Annual Report on Road Safety Research Activities
2014-15

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Title
C-MARC 2014/15 Annual Report on Road Safety Research Activities

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Abstract
This report describes the sixth annual report to the Minister for Road Safety of the Curtin - Monash Accident Research Centre (C-MARC) for the 12 month period up to July 1, 2015. The report covers the research and management activities of the Centre, and outcomes.

Keywords
Road safety; Research

Disclaimer
This report is disseminated in the interest of information exchange. The views expressed here are those of the authors and not necessarily those of Curtin University or Monash University.
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FOREWORD

As Chair of the Curtin - Monash Accident Research Centre Advisory Board I am pleased to provide the foreword to the Centre’s sixth Annual Report to the Hon. Liza Harvey MLA, Minister for Road Safety.

The Centre is now in its sixth year of operation and, as an independent research centre, fulfils an important role in road safety research and research translation and advocates strongly for accident prevention in government, industry and the wider community.

The Centre works closely with the Office of Road Safety (now Road Safety Commission), on behalf of the Minister for Road Safety, and has reached agreement, in principle, for a further five year contract to build on the important research the Centre has undertaken in the past five years.

C-MARC promotes its research findings through research reports and publications, active engagement with the media and relevant professional groups, and the development of an informative website.

The Centre’s relationships with the Road Safety Commission of Western Australia and Monash University remain critically important to its success as a centre of excellence in accident research and research translation, especially in relation to road safety.

I would like to congratulate and thank all members of C-MARC for their untiring efforts to build the Centre and contributing to its research outcomes and reputation.

Emeritus Professor Patrick Garnett
Chair
Curtin - Monash Accident Research Centre Advisory Board
1. INTRODUCTION

In December 2008, Curtin University, Monash University and the Office of Road Safety signed agreements to form the Curtin-Monash Accident Research Centre to assist in meeting the research needs of the WA Government, including agencies represented on the WA Road Safety Council.

This report is the seventh annual report of the Centre, covering the 12 months to July 1, 2015. As such, this report recognises activities which may be of interest to agencies contributing to road safety outcomes, but does not include all activities in detail, particularly if the Road Safety Council agencies do not have a direct interest, such as externally funded projects.
2. **C-MARC MANAGEMENT**

2.1 **C-MARC's Foundation**

C-MARC is a joint arrangement between Curtin University and Monash University Accident Research Centre (MUARC). Importantly, the Faculty of Health Sciences in Curtin University hosts C-MARC, while MUARC provides valuable skills, knowledge and capacity for safety research and the business of research generally. As a result, C-MARC's activities are based on:

- The needs, policies and practices of Curtin University and Monash University;
- The Collaboration Agreement for the Establishment and Operation of the Curtin-Monash Accident Research Centre; and
- The Funding Deed, Deed of Agreement.

C-MARC's research activities are based on the requirements of:

- The Road Safety Council;
- Other funders of research; and
- The University’s research program, including students.

2.2 **Governance**

C-MARC is generally externally funded and commenced with a foundation contract with the WA Government through the Office of Road Safety, on behalf of the Minister for Road Safety, which resulted in a formal Funding Deed. The agreement between Curtin and MUARC is formally described in a Collaboration Agreement for Establishment and Operation. These two documents include prescriptive requirements, which C-MARC will meet. C-MARC will also meet other Curtin University objectives as well as policy and procedural requirements.

C-MARC operates under the oversight of the C-MARC Board, which provides direction and active participation in achieving the Centre's objectives. The Board met on four occasions in the 12 months to July 1, 2015. C-MARC is managed in collaboration with the Office of Road Safety, through the Funding Agreement Facilitation Committee (FAFC), which met four times in the 12 months to July 1, 2015.

The vision for C-MARC, endorsed by the Board, is:
To be a Centre of excellence in accident research and research translation that reduces accidents and injuries (especially in relation to road safety), and advocates for accident prevention in government, industry and the wider community.

C-MARC aims to:

- Contribute information to reduce road and other accident and injury trauma;
- Be recognised as a research Centre of excellence in improving safety;
- Meet the requirements of the Road Safety Council, Office of Road Safety and further clients and stakeholders; and
- Provide a valuable contribution to Monash and Curtin Universities.

The Board recognises the two major challenges for the Centre are:

- The delivery of research which is valued by stakeholders; and
- The Centre's sustainability.

C-MARC operates in a University environment, on a business model, where the business is research. C-MARC's research is valuable to government, industry and the public in WA and to the academic community.

Due to the diversity of perspectives and skills required for safety research, C-MARC collaborates with others in the Faculty of Health Sciences, other faculties and other individuals and organisations.

C-MARC actively promotes its research outcomes for practical application in government, industry and the general community. C-MARC is a proactive public voice in promoting safety and reducing the consequences of accidents. This exposure contributes to the purpose of improving road safety and results in a recognisable brand representing value and legitimacy.

