

Enhancing guidelines for managing cognitively impaired drivers: Insights from Western evidence for Asian adaptation

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ABSTRACT

Introduction: The global incidence of dementia is increasing, and cognitively impaired drivers are at a higher risk of crashes compared to healthy drivers. Doctors face challenges in assessing these at-risk drivers, with questionable adherence to existing guidelines. This study aimed to review and compare guidelines for managing cognitively impaired drivers from various countries.

Method: A scoping review was conducted to identify relevant guidelines, which were then descriptively compared with Singapore's guideline.

Results: Eleven guidelines from 8 countries: US (n=2), Canada (n=2), UK (n=2), Ireland, Belgium, Australia, New Zealand and Singapore were reviewed. All guidelines support driving assessments and conditional licensing in ordinary (i.e. non-professional) drivers with dementia. Canada stands out for not allowing co-piloting and geographical restrictions in conditional licensing practice. Few guidelines provide indemnity for doctors reporting to licensing authorities, and communication about the impact of dementia on car insurance is rarely addressed. Most Western guidelines include evidence-based approaches, provisions for drivers with mild cognitive impairment and early discussions on transitioning from driving. A clinic-based functional screening toolbox and 2 clinical algorithms (1 with and 1 without the Clinical Dementia Rating scale) were identified as having universal applicability. Singapore's guideline, by comparison, is outdated and lacks both developmental rigour and guidance on managing mild cognitive impairment and transitioning drivers out of driving.

Conclusion: Comprehensive, evidence-based guidelines from Western countries provide valuable resources that can help Singapore design or update its guideline.

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Keywords: cognitively impaired drivers, family medicine, fitness-to-drive, geriatric medicine, guidelines

CLINICAL IMPACT

What is New

- This study identified gaps in the current Singapore guideline for managing cognitively impaired drivers and provides useful insights from Western countries that could be adapted to the Asian context.
- A clinic-based functional screening toolbox and 2 clinical algorithms could have potential universal applications.

Clinical Implications

- Singapore's guideline for managing cognitively impaired drivers requires updates to improve its developmental rigour and content.
- This study's findings offer useful evidence-based resources that can assist Asian countries in designing or updating their guidelines.

INTRODUCTION

Licensing authorities rely on medical certifications of fitness-to-drive when renewing licence for drivers who are at higher risk of crashes. Drivers with cognitive impairment are 2 to 8 times more likely to be involved in a crash compared to those without such impairments,¹ and studies show they have a significantly higher risk of accidents in real-world driving situations.² However, many doctors have reported challenges with self-confidence and ethical dilemmas in evaluating these drivers, leading to inconsistent adherence to existing guidelines.³⁻⁴ The ambiguity in these guidelines on when drivers with cognitive decline should cease driving is partly due to insufficient evidence linking

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cognition decline to crash risk.⁵ This has prompted calls for more rigorous updates to guidelines, grounded in expert opinion.⁶ Assessing medical fitness-to-drive in individuals with early-stage cognitive impairment or dementia is more difficult than evaluating those with moderate to advanced dementia. While some drivers in the early stages of cognitive decline may continue to drive safely for some time after diagnosis, others may fail on-road driving tests.⁷ The unpredictable progression of the disease makes it challenging to predict when driving becomes unsafe. At the same time, concerns have emerged about the negative impact of stopping driving on health and well-being.⁸ With dementia cases rising globally and Asia's population ageing more rapidly than the West,⁹ it is crucial to review and summarise current guidelines on managing cognitively impaired drivers to support timely updates and inform policymakers in Asia.

METHOD

A scoping review was conducted between October 2022 and October 2023 to identify guidelines for managing cognitively impaired drivers. Three authors independently screened the titles and abstracts of 4850 English publications (from 2018 to 2022) across 6 databases (Table 1). Out of these, 92 studies were selected for full-text review. Initial thematic analysis identified 5 studies that highlighted guidelines from the US, Canada, UK,

Ireland, Belgium, Australia and New Zealand. The most recent versions of these guidelines were then accessed online for a comparative descriptive analysis with Singapore's guideline.

