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Assessing elderly people to drive

Practical considerations

Background

Older drivers are likely to suffer declines in functioning and a number of health problems that may cumulatively affect driving ability. When involved in a motor vehicle accident, elderly people are more likely to be killed or seriously disabled than younger people.

Objective

This article provides an overview of the assessment for fitness to drive with emphasis on important practical points.

Discussion

General practitioners play a vital role in the assessment of elderly drivers. Consider assessing patients over the age of 75 years and patients who present with multiple disabilities, for fitness to drive. Screening for safe driving includes assessment of vision (acuity, visual fields), motor function (joint function, muscle strength, coordination) and cognition. Additional information may be required about overall functioning from relatives and neighbours. If doubt remains the patient should be referred for a practical driving assessment.

■ **Globally, death and injury resulting from road traffic accidents are a major, and growing, public health concern. United Nations population projections indicate that people aged 60 years and over will account for ever greater numbers of all country populations over the next 30 years.¹ Due to decline in functional capacity, elderly people are more likely to be killed or seriously injured compared to those aged 18–59 years when involved in a motor vehicle crash.¹**

Most people consider driving critical for continued independence, employment and recreation. This is especially true for elderly people who rely on driving for many of their activities (eg. shopping, visiting relatives, doctor's appointments). The risk of a driving licence being withdrawn can invoke strong emotions and the loss of the ability to be independently mobile can have devastating psychological effects. The need to find a balance between the risk to the patient and other road users and driver rights, further adds to the GP's responsibility when assessing the fitness of elderly patients to drive.²

Currently in Australia, only Victoria and the Northern Territory have not introduced mandatory medical assessment for elderly drivers (*Table 1*). The age of assessment differs in each state.

Medical conditions that can affect driving include epilepsy and diabetes mellitus. Patients should be informed that in the case of hypoglycaemic episodes and seizures, they should cease driving (*Table 2*). Some medications can adversely affect brain function to the point where driving skills are impaired. These include benzodiazepines, narcotics, antihistamines and anticonvulsants (*Table 3*). The administration of multiple drugs, or drugs in combination with alcohol, can worsen detrimental effects on driving.

Key factors for safe driving

There are three main key factors for safe driving:

- vision
- motor function, and
- cognition.

Table 1. Regulatory requirements for driver testing^{3*}

State/territory	Vision test	Medical assessment	Road test
Australian Capital Territory	For all drivers on initial license and on each renewal, then at age 50, 60, 65, 70 and 75 years; annually thereafter	At 75 years and annually thereafter	Public passenger vehicle drivers at initial application, after age 70 years and when recommended by doctor/police
New South Wales	Vision test for all drivers on initial application and on each renewal and replacement	At 80 years and annually thereafter	Annually from 85 years From 80 years for holders of R and LR classes when recommended by doctor/police
Northern Territory	On initial application and 5 yearly thereafter	No prescribed age Only if condition notified by physician or driver	Only if recommended by health professional
Queensland	If applicant declares eye or vision disorder and if requested by chief executive	If the person has medical or physical condition that may affect driving or 75 years and older Currency of certificate is determined by the assessing physician	Only if recommended by the assessing physician
South Australia	If visual impairment is reported or declared and from 70 years annually	From age 70 years annually	Annually from 85 years for license classes other than class C
Tasmania	On initial application and yearly from 75 years Part of medical assessment	Yearly from 75 years	Yearly from 85 years
Victoria	On initial application and if declared or reported	If there is concern or declared by the driver	If there is concern or declared by the driver

Vision and driving

Aspects of vision important for safe driving are visual acuity, visual fields and contrast sensitivity. Visual acuity declines with age due to physiological changes in the eye and as a result of diseases such as cataracts, glaucoma and macular degeneration. According to the standards for safe driving recommended by Austroads, if a person has visual acuity worse than 6/12 in the better eye or both eyes, the licence should be suspended until the vision has been corrected.³ In the general practice setting, GP's can easily assess a patient's visual acuity with the Snellen chart.

To distinguish objects against a background older drivers require about three times more contrast than younger drivers.⁴ This can be further aggravated in low light environment such as storms, rain and dusk and lead to failure to distinguish cars or pedestrians against background scenery.