C-MARC is funded through commercial research (fee for service) and academic research (research and other grants). C-MARC's client base commenced with the Office of Road Safety and government transport agencies and is intended to extend to other government agencies and the private sector, including mining and general industry.
The Funding Deed specifies various specific requirements of C-MARC to the RSC. The Funding Agreement Facilitation Committee (FAFC) provides the primary contract liaison between C-MARC and the Office of Road Safety on behalf of the Minister for Road Safety.

2.3 Centre Staff

As of June 30, 2015 C-MARC staff included:

- Professor Lynn Meuleners, Director, full time;
- Dr Jennifer Oxley (MUARC), Deputy Director;
- Mr. Peter Palamara, Research Fellow, full time;
- Dr Min Zhang, Main Roads Research Fellow, full time (contract ended February 20, 2015);
- Dr Kyle Chow, Main Roads Research Fellow, full time (initially casual from July 2014, then full time from March 2015);
- Mr. Matthew Govorko, Research Associate, casual;
- Ms. Michelle Fraser, Research Associate/PhD student, casual;
- Ms. Patricia Barrett, Research Associate, casual; and
- Ms. Seraina Agramunt, Research Associate/PhD student, casual.
- Ms Denice Wallis, Research Associate, casual;
- Mr John Hess, IT specialist, casual.

The full range of MUARC staff are available to C-MARC and several have worked on, or are presently working on C-MARC projects. They include:

- Professor Mark Stevenson (finished at MUARC March, 2015)
- Professor Max Cameron
- Professor Michael Lenne (finished at MUARC December 2014)
- Associate Professor Stuart Newstead
- Associate Professor Judith Charlton – Acting Director MIRI and MUARC
- Dr Michael Fitzharris
- Dr David Logan
- Ms Nimmi Candappa
- Ms Belinda Clark
C-MARC now has access to many other researchers who are interested in collaborating, or have collaborated on safety research projects. These include:

- Delia Hendrie, Senior Research Fellow, School of Public Health and Centre for Population Health, Curtin University;
- Dr Paul Roberts, ARRB;
- Professor Sharon Biermann, Director of PATREC, University of Western Australia;
- Professor Mark Young, Senior Research Fellow, Brunel University, London, England;
- Dr Jonathon Ng, Ophthalmologist, Royal Perth Hospital, Western Australia;
- Associate Professor Nigel Morlet, Ophthalmologist, Royal Perth Hospital, Western Australia;
- Professor Bill Morgan, Head of Ophthalmology, Royal Perth Hospital, Western Australia;
- Professor David Hillman, Western Australian Sleep Disorders Research Institute;
- Professor Max Bulsara, Chair of Biostatistics, Notre Dame University;
- Professor Tanya Chikritzhs, National Drug Research Institute, Curtin University;
- Professor Xiangyu Wang, Acting Woodside Chair Professor in LNG Construction & Co-Director, Australasian Joint Research Centre for Building Information Modelling (BIM), School of Built Environment, Curtin University.
- Associate Professor Robert Anderson, Centre for Automobile Safety Research, The University of Adelaide.
- Dr Janiz Janz, Senior Lecturer, Health, Safety and Environment, School of Public Health, Curtin University

Staff are also available to collaborate in other schools and Centres including:

- the Faculty of Health Sciences;
- the National Drug Research Institute;
- the Department of Spatial Sciences.
3. **2014/15 IN SUMMARY**

C-MARC's development in 2014-15 continued with:

- The 2014/15 RSC research program;
- Projects for other stakeholders;
- Developing local capacity;
- Purchase of a state of the art driving simulator;
- Building profile; and
- Advocating road safety to stakeholders, government generally, business and beyond.

The following baseline research projects were completed during the previous 12 months:

- 12-023 RSC – An investigation of illicit drug related fatal crashes, traffic offences and drivers in Western Australia
- 13-030 RSC – A preliminary analysis of the impact of penalty and enforcement changes for alcohol and illicit drug driving on driver and crash outcomes
- 10-012 RSC - Economic factors and road safety – part two
- 11-022RSC - Road safety advocacy (ongoing)

The C-MARC Board is confident that the Centre continues to progress in the right direction. C-MARC continues to deliver a strong academic portfolio which includes attracting higher degree by research students, success in securing competitive research grants and publishing of peer reviewed papers in high impact journals.

C-MARC continues to improve the visibility of road safety as a community issue, assist in improving road safety policy and practice, and build C-MARC's significance. In this regard, C-MARC has successfully engaged with governments to change policy, which results in improvements to road safety.

C-MARC looks forward to a continuing, expanding and increasingly productive and valuable relationship with the Road Safety Council.
4. CENTRE RESEARCH ACTIVITIES

4.1 2010/11 Road Safety Baseline Projects

The following table summarises the progress of research projects for the Road Safety Research Program for 2010/11.

