accident Research Centre (2008) Safer vehicle purchases: developing cost-effectiveness estimates for fleet managers and others – Part B: injury levels in crashes, Austroads, AP-R325/08
- Monash University Accident Research Centre (2008) Safer vehicle purchases: developing cost-effectiveness estimates for fleet managers and others – Part C: cost of injuries and property damage in crashes, Austroads, AP-R326/08
- Monash University Accident Research Centre (2008) Safer vehicle purchases: developing cost-effectiveness estimates for fleet managers and others – Part D: injury reductions with various fleet purchasing policies, Austroads, AP-R327/08

**Staff membership of boards and committees**
- Road Safety Sub-Committee, Amy Gillett Foundation (M. Cameron)

**Other activities**
Team members also participated in peer-review activities including reviewing papers for the annual Association for the Advancement of Automotive Medicine and Australasian Road Safety Research, Policing and Education conferences and journals including Accident Analysis & Prevention and Traffic Injury Prevention.
Injury epidemiology concerns itself with the distribution and determinants of injury in the population, and the application of that knowledge to the prevention of injury. The research program of this team responds to the high priority accorded in the Australian research agenda to foster an independent, active and healthy older population. By 2051, the ageing of our population will peak as the proportion of the population aged over 65 years reaches 30%, posing social, health and economic challenges. While injury research is a specialist area, the potential contribution to our nations’ broader priorities is substantial. Falls prevention contributes to maintaining independence, road safety research supports social and economic mobility and occupational safety research maintains productivity as the workforce ages. The expertise of the team in falls and occupational safety is being combined to sharpen the focus on injury research for an ageing society.

**Team Leader:**
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Deputy Director

**Laura Ash**

**Lorraine Atkinson**
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**Wayne Baker** CPEng MIEAust, MEngSc(Res), BE(Mech)(Hons), BA, GCertOHM
Research Fellow

**Louise Beasley RN Div 1&3, BaEd**
Research Nurse

**Penny Cooney DipEd, Project Officer**

**Barbara Fox MApSocRes, RN, BA**
Research Nurse

This diverse research group includes epidemiologists, engineers, statisticians, psychologists and nurses. Collectively, the team has experience in identifying injury issues, understanding injury mechanisms and risk factors and testing interventions. Study designs and methods commonly used by the team include injury surveillance, case series studies, case-control studies, cohort studies, and randomised controlled trials. The team is also experienced in database development, maintenance and analysis and is active in facilitating the translation of research to policy and practice.

**Highlights**
A major piece of work in the falls prevention area was completed this year, with the epidemiological and economic modelling to predict the impact of the proven falls prevention measures on falls and fall rates in Australia. This work was undertaken specifically to assist falls prevention program planners and policy makers to allocate resources within fixed falls prevention budgets. Seven interventions defined as most promising for community dwelling older people on the basis of the best available evidence were modelled. The interventions were ranked in terms of cost-effectiveness. However significant implementation issues would need to be resolved in order for some of the more cost-effective interventions to fully deliver on their potential.

The modelling predicted reductions ranging from 0.4% to 4.6% in national fall-related hospital admission rates for people aged 65 years and over for five of the falls prevention strategies implemented over a one-year period. The small to modest size of these reductions suggest that substantial investment in falls prevention will be required to have large effects on the fall-related hospitalisation rates. In addition, the cost-effectiveness of a number of the modelled interventions could be improved by variations to the implementation processes such as measures to increase uptake or decrease the cost per participant. The framework developed provides the potential for the research evidence base to better guide policy and practice with respect to reducing falls and future fall-related hospitalisation rates. The results were presented by invitation to the NSW Health Promotion Directors Forum and at the National Falls Prevention Conference.
A professional team of nurses undertook extensive field work for the Exercise for Independent Living project, including Jenny Bortoli, Bernie Prouse and Jo Williams. An enthusiastic and dedicated team of exercise class leaders delivered exercise classes in the community to participants in this project. These included Janet Adams, Linda Barnett, Jenny Davrain, James Flynn, Robyn Fowler, Kheng Lau, Pam McIntosh, Maureen Mather, Karen Murray, Bryan Nitz, Jon North, Lyn Willmott, Connie Wong and Anastasia Yianni. The team also includes six PhD and one honours (physiotherapy) students in 2008 working on projects involving disability and falls among older people, farm injury, dog bite injury to young children, injury to animal veterinarians, and injury to horse racing jockeys.

**Projects**

**Exercise for Independent Living (funded by the NHMRC and the Wicking Trust)**

This study addresses the issue of disability and falls among our ageing population. The aims are to: (1) test the efficacy of exercise in delaying disability and preventing falls among older people; (2) investigate the mechanisms by which exercise intervenes in the disability pathway; and (3) determine the cost-benefits of exercise for older people.

The study recruited 503 people over 70 years of age and randomly assigned them to receive one of two exercise programs: “Flex and Move” (a flexibility and relaxation program), or “Focus and Flow” (consisting primarily of Tai Chi moves) for a period of 48 weeks. The groups will be compared to determine if there is any difference in the development of disability as well as a range of functional outcomes such as falls, strength, balance, depression, arthritic symptoms and life satisfaction. This is one of the few studies worldwide to test the impact of any exercise program on delaying the manifestation of disability among older people.

Robust evidence that exercise can in fact delay disability will have immediate and significant implications for the maintenance of independence among older people at a critical time for our ageing population. The project has the in-kind support of Australian Retirement Communities and Arthritis Victoria. Chief investigators are: Dr. Lesley Day, MUARC; Professor Keith Hill, National Ageing Research Institute and Northern Health; Professor Leon Flicker, University of Western Australia; Assoc. Professor Damien Jolley, Monash Institute for Health Services Research; and Professor Leonie Segal, University of South Australia.

**Modelling the impact, costs and benefits of falls prevention measures to support policymakers and program planners (funded by Australian Department of Health and Ageing)**

This project has been developed to support the falls prevention impetus that has developed in Australia. There is now substantial and growing research-based evidence on effective interventions for the reduction of fall-related injury among older people.
The potential for the scientific evidence base to translate into falls reductions has not yet been fully realised in Australia. However, investment decisions regarding falls prevention for older people need to be guided by more than just the evidence from randomised controlled trials, as the impact of a program appears to vary with the characteristics of the participants and the infrastructure available to support it. There is, therefore, considerable opportunity for modelling the impact of the different proven falls interventions on future fall rates that, together with cost-effectiveness analyses, can provide a powerful tool to support the determination of policy directions. This project aimed to develop a statistical model to enable a population level assessment of the impact of proven interventions on the fall rate of Australia’s older age groups. Chief investigators are: Dr. Lesley Day, MUARC; Professor Caroline Finch, University of Ballarat; Assoc. Professor James Harrison, Flinders University; Ms Pam Albany and Ms Clare Monger, NSW Health; Professor Leonie Segal, University of South Australia; and Assoc. Professor Trever Crowe, University of Ballarat; Assoc. Professor James Harrison, Flinders University; Ms Pam Albany and Ms Clare Monger, NSW Health; Professor Leonie Segal, University of South Australia; and Dr. Soufiane Boufous, University of New South Wales.

Saskatchewan farm injury cohort study: causes and consequences of farm injury in Saskatchewan, Canada (funded by the Canadian Institutes of Health)

The aim of this study is to understand individual risk factors related to work (individual farm exposures) and settings (contextual or environmental exposures) associated with farm injury. The long-term goal is to inform the development of interventions directed at the prevention of injury within both farm populations and agricultural production settings. The study, that commenced in 2006, has recruited 5,492 participants from 2,390 farms in Saskatchewan, Canada. After collecting a comprehensive set of baseline data, we are now following participant injury experience over a two-year period. The study will have a particular emphasis on identifying the interactions between individual and environmental factors that increase the risk for farm injury. The study will be large enough to examine these interactions for specific high risk sub-populations – farm children and older people engaged in farming. The study is led by Professor Will Pickett, Queens University, and Dr. Jim Dosman, University of Saskatchewan.

Other chief investigators include Dr. Lesley Day, MUARC; Dr. Barbara Marleneg, Marshfield Medical Research Foundation, Wisconsin, USA; Dr. Rob Brison, Queens University; and Assoc. Professor Punam Pahwa, Dr. Niels Koehncke, and Assoc. Professor Trever Crowe, University of Saskatchewan, Canada.

Development of design guidelines for agricultural falling object protection structures (funded by the MUARC Strategic Research Program)

Recent research conducted by the team has demonstrated the potential benefits of a purpose-built agricultural falling object protective structure (AgFOPS) for tractors. MUARC engineers have responded to this need by independently developing a new AgFOPS design concept, that provides for the retrofit of an inexpensive protective structure for unprotected agricultural tractors. The proposed structure has many unique features in that it is tailored to the most common farm hazards, designed for retrofit using basic skills and tools, uses redundant strength in the existing roll over protective structure (ROPS), and is presented in a hybrid performance/prescriptive-based standard that allows for the design to be replicated or further developed by the market. The AgFOPS project also demonstrates a novel industry-university-regulatory relationship where MUARC’s on-going research and development can forge new standards for protection and where the results of research can be streamlined onto the market by MUARC directly supporting manufacturers and suppliers. The project aims to provide a MUARC-patented alternative structure for falling object protection that can be widely adopted due to its suitability, simplicity and lower cost.

Presentations

• Day, L. ‘Agricultural safety issues’, Invited Keynote Speaker, National Workplace Safety Summit, Melbourne, 30-31 July

• Day, L. ‘Modelling the population level impact, costs and benefits of falls prevention measures’, NSW Health Promotion Directors, Sydney, 16 June

• Day, L., ‘Modelling the population level impact of falls prevention programs’, Invited Keynote Speaker, Australian and New Zealand Falls Prevention Conference, Melbourne, October

• Day, L., ‘Application of novel communication technologies to the study of farm families’, Sixth International Symposium on Public Health and the Agricultural Rural Ecosystem, Saskatoon, Canada, 19-23 October

• Lilley, R., ‘The relationship between fatigue-related factors and injuries’, Sixth International Symposium on Public Health and the Agricultural Rural Ecosystem, Saskatoon, Canada, 19-23 October
Injury Epidemiology 31

Rural Ecosystem, Saskatoon, Canada, 19-23 October

Publications

Peer-reviewed journal articles
- Russell, M., Hill, K., Blackberry, I., Day, L. & Dharmage, S. ‘The reliability and predictive accuracy of the falls risk for older people in

Letters to the Editor

Technical reports

Staff committee memberships
- Farmsafe Australia (L. Day, W. Baker – alternate)
- Farmsafe Victoria, Victorian Farmers Federation, Member (L. Day, W. Baker)
- Injury Prevention, Editorial Board (L. Day)
- Journal of Agricultural Safety and Health, Associate Editor (L. Day)
- National Conference on Injury Prevention and Control Scientific Program Committee (L. Day)
- National Falls Prevention Conference Scientific Program Committee (L. Day)
- Older People Injury Prevention Reference Group convened by the Victorian Department of Human Services (L. Day)

Other team activities
Team members also participated in peer-review activities for the NHMRC project grant round and journals including Injury Prevention, the Journal of Agromedicine, American Journal of Industrial Medicine, Occupational and Environmental Medicine and the Medical Journal of Australia.
The work of the Injury Surveillance and Research Team (ISRT) is heavily focused on the ongoing and systematic collation, analysis, interpretation and dissemination of health data on injury-related events to support preventive action and research to reduce injury mortality and morbidity and to improve the health of the community. The two strands of research work conducted by the ISRT are injury surveillance research related to the operation of the Victorian Injury Surveillance Unit (VISU) funded by the Department of Human Services and the conduct of a program of research which is often an extension of our surveillance research. For the past five years, the ISRT has been funded by Marine Safety Victoria (MSV) to conduct a research program to underpin MSV’s Marine Safety Strategy.

Expertise
Staff have qualifications and specialist training in public health, health promotion, epidemiology, psychology, humanities, social sciences and ergonomics and are committed to the translation of research to policy and injury prevention practice.

Highlights
Injury surveillance: Victorian Injury Surveillance Unit (VISU)
VISU was established in 1990 at MUARC and is currently funded by the Department of Human Services (DHS). VISU has developed and maintains three injury surveillance datasets covering externally caused injury deaths, hospital admissions and emergency department presentations (collected from all 38 Victorian urban and rural hospitals that offer a 24-hour emergency service).

1. Provide a free-of-charge data and information service open to government and non-government bodies, education, health and injury prevention/safety organisations, business, media and the community for the planning and development of injury prevention regulations, policies, programs, projects and measures, and for research purposes.

In 2008 we produced and disseminated 193 short reports on specific topics. Examples of reports and their uses include:

- Injury related to vehicle jacks, vehicle support stands, baby walkers, bunk beds and inhalation of toys for review of product standards or regulatory impact statements (all for the Australian Competition and Consumer Commission);

- Injuries associated with minibuses to investigate the need to extend safety regulations to include this mode of transport (for Public Transport Safety Victoria);

- Child drowning for Victims Support Group (for Hannah’s Foundation); and

- Paraquat (herbicide) poisonings for regulation review (for DHS).

2. Produce the VISU publication Hazard focusing on serious
and emerging injury issues. In 2008 two issues of *Hazard* were published: *Hazard* 67 (Summer 2008) Preventing injury in Victorian seniors aged 65 years and older and *Hazard* 68 (Winter 2008) Preventing unintentional farm injury. Preparation of a third issue on Dog bite injury commenced. More than 1,500 hard copies of each issue of *Hazard* are distributed through our general and special mailing lists and each issue can be downloaded from the VISU web page.

3. Maintain and develop the VISU web page containing injury reports and *Hazard*. A major update of posted reports was conducted in 2008 - see www.monash.edu.au/muarc/visu.

4. Provide special data reports to underpin government policy development, program planning and evaluation. Major work in this area in 2008 included: the provision of hospital admissions and ED presentations data to support the implementation and evaluation of the DHS-funded SafeStart Child Injury Prevention projects underway in the Cities of Greater Geelong and Casey; and the production of sets of health (injury) outcome indicators for the Department of Human Services (Recommendations on indicators of inequality for injury) and the Department of Education and Early Childhood Development (Child injury and poisoning indicators 2008).

