

Driver assessment: Uncertainties inherent in current methods

Physical examinations and screening tests conducted in a medical office have limited value when it comes to determining whether patients are fit to drive.

ABSTRACT: Even though it has proved difficult to develop a screening tool for older drivers that is evidence-based, valid, and clinically practical to administer, primary care physicians are still expected to assess fitness to drive in British Columbia. Currently, driver assessments conducted in physician offices include a physical examination and visual testing. Research indicates there are limitations inherent in these methods and it would be preferable to use a simulated driving test or the criterion standard, a road test, when assessing driver performance. Until it is possible to change the way we determine fitness to drive, physicians must remain aware of their legal responsibility to keep unfit-to-drive patients off the road and develop a more consistent assessment approach that includes an optometrist or ophthalmologist report and cognitive screening.

Although all provincial jurisdictions in Canada hold medical practitioners responsible for determining whether their patients are able to drive safely,¹ it has proved difficult to develop a screening tool for older drivers that is evidence-based, valid, and clinically practical to administer.² In a review by Molnar and colleagues to determine guidelines for screening and assessment of older drivers in a medical office, only level III evidence was found, and the authors concluded that “There is no evidence-based information to help physicians make decisions regarding medical fitness to drive.”^{2,3}

One research group has concluded that “in an area with considerable public health impact for drivers with dementia and other road users, the available literature fails to demonstrate the benefit of driver assessment for either preserving transport mobility or reducing motor vehicle accidents.”⁴

Assessing fitness to drive

A fitness to drive assessment needs to cover the triad of motor function, visual-spatial abilities, and cognition, with the overall assessment emphasizing functional abilities rather than medical diagnoses. In the Canadian Med-

ical Association publication, *Determining Medical Fitness to Operate Motor Vehicles: CMA Driver’s Guide*, virtually every section contains a clause saying that when there is any doubt concerning the patient’s ability to drive safely, referral for a road test should be considered.

Along with the fact that functional assessments are generally best performed by specialized practitioners, such as occupational therapists, physical medicine specialists, or physiotherapists, this fundamental directive raises the important question of whether the primary care physician working in the standard office setup is the best person to perform such assessments.

Concerning what functional assessments should be considered, one study has reported that no correlations were found between activities of daily living (ADL) and instrumental scores and ability to pass a simulated driving test.⁵

Physical examination

Although the most straightforward component of the triad might seem to be the standard systematic physical examination, it is not without dilemmas. A physical exam is primarily designed to detect the presence or

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absence of disease, not to assess function and safety: absence of disease does not translate to “fit to drive.” Does the patient’s physical presentation in the physician’s office relate to the physiological changes that occur and the motor functions required when driving a vehicle? Is observing a person enter a room, sit, stand, and, perhaps, climb onto an examination table sufficient to assess motor abilities? If not, is observing motor abilities a relevant part of an examination? Reaction time is, in part, a motor skill, but how often is it tested? And when it is tested, is the dropped ruler test sufficient and does it require a physician to conduct it?

Visual testing

Although minimum standards for visual acuity (VA) and field of vision are set out in fitness to drive guidelines, the question that has to be asked is how reliable and how consistently are the tests carried out? Visual acuity testing is often performed by ancillary staff in office corridors with no defined requirement for the level of lighting.

Intervention has been advised with VA scores less than 20/40, but additional studies have shown there is no increase in crash risk between drivers with scores of 20/40 and 20/70,^{6,7} suggesting that testing static acuity may have limited value.

At best, the standard confrontation test for field of vision is dependent on the examiner’s own field of vision and has been reported as only 35% sensitive and as “inadequate” for detecting visual field deficits.⁸ As useful as field of vision has been shown to be a measurable risk factor for crashes, especially at intersections, can a test of questionable reliability be a sufficient assessment for safe driving, and can it ever be properly conducted in the primary care physician’s office?