<table>
<thead>
<tr>
<th>Project Code</th>
<th>Project Title</th>
<th>Statement of Problem</th>
<th>Purpose</th>
<th>Progress</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-012RSC</td>
<td>Economic factors and road safety</td>
<td>The association between movements in the economy and road crashes is well established. This project investigates this association in a Western Australian context.</td>
<td>To quantify and explain the association between the Western Australian economy (individual economic factors) and serious casualty crash levels.</td>
<td>A draft final report on the Stage 1 analysis was circulated to PAG members in June, 2013. Feedback from the PAG members was obtained and integrated into the report. Results of the study were presented to the Road Safety Council at its October 2013 meeting. The RSC were happy with the study and endorsed the report recommendations. One additional analysis was requested by the Executive Director of the Office of Road Safety to include in the report, being an analysis of the effect of the economy on road trauma in metropolitan Perth and the rest of WA separately. The results have being integrated into the final report which was submitted to the ORS and Project Advisory Group for review September 2014.</td>
<td>Completed</td>
</tr>
</tbody>
</table>

Research and Policy Implications: The results of this project established the relationship between key socio-economic factors and road trauma in Western Australia from 2000 to 2009. Recommendations include considering future possible economic circumstances in setting road safety targets and to consider past changes in economic circumstances in assessing progress towards meeting targets set.

4.2 2012/13 Road Safety Baseline Projects

The following table summarises the progress of research projects for the Road Safety Research Program for 2012/13.

| Project Code | Project Title | Statement of problem: Nearly one in five Australians who use illicit drugs report having driven in the previous 12 months whilst drug affected. This represents an important road safety issue as the use of illicit drugs such as marijuana and amphetamines whilst driving is known to be associated with an increased risk of crashing, particularly fatal crashes. In Western Australia however, there is minimal contemporary information on the prevalence and characteristics of illicit drug related crashes and traffic offences and involved drivers to inform drug-driving countermeasures. |
|--------------|---------------|----------------------|---------|----------|--------|
| 12-023RSC | An investigation of illicit drug related fatal crashes, traffic offences and drivers in Western Australia | | | | |
**Purpose:** The purpose of this project is to provide relevant stakeholders with an understanding of the prevalence and characteristics of illicit drug related fatal crashes, traffic offences and drug-drivers to support the development of educational, licensing and enforcement countermeasures to better manage illicit drug related driving.

**Research and Policy Implications:** Research and policy implications were finalized at the Project Advisory Group meeting. The areas for consideration include: the linkage of driver licensing and crash data to improve the profiling of fatally injured illicit drug affected drivers/riders; data sharing to facilitate better surveillance and reporting; roadside testing policies and practices to monitor the relationship between illicit drugs and alcohol.

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**12-025RSC – Speed camera program evaluation**

**Purpose:** The project aims to develop and apply a comprehensive evaluation framework for the WA speed enforcement strategy. The framework will consist of both process and outcome evaluation components in order to assess the effectiveness in implementing the strategy according to the best practice guidelines as well as quantify what the program has contributed to reducing road trauma in Western Australia.

The project will be undertaken in 3 stages.

**Stage 1** will develop a speed enforcement evaluation framework for WA, covering both process and outcome evaluation considering both automated and non-automated enforcement modes.

**Stage 2** will apply the framework to those elements of the speed enforcement strategy that have been implemented to the end of 2012.

**Stage 3** will apply the framework to those elements of the speed enforcement strategy that were not able to be considered in Stage 2.

**Status:** The process component of the evaluation is also progressing assessing the placement, frequency and timing of automated enforcement operations against the strategy targets. Design of the evaluation of the mobile camera program impacts has been considered and work is commencing to undertake this analysis. This is a complex analysis which is taking slightly longer than anticipated.

Additional funding of $37,000 to cover the work geocoding the mobile camera locations was allocated to the project to allow the full analysis to be undertaken.

It is anticipated the project will be finalised by the end of October 2015. The ORS are being kept up to date with the progress of the work.

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**12-026RSC – Road safety advocacy**

**Purpose:** The purpose of this activity is to promote accurate road safety knowledge and safe practices to the public and to decision makers through a range of media and other avenues, including conference attendances. Advocacy activity continues to raise road safety as community and government issues, transfers knowledge to road safety partners, and increases C-MARC’s profile and credibility.

**Status:** C-MARC staff continue to be asked for media comment and offer information, which has recently included electronic, print and internet outlets. Several discussions with newspaper journalists have not resulted in stories.
4.3 2013/14 Road Safety Baseline Projects

The following table summarises the progress of research projects for the Road Safety Research Program for 2013/14.