5. Provide data to stimulate/support injury prevention research. Data on a diverse range of topics were provided to postgraduate students and career researchers including: non-operatively treated splenic injury (Department of Epidemiology and Preventive Medicine, Monash University); hospital-treated assaultive injury (Department of Epidemiology and Preventive Medicine, Monash University); child abuse and neglect (Child Abuse Research Australia); injury associated with special vehicles used in agriculture (background to study proposal, Monash University Accident Research Centre); and work-related injury (for a report on young worker fatal and non-fatal injury by the Victorian Institute of Forensic Medicine).

Research program

**Marine Safety Victoria (MSV) research program**

The ISRT conducts a rolling program of research for Marine Safety Victoria (MSV), the State authority responsible for maritime safety, to underpin its safety strategy and to evaluate the effectiveness of adopted safety measures. Three new projects commenced in 2008, one of which was completed in the 12-month period.

**Annual marine incident and injury profile**

The ISRT conducts ongoing surveillance of commercial and recreational vessel marine incidents and related injury analysing incident, fatality and injury data extracted from the Marine Incident Reporting System (MIR), the National Coroners’ Information System (deaths), the Victorian Admitted Episodes Dataset (hospital admissions) and the Victorian Emergency Minimum Dataset (hospital emergency department presentations).

The 2008 annual marine report describes the annual frequency, incidence (to the extent possible), pattern and circumstances and potential contributory factors to marine incidents and boating-related sports and recreational injury (including fatalities) for 2007/8 (for incidents) and 2006/7 (for injuries). Over the 12-month study period there...
were 139 commercial, 8 hire-drive and 1,095 recreational vessel incidents recorded on the MIR; three boating-related drowning fatalities recorded on the NCIS; and 902 hospital-treated recreational boating injury cases (223 admissions and 679 ED presentations) recorded on hospital injury surveillance databases. These data were analysed further to discover the activities and circumstances in which high numbers of incidents and injuries occur and potential risk factors and to make recommendations on possible preventive measures and future research directions.

**Evaluation of the Recreational Boat Operators Licensing Scheme**

The Recreational Boat Operator Licensing Scheme was introduced in Victoria in 2001 with the stated objectives of improving recreational power boat operator competencies and uptake of related safety measures. Compulsory licensing was phased in over a 12-month period from 1 February 2002.

The licence test, conducted at VicRoads offices, consists of a computerised 30-question boating knowledge test. Persons who have completed a MSV-approved boating safety training course may apply to VicRoads for a licence without sitting the licence test. Both the VicRoads-conducted theoretical test and the safety training course cover the three essential areas of knowledge covered in the Victorian Recreational Boating Safety Handbook: trip planning; safe vessel operation; and emergency response.

The pre-test and post-test evaluation measured the effect of the Licensing Scheme on the safety knowledge of a sample of recreational boat operators who were granted their licence in 2007-8 and also compared their post-test safety knowledge, attitudes and self-reported behaviours to those of a similarly inexperienced group of boat operators recruited from New Zealand, that has no licensing system. The practical skills of a voluntary sample of newly licensed Victorian recreational boat operators were assessed, utilising an on-water 11-task practical Recreational Skipper’s Ticket knowledge and skills test in operation in Western Australia.

The data collection phase was completed in 2008 and the evaluation report will be presented to MSV in early 2009.

**Recreational boating exposure to risk survey**

Recreational marine incidents and injuries are distributed across a broad range of boating activities but we have no accurate participation or participant time-at-risk denominator data to calculate rates.

We are conducting four quarterly postal surveys of a random sample of 1,600 registered recreational powered boat owners over the period October 1, 2008 to September 30, 2009. The survey will collect boating activity participant exposure data (hours spent on water), boating incidents and injury data.

**Other research**

**Call back study of child dog bite injury cases in the domestic setting**

In tandem with a commissioned injury surveillance study of dog bite injury in Victoria, the Bureau of Animal Welfare also funded the ISRT to conduct a qualitative study of child (aged 0-9 years) dog bite injury in the domestic setting, recruiting cases from eight selected Victorian hospital emergency departments in 2008/9. In-depth telephone interviews will be conducted with the parent/carer, the bitten child if aged 7 years and older and the dog owner (if willing) to better understand the circumstances, potential contributory factors and outcomes of dog bite injury that occurs in the child’s own home or another person’s home.

We aim to recruit 50 cases. One of MUARC’s PhD candidates (Ms Linda Watson) has chosen dog bite injury as her doctorate thesis topic and will recruit a comparison group of children from the community to convert the case series into a case-control study which will then enable the identification of predictors for child dog bite injury. Recruitment and interviewing of cases is in progress.

**Presentations**

- Ashby, K., Cassell, E., Congiu, M. ‘Callback study of hospital-treated recreational boating injury cases over two summers’. Paper presentation at Safety 2008, the 9th World Conference on Injury Prevention and Safety, Merida, Mexico, 15-18 March


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Ashby, K., Cassell, E., Pepperdine, S., Pacquola, M., Singer, Y. & Cleland, H. ‘Contributory factors to fire burn injury with alcohol involvement. Burns Prevention & Care: Focus on the evidence’, Australian and New Zealand Burns Association ASM. Melbourne, 16-19 September

Cassell, E. ‘The use of Emergency Department injury surveillance data and ways to improve data collected at Wodonga Hospital’. Presentation to Wodonga Hospital ED staff

Publications

Reports

• Ashby K. Fire-related emergency department presentations in the Metropolitan Fire District Victoria. VISU report to Metropolitan Fire Brigade. June 2008


• Cassell, E., Clapperton, A. Recommendations on indicators of inequality for injury. VISU report to Department of Human Services. May 2008


• Clapperton, A. & Cassell, E. Victorian child (0-18 years) injury and poisoning indicators 2008. VISU report to the Outcomes and Evaluation Division, Office for Planning, Strategy & Coordination, Department of Education and Early Childhood Development. June 2008


• O’Hare, M. & Cassell, E. Assaultive injury to City of Melbourne residents aged 14-25 years in public places and spaces, 2004/5-2006/7. VISU report to the City of Melbourne. December 2008


• Prang, K-H., Ashby, K. & Hoy, M. Poisoning associated with agricultural and veterinary chemicals. VISU report to Department of Primary Industries. December 2008

Staff membership of boards and committees

• Victorian Safe Communities Network, Executive Member (E. Cassell)

• Kidsafe Victoria, Board Member (E. Cassell)

• City of Melbourne Injury Prevention Committee, Member (E. Cassell)

• DHS Safestart Child Injury Prevention Advisory Committee, Member (E. Cassell)

• Office of Emergency Services Residential Fire Safety Research Working Group, Member (K. Ashby).

Other team activities

Team members also participate in peer-review of conference abstracts and journals including the Medical Journal of Australia, Injury Prevention, Injury Control and Safety Promotion and the Journal of Science and Medicine in Sport.
During 2008 Professor Joan Ozanne-Smith took up an appointment as Professorial Research Fellow at the Department of Forensic Medicine at Monash University.

**Projects**

**Evaluation of community-based implementation methods for an innovative nursery product safety program**

Funded by the Department of Health and Ageing (DHA), this project aimed to evaluate the effectiveness of a community based intervention for nursery product safety in the City of Greater Geelong. An initial needs analysis examining injury data identified three primary targets for intervention activities: (1) transition from cots to beds; (2) additional portacot mattresses; and (3) children being left to sleep in prams/strollers unattended. A further pre-intervention random household survey conducted in Geelong (N=205) versus a control municipality (N=202) provided further support for the need to increase community awareness on the three safety issues identified.

The intervention conducted by the Infant & Nursery Products Association of Australia (INPAA) in collaboration with Safestart (City of Greater Geelong) consolidated a series of community links with relevant key stakeholders. The intervention activities, education of the retailers and associated stakeholders such as maternal and health care nurses and doctors and public relation activities targeted at raising awareness and change in practice within the community, produced an integrated approach to communicating the key safe messages throughout the City of Greater Geelong.

A post-intervention random household survey conducted in Geelong (N=162) versus the control municipality (N=145) indicated that the baseline safety issues associated with nursery products largely persisted post-intervention in both populations. Interestingly, the evaluation of pram/stroller safety intervention indicated that Geelong respondents were more likely to recall receiving promotional materials on safety than the control municipality. It may be relevant to note that the pram intervention was the first of three interventions in Greater Geelong therefore had the greatest time for exposure. Results for the other interventions did identify some difference between Geelong and the control municipality post-intervention, although these results were not statistically significant.

Sustainability of the intervention has been secured in two major ways. First, the SafeStart program in Greater Geelong, which is ongoing, will continue the interventions introduced by the current project. Second, INPAA will continue to develop and use the brochures and advertising material from this study for wider implementation. Ideally, a further follow-up survey should be conducted in 6 to 12 months to detect any further impact of the intervention with increased exposure time.

**Architectural glass-related injury: Implications for improving public safety**

Funded by the Australian Research Council (ARC), this project aimed to investigate for the first time the risk of injury associated with architectural and furniture glass within a domestic environment. With the goal of reducing injury associated with domestic glass, the study consisted of several
parts. Initially, a literature review was conducted on architectural glass- and furniture-related injury. Much of the research revealed data from overseas, sparse research had been conducted within Australia.

The primary focus of the current study was in Victoria. An in-depth investigation of the recent trends of death and injury data associated with glass in domestic environments was conducted with the assistance of the National Coroners Information System (NCIS) and the Victorian Injury Surveillance Unit (VISU). A call-back study was designed to develop an in-depth understanding of specific circumstances involved with injury. A six-month follow up phone interview was completed to investigate the long-term consequences of the injury. Home inspections were also conducted to assess the on-site circumstances of injury.

Upon completion of the study, a total of 118 cases were included in the call-back study, 51 cases in the six-month follow-up and 30 site inspections were conducted. The results indicated that annealed glass appears to be responsible for the majority of domestic glass-related injury. In addition, alcohol has been identified as a common contributor.

A questionnaire for glaziers was mailed out to members of the glazing industry covering public responses to glazing regulations, glazier practices, as well as glazing standards and safety recommendations. Two journal articles that address the epidemiology of domestic glass related injury within Australia as well as the findings of the current study are in the process of being written. The results will be presented at the 9th National Conference for Injury Prevention and Safety Promotion (2009) in Melbourne.

External recognition / awards
- Virginia Routley received the Best Abstract Award at the 3rd Asia Pacific Regional Conference of the International Association of Suicide Prevention in Hong Kong (paper entitled ‘Epidemiology of rail suicide in Victoria’)

Publications
MUARC report series

Peer review journal articles

Conference papers

Other reports

Staff membership of boards and committees
- Australian China Alumni Association, Director (J. Ozanne-Smith)
- Centre of Research Excellence in Patient Safety Research Group, Member (J. Ozanne-Smith)
- Dept of Transport convened Rail Suicide Working Group (V. Routley)
- Injury Prevention, Editorial Board (J. Ozanne-Smith)
- Injury Prevention Research Institutes of Australasia (J. Ozanne-Smith)
- International Journal of Injury Control and Safety Promotion, Editorial Board (J. Ozanne-Smith, V. Routley)
- International Society for Child and Adolescent Injury Prevention, Member (J. Ozanne-Smith)
- Monash China Task Force, Member (J. Ozanne-Smith)
- Nursery Product Safety Reference Group, convened by Standards Australia and the Australian Competition and Consumer Commission, Member (J. Ozanne-Smith)
- Standards Australia Committee CS-072 Safety in House Design (J. Ozanne-Smith)
- Victorian Civil and Administrative Tribunal, Business Licensing, Tribunal Member (J. Ozanne-Smith)
- Victorian Public Health Training Scheme, Member (J. Ozanne-Smith)
- WHO Mentor-VIP, Member International Core Group (J. Ozanne-Smith)
- WHO World Report on Unintentional Child Injury Prevention: Drowning Work Group, Member (C. Staines)
The principal focus of this research group is to develop approaches to road infrastructure design and system operation that meet the aspirations of Australasia’s Safe System. The holistic Safe System approach combines scientific knowledge in all fields of traffic safety from behaviour to road infrastructure, speed management and vehicle design in order to reduce the overall risk of serious injury. These areas of knowledge are being integrated to develop evidence-based road safety strategies, as well as innovative, fundamentally safe, new designs and forms of road transport system.

**Expertise**
This diverse research team includes engineers, statisticians, behavioural and computer scientists. The team’s main areas of expertise are in the safety of pedestrians, roadsides, intersections and motorcyclists, as well as matching travel speeds to the inherent quality of roads and roadsides. More recently, the team has been working in the field of road safety strategy development for Australian jurisdictions. Collectively, the team has experience in identifying and understanding road safety injury mechanisms and risk factors, designing and evaluating countermeasure programs, and translating new research knowledge into policy and practice. Study methods used by the team include simulation, mathematical modelling, database development, maintenance and analysis, and controlled before-after evaluations of on-road treatments.

**Projects**

**Intersection safety**
Intersections represent some of the most hazardous sites on our roads. Approximately 100,000 Australians have been killed or seriously injured in intersection crashes in the last decade and the data for Victoria indicate that around 50 percent of all serious injury crashes occur at intersections. Key projects underway in 2008 include:

**Intersection design investigation – a fundamental review of intersection design to improve safety**
Further progress was made on addressing the problem of the high level of severe trauma occurring at intersections throughout Australia. This project aims to develop fundamentally safe new designs and forms of operation for intersections, such that the risk of death or serious injury is ultimately eliminated. An analysis of Victoria’s road crash problem at intersections along with designed and operated in a way that forgives human limitations, first in terms of biomechanical tolerance in the event of a crash, and then in terms of functional performance. Several research projects have been commenced or completed in 2008, where the aim is to develop practical forms of infrastructure design and system operation to meet the Safe System aspirations.