Though acknowledged as important, both contrast sensitivity and accommodation to changes in illumination are excluded in the visual examination.⁹ Both these abilities, which relate to recovery from glare, decline with age and are important faculties for safe nighttime driving.

ponents of driving ability, it has been shown that drivers with Alzheimer disease (AD) underestimate their memory problems while the healthy elderly overestimate their problems when these are compared with ratings by informants.¹² In one study, drivers with AD reported significantly better

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British Columbia mandates a medical examination at age 80 and every 2 years thereafter to maintain a class 5 driver’s licence.¹⁰ Prior to 80 years, and setting aside guideline absolutes, it is left to physician discretion to report any patient thought to be unfit to drive, whether because of other medical diagnoses or cognitive decline.

Good cognitive ability is the foundation of competent driving.¹⁰ Executive function, which encompasses goal-directed and self-regulated behavior such as strategizing, organizing, attention, and planning, is a major component of cognitive ability.

Unfortunately, studies consistently show that physicians miss cognitive impairment in over 50% of cases where it exists.¹¹ Although the *CMA Driver’s Guide* suggests a format for questioning some cognitive compo-

performance scores than did their evaluators on 7 of 10 items,¹² indicating that those with cognitive dysfunction have reduced insight into their own abilities.

A current flavor of medical focus on the elderly is cognitive decline—anything from mild cognitive impairment (MCI) to fully developed dementia. Estimates are that dementia risk is 1% under 65 years and then doubles for every 5 years of age, so that by 80 years the risk is 16%: those percentages double again with any coexisting vascular risk factor or if there is a family history of dementia.¹¹ With our current threshold for accepted vascular risk factors, how many of the elderly don’t have at least one?

The prevalence of cognitive impairment is estimated at 10% between ages 65 and 74 and 32% between 74

and 84. Some researchers estimate that 2.5% of elderly drivers have dementia of some kind and 50% of patients with dementia are said to be undiagnosed.¹³ In one study, drivers with dementia had crash rates 2 to 5 times greater than age-matched controls.¹⁴

For these reasons alone, it would seem that leaving mandated assessment until age 80 is a bit late, and we might want to review the age criteria for initiating testing. For example, an Australian recommendation is that cognitive screening be done on all patients older than 70 who continue to drive.⁹

Mini-Mental State Exam

In British Columbia, the formalized cognitive screening test designated under the neurology section of the assessment form is the Mini-Mental State Exam (MMSE). However, there are differences both in opinion and in study results concerning the value of the MMSE as a predictor of driving performance. A Canadian review of driving and dementia states that the MMSE “is inadequate as a predictor of on-the-road driving performance because it was not designed to assess cognitive function with respect to driving.”⁹

Further, the MMSE is not thought reliable for detecting MCI and, with the exception of some attentional tasks required, it does not test for executive function. In addition, a low level of education can adversely affect the score.

It has also been reported that MMSE total scores and driving performance are not strongly correlated, which may reflect that the exam focuses on gross cognitive function and may not be sensitive to mild impairments that can compromise driving competency.^{15,16} Despite these limitations, no one with a score of 19 or less on MMSE testing has passed a simu-

lated driving test or road test,⁵ and the recommendation is that anyone with a score between 19 and 24 should be referred for a driving test.¹⁷ However, this does not mean that someone with an MMSE score greater than 24 is safe to drive.

Other screening instruments

Many of the cognitive screening formats available propose cut-off scores for the degrees of severity of cognitive impairment. Some of the authors and researchers who have assessed testing formats claim validity; others do not.

One study found that the physician’s and neuropsychologist’s predictions were not significantly correlated with road test results, and that neuropsychological test scores were not predictive of road test performance.¹⁸ Another concluded that when taken as a whole, results for a neuropsychological testing battery were not strongly correlated to driving performance, but that when tests measuring specific areas such as visual-spatial and attention skills were separated from the entire battery, the correlation between driving performance and cognitive testing results improved.¹⁹

At the difficult end of the test applicability range is the Clinical Dementia Rating (CDR) scale, which the American Academy of Neurology says is a reliable and valid instrument, but is impractical for the practising physician to administer. There are alternatives to the MMSE, and the Montreal Cognitive Assessment (MoCA) has been shown to have greater sensitivity and specificity as well as an ability to detect cognitive decline at an earlier stage.^{20,21}