13-027 RSC – Evaluation of the West Australian Graduated Driver Training and Licensing program (GDTL)

**Statement of problem:** There is good evidence internationally and elsewhere in Australia to show that GDTL programs in their various forms can effectively counter crashes and injury among novices. Western Australia’s version of GDTL has been progressively introduced over the last 10 years, with the most major reforms occurring in 2002. During this time there has been a limited evaluation of the implementation of the earliest version of the program and but no research addressing the important outcomes of crash involvement and injury.

**Purpose:** The primary aim of the proposed research is to systematically investigate the effect of the GDTL program 2002 onward in its various permutations on the incidence of crashes and injuries among novice drivers. The evaluation will be undertaken over the 2013/2014 and 2014/2015 annual programs of research. Planning and design for the project is currently underway. The WA Department of Transport (Licensing Services), WA Police, Main Roads Western Australia, and the WA Health Department have been identified as key agencies for the supply of data for this project. The project will draw on the experiences and learnings of MUARC’s recent evaluation of the Queensland graduated licensing program. Ethics approval has been granted by Curtin University and data requests lodged with Department of Transport (Licensing).

**Status:** Difficulties with MRWA crash data in relation to the identification of drivers for linkage purposes were identified and continue to curtail the project. The Data Linkage Branch is liaising with the Insurance Commission of WA (who provides primary crash data to MRWA) to update post-2010 crash data with identifying driver information. It is expected that this will be finalised by the end of September 2014. In the meantime a submission for linked data has been drafted and lodged with the Data Linkage Branch. Comments have been received and re-drafting is in progress and will be finalised once the Department of Transport (Licensing) provides final assurances regarding the type and quality of data required for the evaluation. It is unlikely that linked Licensing, Crash and Health data will be provided prior to December 2015. This project is on hold and is likely to be re-scoped given the difficulties with the data.

13-030 RSC – A preliminary analysis of the impact of penalty and enforcement changes for alcohol and illicit drug driving on driver and crash outcomes

**Purpose:** This project will investigate the effect of changes in policy and penalties for two high risk driver behaviours. The Blood Alcohol Concentration level of drivers involved in police recorded and attended crashes in Western Australia during the period 2005-2013 will be analysed to investigate variation over time associated with policy and penalty changes introduced in 2010 and 2011. Similarly, the incidence of Section 64AC traffic offences (illicit drugs in oral fluids) among drivers for the period 2008-2013 will be analysed to determine the impact of drug-driving penalty changes introduced in 2011. A time-series
analytical technique known as segmented regression will be used to address the aim of the project, which is to “investigate the impact of changes in road safety related policies and penalties for drink-driving and illicit drugs and driving on the occurrence on road crashes, injuries, and traffic offences in Western Australia.”

**Status:** Completed

**Research and Policy Implications:** The findings of this preliminary investigation trialled a methodology to investigate the change in penalties for drink and illicit drug driving.

**13-028RSC - An in-depth analysis of motor vehicle driver traffic offense and demerit loss data**

This project was put on hold till the appropriate data becomes available and the project above has been undertaken and completed in its place.

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### 4.4 2014/15 Road Safety Baseline Projects

The following table summarises the progress of research projects for the Road Safety Research Program for 2014/15.

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**14-031 RSC - In-depth analysis of pedestrian serious injury collisions**

**Purpose:** Pedestrians contribute to a substantial proportion of deaths and serious injuries on WA roads. The development of effective measures to ensure safe pedestrian travel requires a definitive understanding of the nature and extent of pedestrian serious trauma, and the contributing factors to collision and injury risk. In-depth examination of serious casualty collisions can yield a highly detailed understanding of pedestrian crash events that includes all aspects within a Safe System context including the performance of the vehicle and an assessment of the role of the road environment and design, road user and other factors in crash causation and specific injury outcomes. These in-depth data can play a key role beyond that of any other currently collected data in defining road safety policy and strategy priorities and evaluating countermeasure effectiveness. This project aims to provide an enhanced understanding of at-risk pedestrians, with a particular focus on factors relating to the road user behaviour, the road and roadside setting and vehicle factors that increase the risk of injury collisions. The outcomes will be a set of recommendations for crash countermeasures to address high priority areas of pedestrian trauma in WA.

**Status:** The project commenced January 2015 and two major milestones have been met, as follows: The project team and advisory group members met 17th March, 2015 to discuss the overall aims of the project, confirmed study design and set out a plan of work. In addition, team members met with WA Police, State Traffic Operations to discuss their contribution to the study in providing additional collision details from Police-reports. They have indicated their interest in contributing to the project in this capacity. All the required Ethics Committee Applications, including Hospital and University Applications have been approved. A draft literature review has been written.

**Purpose:** To measure progress of the “Towards Zero” strategy against original targets and to update projections for the end of the strategy to help identify new or changed initiatives required to achieve the strategy targets.