RESULTS

A total of 11 guidelines from 8 countries: US (n=2),^{10,11} Canada (n=2),^{12,13} UK (n=2),^{14,15} Ireland (n=1),¹⁶ Belgium (n=1),¹⁷ Australia (n=1),¹⁸ New Zealand (n=1)¹⁹ and Singapore (n=1) were reviewed.²⁰ All guidelines were designed to assist healthcare professionals in assessing fitness-to-drive, while acknowledging the licensing authority as the ultimate decision-maker regarding a driver's licensing status. Each guideline includes a legal disclaimer. The specific characteristics and designs of the guidelines are outlined in Table 2.

All countries allow conditional licensing for ordinary (i.e. non-professional) drivers who are deemed fit based on individualised assessments, although the frequency of medical and driving reviews varies. Canada has the strictest standards, prohibiting compensatory measures such as co-piloting or geographic restrictions, and instead mandates regular medical/driving reviews to maintain licence status. Conditional licensing for professional or heavy vehicle drivers varies between countries, with New Zealand prohibiting it altogether. Singapore's guideline for this group is unclear (Table 3).

Table 1. Scoping review literature search.

Databases	Medline, PubMed, CINAHL, Cochrane Library, Web of Science, APA PsycInfo
Keyword search	automobile driving, driver, driving, cognitive dysfunction, dementia, cognitive decline, cognitive impair, mental deterioration, mild neurocognitive disorder, cognition disorder, Alzheimer
Inclusion criteria	Editorials, policies, guidelines, statements, driving risks, accident rates on 4-wheel motor vehicles
Exclusion criteria	Studies from Africa, and on tricycles and motorbikes
Thematic contents of full-text reviewed studies	Recommendations/guidelines/guidance, doctors, literature reviews (scoping/systematic), off- and on-road tests, driving simulator, motor-vehicle risk, types of dementia, naturalistic driving, driving cessation, caregiver, biomarkers, vision and frontier research
Identified studies with guidelines on the management of cognitively impaired drivers	Rapoport MJ, Chee J N, Carr DB et al. An international approach to enhancing a national guideline on driving and dementia. <i>Curr Psychiatry Rep</i> 2018;20:16. Selway JS. To drive or not to drive: when there is dementia. <i>J Nurse Pract</i> 2018;14:202-9. Walsh L, Chacko E, Cheung G. The process of determining driving safety in people with dementia: a review of the literature and guidelines from 5 English speaking countries. <i>Australas Psychiatry</i> 2019;27:480-5. Stamatelos P, Economou A, Stefanis L, et al. Driving and Alzheimer's dementia or mild cognitive impairment: a systematic review of the existing guidelines emphasizing on the neurologist's role. <i>Neurol Sci</i> 2021;42:4953-63. Staplin L, Lococo KH, Mastromatto T, et al. CE: Can Your Older Patients Drive Safely? <i>Am J Nurs</i> 2017;117:34-43.

Table 2. Characteristics and design of guidelines on cognitively impaired drivers.

Origins	Each of the Western countries has at least 1 guideline published with a government-linked transportation/licensing agency. Six out of these 7 guidelines from Western countries are joint publications with local medical associations. Sole publications by medical associations also exist (US, Canada, UK and Singapore).
Endorsements	Ten guidelines are officially endorsed by 1 or more (range 1–10) organisations related to healthcare. One guideline (US) did not receive endorsement due to public administration protocol.
Year of publication and version number	Latest publications: 2022 (Ireland, UK, Australia) 2021 (Canada) 2019 (US, Canada) 2018 (UK) 2017 (Belgium) 2014 (New Zealand) 2011 Singapore 2010 (US, reaffirmed 15 May 2023) Earliest publication: 1974 (Canada) First publication: 2015 (Ireland) 1997 (Singapore)
Online access	Free public access: Western guidelines except Belgium Free online access: Singapore Medical Association members
Length of document	A4 pages: range 2–289 pages
Key-points or bolded statements; appendices	All guidelines
Algorithms, flowcharts/pathways, figures, case studies	Some guidelines
Design Type 1	Medical standards of licensing in ordinary and professional/heavy vehicle groups of drivers (n=6)
Type 2	Clinical information to guide the process of assessment and decision-making on driving fitness (n=5)

The requirement for doctors to report at-risk drivers to licensing authorities differs across countries. In British Columbia (Canada) and New Zealand, a hybrid system is used, where doctors are only required to report if the driver disregards medical advice to stop driving (Table 3).