**Outcomes**

**Translation of the Safe System vision into practice**
Highlights of 2008 included the continuation of research activities to improve Australia’s capability to realise the benefits of the Safe System vision. The vision is ambitious in its goal of creating a road transport system that will, in the long term, be free of death and serious injury. This requires the system to be
Review of the published literature on the intersection crash problem and potential solutions were undertaken in 2008. The review focused heavily on innovative, highly effective solutions. The results of these research activities are being used to adapt and develop a new conceptual model, with mathematical capability, to enable both current and new designs to be objectively assessed in terms of their abilities to deliver Safe System outcomes.

The project, which began in 2007, brings together key national and international traffic safety scientists, with experts in traffic and transport engineering. The combined road safety and traffic management expertise of Victoria’s State road authority, VicRoads, the Transport Accident Commission (TAC), Victoria’s Department of Justice and Victoria Police, together with the capacity available at MUARC and the Monash Institute for Transport Studies is facilitating this multi-faceted approach. In addition to local experts, leading researchers and practitioners in Sweden (Swedish Road Administration) and the Netherlands (SWOV), both countries with superior road safety performance and innovative, contemporary road safety philosophies, are actively contributing to the project.

Funding for the project is from TAC and VicRoads.

Evaluation of ‘Dwell on Red’ traffic signal phasing at intersections to improve safety for alcohol affected pedestrians

Motor vehicle collisions with pedestrians are recognised as a serious road safety problem in most countries around the world, including Australia. Alcohol is implicated in the aetiology of many pedestrian crashes and the risk for fatal or serious injury is known to increase significantly with higher blood alcohol concentration (BAC), particularly in excess of 100mg/100ml. Research findings from several countries indicate that a significant proportion of alcohol-related pedestrian fatalities and serious injuries occur during late night and early morning hours (also referred to as high-alcohol hours).

The Dwell-on-Red (DoR) signal treatment aims to reduce the number and severity of pedestrian-vehicle crashes that occur during high-alcohol hours at signalised intersections. The treatment involves reverting to an all-red phase when there is no traffic demand during late night and early morning. This aims to reduce average speeds on intersection approaches, especially high approach speeds. Lower speed is known to be beneficial to traffic safety particularly for vulnerable road users.

DoR was trialed at a metropolitan intersection in Melbourne. An observational study carried out at this intersection revealed a number of serious safety problems during late night hours. As part of the evaluation of effectiveness, speed and flow data were collected using detectors placed 10 and 50 metres upstream of the stop-line. The treatment was found to bring about a significant reduction in average speed at both detector positions. There was a significant increase in the proportion of vehicles travelling at less than or equal to 30 km/h and a significant decrease in the proportion of vehicles travelling greater than 50 km/h at the 10 metre detector position. The proportion of vehicles travelling greater than 50 km/h at the 50 metre detector position also decreased. These findings indicate potential reduction in fatal and serious injury risk. While DoR is low in cost and has a minimal impact on traffic performance, its effectiveness was found to be heavily dependent on traffic-flow. This aspect has an important bearing on future applications.

SRIP European study tour

In support of the Transport Accident Commission and VicRoads, a targeted study tour was undertaken in 2008 to meet road safety specialists and to inspect examples of world’s best practice in infrastructure design in Sweden, the Netherlands, Denmark and England. These countries have introduced innovative changes to the road network with a view to promoting a fundamental safe traffic environment. The countries visited are the top global performers in terms of death rate per 100,000 population. A major focus of the tour was on new and effective infrastructure designs to enhance intersection safety. These designs are being assessed for their potential application to Victoria.

This project was sponsored by the Transport Accident Commission.

Strategy review and evaluation

Development of a new Road Safety Strategy for Western Australia: 2008-2020

One of the fundamental principles of injury prevention is the evaluation and continued improvement of injury prevention strategies to ensure their effectiveness and long-term success.

“The bicyclist is king” in the Netherlands, which has resulted in high-priority being given to cycling in built-up areas as shown here in Amsterdam.
In 2008, the group was active in contributing to the development of a new road safety strategy for Western Australia and reviewing and building on the outcomes of its previous strategy, Arriving Safely 2003-2007. This project involved the development of a comprehensive road safety strategy based on Safe System or Vision Zero principles for Western Australia for the period 2008-2020. Other than in Sweden where the Vision Zero concept was created, such an ambitious approach has not been undertaken elsewhere in the world.

MUARC's contribution to the development of Western Australia's new road safety strategy was finalised when the Western Australian Road Safety Council made its recommendations to government in August 2008. The recommended strategy forecast potential savings in serious casualties of up to 16,000 by 2020 if the optimum strategy were to be implemented.

This project was sponsored by the Western Australia Office of Road Safety.

Evaluation of infrastructure countermeasure effectiveness

In addition to the development and evaluation of countermeasures for intersections and road safety strategies, the team has been actively involved in a number of major projects which aim to evaluate the success of large investment programs in Victoria. Notable projects completed in 2008 include:

- Statewide Accident Blackspot Program
- Safer Road Infrastructure Program
- Initiatives to introduce lower speed limits to urban shopping strips

These projects were sponsored by VicRoads and undertaken in collaboration with the Injury Analysis and Data Team.

Pedestrian safety

Pedestrians are a highly vulnerable road user group due to their relative lack of protection in traffic and their much higher risk of severe injury in the event of a crash. Crashes involving pedestrians constitute a substantial proportion (approx 14%) of all road deaths in Australia. In 2008, the number of pedestrians killed on Victorian roads increased by over 50 percent on the previous year. Given the outstanding successes in reducing pedestrian trauma over the last quarter of a century and the concerning trend of increasing deaths observed in 2008, one of the principle areas of research for this group is to promote pedestrian safety and develop sustainable, low-risk traffic environments.

An objective method for star rating road crossings on school walking routes

Walking is fundamental to human mobility, but its perceived importance as a transport mode has fallen dramatically in past decades. The benefits of walking for society are numerous, including improved health, reduced traffic and enhanced social connection. It has become a community health priority to introduce some of these benefits to primary school children by encouraging active transport to and from school. Consequently, it is vitally important to ensure that children are able to walk safely, with one of the biggest threats being the potential for injury at road crossing points.

To address these health and well-being issues, school children are being encouraged to participate in ‘active travel’ in their journeys to and from school. The program is being implemented, in one form or another, in many Western countries, including New Zealand, Canada, the United States of America, the United Kingdom, as well as in Victoria and other parts of Australia. The benefits of the program include assisting children to become more active, encouraging social and community connections and a reduction in the number of cars on the road, bringing health, environmental, safety and social benefits to communities.

The development of the concept of a star rating tool for assessing the safety of road crossing points for children travelling to or from school was completed in 2008. The tool was developed in partnership with the Caulfield Community Health Service (CCHS), a member of Alfred Health. The model takes into consideration the main determinants of pedestrian crash and injury risk at a road crossing point. It then, based on established relationships and expert consensus, mathematically combined these determinants to generate a ‘safety star rating’ between zero and five for each crossing location. The star rating concept was chosen because of its familiarity to modern consumers for rating a wide variety of products and services. While the model is designed primarily for the rating of crossing points within the abilities and limitations of child pedestrians, it is intended to be generic in its application, subject to recalibration as appropriate.
The next stage of development of the tool will be to pilot the concept at a number of schools within the CCHS catchment with a view to assessing its performance in practice and to strengthen its scientific rigour if required. This tool aims to encourage safe walking among all pedestrians, not just children, and therefore has the potential to contribute significantly to population health on a large scale.

**Development of an evaluation framework for ‘Walk Bendigo’ – a new shared space approach to urban design traffic management and road safety in the Bendigo CBD area**

The team continued to provide methodological support to the Bendigo City Council in their introduction and evaluation of a new shared space approach to urban design traffic management and road safety in Bendigo’s central business district.

The shared space philosophy, pioneered by Dutch traffic engineer Hans Monderman, is based on the notion that road user behaviour is more likely to be affected by the street environment and how it is designed, rather than by the traditional deployment of measures such as speed bumps, traffic lights and pedestrian crossings. It also strives to distinguish between road and pavement, demanding a behaviour that is influenced and controlled by natural human interaction rather than artificial regulation.

This project is being sponsored by the Bendigo City Council.

**Roadside safety**

The crash type accounting for the largest single proportion of death and serious injury is where a vehicle (usually a single vehicle) runs off the road and collides with a tree, pole, embankment or other piece of roadside ‘furniture’ or over-turns on non-traversable terrain. Vehicles running off the road account for around 40 percent of all road crash deaths – of the order of 140 Victorians per annum. Deaths and serious injuries from run-off-road crashes continue to be Australia’s single largest challenge in reducing severe road trauma.

**Clear zone guidelines**

In 2008 a project was undertaken to assess the safety performance of Australia’s roadside clear zone standards, using mathematical modelling to predict the risk of a fatal injury to the occupants of a vehicle which leaves the roadway. The project provides valuable new insights on what is needed to achieve Safe System performance for Australia’s urban and rural roadsides.

This project was sponsored by VicRoads.

**Use of frangible vegetation to address road safety: Stage 2 - workshop**

A workshop was undertaken to assess the potential to use vegetation as a roadside safety crash countermeasure. In addition to MUARC staff, the workshop included botanical and horticultural experts as well as external road safety practitioners.

This project was sponsored by VicRoads.

**Evaluation of flexible barriers on Victorian roads**

An analysis was undertaken to assess how effectively flexible barriers on Victorian roads address crashes, particularly loss of control crashes.

This project was sponsored by the Baseline Program.

**Motorcyclist safety**

Worldwide, motorcyclists are among the most vulnerable road users. Fatality and serious injury rates have been found to be more than 20 times greater for motorcyclists than car drivers, with brain and orthopaedic injuries prevalent. In 2007, motorcyclists comprised 14 percent of all deaths on Victoria’s roads, yet only three percent of registered vehicles in Victoria are motorcycles. Some examples of projects completed or underway in 2008 include:

- Descriptive analysis of Victorian motorcyclist traffic volume data along popular routes (VicRoads)
- Motorcyclist Enhanced Crash Investigation study (VicRoads)
- On-road evaluation of perceptual countermeasures to improve motorcyclist safety (VicRoads)

**Industrial transport safety**

The team continued to assist major companies in Australia by investigating workplace traffic hazards and to formulate traffic management and other strategies to address concerns in industrial settings.

**Speed**

The travel speed of drivers and riders has a profound effect on crash and injury risk. For this reason speed, not just speeding, continues to be the central focus of the team’s numerous areas of research activities. Speed is the common thread running through the research activities addressing pedestrian trauma, intersection crashes, roadside safety and motorcyclist trauma. It is proving a valuable measure for evaluating countermeasure effectiveness, predicting crash and injury risk as a function of infrastructure design variables and forecasting potential savings in severe trauma as a result of improved management of system travel speeds, through enforcement, speed limit change or both.

**Presentations**


• Corben, B. (2008) ‘Towards Zero-Getting There Together’ (supplementary report), Western Australia Road Safety Council, June
• Candappa, N. (2008) ‘Road Safety Guest Lecture’ to Second year Civil Engineering Students, Monash University Clayton, Melbourne, September
• Candappa, N (2008) Departmental Seminar Presentation, Civil Engineering Faculty, 28 August
• Candappa, N (2008) Workshop - Effective means of using frangible vegetation to address run off road crashes, VicRoads, February
• Candappa, N (2008), ‘Outcome-based Clearzone Guidelines’, VicRoads, June

In Sweden the use of frangible ‘lattice’ type structures for lighting poles, power line and highway gantries is common on both urban and rural highways.
Other Conference Publications


Staff committee memberships

- Monash University’s Roads and Traffic Sub-committee (B. Corben, N. Candappa)
- Victoria’s Speed Limits Advisory Group, convened by VicRoads (B. Corben)
- VMAC Victorian Motorcycle Advisory Council, Minister for Transport, Member (B. Corben)
- Victorian Road Safety Reference Group (B. Corben)
- Tasmanian Road Safety Council (B. Corben)
- The Canadian Association of Road Safety Professionals (N. Candappa)

Lecturing

- Unit Coordinator – Long Distance Unit – Masters in Road Safety Engineering, CIV 5306 (N. Candappa)

Sponsor/Consultant Reports (restricted access)


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Safe System Strategy & Infrastructure
The Safety Science, Biomechanics & Innovation Team is a multi-disciplinary team working predominantly in the areas of vehicle and road safety, crash investigation and analysis, and vehicle and traffic related occupational health and safety.

**Expertise**
The team members have backgrounds in engineering, biomechanics, psychology/human factors and statistics. Specialist expertise of the team members include: injury biomechanics, computer modelling and simulation, crash (and other injury-causing event) investigation and reconstruction, the design of safe vehicles for application in industrial settings, evaluation of the effectiveness of new technologies using HARM and other metrics, and road and traffic engineering.

In addition to providing research and consultancy services, the team regularly provides specialist training for professionals working in related areas. In particular, courses are run regularly in the Biomechanics of Injury and Vehicle Crashworthiness. The team also includes a qualified Abbreviated Injury Scale (AIS) trainer who regularly provides AIS training through the Association for the Advancement of Automotive Medicine.

**Projects**

**Occupant protection**
- Evaluation of models for brain injury prediction through full-scale crash reconstructions (Auto CRC)
- Occupant scaling (Auto CRC)
- HARM analysis of new in-vehicle safety technologies (Auto CRC)
- Investigation of occupant protection in far-side crashes (Australian Research Council)

**In-depth crash investigation**
- Australian National Crash In-depth Study (ANCIS Consortium)
- Enhanced crash investigation (ECI) project (VicRoads)
- Enhanced motorcycle crash investigation (EMCI) project (VicRoads/ Victorian Motorcycle Advisory Council)

**Road safety**
- Management of speed attitudes (AustRoads)
- Railway crossing advice (Department of Justice, Vic)
- A review of the literature and evaluation of physical on road-measures to modify driver behaviour with particular reference to lower class roads (VicRoads)

**Crash analysis**
- TRaffic Accident Causation in Europe, TRACE (European Commission)
- Multi National Vehicle Safety Mass Data Study - To examine possibilities and likelihood of
establishing a large European database for on-going benefit analyses of safety technologies (Swedish Road Administration)

• Review of the extent of bus crashes and incidents in Dubai and development of a strategy for addressing these problems in the future (SERCO Consultants)

• Involvement of inappropriate and excessive speed in fatal motorcycle crashes (VicRoads)

Occupational health and safety

• Review traffic volumes and flow around the Shell Geelong Refinery (Shell Refining)

• In-vehicle use of the VACIS ePCR (Rural Ambulance Victoria)

• Enhanced safe riding for motorcycle postal delivery officers (Australia Post)

Specialist training

• Short course in Biomechanics of Injury and Vehicle Crashworthiness (in conjunction with Loughborough University), Prato, 1-2 July 2008.