Peripheral vision is important to detect traffic signs, cars and pedestrians. Visual field defects may be part of the aging process

or be affected by medical conditions such as glaucoma and stroke. Patients' visual fields can be screened by confrontation testing; comprehensive visual fields testing can be done by an optometrist or ophthalmologist. Any suspicion of visual field defects should prompt the GP to refer the patient for further assessment and investigation.

Motor function and driving

Driving requires motor abilities and coordination. The natural process of aging involves a decline in muscle strength and endurance, flexibility, joint stability and coordination. Musculoskeletal problems are common in the elderly and are usually associated with reduced activities due to pain. This has further impact on muscle strength, coordination, joint movements and total physical function.

The assessment of motor function of the elderly driver should include:

- joint movements, with emphasis on cervical rotation and movement in the shoulder joints, wrists, hip joints and ankles

- motor strength is examined by asking the patient to resist the examiner’s movements. Motor strength should be recorded on a scale from 0 to 5 with:

Table 2. Driving recommendations: hypoglycaemic episodes and seizures*2

Medical condition	Recommendation
Angioplasty	Not driving for at least 2 days
Acute myocardial infarction	Not driving for at least 2 weeks
Deep vein thrombosis	Not driving for at least 2 weeks
Aneurism repair	Not driving for at least 4 weeks
Coronary artery bypass graft	Not driving for at least 4 weeks
Pulmonary embolism	Not driving for at least 6 weeks
Syncope	Not driving for at least 3 months
Epilepsy/seizures	Not driving for 6 months since diagnosis or 6 months seizure free period
Chronic epilepsy	2 years seizure free period or recommendation from neurologist
Type 2 diabetes, noninsulin required	If patient has no complications; subject to 5 yearly review
Insulin required diabetes mellitus	Subject to at least 2 yearly review
Hypoglycaemic episode	Not driving for 6 weeks if the reason is unknown and repeated episodes

* Addresses only private standards

- 0 – no muscular contraction detected
- 1 – a barely detectable flicker or trace of contraction
- 2 – active movement of the body part but not against gravity
- 3 – active movements against gravity
- 4 – active movements against gravity and some resistance
- 5 – active movements against full resistance

- patient’s coordination is tested by a rapid alternating movements test and point-to-point testing.

Rapid alternating movements testing can be performed by asking the patient to tap the distal joint of the thumb with the index finger as fast as possible. Observe the speed and rhythm of the movements and compare both sides. The dominant side usually performs better.

Point-to-point testing can be done by asking the patient to touch their nose and the examiner’s index finger. The finger can be moved so the patient can appropriately react to the change in direction.

Cognition and driving

The term ‘cognition’ refers to the mental processes involving gaining knowledge and comprehension: thinking, knowing, remembering, judging and problem solving.

Driving requires a high level of cognitive skills such as memory, sensory perception and attention. When we drive, the sensory stimuli are passed to sensory memory. From the sensory memory, information is passed to the short term or ‘working memory’. By attention, we are able to filter important signals and react accordingly. The working memory does not have great capacity; some of the information is passed to the long term memory for storage, and some is lost.

Visual perception and visiospatial skills are other important factors in driving. They help us have proper orientation in the space around the car. Without these skills, the driver will be unable to distinguish, for example, a stop sign and to determine its distance from the car.

When we drive, we are exposed to different stimuli, which are not static and can vary at specific points in time. The driver must prioritise and focus only on the important stimuli such as traffic signs and pedestrians. This requires attention, which can be affected by: other people in the vehicle, mobile telephones, drugs (*Table 3*) and some diseases (eg. dementia, depression, anxiety).

After all stimuli have been processed, the driver must make appropriate driving decisions. This process is dynamic and requires additional executive skills that allow the driver to respond accordingly to the stimuli, eg. stopping at a red light.

As part of the normal aging process, there is a global decline in cognition. Especially affected are the working memory, attention and executive skills. Cognition of elderly drivers can also be affected by medical conditions and medications. A review of the literature shows that crashes in which elderly drivers are involved, commonly occur in complex situations. This may suggest that cognitive overload plays a large role in the causation of the crash.⁵

Table 3. Drugs affecting the ability to drive¹¹

Effect	Drug	
	Stimulants	Amphetamines (speed, ecstasy, ephedrine, pseudoephedrine, phentermine (duromine))
	Depressants	Antidepressants (tryptanol, prothiaden)
Central nervous system		Antihistamine
		Benzodiazepines
		Barbiturates
		Antipsychotics
	Narcotics	Opiates (heroin, morphine codeine, methadone, propoxyphene)
	Cannabis	Marijuana
Antihypertensive	Verapamil, propranolol	
Anticonvulsants	Tegretol, phenytoin	

Function screening tests

The following cognitive function screening tests form an important part of the driving assessment.