Legal protection for doctors who report at-risk drivers also varies. In Australia, indemnity is provided to all informants reporting such drivers. Canadian doctors have explicit indemnity and protection when reporting (Table 3). All guidelines promote a functional approach to determining driving fitness, combining medical assessment with practical off-road and on-road tests. In 6 countries, occupational therapists are involved in driving assessments (Table 3).

Most guidelines are developed using evidence-based approaches.^{10–16,18} US and Canada are notable for explicitly citing levels of evidence supporting their practices,^{11,12} while Belgium and Singapore rely on local expert panel review, with Singapore's literature references being outdated. In Singapore's guideline, the sources of information

are dated between 1983 and 1995, with references in the Cognitive Disorder section specifically ranging from 2006 to 2008.

The Clinical Assessment of Driving-Related Skills (CADReS) is an evidence-based off-road functional screening toolbox that can be used within the "Plan for Older Drivers' Safety" algorithm (Table 4).¹⁰ Additionally, an algorithm is available to assess driving risk levels across a continuum, integrating the Clinical Dementia Rating (CDR) (Level A evidence) with other risk factors (Level B or C or no evidence). A CDR score of 2.0 identifies a driver as a high-risk driver and recommends immediate cessation of driving.¹¹

There is also an evidence-based guideline that assesses driving risk without using the CDR scale.¹² In this approach, after evaluating the patient's condition, comorbidities, medication use, behavioural issues, driving history, cognitive tests and physical examination findings, clinicians are asked 2 key questions: (1) Would I let a loved one get into a car that this patient is driving? and (2) Would I want to have a loved one cross the street

Table 3. Summary of guidelines in managing drivers with cognitive impairment and dementia, and development of these guidelines.

	US	Canada	UK	Ireland	Belgium	Australia	New Zealand	Singapore
Conditional licensing for ordinary drivers:								
Stated time of day	Allowed	No	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed
Stated locations	Allowed	No	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed
With companion	Allowed	No	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed
Frequency of medical and driving reviews	Varies between states	Every 6–12 months or earlier	Annually	Every 6–12 months or earlier	Based on individualised recommendations	Annually	Based on individualised recommendations	Every 6–12 months or earlier
Conditional licensing for professional/heavy vehicle drivers	Varies between states	Same as ordinary drivers	No for those with dementia	No for those with dementia	Aware of higher standards but not specified	Same as ordinary drivers	No for those with cognitive impairment and dementia	Unclear: no for those with behavioural symptoms
Mandatory reporting by doctors to licensing authorities	Varies between states	Yes in 9 provinces and only if medical advice is ignored in British Columbia	No	No	No	Yes in South Australia and Northern Territory	No unless driver ignores given medical advice during licence renewal stage	No
		No in Alberta, Quebec				No in other states		
Explicit indemnity for reporting to licensing authorities	Varies between states	Yes by the state and Canadian Medical Association	No	Yes by the Irish Medical Association for at-risk, non-compliant drivers	No	Yes irrespective of professional status	Only when driver ignores given medical advice during licence renewal stage	No
Functional model to driving fitness (medical, off-road and on-road assessment)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Driving assessments/by occupational therapists	Yes	Yes	Not stated; licensing authorities will arrange	Yes	Not stated; licensing authorities will arrange	Yes	Yes; licensing authorities will arrange	Yes
Development of guidelines/evidence-based approach reported	Yes	Yes with international experts	Yes	Yes	Literature review by local experts	Yes with international experts	Unclear: draft reviewed by local health experts and disability groups	Literature review by local experts

Table 4. Clinical Assessment of Driving-Related Skills toolbox: summary of screening contents and tools.