• Training for LAB accidentologists in trauma scoring; and to evaluate new technologies using methods including HARM and to apply the Total Secondary Safety Index to French data (Laboratory of Accidentology, Biomechanics and human behaviour), Nanterre, 11 December 2008.

• AIS Accreditation Course. Alfred Hospital, Melbourne. 16 & 17 June 2008 (Trainer: M. Franklyn)

Presentations

• Hillard, P., ‘The Enhanced Motorcycle Crash Investigation Project’, Richmond, Victorian Motorcycle Advisory Council, 18 March

• Fildes, B., DIER/STCA Transport Forum, Hobart, 4 April

• Fildes, B., ‘Safety technologies’, Institute of Public Works Engineering Australia’s Annual Conference, Parramatta, 19 May


• Franklyn M. ‘Analysis of finite element models for head injury investigation: Brain injury research’. Australian National Crash In-depth Study (ANCIS) Meeting, 14th July

• Franklyn M. ‘Analysis of computer models for brain injury’. Monash Campaign Committee for Australia, Malaysia and South Africa, 1st September

• Fildes, B., ‘Lateral Impacts in Australia, Germany and the USA’, 6th ESAR Conference, Hannover, Germany, 5 September


• Franklyn M. ‘Reconstruction of real-world crashes for brain injury
mechanisms’. Victorian Institute of Forensic Medicine (VIFM) Malaysian Delegates, 5th November

Qualifications and awards
- M. Franklyn. CAISS (Certified Abbreviated Injury Scale Specialist). Qualified for certification in March
- M. Franklyn, MUARC Early Career Researcher (ECR) Award for Excellence in Research. Granted July

Students
Steven Xu. Advanced Medical Science (AMS) Student. Supervised by M. Franklyn. Development of a tibial computer model for stress fractures. Using gait analysis data in conjunction with MRI, this project involves developing a finite element model of the tibia in order to determine geometric and loading contributors to stress fractures.

Matt Yang. Summer Vacation Scholar. Supervised by M. Franklyn, Assistant Supervisor S. Peiris. ‘Body size adjustment to measure tibial bone geometric parameters’. This project involves investigating various scaling methods used in cohort studies to account for body size.

Publications

Book chapters

Peer review journal articles

Peer review conference papers

Reports
- Franklyn, M. (2008), Brain modelling and real-world crash reconstructions, Monash University Accident Research Centre, Report produced under contract for the AutoCRC as deliverable C3-02 M069

Staff membership of boards and committees
- Department of Infrastructure, Energy and Resources, Tasmanian Road Safety Council, Hobart, Tasmania, Member (B. Fildes)
- 6th International Confernece on the Protection of Children in Cars, Committee Member (B. Fildes)
- Association for the Advancement of Automotive Medicine Member (M. Franklyn)
- Abbreviated Injury Scale (AIS) Teaching Faculty Member (M. Franklyn)
- Association for the Advancement of Automotive Medicine, Scientific Programme Committee Member (M. Franklyn)
- Victoria State Trauma Outcome Registry Monitoring (VSTORM) Group, AIS Working Group (M. Franklyn)

As a rapidly changing city, Dubai is looking at its future transport safety needs
The Vehicle Safety Test, Evaluation and Crash Research (VSTECR) Team is involved in all aspects of road safety, with a focus on vehicles.

**Expertise**

The core specialty of the VSTECR team is the real-world crash investigation program, adding more than 100 crashes each year across Australia to three separate studies. The resulting case databases are utilised for a wide range of research into vehicle crashworthiness, occupant injury outcomes and human factors and behavioural issues. The team specialises in pre-crash vehicle safety aspects, helping to design and commission advanced instrumented test vehicles and developing the research tools necessary to make use of them. The team has experience in evaluating and comparing emergency vehicles for the Victorian ambulance services, carrying out a comprehensive performance and safety testing research suite. The VSTECR team has a strong practical focus and provides mechanical and electrical design and fabrication services as well as ethical and patient recruitment advice.

The team collaborates extensively with: the Safe System Strategy and Infrastructure Team in the development of road safety strategies and the predictive modelling of their performance; the Behavioural Safety Science Team for pedestrian safety research; the Safety Science, Biomechanics and Innovation Team; and the Human Factors Team for ambulance safety research.

The VSTECR has expertise in mechanical and electrical engineering, technical design and manufacturing, educational and critical care nursing and financial administration.

**Highlights**

In addition to continuing to collect valuable data for the real-world crash investigation studies, the VSTECR team provided valuable assistance to projects led by other teams at MUARC. Extensive numerical modelling expertise was contributed to the development of the Western Australian 'Toward Zero' road safety strategy, which was submitted to government by the WA Road Safety Council in August. A model for determining roadside clear zone risk was developed and further progress made on the X-Assessor model for the star rating of school walking routes.

In the instrumented vehicle research area, the team helped commission a vehicle for the Behavioural Safety Science Team for the '1000 Intersection' older driver naturalistic driving study. This vehicle incorporated several improvements over the earlier ORTeV (on-road test vehicle), with fully-automated system startup upon vehicle start and more compact hardware installation.

During the year the team became involved in the AusDSRC industry cluster, aimed at securing the allocation of a dedicated portion of the radio spectrum in Australia for the use of Intelligent Transport Systems (ITS) applications depending on secure, wireless broadband capability. Our involvement is targeted at both ensuring that non safety-specific applications of the technology do not compromise road safety as well as facilitating the research needs of the development of safety-related applications utilising this technology, including collision avoidance through vehicle-to-vehicle and vehicle-to-infrastructure communications.
Projects

Ambulance new vehicle evaluation

During 2008, research into the safe operation of the VACIS (Victorian Ambulance Clinical Information System) electronic patient care record was carried out for Rural Ambulance Victoria (RAV), in conjunction with the Safety Science, Biomechanics and Innovation and Human Factors teams. The objective of the work was to identify one or more solutions enabling the VACIS ePCR (patient care record) unit to be used in all stretcher-carrying vehicles, whether stationary or in transit. The solution needed to be affordable and practical as well as meet all relevant OHS and ergonomic usage criteria, engaging closely with the relevant stakeholders to achieve this objective.

The project involved collection of data on the current usage patterns of the VACIS ePCR and a user forum, from which pertinent safety, operational and ergonomic issues were identified. Preliminary conceptual solutions were developed and evaluated by MUARC and assessed within a safety and ergonomics context.

Based on the above and supplemented by available material or information provided by RAV relating to OHS, ergonomic and operational requirements, a range of possible conceptual solutions was developed and evaluated by the project team. (Ambulance Victoria; formerly Metropolitan Ambulance Service and Rural Ambulance Victoria)

ANCIS (Australian National Crash In-depth Study)

ANCIS has continued to establish a valuable niche during its first nine years of operation. Real-world crash studies in Europe and the USA have shown considerable benefits in highlighting areas of concern to direct the development of new technologies or testing standards, that can subsequently be applied to vehicles to help prevent crashes or injuries, or on test vehicles to promote design changes to improve real-world operation. The benefits of existing technologies can be evaluated and the projected future benefits of new technologies estimated, making a valuable contribution to reducing serious road trauma.

A key development in ANCIS has been the shift to a stronger focus on factors associated with the crash (primary safety) as well as those associated with the injury (secondary safety). The emphasis in road safety improvement today is to address crash and injury prevention in a systemic way and ANCIS is now able to play a major role in this process. Now as ever before there is a real need for detailed information on crash causation, something mass databases are less able to do, but a function that ANCIS is now well placed to provide.

Importantly, ANCIS is still the only in-depth study of serious injury car and motorcycle crashes available that involves multiple States in Australia. Expansion into other jurisdictions is planned to make it even more representative of serious injury crashes.
across all of Australia. As the database grows in size, it allows for additional robust analyses to address emerging road safety issues — driver, vehicle and infrastructure related — essential for adopting a truly Safe System approach to road safety in the region.

A proposal for Stage 4 of ANCIS, to run from the middle of 2009 for three years, is currently under consideration (Various sponsors).

**Enhanced Crash Investigation**

Cases collected through ANCIS continued to make an ongoing contribution to the Enhanced Crash Investigation study (see Safety Science, Biomechanics and Innovation Team report).

**Crash inspections (AutoCRC)**

At the start of 2008, the 16-year-long crash investigation program with GM Holden was transferred to the Cooperative Research Centre for Advanced Automotive Technology (AutoCRC). In total, more than 700 real-world crash cases were collected and a number of research studies conducted using the generated in-depth database. The AutoCRC Crash Inspection program commenced in July with the aim of continuing to recruit late-model Australian-manufactured Holden vehicles to help validate the safety performance of these vehicles (VicRoads).

**ORTeV (On-Road Test Vehicle)**

The MUARC ORTeV (On-Road Test Vehicle) is a state-of-the-art mobile data acquisition platform developed as part of the AutoCRC safety theme. In conjunction with the School of Biophysical Sciences and Electrical Engineering at Swinburne University, a VE Holden Commodore supplied by GM Holden has been equipped to collect data for both controlled and naturalistic studies. Three main types of information can be continuously logged: vehicle-related data, driver-related physiological data and eye tracking data. In addition, four exterior and three interior camera views are recorded.

Vehicle data is acquired from the vehicle network and currently includes, but is not limited to:

- Vehicle speed
- GPS location
- Accelerator and brake position, as well as vehicle lateral and longitudinal velocity and acceleration
- Steering wheel angle
- Lane tracking and headway logging
- Primary controls (windscreen wipers, turn indicators, headlights, etc.)
- Secondary controls (sat-nav system, entertainment system, HVAC, etc.).

For controlled test programs, driver eye movements can be tracked and overlaid on a driver’s-eye camera view. Physiological data such as EEG, EOG, EMG and pulse oximetry correlate real-world stimuli with driver responses. ORTeV is equipped with seven unobtrusive cameras recording forward and peripheral views spanning 180° about straight ahead as well as three interior cameras and a rearward-looking camera. A combined lane position and headway detection system has recently been implemented.

ORTeV is currently being used for a PhD project into the physiological signs of driver distraction and is available for research into areas such as Human-Machine Interface (HMI), driver behaviour, naturalistic driving and others.

**Presentations**


Publications

Sponsor/consultant reports (restricted access)

- Taranto, D. & Logan, D. (2008), Ongoing maintenance, testing and validation of Onroad Test Vehicle #1, Monash University Accident Research Centre, Report produced under contract for the AutoCRC as deliverable C3-02 M071

- Taranto, D., Logan, D. & Tomasevic, N. (2008), Literature review of available video analysis techniques, Monash University Accident Research Centre, Report produced under contract for the AutoCRC as deliverable C3-02 M072

- Tomasevic, N. & Logan, D. (2008), Data storage and management system, Monash University Accident Research Centre, Report produced under contract for the AutoCRC as deliverable M074

Staff membership of boards and committees

David Logan: AusDSRC Steering Committee: Leader Working Group 5, Safety

20 years of crash investigation
MUARC established a satellite node at the Monash University Prato Centre in Italy. MUARC Europe was launched at a ceremony at the Monash Prato Centre in November 2008 by the President of the Regione Toscana, Claudio Martini. A number of key international guests, including the Australian Ambassador to Italy, Amanda Vanstone, attended the launch.

Associate Director of MUARC Prato, Professor Brian Fildes said partnerships with local and European individuals and groups would be critical for the success of MUARC Europe. "We have already approached a number of universities and researchers in Italy and other European countries to form agreements for collaborative work to address the global problem of injury," Professor Fildes said.

Activities Planned for MUARC Europe
The Prato node will focus on research in injury causation and prevention across Europe, as well as teaching programs and community engagement.

Research
MUARC has a long history of undertaking safety research in all forms of daily activity including safety on the road, safety in the workplace, safety at home, school and in sporting events and in prevention trauma generally. Much of this research has been internationally based and implemented for the benefit of the community. MUARC Europe aims to work diligently at applying its research expertise to safety problems in Italy and Europe to benefit all citizens in the region.

Research is expected to tackle major issues in road and workplace safety in Italy and throughout Europe using a scientific evidence-based approach. Data will be fundamental in identifying and addressing safety problems and the identification of effective best-practice and innovative solutions to these problems will be an important part of the research effort.
Teaching and Education
Educating the community in safety at work, and in travel and leisure activities is fundamental for improving safety. This requires people in industry, government and community leaders to show the way for its citizens to embrace. MUARC Europe will undertake training courses in best safety practices for professionals, employees and students to help improve safety knowledge and safe behaviour among the whole community.

Early initiatives in this area include short training courses in biomechanics and vehicle safety for European industries, as well as formal university units in trauma prevention and compensation for undergraduate and graduate students in road safety.

Working with the Local Community
MUARC’s expertise over the last 20 years has been most valuable in working with local communities on solving their safety problems. This approach will be adopted here in Italy and throughout Europe to help those responsible for improving safety to achieve their goals. MUARC has long recognised that to be most beneficial, it must work to ensure its research knowledge is applied to new and innovative safety initiatives.

To help foster this, discussions have already been held with the local Prato Commune and in Florence on ways in which MUARC Europe can assist in addressing local safety issues on the road and in the workplace. The adoption of a strategic approach is critical in optimising the benefits of safety improvements for the community at large.

