Road crashes: how important is the location of alcohol outlets?

C-MARC recently investigated the importance of the number and location of alcohol outlets in relation to road crashes in metropolitan Perth.

A body of research has demonstrated that alcohol consumption increases the risk of a road crash. The short-term effects of alcohol include decreased coordination, impaired attention and judgement, all of which have a negative effect on driving performance. Previous research has examined the effects of alcohol outlets on various alcohol-related harms including road crashes. Road crashes differ from other alcohol-related harms because of two conflicting mechanisms which potentially link them to alcohol outlets: higher alcohol availability (through easier access to closer alcohol outlets) and greater exposure to driving (through longer driving distances from more distant outlets).

The study conducted by Dr Michelle Hobday assessed the effect of the number of alcohol outlets at different distance bands or buffer zones (0-2km, 2-5km, 5-10km and 10-20km) from alcohol and non-alcohol related crashes in the Perth metropolitan area. The project used crash data from 2005 to 2015, extracted from the Integrated Road Information System (IRIS) database, which is maintained by Main Roads Western Australia. Alcohol outlet licensing information for all bottleshops and on-premise outlets (e.g., hotels, nightclubs, restaurants) was obtained from the Department of Racing, Gaming and Liquor Western Australia for the same time period. A geographic information system was used to calculate the road network distance between each alcohol-involved and non-alcohol-involved crash and each outlet within 20km of the crash. Counts of outlets within each buffer zone around a crash were then computed, and statistical models were created.

The results found that crashes with greater numbers of on-premise outlets, especially within 2km of outlets, were more likely to be alcohol-involved than non-alcohol-involved. This is possibly because of an interaction between drivers recently drinking at clusters of alcohol outlets nearby, or non-drinkers who reside in the area. Crashes with higher numbers of bottleshops beyond 5km from the crash were less likely to be alcohol-involved than non-alcohol-involved. Crashes in postcodes outside the CBD were more likely to be alcohol-involved than non-alcohol-involved.

“Toward Zero”, the Western Australian road safety strategy for 2008 to 2020, identifies drink driving as a crash problem behaviour which can benefit from interventions in all four cornerstones of the Safe Systems road safety approach. Recommendations from the study pertain to the ‘safe road use’ cornerstone, primarily through enforcing road rules. Results suggest using enforcement initiatives such as random breath testing (RBT) close to clusters of on-premise outlets (such as entertainment districts) but also at greater distances (beyond 10km) from these areas, particularly in the early hours of the morning over weekends, and that RBT would be usefully employed in areas where bottleshops are more scattered.

From the Director

Welcome to the second issue of the Curtin-Monash Accident Research Centre newsletter for 2017.

In this issue we discuss a study looking at possible locations in WA that might benefit from the Rural Intersection Active Warning System. We are pleased to add another member to the C-MARC Team, Dr Kim Ward, who is introduced on page 3. There is also a great opportunity for someone to undertake a PhD with C-MARC looking at driving performance for drivers with mild dementia. Lastly, details can be found on the back page of the Australasian Road Safety Conference 2017 that is taking place in October. Hope to see everyone there.

We hope you enjoy the latest newsletter.

Lynn Meuleners
The Potential for Rural Intersection Active Warning System (RIAWS) in Western Australia

The Rural Intersection Active Warning System (RIAWS) is an innovative road safety treatment designed to slow the traffic on the major approaches to a high-risk rural intersection when vehicles are turning or crossing into or out of the side roads, thus reducing fatal and serious casualties. The team at C-MARC recently investigated WA locations which might benefit from such a system.

The Rural Intersection Active Warning System (RIAWS) is an innovative road safety treatment designed to slow major through road traffic on approaches to an intersection when a potential collision risk exists. The system was implemented by the New Zealand Transport Agency (NZTA) as a trial at a number of rural intersection sites in New Zealand since 2013, with the implementation and performance at each site being monitored in an ongoing manner. NZTA based its implementations of RIAWS on the variable speed limit system that was previously trialled in various locations in Sweden by the Swedish Road Administration between 2003 and 2007.

RIAWS detects the presence of vehicles approaching from side road(s) and/or right turning vehicles from the main through road, and sends real-time information about such events to the local control system. It then activates electronic signage (variable speed limit or “Slow Down”) on the intersection approaches. Traffic waiting at right turn bays and stop lines maintain the electronic sign activation, and the signs turn off when traffic clears.

The main purpose of the RIAWS is to slow the traffic on the major approaches to the intersection when vehicles are turning or crossing into or out of the side roads. This provides a “safe system” by proactively managing crash risk and the potential severity in these higher risk situations. The ultimate goal is that RIAWS will reduce fatal and serious casualties at high-risk rural intersections.

The NZTA RIAWS trial found a significant reduction in all crashes and high severity crashes across ten NZTA trial sites since RIAWS first became operational. They found that there was sustained speed reduction when potential for collisions existed, and there was evidence of drivers reacting to RIAWS in crashes and mitigating serious harm.

The site selection criteria and process for RIAWS in New Zealand were based on the High-risk Intersections Guide (HRIG) developed by NZTA. The NZTA implementation of RIAWS specifically targeted crash types that are equivalently known as Right Angle or Right Turn Through crashes in WA.

Dr Kyle Chow, the Main Roads WA research fellow, recently investigated WA locations which might benefit from such a system. A list and details of rural WA intersections, each with at least one casualty crash (i.e. a fatal, hospitalisation, or medical treatment crash) in the five year period 2011 to 2015 inclusive, was obtained from Main Roads WA.

The crash history of each intersection was identified using 1995-2015 WA road crash data from the WA Police, as maintained by Main Roads WA on the Integrated Road Information System.