**Status:** The most difficult part of the process, building the model, is underway. Data needs are currently being identified and will be incorporated into the model in order to generate the results. A workshop involving key stakeholders is being planned for mid-June to discuss the draft results, after which final changes will be made and recommendations made.

14-033 RSC - Investigation of the relationship between traffic and criminal offences, demerit point losses, and killed and serious injury crash involvement

**Purpose:** This project will investigate the nature of the relationship between traffic offences, demerit point losses, non-traffic criminal behaviours and the risk of involvement in crashes resulting in death or serious injury.

**Status:** The most recent PAG meeting has identified some data quality and supply issues and has thus required a revision of the project. Only KSI crashes occurring 2013-2014 will be investigated with an investigation of traffic and criminal offences and demerit point losses 36 months prior to the crash. The change in cohort years to be investigated was necessitated by the discovery that MRWA, who will supply relevant crash records, does not have access to driver identifiers required to retrieve subsequent licensing and police records. The RSC and C-MARC have both made application to ICWA to release driver identifiers to MRWA. This is being negotiated. In the meantime, WAPOL is currently reviewing the project and the demands on their resources before providing formal approval for the project.

14-034 RSC – An investigation and evaluation of best practice enforcement in roadside breath and oral fluid testing for drink and drug driving

**Purpose:** The general aims of this project are to (i) develop an understanding of factors affecting the administration and implementation of roadside breath testing for alcohol and oral fluid testing for illicit drugs in WA via a survey of WA Police personnel, and (ii) to implement and evaluate a ‘best practice’ strategy trial for roadside breath testing and oral fluid testing in regional WA locations.

**Status:** This project represents a major amendment of the previous project that sought to undertake a three-phase evaluation of Random Breath Testing. After consultation with the new Assistant Commissioner for Traffic the project scope has been amended to undertake a review and trial of best practice measures in roadside alcohol and drug testing. The project has been accepted by the Road Safety Commission and WAPOL (subject to formal approval which is currently being reviewed).
4.5 Injury Prevention Research

The following table summarises other injury prevention projects being undertaken by Professor Lynn Meuleners.

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Understanding the impact of cataract vision impairment on risk of falls

**CIs:** Dr Lisa Keay, Professor Lynn Meuleners, Dr Jonathon Ng, Dr Nigel Morlet, Professor Peter McCluskey

*Funded by an NHMRC grant for three years - $780,000*

**Aim:** A prospective, 24-month cohort study is planned involving over 700 patients aged 70 years or older with bilateral cataract presenting for surgery at public hospital eye clinics in Sydney, Melbourne, Perth and Adelaide.

**Status:** Data recruitment is completed with WA recruiting 65 patients with bilateral cataract. Data analysis will be undertaken in NSW.

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Dementia and hospitalisations due to an injury: A population based study

**CI:** Professor Lynn Meuleners

*Funded by Alzheimer’s Australia for one year - $20,000*

**Aim:** A retrospective, population-based cohort study will be undertaken using data from the Hospital Morbidity Data System (HMDS), the Trauma Registry and the Western Australian Mortality Database from 2001 to 2011. The WADLS will be used to compare injury related outcomes as well as crash risk for people with and without a diagnosis of dementia, aged 65+.

**Status:** Three papers have been written and are under review.

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Neurocognitive predictors of risky driving in young people

**CIs:** Professor Julie Stout, Professor Mark Stevenson, Professor Lynn Meuleners

*Funded by the Neurotrauma Research Fund for two years- $196,000*

**Aim:** This study will be the first examination of developmentally-relevant measures of cognition in conjunction with both self-reported and naturalistic driving behaviour in young novice drivers. Identification of cognitive characteristics in young drivers that predict driving risk behaviour will contribute essential evidence to inform prevention strategies to improve road safety in young people at highest crash risk.

**Status:** The final report was submitted to Neurotrauma Research Program December 2014.
Safer cycling and the urban road environment

CIs: Professor Mark Stevenson, Dr Marilyn Johnson, Dr Jennie Oxley, Professor Lynn Meuleners, A/Prof Belinda Gabbe, Prof Geoffrey Rose, Prof Jennifer Dill, Dr Roderick Katz, Mr David Moyses, Mrs Juliet Bartels, Mr Michael Nieuwesteeg, Mr Peter Bourke

Funded by an ARC Linkage grant over three years - $1,200,000

Aim: The aim of the project is to improve the safety of cyclists through identifying enhanced urban road design and evaluating new designs in Australia’s first cycling simulator.

Status: The project commenced July 2013. Study progressing well with 60 injured cyclists recruited and 45 comparison cyclists in WA. Victorian recruiting is also going well.