Despite its simplicity, the recently developed Test Your Memory (TYM) instrument is reported to be more sensitive for detection of Alzheimer disease than the MMSE, detecting 93%

of patients compared with 52% for the MMSE.²² A simple visual recognition test of 10 selected roads signs has been shown to reliably predict the ability to pass a road test, with a score of 7 or less accurately predicting failure.^{23,24} Traffic signs incorrectly identified by drivers with dementia included “no passing zone,” “yield,” and “stop,” with 76% failing to correctly identify a stop sign and only 45% able to identify a sign for no passing.²³

The simplicity of these tests returns us to the question of primary care physician involvement: if a screening test for driving is undertaken, are physician skills needed to conduct it? The TYM test can be self-administered and still remain valid, and other screening tests can, after simple training, be administered by non-physician personnel.

Applying assessment results

Whatever overall assessment is undertaken, the findings should lead to one of three designations: pass/safe to drive, fail/unsafe to drive, and indeterminate/requiring further testing.³ The assessment itself could be tripartite: visual function conducted by those with adequate equipment (e.g., optometrists or ophthalmologists), cognitive testing by a formalized screening scale and conducted by trained personnel, and a physician exam for those medical diagnoses clearly designated as prohibiting driving. Individuals who fail visual standards should not drive. Those with severe cognitive impairment should not drive or should be referred for a simulated driving test or road test to assess their driving ability. In British Columbia, simulated driving tests can be conducted via the DriveABLE program, usually at the driver’s expense, but with some coverage when specifically requested by a physician.

Any physician-conducted medical examination to ascertain medical diagnoses incompatible with safe driving should be the final, not the first, component of a fitness to drive assessment. The view of this author is that driver assessment should be organized and run under provincial Offices of Superintendents of Motor Vehicles (OSMV) and not involve primary care physicians at all. Unfortunately, even though it is the provincial motor vehicle authority that withdraws the licence, patients will perceive “my doctor took my licence away” and the doctor-patient relationship can be adversely affected. Another aspect of that relationship can lead to the doctor approving driving privileges when an otherwise uninvolved assessor would not permit this.

A practical alternative would be to set aside the current physician-based assessment model and simply conduct simulated driving tests, supplemented by road tests where ability remains in the indeterminate range: “a standardized road test is preferable to neurological testing, a medical examination, or a mental status examination alone in determining driver competence in AD patients.”¹⁸

Errors committed during a simulated driving test that have been found to correlate with road test failure are lane boundary crossings and driving more slowly,²⁵ and deficiencies in speed control, changing lanes and signalling, qualitative judgments, and reacting to other drivers.²⁶

Study information suggests we should question the usefulness and reliability of physician-conducted medical examination and neuropsychological testing as predictors of driving competence over functional road or simulated driving tests. Information also suggests that an initial abbreviated simulator screening test could be designed to indicate pass,

fail, or requiring a more comprehensive test.

Conclusions

As it is unlikely that the current driver assessment model will change any time soon, physicians should develop a more consistent approach when assessing fitness to drive. For instance, any patient scheduling an appointment for driver assessment should be asked to provide:

- An optometrist or ophthalmologist report on visual acuity and field of vision tests conducted within the previous 6 months.
- A list of medical diagnoses and any prescribed or over-the-counter medications currently being taken.

Patients should also be advised about the process:

- For those over 65 years of age, the visit will initially involve some form of brief memory test (e.g., the TYM), which may be followed by a more extensive test if there is any doubt about the result.
- The physical examination will focus on medical conditions that are thought to affect the ability to drive safely and that are outlined in the *CMA Driver's Guide*.

Physicians should keep in mind that the precedent has been set where-

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by they can be held legally responsible in suits related to motor vehicle accidents involving their unfit-to-drive patients, even when the physician did not know that the patient was still driving.^{27,28}

Since the behind-the-wheel test has been identified as the most appropriate method to determine driving competence, is the current criterion standard,²⁹⁻³¹ and assesses real-world behaviors, it would be reasonable to attempt to move toward a model based on this approach and remove the uncertainties inherent in current assessment methods.

When considering community safety, does it matter why someone is unfit to drive? If drivers cannot pass a behind-the-wheel test, they should not be on the road.

Competing interests

None declared.

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