Fitness-to-Drive: Evidence Based Decisions for Medically At-Risk Drivers

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Abstract

Licensing authorities face the escalating challenge of an aging population with an increasing number of chronic medical conditions. Many of these chronic health problems have a significant, detrimental effect on driving competence, in particular when cognition is affected. Crash risk for cognitively impaired individuals, has been shown to be similar to that of alcohol impaired drivers. This is cause for concern as cognitive impairment is highly prevalent in our society, with one in four people over the age of 65 currently having significant deficits. In Australia, licensing departments rely heavily upon recommendations from medical professionals regarding individual's fitness to drive. However, diagnosis alone is inadequate for making licensing decisions & functional capacity also needs to be considered. Unfortunately, it is difficult to objectively determine the functional impact of a person's cognitive impairment in a clinical setting without the provision of appropriate tools. In response to this growing need, the DriveABLE assessment protocol was developed. DriveABLE has worked alongside licensing departments and health professionals for many years to provide an evidence based solution to identifying medically at-risk drivers and objectively determining fitness to drive. Although having been used widely throughout Canada & the USA, this best practice technology has only recently become available in Australia & New Zealand. The DriveABLE assessment protocol is presented as a systematic, evidence based solution to this growing road safety issue.

Keywords

Driver Assessment; Evidence Based; Safe Road Users; Fitness-to-Drive; Medical Conditions; Licensing Policy; Elderly Drivers; Cognitive Impairment.

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Introduction

The first of the Australia's baby boomers enter their senior years in 2011, and will cause rapid growth in the nation's population over the age of 65 in coming years [1]. These demographic changes will also be reflected in the nation's driving population. With advancing age, these drivers have an associated increase in the prevalence of many chronic medical conditions including Alzheimer's disease and other dementias, diabetes and stroke [2]. Such conditions are associated with functional declines including impacts on driving ability.

In recent years there has been a shift away from the traditional licensing focus of monitoring older driver's competence. Instead there is growing recognition of medically impaired drivers being a more appropriate focus when fitness to drive is concerned [3]. However, the current practices used by licensing authorities and medical professionals have considerable limitations in identifying at-risk individuals and evaluating fitness to drive [4]. A systematic, evidence based screening and assessment procedure that is widely accessible and cost efficient is needed to effectively manage this growing road safety issue [5].

Medically At-Risk Drivers

Extensive literature exists highlighting the significant impact of chronic medical conditions on driving ability and therefore road safety [6-9]. Conditions associated with cognitive impairment have been identified as having the greatest impact on driving ability [6, 10]. Accident risk for illnesses impairing cognition has been shown to be comparable to the risk for alcohol impaired individuals driving over the legal blood alcohol limit [3, 6, 11]. However, unlike intoxicated drivers, those with cognitive deficits are impaired 24 hours a day, 7 days a week. These individuals present an unacceptable safety risk to both themselves and other road users if competence declines are not identified.

Dementia is the most common cause of cognitive impairment, currently affecting more than 1% of the Australian population and with over 1,300 new cases being diagnosed weekly [12]. In addition to dementia, many other common medical conditions can affect the mental functions necessary for safe driving [10]. An extensive study showed that 25% of the population over the age of 65 has significant cognitive impairment with approximately 8% being attributed to dementia and 17% due to other causes [13]. This equates to over 700,000 senior Australians currently living with cognitive deficits [14]. Due to the nation's aging population, this number will escalate rapidly in coming years.

Research has revealed that on average, individuals with dementia continue to drive for four years after the onset of symptoms [15]. A study by Ross et al. demonstrated that 42% of Australian men with probable dementia and 63% with possible cognitive impairment were still driving [16]. Research by Bess found that one in four people with serious cognitive impairment held a valid driver's licence and continued to drive regularly [17].

To illustrate the magnitude of this problem, one Canadian researcher estimated that the number of drivers with dementia in Ontario (current population 13 million) will increase three fold between 2000-2026, from 34,000 to in excess of 100,000 [15]. Similar trends can be expected in Australia. There is sufficient evidence to predict that drivers with cognitive impairment will increasingly present a major public health problem without the implementation of accessible, effective identification and assessment procedures. However, despite this forecast, road safety strategies such as "Towards Zero" and current re-licensing procedures fail to address this significant issue [18].