Driving performance and self-regulation among older drivers with bilateral cataract: a prospective cohort study

CIs: Professor Lynn Meuleners, Dr Lisa Keay, Dr Mark Young, Dr Jonathon Ng, Dr Nigel Morlet, Professor Peter McCluskey

Funded by an ARC Discovery grant over three years - $376,000

Aim: This prospective study will use naturalistic in-vehicle driver monitoring devices and a state-of-the-art driving simulator to examine the association between clinical measures of vision, refractive management, driving patterns, self-regulation and driver performance for bilateral cataract patients before first eye surgery, between surgeries and after second eye surgery.

Status: Study recruitment has started in WA with 57 participants recruited. Recruitment in NSW has been poor with only 11 participants recruited in ten months. Recruitment has ceased in NSW and will start recruitment in Victoria late September.

The DIAMOND Study: Diverging Diamond Interchanges in Western Australia: Performance on a Driving Simulator

CI: Professor Lynn Meuleners, Dr David Logan, Dr Paul Roberts, Dr Kyle Chow

Funded by Neurotrauma Research Program

Aim: The aim of the study is to evaluate driver performance while navigating a DDI using a laboratory-based driving simulator. Specific objectives are to:

1. Assess driving simulator performance and cognitive/physical workload when navigating a DDI under different environmental conditions (daytime, nighttime and when it is raining).
2. Determine specific groups of drivers at increased risk of errors when navigating a DDI.
3. Assess what signage (normal versus enhanced) is necessary for drivers to safely navigate the DDI.
4. Make recommendations and provide community education particularly targeted to high risk groups

**Status:** Ethics application approved. Driving scenario being built. Waiting for the new simulator then will start recruiting.
4.6 Main Roads WA Research Fellowship Program

The following projects are part of the Main Roads research fellowship. The new Fellow commenced January 20, 2014.

The effectiveness and cost-effectiveness of the Black Spot Program in Western Australia, 2007-2012

**Purpose:** To evaluate the effectiveness of projects treated under the State Black Spot Program in terms of the net reduction in crash frequency and crash costs at treated sites in WA. The evaluation also examined the effectiveness of the program by treatment category at both broad and specific levels of categorisation.

**Methods:** A quasi-experimental “before” and “after” comparison will be adopted in casualty crash and all reported crash frequencies (include fatalities, hospitalisation and PDO crashes) at sites treated under the State Black Spot Program. The analysis also included the estimation of the net economic worth of the Program.

**Status:** Ongoing. Final report for the 2007-2008, 2009-2010 and 2011-2012 Programs submitted to Main Roads WA. The draft report for 2005-2006 Program has been submitted to Main Roads for feedback; economic evaluation is being undertaken.

The epidemiology of heavy vehicle crashes in Western Australia: 2001-2013

**Purpose:** To describe the magnitude of the problem; identify trends; characteristics of the population at risk, as well as vehicular type, temporal, and environmental factors related to an articulated heavy vehicle crash.

**Methods:** A retrospective epidemiological study will be undertaken using crash records from 2001 to 2013. The analysis will be stratified by metropolitan, rural and remote areas of Western Australia as well as by truck type. As well a GIS analysis will also be undertaken to identify ‘hotspots’ for heavy vehicle crashes.

**Status:** Two reports completed and submitted to Main Roads WA.

Evaluation of effectiveness of flexible and non-flexible road safety barriers

**Aim:** To evaluate the effectiveness of flexible and non-flexible road safety barriers in WA

**Methods:** A retrospective before and after study design will be undertaken examining the net reduction in crash frequency at treated sites in WA

**Status:** A list of WA road sections treated with flexible and/or non-flexible road safety barriers has been obtained from MRWA. Ethics submitted. The necessary data clean-up and manipulations have been completed, and the first phase of analysis using GEE Poisson has begun. Kyle was concerned that a number of barriers on the MRWA list could have been constructed and completed at the same time as some “new” road sections – i.e. without meaningful “before” crash periods, unlike those barriers that were added to existing road sections. Kyle has discussed this with Tony Radalj and developed a method to identify and remove such barriers from the study. Preliminary results have been shown to Tony with positive feedback received.
An evaluation of the road safety performance of high speed rural seagull intersections on Forrest Highway

**Aim:** To evaluate the road safety performance of high speed rural seagull intersections on Forrest Highway.

**Methods:** A retrospective before and after study design will be undertaken examining the net reduction in crash frequency at treated sites in WA.