Collaboration
Fundamental to all these objectives is the need to work collaboratively with local research and implementation organisations. Experience has shown that working in partnership with local organisations is the most effective means of bringing those with particular expertise together to tackle specific safety problems. This has led to the introduction of new innovative approaches to safety of benefit to all citizens.

To date, collaborative agreements have been made with European research organisations in France, Great Britain, and the Netherlands, and agreements are currently under negotiation in Italy, Sweden and Germany. MUARC also has collaborative agreements with other countries such as the USA and the Middle East.

To help ensure MUARC Europe is focused on critical issues in Europe, a Research Advisory Committee comprising prominent European and Australian experts is to be formed to help guide the direction of research undertaken by MUARC in Europe.

Monash Prato opened in 2001 at Palazzo Vaj in the heart of Prato’s historical centre. Monash secured the location with support from the Region of Tuscany and the local government of Prato.

Attendees and faculty of the inaugural short course in Biomechanics and Crashworthiness at the Prato Centre, July 2008
MUARC Malaysia was established in Kuala Lumpur in October 2008, with Dr. Jennie Oxley as the Associate Director. Our offices are situated within the School of Engineering, Monash Sunway Campus. Sunway Campus is expanding its research profile by advancing and encouraging its research Centres in their research strengths and collaborative efforts within Monash and with government agencies, other universities and relevant organisations.

**Objectives and achievements**

The primary goals of MUARC Malaysia are to develop:

i) collaborative research groups to undertake research projects that aim to achieve improvements in priority injury areas; and

ii) research capacity through quality research education and training opportunities.

The first three months of MUARC Malaysia’s existence were successful and would not have been possible without the valuable support from both Clayton and Sunway Campuses. We have received a very warm welcome from Professor Robin Pollard (PVC, Sunway Campus), Professor Walter Wong (DVC, Sunway Campus) and the School of Engineering team (particularly Professor Ian Prince).

A number of collaborative research areas have been under development in 2008 and we look forward to further developments and translation of these partnerships into large research projects in 2009 and beyond. Some priority research areas that are under development are summarised below.

**Road safety:**

Most South East Asian countries have a poor road safety record, with road fatality indexes at least five times that of high performing countries, and motorcyclists make up the majority of all road deaths. The safety of vulnerable groups (particularly motorcyclists) is a priority area for the region. Research projects, short courses and training programs) are currently under development to address all aspects of safety for these groups. There is a particular focus on education, road and infrastructure improvements and trauma management. Partners include: the Global Road Safety Partnership (Asia), the Road Safety Department, Ministry of Transport, the Malaysian Institute of Road Safety (MIROS), the Institute of Transportation and Australian Education International, Taiwan, a number of large trauma hospitals in Malaysia and Singapore, research universities (Universiti Putra Jaya, Universiti Kebanksaan Malaysia, Universiti Tunku Abdul Rahman) and Exxon-Mobil Malaysia.

**Sports injury prevention:**

One of the priorities of the Malaysian Ministry of Youth and Sport and the National Sports Council is to improve the performance of sports performers...
and competitors and reduce sports-related injuries. A number of researchers are working in the area and are keen to partner with MUARC on a range of research projects. Partners include: National Sports Council, Universiti Sains Malaysia, School of Engineering, Monash University Sunway Campus.

Health education and promotion:
There is concern in Malaysia about the overall health and well-being of children and the elderly, and MUARC Malaysia has been in discussion with the Institute for Health Management, Ministry of Health, and university-based researchers (Faculty of Medicine and Health Sciences, Monash University Sunway Campus, and Universiti Sains Malaysia; Universiti Putra Malaysia; Universiti Malay; Asia-Pacific Institute of Ageing Studies at Lingnan University Hong Kong, Monash-China; Healthy Ageing Research Unit and Monash-China Health Initiatives, Monash University Clayton) to undertake research projects and develop seminars on issues on healthy lifestyles, well-being, and injury prevention strategies for these population groups.

Occupational health and safety:
Workplace safety is another priority area for injury prevention in the Asian region and the Centre has established collaborations with the Workplace Safety and Health Council, Singapore, Malaysian National Institute of Occupational Safety and Health, the Occupational Health and Safety Department Monash University Sunway and workplace safety consultants in Singapore and Malaysia.

Capacity building:
In addition to establishing research partnerships, MUARC Malaysia has been progressing in attracting potential HDR students. We are looking forward to welcoming a number of new students at both the Sunway and Clayton Campuses early in 2009.

The way forward
The goals for MUARC Malaysia in 2009 and beyond are to progress the partnerships already formed and engage other government departments and key stakeholders to advance our research potential and capacity in the region. It is anticipated that, within the next 12 months, MUARC Malaysia will have established itself as a Centre conducting high-quality research projects addressing high-priority health areas within the Asian and South East Asian regions.

Presentations
Numerous presentations providing information on MUARC and our research capacity and expertise have been made to government departments, relevant organisations and university faculties.
The mission of the South African Research Node reflects the Mission Statement of MUARC, that being:

To conduct high quality public health injury prevention research and educational programs relevant to the challenges faced by contemporary Africa, and in so doing, engage and challenge government, industry and citizens to act collectively to eliminate serious health losses due to injury.

With the support of MUARC (Australia), the Research Node will conduct health and injury prevention research with these activities aligned with the Millennium Development Goals. Capacity building to advance the health of all African citizens represents a core goal of the Centre.

Objectives and expectations

Within two years, the Centre will be a collaborative research group, internationally recognised for excellence in research focused on achieving real and measurable health improvements and reductions in the burden of injury.

In meeting this Objective, the Centre will focus on:

1. Developing research capacity through research education and training activities;
2. Undertake research projects to advance the evidence-base to inform population-based injury prevention programs;
3. Establish the capacity and mechanisms for translating research into practice;
4. Demonstrate the effectiveness of population-level prevention programs in the following priority areas: transport safety with special emphasis on road trauma, acute care and trauma, child health and home safety; and

“Despite being a continent facing significant health challenges there is an enormous sense of moving forward and a striving for an improved quality of life. There is a sense of raw energy evident in daily life and the people are truly amazing. The opportunity to build relationships in Africa with a view to improving health and reducing the burden of injury is both incredibly exciting and daunting. The stakes here are higher than anywhere else: an incremental improvement impacts on the lives of thousands. Being in a position to transfer skills is certainly a privilege.”
5. Community engagement activities focused on health improvement and injury prevention programs

Achievements
The establishment of the Centre within the Research Directorate at the Monash South Africa campus was accomplished by the end of 2008. The Centre is collaborating with the Faculty of Law, Monash University Australia to undertake a comparative road safety law program with particular emphasis on road safety law in Botswana. This initiative stemmed from a collaborative agreement with the University of Botswana entered into by Monash South Africa, facilitated by the Office of the Deputy Vice-Chancellor (International), Monash University.

MUARC (SA) is collaborating with the Ministry for Home Affairs, The Republic of Tanzania, focusing on road safety.

Activities will be focused initially in the key areas of data systems, drink-driving and speeding education and enforcement programs and pedestrian safety.

Presentation (Africa only)

The way forward
The goals for 2009 are to actively engage a range of stakeholders in South Africa, Botswana, Tanzania and Namibia. The key priority is to establish long-standing and productive partnerships in the core areas of road trauma prevention, acute care and trauma, and child health and home safety. Capacity building through community engagement and higher degree students represents a priority development objective.

Membership of boards and committees
- Association for the Advancement of Automotive Medicine, Membership and Credentials Committee (M. Fitzharris)
In July 2005 Monash University Accident Research Centre was designated for an initial four-year term as a WHO Collaborating Centre for Violence, Injuries and Disabilities.

The current terms of reference for the Collaborating Centre are:

1. to assist with the development and monitoring of regional capacity in injury prevention including data systems, research, and injury prevention policy and planning developments;

2. to contribute to solving the major unintentional injury burden in the region (particularly road traffic injury, drowning, falls, poisoning) through research, training, leading-edge workshops and general information exchange;

3. to contribute to suicide prevention in the region by conducting research on access to the means of suicide and assisting countries to develop and implement policies aimed at reducing access to methods such as poisoning and falls from heights; and

4. to assist the WHO Regional Office for the Western Pacific to develop, implement and evaluate a regional injury prevention strategy.

The third year of the Monash University initial designation period was completed in July 2008. It was a very productive year particularly in terms of capacity building, collaborative in-country regional research and publications.

Planning discussions will be held with the WPRO Regional Advisor and Director of the Department of VIP to determine the next stages of development for the Collaborating Centre as the first designation period draws to a close.
The Accident Research Foundation was established by the Monash University Council on 16 December 1996.

As stated in the Regulations, “The objects of the Foundation shall be to support encourage and promote the work of the Accident Research Centre generally, and to provide funds for research by the Centre aimed at preventing accidents and reducing injuries on the road, in the home, in sport and recreation, at work and in other places or activities."

The Monash University Accident Research Foundation has made scholarships available for students at the Accident Research Centre for study in any of the principal research areas of the Centre. Three MUARC Scholars were supported by the Foundation during 2008.

**John Lane Memorial Scholarship**

Dr. John Lane, recognised as the father of aviation safety in Australia, and a leader in road safety, died on January 21, 1999. In recognition of Dr. Lane’s contribution in the field of injury prevention, and as a personal tribute, the Trustees of the Foundation established the John Lane Memorial Scholarship.

Robin Hutchinson was holder of this scholarship in 2008.

**Peter Vulcan Scholarship**

Professor Peter Vulcan retired in 1998, bringing to an end eleven years of outstanding service as the champion and Founding Director of the Accident Research Centre. His unique and distinguished contribution both to injury prevention and the Centre were recognised with the establishment of this award.

Matthew Ericson was holder of this scholarship in 2008.

**Safe Family Research Scholarship**

The Amy Gillett Foundation was established in recognition of the champion Australian cyclist who died while training in Germany in 2005. Amy’s parents, Mary and Denis Safe, recognise that a growing number of cyclists are killed and injured on Australian roads each year, as more people turn to bicycles for health and transport. The Amy Gillett Foundation has offered, in conjunction with the Monash University Accident Research Foundation, the Safe Family Research Scholarship – to encourage research in this important field of road safety.

The Foundation’s objective is a reduction in the number of accidents involving motorists and cyclists. Amy Gillett, 29, was a member of Australia’s athletic elite. She represented Australia in rowing at the 1996 Atlanta Olympic Games, before she became a champion cyclist. She was also committed to her academic endeavours, holding a Bachelor of Applied Science (Exercise and Sports Science) and Honours in Human Movement. Amy had started her PhD, which was to study how women reacted to life after sport, irrespective of their level, achievements and profile.

Marilyn Johnson was holder of this scholarship in 2008.

(For project descriptions see the Research Training section following.)
MUARC is committed to research training for the development of new leaders in the field of injury prevention. The Centre has a vibrant doctoral research program and offers pathways to a PhD through Honours and fourth year research project supervision. Many of the Centre’s staff contribute to undergraduate and postgraduate coursework, short courses, workshops and training programs locally and around the world as part of our commitment to the advancement of knowledge and expertise to reduce injury and enhance safety.

**PhD research program**

PhD students at MUARC study in an energising and collaborative environment with a diverse range of highly skilled researchers and injury prevention practitioners.

The major component of the program consists of research presented in the form of a thesis, in accordance with Monash University guidelines. The thesis represents a significant contribution to the knowledge and understanding of injury prevention and demonstrates the capacity to carry out independent research.

Students also undertake a minor study program, designed to broaden understanding of the field of accident and injury prevention, increase exposure to a wide range of issues beyond their thesis topic and foster an environment of inquiry that supports the development of critical analysis skills.

**Postgraduate Program**

**Highlights:**

Two new candidates joined the Centre’s higher degree by research group during 2008, making a total of 20 full-time and part-time MUARC PhD students enrolled on the Clayton campus. New candidate, Linda Watson, a Research Fellow with the Centre’s Injury Analysis and Data Team, was awarded an Australian Postgraduate Award (APA) to study ‘Dog bite injury: an investigation into the effectiveness of regulation’. Jim Langford also commenced studies in March, under the Monash Staff Candidature scheme and will compile his thesis based on a series of studies on assessing and managing older driver crash risk. At the other end of their candidature, more than one-third of the Centre’s current cohort of students were engaged in the final stages of analyses and writing towards the latter part of 2008. Amongst these was Jessica Edquist, who submitted her thesis on ‘Driver distraction: the effects of visual clutter in the highway environment’. Peter Vulcan scholarship holder, Matthew Ericson, was awarded a Postgraduate Publication Award to support the writing up of publications from his thesis. Matthew will take up the award in January 2009 upon completion of his thesis.

The Centre encourages and supports students’ participation in conferences as an important way to connect with experts in their field and to gather feedback on their own work. A number of students attended national and international meetings: Marilyn Johnson presented at the Australasian Road Safety Research, Policing and Education Conference on her cycle safety observational study; Trang Vu presented a paper on a proposed conceptual framework for assessing the value of an injury surveillance system at the 2nd Asia Pacific Injury Prevention Conference 4–6 November in Hanoi. In addition, Trang co-chaired a concurrent session on capacity building with Dr. Tran Thi Ngoc Lan from the injury prevention
Richard Fernandez BSc(Hons)

Robin Hutchinson BSc(Behav.), BSc(Hons)

Marilyn Johnson MAppSocRes, BA(Hons)

Jessica Killian MSc(Repro), GradDip (ReproSci), BSc

Jim Langford MEdSt, BA(Hons)

Adam McKinnon MIT, BA(Psych)

Eve Mitsopoulos-Rubens BA, BSc(Hons)

Damian Morgan BA(Hons)

Carlyn Muir MA(SocSci), Psych(Hons)

department, Ministry of Health. Also while in Mexico, Trang attended the Second Global Meeting of Ministry of Health Focal Points for Injuries and Violence Prevention as an observer, and the meeting of WHO South-East Asia and Western Pacific Regions as a rapporteur. Virginia Routley presented her research at the same conference in Mexico and also to the 2nd Asia Pacific Conference on Injury Prevention.