Trail making test

Reitan has stated that the trail making test B (TMT B) (*Figure 1*) is one of the best measures of general brain functioning.⁶ The test assesses working memory, visual processing, attention and psychomotor

Figure 1. Trail making test B (TMT B)

Instructions: connect 1–A–2–B–3–C following the pattern until L–13. If completion takes over 3 minutes this should prompt a more detailed evaluation of driving ability

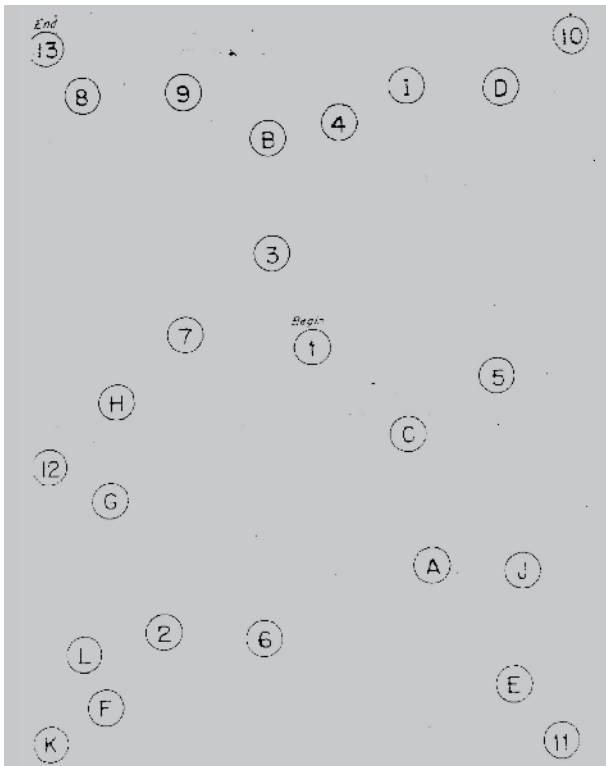


Table 4. Freund clock drawing test score card¹⁰

Time (3 points)	One hand points 2 (1 point)
	Exactly two hands (1 point)
	Absence of intrusive marks, eg. writing or hands point to incorrect time, hand points to 10, tic marks, time written in words (1 point)
Numbers (2 points)	Numbers are inside the clock (1 point)
	All numbers from 1–12 are present and there is no omission or duplication (1 point)
Spacing (2 points)	Numbers are spaced equally or nearly equally from each other (1 point)
	Numbers are spaced equally or nearly equally from the edge of the circle (1 point)

coordination. Numerous studies have demonstrated an association between poor performance in the TMT and poor driving skills.⁴

The American Medical Association recommends the TMT B to be completed in 3 minutes.⁴ Completion of the test over 3 minutes should prompt further evaluation of the patient's driving abilities and if necessary, referral for practical driving assessment.

Mini Mental State Examination

The Mini Mental State Examination (MMSE) is a cognitive screening test available on some computerised medical record systems.⁷ It has low predictive value for safe driving and the score should be used as an indication for further testing, not for the suspension or cancellation of a driving licence. Declining MMSE scores have been associated with driving cessation in patients with dementia.⁸ Studies indicate that a score of less than 20 is associated with higher crash risk.⁹

Clock drawing test

The clock drawing test (CDT) is a fast and reliable screening method for identifying risky drivers and is especially useful in evaluating multiple areas of cognitive function including comprehension, memory, visiospatial abilities, abstract thinking and the executive function.

The CDT is performed by asking the patient to: draw a clock, put all the numbers in, and set the time at 10 minutes past 10.⁷ Using the Freund CDT scoring scale (*Table 4*), the maximum score is 7 and scores of less than 4 have been linked to unsafe driving.¹⁰ Failing the test indicates the need for formal driving evaluation.

These screening tests are used as an indicator of cognitive decline, however failure is not an indication for suspension of a driving licence. Abnormal cognitive tests should prompt the physician to look at the patient's medical history and medications, and assess what impact they may have on the patient's cognition.