Instead of using NZTA’s HRIG, the C-MARC team utilised Main Roads WA’s Road Trauma Risk Analysis methodology, which was specifically developed to target the needs of WA. The C-MARC team considered the speed environment, control, traffic volume, and crash history of each site. The C-MARC team then quantified the relative risks of each intersection and identified sites that were most at risk in regards to Right Angle and/or Right Turn Through crashes.

A total of 20 WA sites were identified that are potentially suited to RIAWS. These were along major rural routes such as Forrest Highway, Bussell Highway, Great Eastern Highway, South Western Highway, Indian Ocean Drive, and Brand Highway.

All sites have a high crash density, especially with Right Angle and/or Right Turn Through crashes. They also have high traffic volumes on the major through route with relatively low side road traffic, with at least one leg of the through traffic having an existing speed limit of 100 km/h or above. Such sites are especially at risk of the crash types that are targeted by RIAWS.

The C-MARC team will continue to perform further investigation into RIAWS as well as other innovative road safety treatment that have the potential to save lives and reduce road trauma.
**Dr Kim Ward — Research Associate**

Dr Kim Ward comes from a background of 32 years clinical experience working as a Sleep Scientist in the Department of Health. The primary goal of the service is to diagnose and treat sleep disorders. As Senior Scientist she was responsible for the management, maintenance and operation of an investigative service for the assessment of patients with sleep disorders, the most common being obstructive sleep apnoea (OSA). Being based in a teaching hospital (SCGH), Kim also developed expertise in the research, educational and quality control programs of a sleep service. Last year she submitted her PhD entitled “Effective assessment of accident risk in OSA”. This study analysed aetiological aspects of the relationship between OSA, excessive sleepiness and accident risk. In addition Kim evaluated a simple portable sleep monitor with the goal of expediting OSA diagnosis in individuals at high risk of accidents.

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**PhD Scholarship Opportunity at C-MARC**

Do you have a background in psychology, health or road safety and are interested in pursuing a PhD?

C-MARC researchers, together with researchers from Dementia Training Australia, Sir Charles Gairdner Hospital, and the University of Melbourne, were awarded an ARC Linkage Grant to examine driving performance and self-regulation practices in drivers with mild dementia. As part of this project there is an exciting opportunity for an individual to undertake a PhD whilst being based at C-MARC.

The project aims to assess longitudinal changes in the driving performance, driving self-regulation, mobility and satisfaction with mobility for older drivers with mild dementia, compared to that of older drivers without dementia. The project will use an innovative combination of real time in-vehicle driver monitoring devices to objectively measure natural driving patterns and self-regulation practices, and a state-of-the-art driving simulator to provide a comprehensive evaluation of driving performance. The findings from the study will optimise management of driving outcomes and mobility for older drivers with mild dementia.

If you are interested in this exciting opportunity with C-MARC, please email Professor Lynn Meuleners at L.Meuleners@curtin.edu.au

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**Publications**

**Scholarly Book Chapters**


**Scientific Journal Articles**


About the conference

The Australasian College of Road Safety (ACRS), Austroads, ARRB and Curtin-Monash Accident Research Centre (C-MARC) invite you to attend the largest road safety-dedicated conference in the Southern Hemisphere. The 2017 Australasian Road Safety Conference (ARSC2017) will be held in Perth on the banks of the Swan River at the beautiful Crown complex from Tuesday to Thursday 10-12 October 2017.

With a theme of “Expanding our horizons”, ARSC2017 will showcase the regions’ outstanding researchers, practitioners, policymakers and industry spanning the plethora of road safety issues identified in the United Nations Decade of Action for Road Safety, including road safety management, infrastructure, safe vehicles, user behaviour, and post-crash care.

ARSC2017 will bring with it a special focus on engaging all levels of government and community, from the city to the bush, to move Towards Zero. The comprehensive 3-day scientific program will showcase the latest in research, education, policing programs, policies and management strategies, technological developments in the field, national and international keynote speakers, oral and poster presentations, expansive stakeholder exhibition, and workshops and interactive symposia.

ARSC2017 is expected to attract over 500 delegates including researchers, policing and enforcement agencies, practitioners, policymakers, industry representatives, educators, and students working in the fields of behavioural science, education and training, emergency services, engineering and technology, health and rehabilitation, policing, justice and law enforcement, local, state and federal government, traffic management, and vehicle safety.

Keynote speakers

The ARSC2017 Organising Committee recently announced the following keynote speakers:

- Dr Mark Rosekind – Chief Safety Innovation Officer, Zoox, & Former Administrator, US National Highway Traffic Safety Administration (NHTSA)
- Professor Len Collard – Australian Research Council Chief Investigator, School of Indigenous Studies, University of Western Australia
- The Hon Michelle Roberts MLA – WA Minister for Police, Road Safety
- Mr Kim Papalia – Commissioner, WA Road Safety Commission
- Dr Sudhakar Rao – State Director of Trauma, Royal Perth Hospital
- Mr David Bobbermen – Program Manager Safety, Austroads
- Mr James Goodwin – CEO, Australasian New Car Assessment Program
- Mr Stuart Ballingall – Program Director, Connected and Automated Vehicles, Austroads
- Ms Rita Excell – Executive Director, Australian Driverless Vehicle Initiative (ARRB)
- Mr Terry Agnew – Group CEO, Royal Automobile Club of Western Australia
- Mr Antonio Piscitelli – Business Development Specialist – IOT and M2M – Telstra & Steering Committee, Australian Driverless Vehicle Initiative (ARRB)

To register for the conference or for further information, please visit http://australianroadsafetyconference.com.au/