**Status:** A literature review of the road safety performance of seagull intersections in Australia and internationally has been performed by C-MARC and submitted to MRWA. David and Brendon Wiseman (MRWA) have provided a selection of 9 high speed rural seagull intersections on Forrest Highway for evaluation. C-MARC is in the process of selecting a list of T-intersections with similar traffic characteristics but without the seagull treatment for comparison purposes. While awaiting further information from Brendon, Kyle has met with Tony Radalj to discuss the study design and selection of control sites.
4.7 Grant Submissions for Funding in 2014/15

NHMRC partnership grant, **Land use, transport and population health: integrated modelling to inform strategic health policy –Unsuccessful**  
*Funding requested $1,800,000 over three years*  
CIs: Professor Mark Stevenson, Professor Majid Sarvi, Professor Rodney McClure, Professor Peter Newman, Professor Lynn Meuleners, Associate Professor Stuart Newstead, Professor Mark Wallace, Associate Professor Michael Fitzharris

Canadian Institute of Health Research, **The Crash Causation and Outcome Study; A multicentre study of risk factors for and consequences of minor road traffic crashes. - Unsuccessful**  
*Funding requested: $1,200,000 over five years*  
CIs: Dr Jeff Brubacher, Dr Brasher, Dr Brussoni, Dr Chan, Dr Desapriya, Dr Lund, Professor Meuleners

NHMRC Dementia Research Team Grant, **Managing a successful transition to non-driving for people with dementia. - Unsuccessful**  
*Funding requested $1,411,456.00 over five years*  
CIs: Associate Professor Judith Charlton, Dr Sjannie Koppel, Dr Jennie Oxley, Professor Barbara Workman, Professor Lynn Meuleners, Professor Tom Drummond, Professor Gary Naglie

Neurotrauma Research Program The DIAMOND Study: Diverging Diamond Interchanges in Western Australia: PerforMance ON a Driving simulator. **Successful (funded for $134,000)**  
*Funding $134,000.00 over one year*  
CIs Professor Lynn Meuleners, Dr David Logan, Dr Paul Roberts, Dr Kyle Chou

Neurotrauma Research Program, **Personalised, context-specific messages for reducing risky driving behaviours. Unsuccessful**  
*Funding requested $150,000.00 over one year*  
CIs: Professor Mark Stevenson, Professor Julie Stout, Professor Lynn Meuleners, DR JD Newton, Dr M Hughes, Dr Y Glikmann-Johnson
5. **FINANCIAL REPORT**

The Statement of Income and Expenditure for the year ended 30 June 2015 is attached. This period covers the operation of the road safety activities of the Centre from July 2014 to June 2015 inclusive.

The Statement covers the RSC base contract funding costs within the Centre:

- **Balance Carried Forward:** $200,699.00
- **Total Revenue:** $695,775.00
- **Total Expenditure:** $482,540.00
- **Net Operating Result:** $213,235.00
- **Balance of Funds:** $413,934.00

As per the Funding Deed, the annual audited financial report has been completed based on the part of the centre's finances, which apply to the Road Trauma Trust Account funding and research activity only.
6. OTHER CENTRE ACTIVITIES

Consistent with research, C-MARC is involved in many complementary activities to build the sustainability of the Centre.

6.1 C-MARC Profile, Media and Advocacy

Considerable effort has been spent on increasing the awareness of C-MARC through dialogue with key stakeholders, clients, potential clients and interested professionals.

C-MARC has been active in a variety of activities to increase its profile to the road safety community including:

- Meeting with MUARC staff to develop possible research projects;
- Meeting with representatives of agencies involved in the Road Safety Council;
- Four C-MARC sponsored seminars from local and international road safety researchers, with numerous participants mostly road safety practitioners;
- Participation in other professional and public events;
- Production of four C-MARC newsletters; and
- Contributions to Curtin and other newsletters.

C-MARC has been actively engaging with the media, both proactively and reactively. This engagement provides research information and influences policy to the public, the road safety industry, policy makers and elected representatives. Media activity advocating road safety topics, responses to public issues and safety improvements have included:

- 15 radio interviews on road safety issues;
- Approximately 22 public print and on-line news articles; and
- Numerous reports in national professional journals, publication of peer-reviewed journals, Curtin newsletters and other publications.

The C-MARC website is continually updated throughout the year and contains a variety of current information for the public, researchers and practitioners which includes C-MARC and MUARC reports, newsletters and seminar information.
6.2 Research Students

The following research is being undertaken by students under C-MARC supervision.

Mr Kien To. Impact of bilateral cataract surgery on quality of life, depression, falls and other injury: A prospective study in Vietnam
PhD (commenced 2011) Curtin University
Supervised by: Professor Lynn Meuleners, Professor Andy Lee, Dr Dat van Duong

Ms Michelle Fraser. Safer cycling and the urban road environment
PhD Curtin University
Supervised by: Professor Lynn Meuleners, Professor Mark Stevenson, Dr Kyle Chow
Status: Started September 2014 and progressing well.

