

Centre for Road Safety

# **Review of literature, programs and practices to support older driver safety and mobility**

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# 1 Background

The population of New South Wales (NSW) is ageing and associated with this is a significant increase in the overall number of older driver licence holders. In addition, there are significant changes emerging regarding transport and mobility expectations amongst older road users including high personal mobility, greater use of the private car, as well as increased use of other travel modes.

While there is strong emphasis for older adults to maintain their mobility for as long as possible, their safety is a priority and one that requires innovative measures to reduce crash and injury risk (Langford & Koppel, 2006). Older drivers are over-represented in fatal crashes in NSW, elsewhere in Australia and internationally.

There are numerous systems and practices currently in place in NSW to manage older drivers' safe mobility, including the older driver licensing system and medical standards and procedures for assessing fitness to drive, as well as provision of educational resources for older drivers. Current arrangements in NSW require older drivers aged 75 years and over to undergo an annual medical assessment and those aged 85 years and over must also undertake a practical on-road test to retain an unconditional driver licence.

However, in view of the complex array of current and emerging issues surrounding safe mobility, it is critical to maintain a good understanding of best practice approaches in assessing fitness to drive (assisting health professionals and improving screening practices), and assisting older drivers to self-assess and self-regulate their driving effectively and transition from driving to non-driving appropriately and successfully.

## 2 About the review

The Monash University Accident Research Centre (MUARC) was commissioned by Transport for New South Wales (TfNSW) to undertake a review of the literature, programs and practices related to older driver licensing and other programs addressing safety and mobility.

### 2.1 Review objectives

The broad objectives of this project are to:

1. Identify the range of off-road tools and programs available to support older drivers' self-regulation and transition to retirement from driving (including support for family members and carers);
2. Identify the range of tools designed to assist health professionals assess older drivers' fitness to drive;
3. Provide an in-depth understanding of the tools and programs identified and their effectiveness (including but not limited to the capabilities tested, the context of the tools, their benefits and limitations, including their efficacy in predicting crash risk of older drivers where relevant);
4. Provide recommendations for the applicability and generalisability of the identified tools to the existing older driver licensing system in NSW.

The review describes, critically evaluates and synthesises the literature on tools, programs and resources with a focus on the following aspects of managing older road user safe mobility:

- Tools, programs and resources that assist older drivers to self-assess their own fitness to drive and encourage self-regulation;
- Initiatives to support older drivers' transition to retirement from driving;
- Tools and training materials that assist health professionals and licensing jurisdictions assess older drivers' fitness to drive;
- Role of technology and other means in delivering transport information and education to older road users; and
- Incentive schemes to promote travel mode shift and their uptake.

### 2.2 Review methodology

To undertake the review, a systematic approach was adopted to ensure that an extensive range of tools, resources and programs were sourced and evaluated.

The structured literature search comprised a targeted and critical review of published and 'in house' national and international literature and other grey (unpublished) literature to explore the current understanding of effective screening practices to assess older drivers' fitness to drive and the effectiveness of supporting tools and resources in assisting older drivers to self-assess, self-regulate and transition to driving cessation and use of alternative transport modes. The review comprised three complementary phases, including library-based searches, desktop searches and a survey of national and international experts.

For the review of evaluation studies, research papers that provided an evaluation of any of the identified tools, resources or programs were assessed. Each selected paper was assessed using broad principles underpinning evidence-based science as specified by the National Health and

Medical Research Council (NHMRC, 2009) for quality assessment of studies. In addition, the Newcastle-Ottawa Scale was used to further refine the assessment of the quality of evidence. These guidelines and scales provide a systematic analysis of the evidence on the resources, tools and programs in terms of:

- Quantity of evidence (i.e., number of studies included);
- Level of evidence (i.e., best study types for the specific question; risk of bias); and,
- Quality of evidence (i.e., how well the studies eliminate bias).