Identification of Medically At-Risk Drivers

In acknowledgement of the role that medical conditions play in determining driver competence, all Australian states have now introduced laws requiring the mandatory reporting of medical conditions for the purposes of driver's licensing [19]. However, the onus of reporting is on the patient. There are many concerns surrounding the effectiveness of self reporting in general, however in the presence of cognitive impairment, lack of insight into one's own increasing deficits is a major limitation [20].

In Australia, the responsibility for identification of medically at-risk drivers has been largely delegated to medical practitioners. However, these health professionals have typically lacked access to valid screening tools to assist them with this important task [4, 15, 21, 22]. Molnar et al. state that "when assessing older drivers for medical fitness-to-drive, physicians are working in an evidence based vacuum" [23]. Compounding this is the difficulty associated with the clinical identification of cognitive impairment. This was illustrated by Valcour et al. who found that 67% of all dementia cases (and 90% of cases where the impairment is mild) were not detected in the primary care setting [24]. Jang et al. reported that 93% of physicians recognised that a clinical screening instrument that assisted them to identify at-risk drivers would be useful in their practice to help overcome this barrier [25].

Assessment of Fitness-to-Drive

Diagnosis or identification of cognitive impairment alone is not sufficient to warrant the removal of driving privileges [26, 27]. For example, some drivers in the early stages of dementia remain capable of driving. However, there is marked variability in the degree of functional impairment and the rate of individual disease progression. As a result, direct tests of driving competence should be considered as the criterion for continued driving rather than diagnosis alone [28, 29]. The revised Austroads "Assessing Fitness to Drive" guidelines reflect this approach, moving away from their previous emphasis on diagnosis, towards the evaluation of functional ability [19]. However, unfortunately the guidelines offer very little in the way of useful guidance to health professionals in the decision making process, particularly when cognitive impairment is a potential issue. Furthermore, standard medical examinations have repeatedly been proven ineffective in differentiating between at-risk drivers whose function has declined and those who remain competent [30] as physicians must often rely upon subjective impressions rather than objective evidence [22]. Although many practitioners assume that referring patients for a conventional road test is adequate for determining driving competence, such assessments are known to be ineffective in revealing the driving issues of concern in cognitively impaired individuals [10].

Furthermore, the Australian Medical Association has stated that doctors do not want the perceived responsibility for making judgements about fitness to drive due to its potential to negatively impact on the doctor-patient relationship [31]. Patients may also fail to report symptoms to their doctor or to access much needed medical care in order to avoid the potential of losing their licence. Many Australian doctors have expressed their preference for alternative models of decision making to be implemented to avoid these consequences [32].

Experts have recommended that drivers with chronic medical conditions who are screened and identified as medically at-risk by their medical practitioner, should ideally be referred for an independent, evidence based driving assessment [33]. For chronic conditions, the disease impact is persistent and the effect on the individual's ability to drive is therefore "directly measurable" [21]. Consequently, best practice is objective assessment using a science based driving evaluation. Ideally such an assessment would be widely available and standardised across all locations. However, without an external criterion measure and a calibration procedure, it is unclear how standardization across sites could be achieved [34].

Most major cities in Australia have specialist occupational therapists who work in the field of driver assessment. However, these evaluations are generally costly and often inaccessible to rural residents [35]. Furthermore, it has not been possible to standardise these assessments [36]. The rapidly growing need for wide scale testing cannot be met through these existing services, particularly due to the requirement for specialised professionals to administer such assessments. Consequently, additional cost effective, readily available solutions that can be standardised across locations are urgently required [35].

Evidence Based Solutions

Researchers from the Medically At-Risk Driver (MARD) Centre and the University of Alberta Neuro-Cognitive Research Centre have developed evidence based tools that allow a systematic, objective approach to the identification and assessment of medically at-risk drivers with cognitive impairment. In response to the great need that exists in Australia these best practice [37] tools have recently been introduced to Western Australia. In addition, the MARD Centre has developed a clinical pathway to guide medical professionals in the area of fitness to drive. This protocol is available for use by Australian licensing authorities and health professionals to provide a framework to the overall process of medically at-risk driver identification and assessment.

Appendix 1 provides a simple overview of the adapted protocol proposed for identifying and assessing medically at-risk drivers. This process is closely aligned with the Austroads "Model Licensing Re-Assessment Procedure" developed over recent years by the Monash University Accident Research Centre [5].