Ms Seraina Agramunt. Driving performance and self-regulation among older drivers with bilateral cataract: a prospective cohort study
PhD Curtin University
Supervised by: Professor Lynn Meuleners, Dr Kyle Chow, Dr Jonathon Ng
Status: Started July 2014 and progressing well

Dr Rogers Nditanou. Population based estimation of traffic injuries in Yaounde, Cameroon using the capture-recapture method
Master of Public Health (commenced second semester 2014) Curtin University
Supervised by: Dr Janis Janz; Mr Peter Palamara
Status: In progress

Mr Craig Bowd- Diabetes and motor vehicle crash risk: A population based study
Master of Public Health, possible PhD
Supervised by: Professor Lynn Meuleners
Status: Started May 2015, preparing candidacy
6.3 Publications

The following papers were published in scholarly-refereed journals 2014/15.


To KG, Meuleners L, Fraser M, Do DV, Duong DV, Huynh V, To QG, Phi TD, Tran HH, Nguyen ND. The Impact of Cataract Surgery on Vision-Related Quality of Life for Bilateral Cataract Patients in Ho Chi Minh City, Vietnam: A Prospective Study. *Health and Quality of Life Outcomes* 2014, 12(1): 16.


Submitted and under review


Hobday M, Gordon E, Liang W, Meuleners L, Chikritzhs T. Distance travelled to purchase alcohol and the mediating effect of price. Submitted to *Drug and Alcohol Review*

6.4 Presentations

Palamara, P. An investigation of car versus pedestrian crashes at signalized intersections in the Perth Central Business District: Who’s running the gauntlet? 2014 Road Safety Research, Policing and Education Conference, Melbourne November 12th-14th 2014, Accepted as oral presentation


Palamara, P. Clark, B. Prevalence and characteristics of late night drink-driving in Perth, Western Australia. Submitted to the 7th Australasian Drug and Alcohol Strategy Conference, Brisbane, March 2015. Accepted as an oral presentation.
Meuleners L, Fraser M, Gorvoko M, Stevenson M. **Obstructive Sleep Apnea, Health-Related Factors and Long Distance Heavy Vehicle Crashes in Western Australia: A Case Control Study.** International Fatigue Conference, Fremantle, March 23-27, 2015. Accepted as an oral presentation.

Hobday M, Chikritzhs T, Meuleners L, Liang W. **The Effect of Alcohol Outlets and Sales on Alcohol-related Injuries Presenting at Emergency Departments at Varying Distances from the CBD in Perth, Australia from 2002 to 2010.** Submitted to the 7th Australasian Drug & Alcohol Strategy Conference, Brisbane, March 2015. Accepted as an oral presentation.

Meuleners L, To K, Fraser M, Van Duong D, Van Do D, Phi T, Tran H. **The impact of cataract surgery on vision-related quality of life for bilateral cataract patients in Ho Chi Minh City, Vietnam.** Submitted to the European Cataract Society Barcelona Spain, September 5-9, 2015. Accepted as poster presentation.

Meuleners L, Bulsara M, Chow K, Ng J. **A retrospective population based study examining motor vehicle crashes on older drivers with and without dementia.** Submitted to the 59th Association of the Advancement of Automotive Medicine annual conference, Philadelphia USA, October 2015. Accepted as a rapid fire oral presentation.
6.5 Staff Development

Staff attended the following conferences, in most cases either presenting papers or chairing sessions, with hundreds of participants:

- 20th World Congress of Epidemiology, Anchorage, Alaska, August 2014.
- International Fatigue Conference, Fremantle, March 2015
- 7th Australasian Drug and Alcohol Strategy Conference, Brisbane, March 2015.

6.6 Professional Participation

Staff at C-MARC are members of various professional organisations including the Australasian College of Road Safety (ACRS). Professor Lynn Meuleners and Mr Peter Palamara are members of the executive of the WA chapter of the Australasian College of Road Safety.

Professor Lynn Meuleners and Dr Paul Roberts from ARRB organised the highly prestigious Fatigue Conference which was held in Fremantle, March 2015.

C-MARC staff involvement increases awareness of the Centre, fosters collaboration and enhances knowledge of C-MARC staff and other professionals. Such dialogue also informs staff about safety issues and facilitates the translation of research into practice.
## ATTACHMENT: Road Safety RTTA Finance Statement

Curtin University of Technology  
Curtin-Monash Accident Research Centre  
ANNUAL REPORT ROAD SAFETY ACTIVITIES  
Base Funding Results  
Statement of Income and Expenditure for the Year Ended 30 June 2015

<table>
<thead>
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<th>Description</th>
<th>2015</th>
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<td>Consultancy and Contract Research</td>
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<td>Other Research Income</td>
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<tr>
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<tr>
<td>Other Revenue</td>
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<td>Repairs and Maintenance</td>
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<td>Fees &amp; Commissions</td>
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<td>23,612</td>
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<td>Assett Disposal &amp; Write-Offs</td>
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<td>Inventory Used &amp; Sold</td>
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<td>1,483</td>
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