Our students are excellent ambassadors for the Centre’s activities and we thank them for their participation in the advancement of scientific knowledge through their scholarly activities in the local and international arena.

External recognition / awards

Whilst the Centre’s research in itself is very rewarding, it is also very pleasing when this contribution is recognised externally. Even more so when our students are recognised:

- Johnathon Ehsani received the Sir John Monash Award. The awards are considered Australia’s most prestigious postgraduate scholarships and recognise individuals for their leadership, academic excellence and contribution to the community. Johnathon will spend three years at the University of Michigan pursuing studies in adolescent risk taking.
- Lyndal Bugeja won the ‘Best paper on the policy theme’ at the 9th Conference on Injury Prevention and Safety Promotion in Merida, Mexico.

PhD candidates

The postgraduate students make an important contribution to the Centre’s research program as demonstrated by the diversity of interest areas and research projects outlined below. We wish to thank all of our students for their enthusiasm and dedication. We would also like to acknowledge the major contribution of our PhD supervisors, both internal and external, who provide expert guidance and extensive support to our student community and who play such an important role in the success and quality of PhD completions at MUARC.

Lyndal Bugeja

Supervisors: Professor Joan Ozanne-Smith, Professor Joseph Ibrahim (Department of Epidemiology and Preventive Medicine) and Judge Jennifer Coate (State Coroner’s Office, Victoria)

The contribution of coroners’ recommendations to the prevention of external cause of death in Victoria, Australia

The aim of the study is to identify and examine the factors that facilitate and impede coroners to make recommendations on public health and safety and the administration of justice in Victoria, Australia. The research design for this study comprised: a retrospective cohort study comparing recommendations cases to non-recommendations cases; in-depth analysis of recommendations cases; and key informant interviews. This research has, and will continue to, inform the strengthening of the prevention role of the coroner through legislation reform of the Coroner’s Act, 1985 (Vic) and development of an evidence-based information system to support coroners’ death investigations in Victoria. (Australian Postgraduate Award)

Fiona Clay

Supervisors: Professor Rod McClure, Dr. Wendy Watson (NSW Injury Management Centre)

The determinants of outcome following orthopaedic trauma

This research aims to examine patient focused outcomes following minor or moderate acute orthopaedic trauma in a sample of adult patients presenting to hospital following an unintentional injury. In a prospective cohort study, 170 patients were recruited from 4 Victorian hospitals and followed up over a six-month period. Patients were surveyed about their expectations regarding recovery, whether they had returned to work, whether they were experiencing pain and about their general physical and mental health. In addition, information was collected about their injury.

An analysis of factors predicting the presence of pain at 6 months and pain that limits activity suggests that
Lyndal Bugeja presented her paper at the 9th World Conference on Injury Prevention and Safety Promotion in Mexico on the development of legislation for mandatory wearing of personal flotation devices on recreational vessels

a variety of psychosocial and injury related factors may be important in determining outcome. This analysis will form the basis of a journal article in 2009. During 2008, the work was presented at Toronto Western Hospital (CREIDO) in Canada. (NHMRC scholarship)

**Clay Douglas**
Supervisors: Professor Brian Fildes, Dr. Tom Gibson (Human Impact Engineering) and Dr. Peter Hillard

**Modelling far-side occupants in side impact crashes**

Regulations and interventions to protect far-side occupants in crashes do not currently exist, despite these occupants accounting for over 30 per cent of the seriously injured persons and harm in side impact crashes. Furthermore, no suitable crash dummies or mathematical models have been developed to investigate far-side occupant dynamics during such a crash. As a result, this study aims to develop and validate a computer model capable of mimicking human response in far-side impacts. The model will then be used to investigate the influence of seat belt properties, impact direction and potential countermeasures on occupant loading and injuries. Therefore, this model may aid the improvement of safety features currently in vehicles. The PhD itself falls under the umbrella of a larger study aimed at improving protection to far-side vehicle occupants. It is an ARC Linkage study involving a collaboration of universities in Australia and the USA as well as industry partners

GM Holden and Autoliv. (Australian Postgraduate Award (Industry))

**Jessica Edquist**
Supervisors: Professor Ian Johnston, Dr. Simon Hosking (DSTO) and Dr. Tim Horberry (University of Queensland)

**The effects of visual clutter in driving performance**

This project examined the issues of perception and information processing surrounding visual clutter in the driving environment. The results provide guidance to road authorities as to why, how and where to regulate visual clutter on roadsides, including roadside advertising and multiple traffic signs. The thesis was completed in 2008. Jessica was subsequently invited to co-lead a full day workshop on visual clutter at the Annual Meeting of the Transportation Research Board (USA). The workshop was attended by both researchers and road safety practitioners and was a great experience.

The project was part of an ARC Linkage Grant study entitled ‘A Human Factors Approach to the Design of Visual Information in the Highway Environment’. The industry partner was the Department of Main Roads, Queensland.  (Australian Postgraduate Award (Industry))

Publications arising from the thesis:


Matthew Ericson
Supervisors: Professor Ian Johnston and Emeritus Professor David Chandler (Monash Asia Institute)

Improving the process of technology transfer for better road safety policy outcomes in Cambodia and the Lao PDR

Road safety interventions which have proven effective in developed countries are frequently less successful when transferred to developing countries. The objective of this research is to analyse impediments to successful transfer using case studies from Cambodia and Laos. Three case studies analyse the practical policy problems of the technology transfer process. The first explores vehicle safety standards using the example of two-wheel tractors in Laos and Cambodia. The second case study examines whether canopies would protect passengers travelling in the cargo-area of pickup trucks. The final case study compares how motorcycle helmet-wearing programs are implemented in Cambodia and Laos. (Monash University Accident Research Foundation Peter Vulcan Scholarship)

Richard Fernandez
Supervisors: Professor Joan Ozanne-Smith, Associate Professor Raphael Gaebierta (Department of Civil Engineering), Associate Professor Nigel Wreford (Department of Anatomy and Cell Biology) and Dr. Lesley Day

A novel approach to the prevention of fall induced hip fracture: the anatomical and functional basis to improve hip-fracture preventing devices

Hip fractures are one of the most serious health problems facing the ageing population today. There is substantial evidence to suggest that the majority of hip fractures are a result of a fall directly onto the ‘greater trochanter’, or top part of the thigh bone. Furthermore, the risk of re-fracture following a second fall is very high. The development of the external hip protector has served as a promising avenue for hip-fracture prevention; however, its effectiveness is limited by low wearer compliance in the target population. This PhD project investigates the feasibility of a novel implanted hip fracture-preventing device and also develops further specifications for a new generation of external hip protecting devices in an attempt to increase wearer compliance. The project includes an anatomical and surgical evaluation of potential implant sites, examination of hip musculature morphology using computed tomography and computer based imaging techniques and biomechanical testing of muscle tissue.

Robin Hutchinson
Supervisors: Professor Tom Triggs, Dr. Simon Hosking (Defence Science and Technology Organisation) and Dr. Gavan Lintern (General Dynamics)

Supporting lane change behavior with an ecological interface

The high demands placed on drivers in the road environment can lead to errors in judgement and breakdowns in situation awareness. These deficits can lead to deleterious consequences. Lane changing is a particularly challenging driving manoeuvre because of the need to make simultaneous judgements concerning multiple vehicles located in polar directions. A variety of driver assist systems have been developed to aid the driver in monitoring the road way and to alert the driver to potentially hazardous situations. While these systems have been demonstrated to generally have a positive impact on driving, they are still in their infancy and require further development. Ecological Interface Design (EID) is an approach to display development that may offer solutions to some of the limitations associated with current driver support systems. The aim of this project is to develop EID for the automotive domain and to use the principles of EID to develop a driver assist system to support lane change behaviour. This project aspires to enhance the design philosophy behind the development of driver assist systems and thereby positively impact road safety. Naturalistic driving data is being analysed in order to better understand the dynamics of lane change associated headway. This information will inform the design of the interface. (Monash University Accident Research Foundation John Lane Memorial Scholarship)

Marilyn Johnson
Supervisors: Dr. Jude Charlton and Dr. Jennie Oakey

Cycling safety from the perspective of all road users

Cycling is the fourth most popular form of physical activity in Australia and each year the number of people cycling is increasing. While the health and environmental benefits of cycling are clear, cyclists continue to be vulnerable road users and cyclist safety is a serious road safety concern. The aim of this research project is to identify strategies to improve safety for cyclists who ride on the road. There are three stages investigating the interaction between cyclists and other road users. The first stage is a series of observational studies, these are being undertaken at intersections across metropolitan Melbourne using a covert video camera to record cyclist and driver behaviours. Stage 2 is an online survey of cyclists and drivers and Stage 3 is a naturalistic cycling study that will be conducted in 2009. (Safe Family Research Scholarship, Amy Gillet Foundation & Monash University Accident Research Foundation)

Jessica Killian
Supervisors: Professor Joan Ozanne-Smith and Professor Olaf Drummer (Department of Forensic Medicine)

The correlation between forensic toxicology and unnatural death

Injury is an important public health problem and a major cause of death, particularly in young people. Drug induced impairment and interactions are known to cause an increased risk of mortality. However, the full extent of involvement across the whole range of injury deaths is mostly unknown.

Data on 7,400 unnatural deaths reported to the Coroner in Victoria, Australia from July 2000 to June 2005 were extracted from the National Coronial Information System (NCIS) and cases with toxicity reports were analysed to determine the
Cycling infrastructure creates designated space for on-road cyclists. The space gives drivers confidence about interacting with cyclists.

Dr. Rodney Pope (Charles Sturt University)
Supervisors: Professor Joan Ozanne-Smith and Dr. Rodney Pope (Charles Sturt University)

Optimising the utility of injury surveillance systems for injury control in active populations

The main objective of this project is to optimise the utility of injury surveillance systems for injury prevention in active populations. Expected outcomes of the research include: a qualitative examination of procedural and socio-cultural factors affecting injury surveillance systems in the Australian Army and the Victorian civilian community; the identification and evaluation of new methods of injury data analysis (e.g. statistical process control charts, data mining techniques) to facilitate injury prevention; and the examination of user preferences toward current and innovative modes of information dissemination adopted by an injury surveillance system. The results of this research will be particularly important to the Australian Defence Force and the Victorian civilian community as well as broader application across injury surveillance systems worldwide. This research trialing new methods of injury surveillance data analysis was presented at the 9th World Conference on Injury Prevention and Safety Promotion in Mexico. (Australian Postgraduate Award (Industry), Department of Defence)

Eve Mitsopoulos-Rubens
Supervisors: Emeritus Professor Tom Triggs and Dr. Mike Regan

Investigating the calibration skill of young novice drivers relative to experienced drivers

It has been proposed that deficiencies in calibration ability contribute to young novice drivers’ high crash involvement. However, little direct and objective evidence exists of differences in calibration ability between novice and experienced drivers. Calibration in driving can be defined as the ability to match task demands to one’s own capabilities as a driver. Calibration involves comparison between capabilities and task demands to determine whether there is an undesirable mismatch which necessitates appropriate modification to one’s driving behaviour to ensure that safety is not compromised. Pre-requisites to effective calibration are an accurate knowledge of the demands imposed by the traffic system and of one’s own capabilities as a driver.

The primary aim of this PhD research program is to explore the fundamental differences between young novice and experienced drivers’ calibration ability. The research involved a series of four experiments, three of which utilised the MUARC advanced driving simulator. In summary, differences in calibration ability were found between young novice and experienced drivers. However, the presence of differences was found to be largely contingent on the nature of the task at hand. The outcomes of this research served to provide a theoretical and methodological framework to guide further study into calibration in driving as it relates to young novice drivers and, in the process, to reconcile some of the issues that have limited further thinking in this area. The thesis will be submitted in 2009. (Australian Postgraduate Award)

Damian Morgan
Supervisors: Professor Joan Ozanne-Smith and Emeritus Professor Tom Triggs

Risk factors for unintentional drowning at surf beaches

The PhD study identifies and assesses factors that contribute to the risk of drowning at surf beaches as well as providing estimates of exposure to that risk. Methods used include analysis of coronial data, observation of beach users, self report, and expert risk assessment. Data gathered in this study is used firstly to develop a predictive model of exposure to drowning risk, and secondly, to
Carlyn Muir
Supervisors: Dr. Judith Charlton, Professor Brian Fildes and Professor Joanne Wood (Department of Optometry, Queensland University of Technology)

Vision and driving with hemianopia

Hemianopic visual field loss is blindness or reduction in one half of the visual field caused by damage to the visual pathways in the brain. There is limited evidence regarding the ability to drive safely with hemianopia, however some studies have suggested that hemianopic field loss may not impair driving ability enough to warrant licence refusal. Research suggests that individuals with hemianopic field loss appear to compensate for their deficit to varying degrees by employing altered scan paths and excessive fixation in the blind region. However, fixation does not necessarily imply attentional processing, therefore identifying whether these altered scan paths actually correspond to attentional processing in the blind region would provide evidence as to whether this is an effective compensatory strategy.

Therefore, the primary aims of this PhD are to investigate the extent to which individuals with hemianopic field loss compensate on a visual attention task and to investigate the relationship between performance on a visual attention task and cognitive and vision tests commonly used in driving assessment. Outcomes of this research will be useful for developing a suitable screening assessment for visual fitness-to-drive in individuals with hemianopic field loss. Carlyn presented preliminary data from her PhD at the 9th International Conference on Low Vision in Montreal, Canada this year. (Australian Postgraduate Award (Industry))

Virginia Routley
Supervisor: Professor Joan Ozanne-Smith

Development of seat belt wearing in two cities in China

China’s rapidly developing economy and motorisation have been accompanied by official road traffic statistics of almost half a million road traffic crashes and injuries and 100,000 fatalities (2005). The road traffic safety law, requiring seat belts to be worn where fitted, came into effect in May 2004 and, since seat belts are a highly proven intervention, has considerable potential to reduce fatalities and injuries and thus impact on the global burden of injury. Seat belt wearing studies in China have been scarce.