## 2.3 Key themes of the review

The review addressed issues relevant to the safe mobility of older road users within the following five broad themes:

1. Self-assessment and/or self-regulation
2. Transition to retirement from driving
3. Resources for health professionals and licensing authorities to assess fitness to drive
4. Travel mode schemes
5. Technologies to deliver transport information

For the purpose of this review, the terms 'older drivers' and 'older road users' primarily refer to those aged 75 years and over. However, it was important to also capture the wide body of literature and resources designed to promote self-regulation, assess fitness to drive and facilitate transition to alternative modes of transport. Therefore, the review was not limited to 75 years plus; rather it included all relevant literature and materials that matched the specific themes of interest.

The next sections of this report present the key findings from the review, outlining key good practice principles and promising tools, resources and programs separately for each of the five themes.

## 3 Self-regulation & self-assessment

### 3.1 Good practice principles

- Selection/development of tools that are based on sound behaviour change theoretical frameworks and adult learning principles;
- Combination of educational and training/coaching components and delivery styles;
- Inclusion of family members and health care providers;
- Selection/development of tools with key safety and mobility messages;
- Building in a robust evaluation to assess the effectiveness of programs.

### 3.2 Promising tools

There are promising aspects of a number of tools; however, it is cautioned that few resources are evaluated and evidence of their effectiveness is not strong. Notwithstanding, the following tools show promise for increasing participants' knowledge of safe driving practices, self-awareness and self-regulatory practices as well as avoidance of hazardous driving situations and acknowledgement of visual deficits that may impair driving performance: Driving Decisions Workbook and UQDRIVE. The Driving Decisions Workbook is a self-evaluation instrument that aims to provide individuals with information about their current or future driving ability as well as potential driving restrictions or clinical evaluations that could increase driver safety (Eby, Shope, Molnar, Vivoda & Fordyce, 2000).

There is evidence that this workbook can increase self-awareness and general knowledge when used as a first tier assessment and educational tool (Molnar, Eby, Kartje, & St Louis 2010). The UQDRIVE is a community-based education and support program that aims to assist older individuals with transition to driving cessation (Liddle, McKenna, & Bartlett, 2007). There is high quality evidence among older drivers that this intervention is effective in promoting community engagement, use of public transport to maintain mobility and satisfaction with lifestyle changes following driving cessation (Liddle, Haynes, Pachana, Mitchell, McKenna, & Gustafsson, 2014). There is some evidence that the AARP Smart Driver course may be more effective for improving driver knowledge when used as part of a multi-faceted intervention that also includes behind the wheel coaching/training components. Adding on-road assessment components may help reinforce and apply knowledge of safe driving behaviours and improve some aspects of safe driving.

## 4 Transition to non-driving

### 4.1 Good practice principles

- The process of educating and encouraging use of travel modes other than the private vehicle should start at an early age (from around 55 years and before the need to stop driving);
- Selection/development of tools that provide a range of programs for selected groups including components addressing lifestyle and psychological adjustments;
- Understanding of the importance of planning ahead as early as possible and increasing awareness and use of alternative transport options, and involving family and carers.

### 4.2 Promising tools

Few resources are evaluated and the evidence of effectiveness is not strong. The UQDRIVE shows promise as a community-based education and support program that can significantly enhance mobility. The program promotes increased use of public transport and walking and increased self-efficacy and ratings of performance and satisfaction regarding transport and lifestyle issues. Further validation is needed to address the limitations of the few randomised control trials (RCTs) that evaluated the UQDRIVE.



# 5 Assisting to assess medical fitness to drive

## 5.1 Good practice principles

- It is essential that a multi-tier screening process is established;
- It is also critical to select a range of assessments addressing skills closely related to driving abilities;
- Consideration of assessment cut-off scores to accurately identify at-risk drivers with appropriate sensitivity and specificity levels;
- Health professionals should be equipped with continuing education and training programs and feasible and valid tools to assess fitness to drive and to support their patients.