General driving assessment	Driving history (Modified Driving Habits Questionnaire), instrumental activities of daily living, changes in medication
Vision	Visual perception, visual processing, visual spatial skills, visual acuity (Snellen chart), visual field screening, contrast sensitivity (Pelli-Robson contrast sensitivity chart)
Cognition	Montreal Cognitive Assessment test, Trail Making tests, Clock Drawing test; Snellgrove Maze Test
Motor/sensory	Rapid Pace test, Get-Up-and-Go test, functional range of motion tests (normal vs impaired)

Adapted from Pomidor A (Ed). *Clinician's Guide to Assessing and Counselling Older Drivers*. 4th ed. New York: American Geriatrics Society; 2019.

in front of a car that this patient is driving? If the response is “uncertain”, the driver is referred for on-road testing. If the response is “absolutely not”, the driver is considered high-risk and advised to stop driving, pending further investigation by the licensing authority.¹²

Only guidelines from Western countries emphasise early engagement with patients to discuss eventual driver retirement and provide support for transitioning to alternative transportation and lifestyle adjustments. In the UK, doctors are required to inform drivers diagnosed with dementia of their legal obligation to inform their car insurance company. Failure to do so can invalidate the patient's insurance policy, and driving without valid insurance is a criminal offence.¹⁵

DISCUSSION

Assessing driving risk across the spectrum from mild cognitive impairment to moderate dementia remains a global challenge. Our findings indicate that, to date, no test—including cognitive assessments—or historical risk factors can precisely quantify driving risk in individuals with cognitive impairment or dementia. As a result, clinicians must integrate both qualitative and quantitative assessments in their decision-making. Notably, we identified several evidence-based tools from Western guidelines with potential for application: (1) the CADReS toolbox,¹⁰ (2) the algorithm incorporating the CDR scale,¹¹ (3) the algorithm without the CDR scale,¹² and (4) early discussions about driver retirement with individuals and caregivers, alongside practical support for transportation alternatives and monitoring health and well-being outcomes after retirement from driving. Since the CDR scale requires specific training and familiarity, in areas where doctors are not trained in its use, the non-CDR algorithm offers a valuable alternative for clinical decision-making, with potential for broader application in the Asian context.

All guidelines recommend a functional-based approach to assess driving ability, combined with individualised practical driving evaluations, which permit conditional licensing for ordinary drivers. Notably, Canada takes a stricter approach, prohibiting geographical restrictions and co-piloting as part of conditional licensing for drivers with cognitive impairment or dementia. While the evidence on the safety of conditional licensing remains inconclusive, there is strong evidence that retiring from driving negatively impacts health and well-being.⁸ Therefore, allowing conditional licensing with geographical restrictions and co-piloting, coupled with regular medical and driving reviews (every year or less), may provide a balanced approach to support ordinary and compliant drivers. The limited availability of conditional licensing for cognitively impaired professional drivers in most countries reflects a tiered approach, as professional drivers are generally at greater risk of accidents due to longer driving hours and higher fatality rates compared to ordinary drivers.²⁰ In licensing frameworks where mandatory reporting by doctors is not required, physicians may feel conflicted about breaching patient confidentiality when reporting non-compliant, at-risk drivers. This can strain the doctor-patient relationship^{3,4,16} and expose doctors to potential legal challenges from dissatisfied drivers. Practical strategies emerging from this study include implementation of a hybrid model, where doctors are required to report only non-compliant drivers,^{13,19} or providing full legal indemnity and protection for reporting doctors,^{12,16,19} followed by further investigation by the licensing board.

The UK clinical guideline uniquely emphasises the doctor's responsibility to inform the driver or caregiver to verify the validity of car insurance following a dementia diagnosis,¹⁵ a point often overlooked in previous research. Further revisions of guidelines and public education efforts should incorporate this important message. This study

identified only 1 Asian guideline (Singapore). The focus on English language sources and recent publications (2018–2022) may have excluded other relevant Asian guidelines. Given the rapid ageing of populations in Asia, policymakers must acknowledge the public health risks posed by cognitively impaired drivers. Adapting initiatives from Western countries could help accelerate the development of regional policies. Policymakers should work closely with medical associations and licensing authorities, taking into account cultural factors such as family dynamics, societal needs and public transportation availability. Additionally, cross-national research on leveraging technologies like telemedicine, artificial intelligences and virtual reality to assess driver safety should be prioritised.

CONCLUSION

Managing cognitively impaired older drivers to maintain road safety and promote optimal health outcomes is a challenging and complex responsibility for clinicians tasked with assessing fitness-to-drive. Clear, reliable and up-to-date guidelines are essential for this purpose. Comprehensive, evidence-based guidelines from Western countries can serve as valuable models to inform future developments in Asia.

Declaration

The authors declare they have no affiliations or financial involvement with any commercial organisation with a direct financial interest in the subject or materials discussed in the manuscript.

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