The overall assessment

Once the patient's vision, motor function and cognition are obtained, it is important to collect additional information about the patient's functioning (from relatives and neighbours). If doubt remains about the patient's driving safety, they should be referred for a practical driving assessment. These are performed by an occupational therapist trained in health and safety or by a motor driving school instructor. *Figure 2* provides an algorithm for the assessment process. If patients are high risk they should be advised to cease driving. This should be recorded in their patient notes. For patients with specific problems that increase their risk in certain situations, it may be appropriate to advise restrictions to their driving licence, such as day light driving only, limited distance from home, or the fitting of additional mirrors (*Table 5*).

Conclusion

After assessing the mental and physical condition of the patient, GPs are in unique position to anticipate how these conditions can

Figure 2. Algorithm for assessing fitness to drive

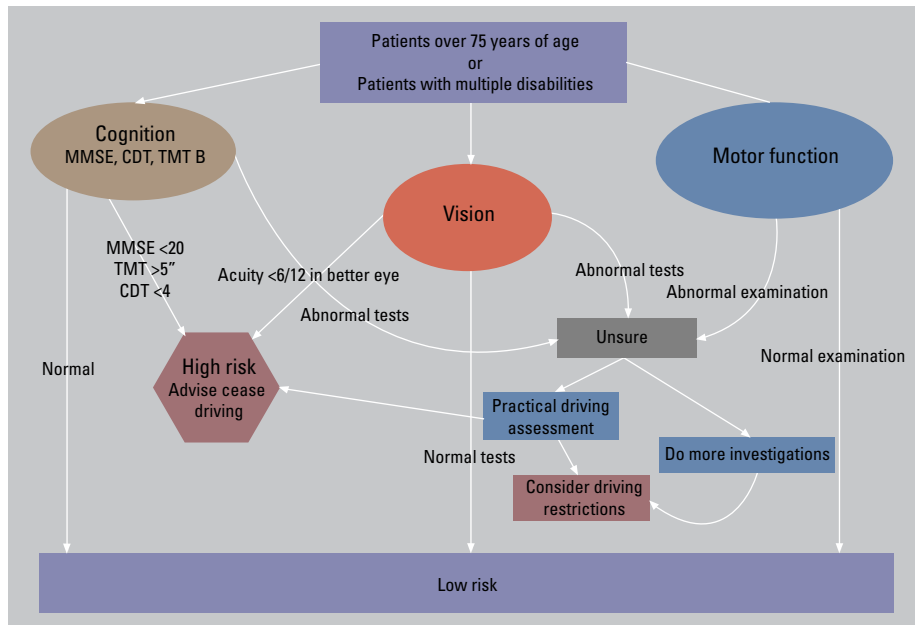


Table 5. Practical points in driving assessment

- Assess all patients over 75 years of age or younger patients with multiple disabilities
- Remember that the driver may not fully declare impairments if these work to their disadvantage
- Assess the patient's visual acuity and peripheral vision
- Assess the patient's motor function
- Assess the patient's cognitive function by TMT B, CDT or MMSE tests
- If unsure about the outcome of your assessment, refer to a colleague for a second opinion or to an occupational therapist for driving assessment
- If there are abnormalities in the patient's health assessment that may cause impairment, consider driving restrictions such as day light driving only, limited distance from home, fitting additional mirrors
- Record all examination findings in the patient's file
- Record all restrictions imposed on the patient's driving licence
- Record the period until the driving licence is granted
- Discuss openly your concerns about the risks involved if the patient continues to drive. Discuss alternative means of transportation
- Stand firmly behind your opinion and do not bend under intimidation from patients and/or their relatives

affect the patient's ability to drive. It is important to remember that a number of concurrent medical conditions may have additive or compounding detrimental effects on judgment and overall driving function. This is an important issue with older drivers who are likely to suffer simultaneous decline in a number of areas. It is important

to consider functional ability rather than make judgments based on chronological age.

The physician who assesses elderly drivers must have a good knowledge of their medical history and understanding about the impact of physical and cognitive decline on driving. What makes it harder is that there are few clearcut standards or valid measures to assess driving competency. If uncertain, referral for practical driving assessment is warranted.

Conflict of interest: none declared.

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