Level One: Identification of Medically At-Risk Drivers (Pre-Screening)

The need for an evidence based screening tool to assist in the detection of driving related cognitive impairment led to the recent development of a validated clinical screening tool, the SIMARD MD (**S**creen for the **I**dentification of the Cognitively Impaired **M**edically **A**t-**R**isk **D**river - A **M**odification of the **D**emTect) [38]. This brief, 5 minute pen and paper test is practical to use in the clinical setting and has been shown to have a high degree of accuracy in detecting medically at-risk drivers. The SIMARD MD is freely available for use by health professionals involved in fitness to

drive recommendations. The screening instrument identifies three categories of drivers:

  i)   those with high probability of failing a driving evaluation *(unfit to drive)*
  ii)   those with high probability of passing a driving evaluation *(fit to drive)*
  iii)   those who require a driving evaluation to determine competency [38].

Those drivers who are identified by the SIMARD MD as needing further assessment should be referred for Level Two evaluation. This allows medical professionals to take a more arms-length approach and thereby avoid the negative consequences of medical care providers having to adjudicate on fitness to drive decisions [21].

Level Two: Off-Road Assessment (Cognitive Screening)

Once a driver has been identified through Level 1 screening as being at-risk, the decision about whether or not they remain fit to drive should ideally be made through a specialised driving assessment consisting of comprehensive off-road and on-road testing [33].

Off-road screening utilizes the DriveABLE Cognitive Assessment Tool (DCAT) [34, 39]. The DCAT is a computer based evaluation of the cognitive functions necessary for safe driving. The use of a simple, computerised presentation allows for a high degree of accuracy and objectivity in performance measures. The test battery measures cognitive facets relevant to driving such as motor speed and control, span of attentional field, spatial judgement, decision making, attentional shift, executive function and the identification of hazardous situations. An individual's performance on each of the DCAT tasks is compared to normative data for their own age group. The test battery has been found to be highly predictive of actual on-road driving performance, with 95% accuracy in identifying the most dangerous and the most competent drivers [34]. Consequently, in many cases a recommendation about continued driving can be made based on the in-office assessment results without the need for further testing. The DCAT uses a three tiered assessment outcome as recommended in the driving literature: pass, fail and indeterminate [40]. Only those drivers who fall into the indeterminate category require progression to Level 3, on-road evaluation. This has important safety benefits by identifying the most impaired drivers without the need for testing on public road ways. The predictive accuracy also allows for significant cost savings by reducing the number of drivers requiring on-road assessment. The DCAT can be easily implemented on a wide scale in a variety of settings with only minimal training requirements.

Level Three: On-Road Evaluation

In cases where driving competence requires further clarification (indeterminate on Level 2), the DriveABLE On-Road Evaluation (DORE) is used. Unlike standard road tests which have been shown to be unsuitable for the evaluation of experienced drivers [21, 34], the DORE has been developed through extensive research as an objective, evidence based alternative. The research identified the driving errors that are markers of competence decline as well as the conditions necessary to reveal these competence errors. This information was then translated into rules defining

the requirements for road course layout and pass/fail criterion. In developing the DORE, emphasis was placed on achieving the unprecedented degree of standardisation required for licensing purposes and removing the subjectivity of traditional road testing procedures. This was accomplished through the use of a criterion (the DCAT) external to the driving task, against which the performance on any particular road course can be measured [34]. Therefore, objective results and consistency are achieved, irrespective of course location and assessor.

Conclusion

Medically at-risk drivers represent a rapidly growing road safety concern in Australia. In particular drivers with conditions associated with cognitive impairment present an especially high risk, both to themselves and to other road users. However, despite the introduction of mandatory reporting legislation to all Australian states, the formal systems currently in place fail to provide an adequate solution to this issue. There is an urgent need for licensing processes to be reviewed with a focus on systematic identification of drivers who are at-risk as well as structured guidelines for the standardised, evidence-based evaluation of driver fitness. Ideally, such services should be widely available and easily scalable to enable access by metropolitan and rural drivers and cope with the escalating numbers of medically at-risk drivers.

Evidence based tools have already been developed to specifically address this issue. Within Australia, the science based DriveABLE solution is currently offered as a private fitness-to-drive assessment service in the absence of effective testing procedures through the official licensing authorities. However, there is definite scope for implementation of these services and protocol through licensing departments or associated organisations. Assessments have already been successfully introduced as standard procedure in other parts of the world enabling more equitable, accurate and standardised evaluation of fitness to drive.

Western Australia has set bold road safety targets with the "Towards Zero Road Safety Strategy (2008-2020)" which aims to address the four safe systems cornerstones of Safe Roads, Safe Vehicles, Safe Speeds and Safe Road Users [18]. However, the Towards Zero strategy fails to acknowledge the significant and growing impact of medically impaired drivers on road user safety. This is a serious omission that requires addressing if there is any possibility of the Towards Zero vision becoming a reality.

