



# Western Australian Centre for Road Safety Research

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## Visual Impairment and Crash Risk: A Population-Based Study

Visual fields are important for safe driving; however, the association between visual field loss and driving performance is unclear, with studies producing conflicting results. Visual field loss affects the detection of objects in the periphery, judging distances and speed, maintaining lane position in a curve, and anticipatory skills while driving.

Dr Siobhan Manners, as part of her PhD, will be undertaking a population-based investigation on the association between the severity and location of visual field loss and the risk of injury, including motor vehicle crashes for older adults aged 60-plus. This innovative study will be the first to link a large-scale ophthalmic database of approximately 400,000 visual fields for 62,000 older adults to population-based police-reported crash data, hospitalisation, death and trauma data. It will also quantify the economic impact on the health care system for motor vehicle crashes in older adults with visual field loss.

The specialised ophthalmic database contains collected computerised static visual fields using a Humphrey Visual Field Analyser (HFA) to assess and track changes in visual field sensitivity. The data obtained from the HFA machines was collected from teaching hospital eye clinics and 18 private practices throughout Western Australia. The geographical spread of the data ranges

from Geraldton in the Mid-West to Bunbury in the south. Siobhan also has permission to use visual fields from the Lions Eye Outback Vision van, which provides services to the remainder of country Western Australia.

It is anticipated that the power of the 400,000 visual fields records will provide definitive estimates of crash risk and the association between the severity and location of visual field loss, specifically superior versus inferior fields. They will also assist in assessing fitness-to-drive for visually impaired older driving populations.

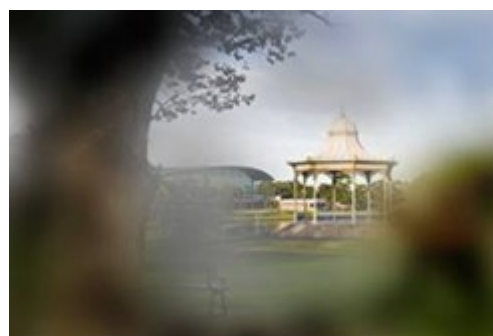


Photo 1. Loss of peripheral vision

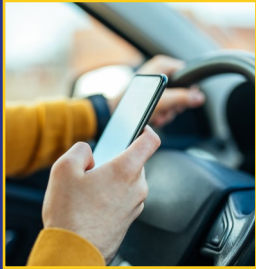


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## Driving Exposure, Patterns and Safety Critical Events for Older Drivers With and Without Mild Cognitive Impairment: Findings from a Naturalistic Driving Study



### Did you know?\*

- Two-thirds of the Australian population live in capital cities and metropolitan areas.
- But more than half of the road fatalities occur in rural or remote areas.

\*Source: NRSPP



Mild cognitive impairment (MCI) can negatively impact the driving ability and performance of older drivers. However, limited research has examined the differences in naturalistic driving exposure, patterns and safety critical events in drivers with and without MCI.

A recent study—published in *Accident, Analysis and Prevention* by Wendy Feng, Professor Lynn Meuleners and Dr Michelle Fraser—compared driving exposure patterns (e.g. night-time trips, peak-hour trips) and safety critical events (harsh acceleration, harsh braking and harsh cornering) between drivers with MCI and a comparison group without cognitive impairment.

Using an in-vehicle monitoring device, naturalistic driving data were collected from 36 older drivers with MCI and 35 older drivers without cognitive impairment over a two-week monitoring period in Western Australia. While older drivers with MCI had fewer safety critical events than drivers without cognitive impairment, this difference was not statistically significant. There were also no statistically significant differences between drivers

with and without MCI for measures of driving exposure or any of the driving patterns including weekday trips, night-time trips, and trips on highways/freeways. The results of the multivariable modelling only found binocular contrast sensitivity associated with the rate of safety critical events. Better contrast sensitivity was associated with a decreased rate of safety critical events over the two-week period.

Drivers with MCI had similar driving exposure and patterns as older drivers without cognitive impairment; however, drivers with better contrast sensitivity experienced fewer safety critical events. The findings of this study will support efforts to develop reliable evidence-based guidance regarding age-related cognitive decline associated with MCI and the ability to drive safely. The improved understanding of changes in driving behaviours associated with MCI may assist physicians, driver rehabilitation specialists, and others who offer guidance to older adults regarding driving safety to know when to recommend driving cessation.

## Using telematics to reduce risky driving behaviour in young, regional drivers

### Can personalised driving feedback via a Smartphone app reduce risky driving behaviour among young provisional drivers in regional WA?

WACRSR researchers Dr Michelle Fraser and Professor Lynn Meuleners have received funding from the Neurotrauma Research Program/Department of Health WA to examine this question in 2021. A randomised controlled trial will assess the impact of providing personalised feedback to young drivers in regional WA about their risky driving behaviour, via the UA-App.

Young drivers are over-represented in crash, serious injury and fatality statistics in Australia, with crash risk greatest in the first 6–12 months of licensure. The risk of fatal and serious injury crashes is also higher on regional roads in WA.