This study for PhD by publication has involved measuring the progress of seat belt wearing and attitudes in Nanjing, Jiangsu Province and Zhoushan, Zhejiang Province. Surveys undertaken in April 2005, 2006 and 2007 of 120,000 observations of seat belt wearing have been published in two international journals. An article reporting results of 2,200 interviews has been accepted for publication and a fourth article presenting results of 10 focus groups and a fifth integrating taxi results have been submitted to journals. The study will inform wider seat belt wearing interventions in China. The World Bank Global Road Safety Facility has funded the second and third year of this project. (Australian Postgraduate Award)

Publication and Presentations:


Carolyn Staines
Supervisors: Professor Joan Ozanne-Smith and Professor Graeme Davison (School of Historical Studies, Faculty of Arts)

The Victorian experience of drowning and its prevention: historical eco-epidemiological study of drowning prevention in an economically developing community

Victoria, along with other economically developed communities, has had considerable success in reducing drowning death rates. However, drowning continues to be a major cause of unintentional injury deaths in developing countries. This study aims to inform drowning prevention in developing countries by determining how Victoria reduced its drowning rate.

The study investigates the causes of drowning deaths and the patterns of change by reviewing the records of a sample of almost 1,500 coroners’ inquests dating from the 1860’s to the 1970’s. This research, supplemented by additional information from other historical sources and newspaper archives, is producing a rich picture of the drowning risk profile of Victoria’s early settlers and the evolution of this over the period of the State’s economic and social development.

Results of this study have been presented at international and national conferences and the methodology of this study has attracted attention as it employs an unusual combination of the disciplines of epidemiology and history to provide an output that is rich in both quantitative and qualitative information. During 2008, Carolyn contributed to the writing of the WHO’s World Report on Child Injury Prevention. (Monash Research Graduate Scholarship)

Karen Stephan
Supervisors: Dr. Michael Lenné and Professor Ian Johnston

The association between drivers’ use of prescription medications and risk of injurious traffic crash

Intermitted for 2008.

Trang Vu
Supervisor: Professor Joan Ozanne-Smith

Hospital–based surveillance for road traffic injuries in Vietnam

Vietnam’s injury surveillance system is in its early stage of establishment. Injury data come from 100 hospitals across the country, the Vietnam Multi-Centre Injury Survey conducted in 2005 and two field epidemiological laboratories situated in two Northern provinces. These sources of data are supplemented by data from several cross-sectional surveys conducted by a diverse range of organisations in Vietnam, and administrative data collected by Ministry of Public Security, Ministry of Transport, Ministry of Justice and Ministry of Labour, Invalid and Social Affairs.

This research plans to provide a quantitative assessment of the quality of hospital surveillance data related to road traffic injury presentations currently available in Vietnam; to identify capacity gaps in the health sector to inform planning at central and provincial levels; and to develop appropriate method(s) to prioritise capacity needs in hospitals to ensure the continuation of surveillance beyond the implementation phase.

The first face-to-face consultation with relevant staff in the Injury Prevention Department, Department of Preventive Medicine, Ministry of Health occurred in Hanoi on 7 November 2008. The staff provided helpful feedback on the research plan and indicated that the proposed research would fill significant gaps in current knowledge. However, funding issues were identified as major concerns which would affect the viability of the research in the local environment. (Australian Postgraduate Award)

Linda Watson
Supervisors: Dr Lesley Day, Dr Stuart Newstead

Dog bite injury: an investigation into the effectiveness of regulation

In recent years, many State regulations in Australia have focused on restricting particular breeds, despite there being little scientifically sound evidence to suggest that the targeted breeds feature disproportionally in dog bite injury statistics. Within Australia there are no reliable statistics available on the breed of dogs involved in injury events, mainly because breed identification based on phenotype is reported to be inaccurate, even when experienced observers are involved. Further, accurate breed denominator data are not available to allow estimation of breed specific bite injury rates. The effectiveness of breed specific regulatory measures has not been clearly demonstrated, nor has any literature been identified where this approach has been examined for potential harmful effects. The evaluation of injury interventions is critical to ensure that health gains are made and finite public resources are used effectively. Breed specific regulatory measures may reflect a simplistic and unrealistic appreciation of the causal factors.

It is well recognised that a dog’s reaction in any situation depends on at least six interacting factors including heredity, early experience, socialisation and training (or lack of), health (medical and behavioural), current environment and victim behaviour. Current breed specific regulation removes responsibility for dog biting incidents from dog owners and places the focus on dogs. It may also engender a false and dangerous perception that breeds not included will not show aggression.

A fundamental principle of injury prevention is that the most effective solutions involve a multi dimensional approach, which in the instance of dog bite injury would involve dog owners, parents, children, the community at large, local authorities and legislators.

This thesis will examine these issues relating to breed specific regulatory interventions, within a conceptual framework based on established injury prevention and health promotion principles using the Australian and Victorian context. (Monash Graduate Scholarship)
The mainstay of the thesis will be a series of peer-reviewed publications, consisting of:

- an examination of older drivers’ distinct crash and driving patterns, especially to identify different exposure aspects and characteristic risk factors;
- an evaluation of older drivers’ extent of crash involvement, their responsibility for crashes and the extent to which they represent a risk to other road users; and
- an evaluation of licensing authorities’ and others’ options for determining older drivers’ fitness to drive, including detailed examination of the commonly used assessment protocols.

Based on the findings from these publications, there will be further papers describing promising countermeasures aimed at maintaining acceptably safe driving. These countermeasures have been based on Safe System principles and include more accurate targeting of at-risk older drivers, more strategic licensing options, the promotion of more crashworthy vehicles and improved highway design tailored to older drivers’ needs.

2008 Co-supervised PhD candidates from other faculties and institutions

MUARC staff also co-supervise PhD candidates who are enrolled in other Monash faculties and departments as well as other Australian and overseas institutions.

Karen Scally
Faculty of Medicine, Nursing and Health Sciences, Monash University
Supervisors: Associate Professor Nelle Georgiou-Karistianis (Psychology), Professor Tom Triggs (MUARC) and Dr. Judith Charlton (MUARC)

Factors influencing driving performance in Parkinson’s Disease

Parkinson’s disease (PD) is a movement disorder that causes physical symptoms such as resting tremor and difficulty initiating and executing movement. Research has shown that driving ability is compromised by PD and in particular, cognitive changes in PD are linked to poor driving performance. No effective screening methods currently exist to assess and predict driving ability in PD. Previous research has shown that drivers with PD have significantly poorer driving performance than ‘non-PD controls’ and rely heavily on external cues (eg static warning signs) to regulate driving performance.

This study aims to further investigate PD drivers’ responses to selected ‘ecologically valid’ external cueing conditions during simulated driving performance. The driving scenario for this study includes a flashing ‘prepare to stop’ signal used at potentially hazardous intersections where there is a high speed zone or low visibility on approach to the traffic lights.

Jim Langford
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**Michael Lucas**  
University of Western Australia  
**MUARC Co-supervisor: Dr. Lesley Day**  

### Injury among Australian veterinarians

This project is a component of the Health Risk of Australian Veterinarians (HRAV) study of a cohort of veterinarians who graduated from Australian universities from 1960–2000. The aim of the HRAV study is to determine whether this cohort is at increased risk of cancer, injury, zoonoses (diseases that are transferable from animals to humans) or adverse reproductive outcomes and to determine the risk factors for these conditions in veterinary practice. The aim of this PhD study is to identify the prevalence of, and risk factors for, injuries among Australian veterinarians and to develop a relevant prevention model for occupational settings.

**Daryl Pedlar**  
(Doctor of Health Science)  
Deakin University  
**MUARC Co-supervisor: Dr. Lesley Day**  

### Acute farm injury in south-west Victoria

The aim of this project is to develop a framework for a preventive strategy for dairy farm injury in south-west Victoria, based on a profile of injury in this region and input from a regional consultative forum. The dairy farm injury profile will be developed from specialized emergency department and general practice injury data collections, in addition to an exposure survey of dairy farmers.

**Melissa Russell**  
University of Melbourne  
**MUARC Co-supervisor: Dr. Lesley Day**  

### Falls risk, assessment and interventions for older fallers presenting to the emergency department and being discharged home

The aim of this study is to investigate if a multi-factorial falls risk assessment and moderate intensity targeted referral-based intervention program would reduce falls and injuries, with older fallers presenting to, and discharged directly home, from an Emergency Department (ED). Four nested studies were also performed investigating the (1) falls risk profile of the participants, (2) risk factors for short-term functional decline after discharge from the ED, (3) evaluation of the Falls Risk for Older People in the Community (FROP-Com) assessment tool, and (4) development of a FROP-Com screening tool for use in the ED. In the nested studies it was found that 94% of participants sustained an injury and the post ED discharge falls rate was 5.5 falls/per 1,000 person days. The factors associated with functional decline were injury factors, female gender, slower gait velocity and depression. The inter-rater reliability of the FROP-Com assessment tool was found to be good (intraclass correlation coefficient: 0.81) and the area under the receiver operating characteristic curve was 0.68. The factors most predictive of falls, and chosen for a FROP-Com screening tool were a history of falls, balance and independence with activities of daily living. This series of studies reinforced the high falls risk of older people presenting to an ED after a fall and the short-term functional decline evident after discharge home. The FROP-Com assessment tools and the newly developed screening tool were found to be reliable and be moderately predictive of falls. The PhD thesis was submitted in 2008 and the results of the randomised trial of the falls intervention have been submitted for peer-review.


### Undergraduate/Honours

Several Advanced Medical Science (AMS) students have undertaken their research projects at MUARC.

**Steven Xu**  
AMS student  
**Supervisor: Dr Melanie Franklyn**  

### Mechanics of tibial stress fractures

Stress fractures are microfractures that gradually result from repetitive, non-traumatic stresses applied to bone that is unaccustomed to the applied loads. They commonly occur in athletes and military recruits who run regularly or participate in high impact exercises – particularly after an abrupt change in exercise pattern, before bone microstructure can adjust. Stress fractures are painful during and after exercise; they are particularly problematic for high-performance athletes who lose valuable training time as the injury gradually heals.

This project will analyse, from a mechanical perspective, the stresses and strains that occur in the tibia of a stress fracture patient while running. This entails creating a finite element model of the tibia from geometric data obtained from an MRI scan, and load data obtained during gait analysis. The stresses and strains will be compared to that of a healthy control subject, and the project will investigate the geometric and loading changes that could potentially ‘remove’ the stress fracture.

This undergraduate thesis began in July 2008 and will finish in May 2009.

### Vacation placements

**Alice Barnett**

“During my placement at MUARC, I worked in the Behavioural Safety Science Team with Dr. Charlton, Michelle Whelan and Carlyn Muir on the 1,000 Intersections: Older Driver Naturalistic Driving study and the Vision Impairment and Fitness to Drive project. I assisted with data coding and data entry of different types of data sources such as video-recordings of drivers and standardised vision tests. I also conducted a literature search on selected medications and crash risk. The Vacation Research Scholar program provided me with a valuable opportunity to learn more about life as a researcher and the strategy and organisation of research at MUARC.”

**Mathew Yang**  
Supervised by M. Franklyn, Assistant Supervisor S. Peiris  

Body size adjustment to measure tibial bone geometric parameters. This project involves investigating various scaling methods used in cohort studies to account for body size.
Academic Seminar Programs

Lunchtime Seminar Series
Convenor: Jennie Oxley
Guests and staff present seminars throughout the year on a range of injury prevention topics. The seminars are publicized widely and are open to other faculties and the wider community. Details of upcoming seminars are available on the Centre’s web site. The Centre would like to thank those who made presentations during 2008. These are invaluable sessions for staff, students and guests and offer an opportunity to hear about new research and engage in discussion and debate on issues in injury prevention.

- Niels Agerholm, Traffic Research Group, Aalborg University - Intelligent Speed Adaptation in Denmark
- Dr. Shawn Marshall, University of Ottawa - Driving Post Stroke and Traumatic Brain Injury
- Dr. Virginie Etienne, Postdoctoral Fellow, MUARC - Executive functioning and driving. Study in normal ageing and in Alzheimer’s disease
- Jessica Edquist, MUARC - Visual clutter in the road environment: effects on safe driving performance
- Assoc. Professor Geoff Rose, Department of Civil Engineering, Monash University - Operational implications of emerging private passenger vehicles
- Kim Borg and Laura Wilson, School of Political and Social Inquiry (Behavioural Studies Group), Faculty of Arts, Monash University (presentation of Honours theses) - Personality and young drivers: is there a relationship between the Five Factor Model of personality and driving behaviour?; and ‘Red light raving’: young recreational drug users’ perceptions of drug driving in Melbourne, Victoria
- Professor Philip Schulter, Auckland University of Technology, NZ - Slippery statistics: pesky p-values and ambiguous ANOVAs - is it time for a Bayesian alternative?

Graduate Seminar Series
Convenor: Jude Charlton
The Centre’s postgraduate candidates present their research at seminars throughout the year. Students present at the time of confirmation (twelve months into candidature) and at various intervals. These seminars both provide information to staff and students in the Centre about PhD research, and provide an opportunity for the students to receive constructive feedback from colleagues and independent experts. Details of upcoming presentations are available on the Centre’s web site.

Presentations in 2008
Robin Hutchinson
Supporting lane-change with an ecological interface.

Marilyn Johnson
Cycling safety from the perspective of all road users

Trang Vu
Hospital-based surveillance for road traffic injuries in Vietnam

Researcher Meetings
Convenor: Lesley Day
The successful Road Safety Researcher Meetings introduced in 2007, were expanded in 2008 to Centre-wide Researcher Meetings. The aim of these meetings is to provide an informal forum for staff to present current and future research projects, facilitating discussion on methodological issues, study interpretation, and policy and practice implications. Themes for each meeting are selected from the Centre’s main programmatic areas.