## 5.2 Promising assessments

Despite the substantial number of reviews addressing the issues of effective screening assessments, current evidence does not support recommendation for any best practice assessment. However, the review noted that the Candrive/Ozcandrive study, a prospective cohort study conducted across multiple sites, represents a robust design and holds considerable promise to deliver an effective screening tool that will help clinicians identify potentially at-risk older drivers. Results are expected late 2017.

A promising individual assessment tool is the DriveSafe and DriveAware (DSDA) questionnaire consisting of two assessment measures: DriveSafe provides information about an individual's global awareness of their driving environment (Kay, Bundy, & Clemson, 2009); DriveAware measures a driver's awareness of their on-road environment and driving skills (Kay, Bundy, & Clemson, 2009). The DSDA has been shown to have good sensitivity and specificity to predict outcomes of on-road tests with high level accuracy for about half of drivers. However, there are some noted limitations and the tool requires further research and refinement before consideration for use by health professionals and in licensing authority settings.

Importantly, the review highlighted that, rather than relying on a single screening or assessment tool, multiple cognitive and neuropsychological measures could be administered to develop a comprehensive assessment protocol with good predictive validity. A combination of tests has the benefit of measuring multiple driving skills including cognitive, visual-perceptual and physical/motor components.

## 6 Travel mode schemes

### 6.1 Good practice principles

- It is critical that awareness of and encouragement to use alternative transport occurs at earlier ages;
- Free or reduced travel on public transport when older adults are likely to use it and subsidised trips for taxis, ride-share, car-share services;
- Integrated network of community transport networks that allocate and utilise resources effectively;
- Provision of a level of services and flexibility;
- Use of volunteer drivers;
- A car trade-in program.

### 6.2 Promising schemes and programs

Few evaluations of the effectiveness of mode shift schemes were identified; however, reports on public transport and community transport options suggest that free, reduced or subsidised public transport and taxi/ride-share/car-share are promising. A best practice example of volunteer community transport is ITNAmerica.

# 7 Technologies to deliver transport information

## 7.1 Good practice principles

- Leverage the range of communication technologies to provide integrated travel information;
- Accessible travel information for public transport.

## 7.2 Promising technologies

No evaluations of the effectiveness of information technologies were identified. However, the review identified several technological means for delivering transport information or trip planning that are regarded as potentially promising tools. One such resource in NSW is the CTABS project which enables users to book trips online with their local community transport organisations. Potentially effective practices overseas include the GoLA app which has been successfully used in California and Colorado. It is an integrated mobility app which combines public and private transport options to meet all transport needs. The Connect San Mateo website is another good practice example and integrated mobility tool that offers door-to-door planning. The Rhein-Main Transport Authority website and application has also been recognised as a door-to-door accessibility service, helping individuals who have limited mobility to reach destinations. Several vehicle technologies were also recognised as potentially effective for older drivers such as Tesla's Second-Generation AutoPilot system which allows for Level 5 autonomous driving. However, it is likely that further developments in autonomous technologies are needed before they can make significant impacts on older drivers' mobility.

## 8 Summary

The review identified a range of tools, resources and programs within the five themes for assisting older road users and key stakeholders. A detailed analysis of the available research also provided information with respect to the quantity, level and quality of evidence on effectiveness, strengths and qualities of the tools, programs and resources.

The review revealed that for some themes, there were few tools or resources that have been evaluated and additional assessments of their effectiveness are needed. Notwithstanding this limitation, where the quality of the research and the strength of evidence warranted, several promising tools, resources and programs were identified for their potential usefulness in the NSW context.

It is expected that the findings from this research will inform future programs in relation to the older driver licensing system in NSW. Given the relative paucity of evidence for the efficacy of resources in this area, an overarching recommendation is to consider including robust evaluations to assess effectiveness whenever tools, resources or programs are developed and implemented.

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