Acknowledgments

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DriveABLE Assessment Process*

LEVEL 1 ASSESSMENT

LEVEL 2 ASSESSMENT

LEVEL 3 ASSESSMENT

OUTCOME & SUBSEQUENT ACTIONS
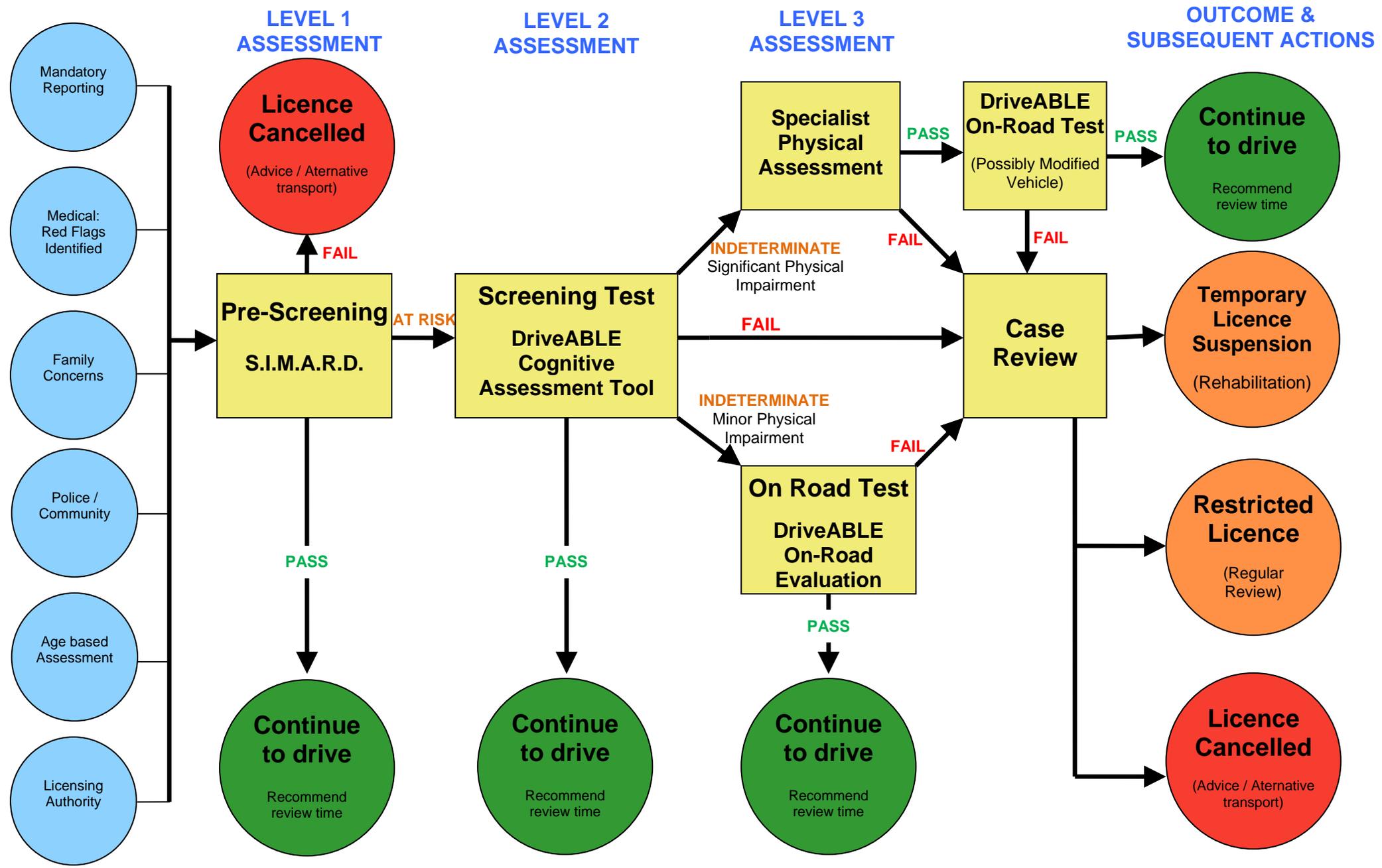
* Adapted from "Model Licensing Re-Assessment Procedure For Older Drivers" Austroads Research Report (2004)