Presentations in 2008
Vulnerable Populations
Jude Charlton: Older driver research
Joan Ozanne-Smith: Introduction of child booster seats in China

Surveillance Data Systems and Measuring the Injury Burden
Stuart Newstead: Feasibility of linking road and health sector data bases
Rebecca Lilley: New Zealand Prospective Outcomes of Injury Study

Simulation and Design
Melanie Franklin: Head injury modelling
Wayne Baker: Agricultural machinery design and safe operation study

Program Implementation and Evaluation Science
Nirmita Candappa: Roundabout design and evaluation
Erin Cassell: Modelling the population level impact of falls interventions

Vulnerable Populations
Lesley Day: Farm injury risk among men
Erin Cassell: Trends in injury hospitalisation for older persons falls

The Researcher Meetings also provided a forum for polishing presentations at two conferences: the 9th World Conference on Injury Prevention and Safety Promotion, and the 2008 Australasian Road Safety Research Conference. In addition, two of the meetings were devoted to journal club discussions of published work.
The Centre hosts many Australian and international visitors throughout the year, from individuals to bus loads. Various groups visit the Centre to learn more about its research and to collaborate with the Centre’s experts. We are also fortunate to have longer term guests who enrich the research program.

**Philip Schluter**
Professor Philip Schluter undertook a four month sabbatical at MUARC to work on a range of projects with Professor Rod McClure. Philip was the first professorial appointment in Biostatistics in New Zealand in 2005, in the Faculty of Health and Environmental Sciences at Auckland University of Technology (AUT) and concurrently holds an appointment as Honorary Professor of Biostatistics in the School of Nursing and Midwifery at The University of Queensland.

**Niels Agerholm**
Niels Agerholm from the Traffic Research Group of the University of Aalborg in Denmark visited the Centre for three months to further his research for his PhD with Professor Tom Triggs as his supervisor. Niels’s research project is part of the Danish Intelligent Speed Adaptation project ‘Pay As You Speed’. The project is exploring the effect of an ISA system that imposed penalty points for speeding beyond the speed limit, in addition to providing warning signals. In his time at MUARC Niels compared the results of the Danish program with those of the MUARC TAC SafeCar program which explored the effect of ISA warning signals on speed selection. Re-analysis of SafeCar data allowed examination of different ways of determining the form of feedback when speeding. Niels and Tom gratefully acknowledge the support and permission of the TAC for this re-analysis. Nebojsa Tomasevic assisted greatly in the re-analysis of data.

**Nicole Van Nes**
Dr. Nicole van Nes (from SWOV in the Netherlands) was seconded to MUARC for approximately 9 months. Nicole has worked primarily with the Safe Systems Strategy & Infrastructure Team on the intersection design and speed attitudes projects.

**Virginie Etienne**
Dr. Virginie Etienne, Endeavour Australia-France Postgraduate Student Award Recipient, undertook a six month placement at MUARC in 2008. Virginie has completed her PhD at INRETS in Lyons. She worked with the Behavioural and Safety Science Team following up some of the outcomes of her PhD research in the area of ageing, dementia and driving.

**Courses**
In April 2008 MUARC hosted the delegates of the International Cooperation on Theories and Concepts in Traffic Safety (ICTCT) Workshop which was run over 2 days. MUARC Senior Research Fellow Jeffery Archer is a member of ICTCT and played a lead role in bringing this workshop to Australia.
MUARC would like to thank the following people for their valuable contribution to the research program as external members on Project Advisory Committees, Project Steering Committees and Project Working Groups.

**Architectural glass related injury: implications for improving public safety**
- Brian Ashe: Australian Building Codes Board
- Chris Barker: Pilkington Australia
- Noel Caulfield: Homesafekids
- Dennis Hogan: Victorian Building Commission
- Noel Stokes: Pilkington Australia

**Australian National Crash In-Depth Study (ANCIS)**
- Pam Albany: Motor Accidents Authority (NSW)
- Thomas Belcher: Department of Transport, Regional Development and Local Government
- Bill Bridgens: Ford Motor Company of Australia
- Michael Case: Royal Automobile Club of Victoria (RACV) Ltd
- Angela Conway: Department of Infrastructure, Energy & Resources (Tasmania)
- Samantha Cockfield: Transport Accident Commission
- Paul Fay: Ford Europe
- Jack Haley /Scott Nargar: National Roads and Motorists’ Association Limited
- Mike Hammer: Holden Ltd
- James Hurnall: Federal Chamber of Automotive Industries
- Robert Judd: Autoliv Australia
- Dan Leavy: Roads & Traffic Authority (NSW)
- Pamela Leicester /Robert Macdonald: Insurance Australia Group

**Austroads older driver - Stage 4**
- Ross McArthur /Chris Jones: VicRoads
- Mark Morarty: Toyota Motor Corporation of Australia
- Craig Newland: Australian Automobile Association
- Ashley Sanders: Mitsubishi Motors Australia Ltd

**Baseline Program Committee**
- Kevin Casey: VicRoads
- Antonietta Cavallo: VicRoads
- William Gibbons: Department of Justice
- David Healy: Transport Accident Commission

**Baseline: Consumer choice, non-fleet vehicles**
- Michael Case: Royal Automobile Club of Victoria (RACV) Ltd
- Chris Jones: VicRoads
- Christine Livingstone: Department of Justice
- Emma Mulholland: Transport Accident Commission
- Nick Platt: Royal Automobile Club of Victoria (RACV) Ltd
- Jessica Truong: Transport Accident Commission

**Baseline: Crime and road safety**
- Antonietta Cavallo: VicRoads
- Damian MacDonald: Department of Justice
- Samantha Cockfield: Transport Accident Commission
- Anne Harris: Royal Automobile Club of Victoria (RACV) Ltd
- Kevin Casey: VicPol

**Baseline: Cyclist bunch riding: a review of the literature**
- Damian McDonald: Department of Justice
- David Healy: Transport Accident Commission (TAC)
- Grazyna Mackiewicz: VicRoads
- Kevin Casey: VicPol

**Baseline: Driver distraction**
- Antonietta Cavallo: VicRoads
- Damian McDonald: Department of Justice
- Jonathon Passmore: Transport Accident Commission
- Russell Scott: VicRoads
- Charmaine Simmons: VicRoads
- Jessica Truong: Transport Accident Commission
- Diana Vieira: Royal Automobile Club of Victoria (RACV) Ltd

**Baseline: ‘Dwell on Red’ traffic signal phasing at intersections**
- Sarah Coleman: Department of Justice
- David Healy: Transport Accident Commission
- Linda Ivet: VicRoads
- Shane Patton: VicPol

**Baseline: Heavy vehicle safety and the problem of speeding – a case for the use of speed control technology**
- Michael Case: Royal Automobile Club of Victoria (RACV) Ltd
- David Healy: Transport Accident Commission
- Chris Jones: VicRoads
- Jeffrey Millar: VicPol
Baseline: Older driver safety
Lisa Gandolfo  Department of Justice
Elizabeth Knight  Transport Accident Commission
Kirsten Lynch  /Michelle Xiriha VicPol
Jodi Page-Smith  Transport Accident Commission
Tricia Williams  VicRoads

Baseline: Flexible barrier system
William Gibbons  Department of Justice
Ken Hall  VicRoads
David Healy  Transport Accident Commission
Peter Keogh  VicPol
Daniel Przychodzki  Royal Automobile Club of Victoria (RACV) Ltd

Baseline: On-road alcohol surveys
Melinda Congui  Royal Automobile Club of Victoria (RACV) Ltd
William Gibbons  Department of Justice
Allison McIntyre  Transport Accident Commission
Peter Nelson  VicRoads
Greg Parr  VicPol
Philip Swann  VicRoads
Andrew Tait  VicRoads

Baseline: Road environment, speed and crash risk
Kevin Casey  VicPol
Antonietta Cavallo  VicRoads
Samantha Cockfield  Transport Accident Commission
Damian Macdonald  Department of Justice
Peter Schofield  VicRoads

Baseline: Strategy modelling and data systems
Antonietta Cavallo  VicRoads
David Healy  Transport Accident Commission
William Gibbons  Department of Justice
Wendy Kimber  VicPol
Michael Nieuwesteeg  Transport Accident Commission
Neil Richardson  VicPol

Baseline: Zero pedestrian deaths
Elizabeth Knight  Transport Accident Commission
Samantha Collins  Transport Accident Commission
Cassady Southern  Department of Justice
Linda Ivet  VicRoads
James Holgate  VicRoads

Exercise for independent living
Flavia Cicuttini  Department of Epidemiology and Preventive Medicine, Monash
Leon Flicker  University of Western Australia
Keith Hill  National Ageing Research Institute and La Trobe University
Damien Jolley  Institute for Health Services Research, Monash
Leonie Segal  University of South Australia

Farm Injury Risk among Men (FIRM)
Jim Dosman  University of Saskatchewan, Canada
Louise Hagel  University of Saskatchewan, Canada
John Langley  Injury Prevention Research Unit, University of Otago, New Zealand
Malcolm Sim  Department of Epidemiology and Preventive Medicine, Monash University
Don Voaklander  University of Alberta, Canada
Rory Wolfe  Department of Epidemiology and Preventive Medicine, Monash University

Jill Green  SIDS and KIDS Victoria
Ros Howe  Consumer Affairs Victoria
Sarah Proudfoot  Australian Competition and Consumer Commission
Beverley Steer  Department of Health and Ageing
Tim Wain  Infant and Nursery Product Association of Australia
Megan Urlich  City of Greater Geelong, SafeStart Project

Used car safety ratings
Members
Michael Case  Royal Automobile Club of Victoria (Chair)
Samantha Cockfield  Transport Accident Commission
Ross McArthur  VicRoads
Chris Jones  VicRoads
Henry Schleimer  Queensland Transport
Anant Bellary  Queensland Transport
Steve Spalding  Royal Automobile Club of Queensland (RACQ) Ltd
Jon Gibson  Office of Road Safety Western Australia
Michael Upton  Royal Auto Club of Western Australia Ltd
John Goldsworthy  Australian Transport Safety Bureau
Jack Haley  NRMA Motoring and Services
Dan Leavy  Roads and Traffic Authority, New South Wales
Mark Borlace  Automobile Association South Australia
Stella Stocks  AA New Zealand
Stuart Worden  Land Transport New Zealand
Mike Upton  Royal Automobile Club of Western Australia

Observers
Barbara Bibby  Land Transport New Zealand
John White  Land Transport New Zealand
Iain Cameron  Office of Road Safety Western Australia
Teresa Rechichi  Office of Road Safety Western Australia
James Hurnall  Australian Automobile Association
Craig Newland  Australian Automobile Association
Doug Ling  Royal Automobile Club of Tasmania (RACT) Ltd

Visionary research model study
Antonietta Cavallo/VicRoads
Tricia Williams  Department of Justice
William Gibbons  Transport Accident Commission
Ken Ogden/ Royal Automobile Club of Victoria (RACV) Ltd
Michael Case  Club of Victoria (RACV) Ltd
Peter Keogh  VicPol
Statement of Income and Expenditure

<table>
<thead>
<tr>
<th>Balance as at 1 January, 2008</th>
<th>$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less Post Closing Adjustments to Carry Forward ¹</td>
<td>800,412</td>
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<tr>
<td>2,062,257</td>
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<table>
<thead>
<tr>
<th>Income:</th>
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<tbody>
<tr>
<td>Department of Education, Science &amp; Training</td>
<td>1,046,173</td>
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<tr>
<td>Research:</td>
<td>6,570,268</td>
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<tr>
<td>Australian Research Council</td>
<td>13,069</td>
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<tr>
<td>National Health &amp; Medical Research Council</td>
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<tr>
<td>Competitive Commonwealth Research</td>
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<tr>
<td>State Government Research</td>
<td>2,252,289</td>
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<tr>
<td>Commonwealth Government Research</td>
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<tr>
<td>Industry Australia Contracts</td>
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<tr>
<td>Industry Australia Grants</td>
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<td>Industry International Research</td>
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<tr>
<td>Industry International Competitive Research</td>
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<tr>
<td>Co-operative Research Centres</td>
<td>2,006,927</td>
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<tr>
<td>Commercial</td>
<td>635,495</td>
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<tr>
<td>Internal Grants (Monash Research Support)</td>
<td>142,000</td>
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<tr>
<td>Non Research Grants/Donations</td>
<td>45,895</td>
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<tr>
<td>Other (inc. Sale of Assets, student fees, transfers)</td>
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<tr>
<td>Monash University internal transfer ²</td>
<td>1,250,000</td>
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<table>
<thead>
<tr>
<th>Expenditure:</th>
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<tbody>
<tr>
<td>Salaries and related expenditure</td>
<td>6,358,694</td>
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<tr>
<td>Financial and administration ³</td>
<td>582,028</td>
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<tr>
<td>Student related</td>
<td>94,896</td>
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<tr>
<td>Infrastructure related</td>
<td>339,216</td>
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<tr>
<td>Central Support Services - Overhead costs</td>
<td>1,456,559</td>
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<tr>
<td>Other operating expenditure</td>
<td>943,565</td>
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<tr>
<td>Capital expenditure</td>
<td>372,393</td>
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<table>
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<th>Balance at 31 December, 2008</th>
<th>$</th>
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<tbody>
<tr>
<td>10,147,351</td>
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¹ Transfer of Long Service Liability to Central Funds - May 2008

² Accommodation and other services which were previously supplied as in-kind university support have been replaced as overhead costs. The university has also provided a transfer of funds to part offset these charges.

³ Includes payments to consultants

The Centre’s accounts have been certified correct by the University Corporate Finance Division. Where required as a condition of funding grants, accounts will be audited by the University’s Internal Auditor. They will be subject to Government audit as part of the University’s annual accounts for the calendar year 2008.

Footnote: It should be noted that the Centre operates on a calendar financial year and its revenue and expenditure are, for the most part, project related and several projects cross fixed reporting periods and financial years. The apparent ‘surplus’ mostly reflects grant and contract income received in 2008 for expenditure that will be incurred in 2009.

Certified Correct
Norman Butters
Disbursements Manager
Corporate Finance Division
Above: An exciting new addition to the Centre's resources during 2008 was this mobile simulator. Throughout 2008, the simulator was located at sites in Melbourne and Mornington in a large-scale older driver study conducted by the Behavioural Safety Science Team for AutoCRC and GM Holden.