Telematics technology can unobtrusively capture real-time motor vehicle data, including speeding, harsh braking and harsh acceleration. The UA-App is a smartphone app developed by Urban Analytica that uses telematics to record driving behaviour, which then provides feedback to the driver.

Two hundred young drivers in the Great Southern, South West and Mid-West regions of WA will be allocated to the intervention or control group. The app will provide feedback to the intervention group about each trip, including whether the driver exceeded the

speed limit or undertook extreme braking or acceleration, as well as a weekly driving 'score' (Figure 1). The control group will receive weather alerts via the app and no driving feedback. Driving data will be recorded continuously for a two-month period for each participant, with any changes in driving behaviour assessed.

If the intervention is successful, telematics technology could be incorporated into existing road safety initiatives on a larger scale, reducing motor vehicle crashes, serious injuries and deaths for this group of high-risk drivers.

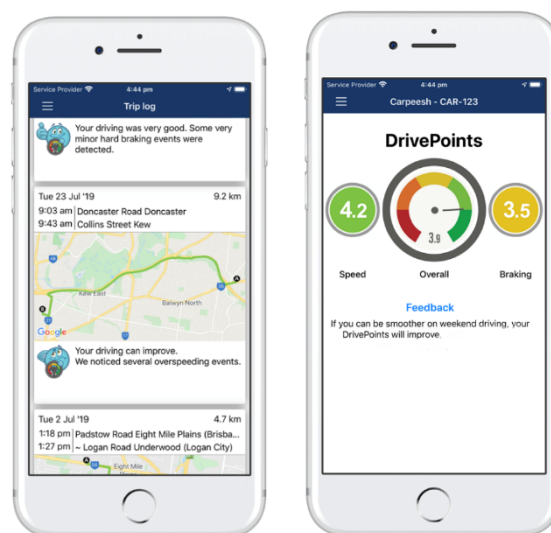


Figure 1. The UA-APP

## Australasian College of Road Safety: WA Chapter Update

In December, the Western Australian chapter of the Australian College of Road Safety held a meeting, chaired by WACRSR Deputy Director, Associate Professor Paul Roberts, to elect new positions and brainstorm ideas for activities in 2021. The new WA chapter committee comprises:

- Chair – Paul Roberts (WACRSR)
- Secretary – Teresa Williams (MRWA)
- Treasurer – Ed Rose (MRWA)
- Member Engagement – Terri-Anne Pettet (WALGA)
- General Officer – Fritha Argus (MRWA)

The WACRSR looks forward to working with the new committee in our common goal of helping to tackle road safety issues in WA. On 21 January, the new committee of the WA chapter of the Australasian College of Road Safety held their first meeting. The committee discussed a range of issues including potential activities for the coming year. Watch this space for announcements about upcoming activities and please let us know if you would like to be involved in the chapter.

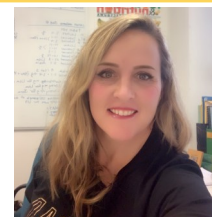


*Fostering communication, networking, professionalism and advocacy in road safety*

## New Staff

### Dr Gina Arena

Gina is an injury epidemiologist and her research has focused on injury prevention using the WA Health Services Research Linked Database. She is interested in reducing road-related harm and understanding the contributing factors related to injury and death in road crashes and trauma.



## New Students

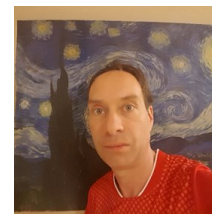
### Dr Siobhan Manners

Siobhan completed her Doctor of Medicine in 2020, and a previous honours degree in Health Science in 2014. She has six years of experience in Data Linkage as a Senior Data Linkage Officer and Project Officer at the WA Data Linkage Branch. Siobhan has been working on road safety and vision science research for eight years having held roles as a research associate at UWA, Curtin University and the Lions Eye Institute. She will be commencing her PhD in 2021.



### Machiel van der Stelt

Machiel's topic is *Sensor Network collecting air pollution and body vitals data to model kids' health, road safety and air pollution in Perth, Western Australia*. The research will be undertaken in collaboration with the Department of Electrical, Electronic and Computer Engineering at The University of Western Australia.



## Main Roads Fellowship

### Dr Matthew Legge

Main Roads Western Australia has provided funding for a three-year fellowship to be based at the Western Australian Centre for Road Safety Research. Dr Matthew Legge will be the Main Roads fellow and will undertake work including in-depth evaluations of road programs, road design assessments, billboard safety and other road safety issues as required.



## Upcoming Seminar

### Road Safety Potential from Telematics

**Presenter:** Professor Mark Stevenson

Professor of Urban Transport and Public Health, Melbourne School of Design, The University of Melbourne

**Date:** Thursday 8 April 2021

**Venue:** TBC

#### Western Australian Centre for Road Safety Research (WACRSR)

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The Western Australian Centre for Road Safety Research is a West Australian based independent multi-disciplinary road safety research centre established by the West Australian State Government's Road Safety Commission in 2019.

The Centre represents a significant partnership between the Road Safety Commission and The University of Western Australia.

WACRSR's mission is "to conduct high-quality research to educate, inform and facilitate crash and injury reduction in Western Australia."

WACRSR's vision is the elimination of death and injury-related harm to the community when using Western Australian roads.