



The high and increasing crash rates of older drivers is of growing concern, and the role of physicians is coming under greater scrutiny. This is because age *per se* is unlikely to be the cause of many older driver crashes. The more likely causes are medical conditions, and physicians are well placed to identify patients with medical conditions that may impair the ability to drive safely. Although guidelines are available, these have limitations which reduce their utility in daily practice. This review discusses these limitations and suggests different approaches that are appropriate for evaluating fitness-to-drive for medical conditions having acute episodes vs. chronic outcomes.

Key words: fitness-to-drive, driving assessment, older drivers, physician responsibilities and driving.

Considerations for Assessment of Medical Competence to Drive in Older Patients

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Crash injury and fatality rates of older drivers are a growing cause for concern. In Canada, injury and fatality crashes of senior drivers increased 47% between 1979 and 1995.¹ To put this in context, the crashes of younger Canadian drivers decreased 8% in that time period. In the U.S., the statistics are similar: fatality crashes of drivers 70 years or older increased 42% between 1987 and 1997, whereas those for the total population decreased by 8%.² Although there are changes in mental and physical abilities that accompany normal aging, it is unlikely that age-related changes *per se* are the cause of many older driver crashes. It is much more likely that the more pronounced changes associated with medical conditions are the real causes of driving impairments.

In Canada, most provinces require physicians to report patients who may be medically unfit to drive (Table 1). Guidelines to assist physicians in these decisions are available, such as the Canadian Medical Association's *Guidelines for Physicians in Determining Medical Fitness to Drive*, and the American Medical Association's *Physician's Guide to Assessing and Counseling Older Drivers*.^{3,4} However, these guidelines do have limitations, some of which are discussed here.

Limitations of Medical Guidelines for Evaluating Fitness-to-drive

Perhaps the single most limiting problem with medical fitness-to-drive guidelines is that the recommended action for any medical condition is based on the presumption that the patient has only that one medical condition. Unfortunately, it is the rare older patient who does not have several chronic medical conditions and multiple prescribed and over-the-counter medications. The ultimate effect of any medical condition will be a combination of comorbidities, medications, dosage and age of the patient. Unfortunately, this means that the most typical situation is beyond the scope of available guidelines.

Patients with cognitive impairment provide the most challenging situations for decisions about driving competence and safety. To provide some assistance in this regard, the Canadian Medical Association (CMA) guidelines recommend the use of the Mini-Mental State Examination (MMSE),⁵ and specify cut-off scores for taking different actions. With a score below 24, for example, the recommendation is that the person is ineligible to hold a driver's license of any kind pending a complete neurological assessment.

There are two problems with the CMA guidelines. First, neurologists lack sufficient tools to make evidence-based decisions about driving competence in the

case of cognitive impairment. Moreover, if every patient with an MMSE score of less than 24 was sent to a neurologist for further assessment, this scarce resource would be unnecessarily usurped. The second problem is that there is no evidence to support the use of any specific MMSE score as a basis for driving decisions. Several studies have found less than a one-point difference in MMSE scores between patients with and without crashes.⁶⁻⁸ In an extensive study of older Finnish drivers, 78% of those who scored 25 or higher on the MMSE were involved in crashes and there was a mean MMSE of 27.7 among those involved in crashes.⁹ A score of 25 or higher should therefore give no comfort that the patient is competent to drive.

The CMA guidelines do say that persons with MMSE scores of 25 or greater should be evaluated for driving ability if they are suspected of having poor judgment, poor reasoning, poor abstract thinking or poor insight. Perhaps a more prudent recommendation would be that

any patient with these suspected declines should be evaluated for driving ability, regardless of MMSE score. What is left unspecified in these guidelines is the nature of the evaluation for driving ability, which will be addressed later in this review.

The Categorization of Medical Conditions

Although a “systems” approach (e.g., cardiovascular, neurological) is most typical for fitness-to-drive guidelines, it may be more helpful to regard medical conditions as fitting into two categories based on whether the outcome of concern for driving is acute or chronic. This is an important distinction because the most appropriate and effective procedures for assessing driver competence are different for acute and chronic conditions. A summary of these categories of medical conditions is provided in Table 2, and a fuller discussion follows. It should be noted that some medical conditions, such as dia-

betes, congestive heart failure and chronic obstructive pulmonary disease, can have outcomes that fit both categories.

Medical Conditions with Acute Episodes

Many medical conditions can result in acute episodes that render the driver unquestionably unsafe and incompetent when the episode occurs. These include seizures, myocardial infarction and hypoglycemic episodes. The challenge in these situations is to predict how likely it is that the episode will occur. The research is far from adequate to provide truly evidence-based decision making. However, consensus guidelines provide information that can assist the physician in deciding on a course of action. For example, the CMA guidelines suggest acute myocardial infarct patients should have a waiting period of one month post-MI, stable angina pectoris patients should have no additional restrictions, and bary aneurysms are an absolute barrier to driving any class of motor vehicle.³

Following guidelines, such as those of the CMA, in cases of illnesses limited to acute episodes also provides the physician with some basis for risk management. Even in these cases, however, the guidelines have shortcomings that limit their usefulness in everyday practice. As discussed above, the most critical one has to do with comorbidities and multiple medications that can severely alter the likelihood of an acute episode. Unfortunately, in the case of medical conditions with acute episodes, the guidelines in combination with clinical experience are the best that is available.

Medical Conditions with Chronic Outcomes

The situation is very different when medical conditions have chronic, relatively stable outcomes. With chronic conditions, there is no issue of predicting the likelihood of an “episode”, as the outcome is ongoing. The concern regarding conditions with chronic outcomes is whether or not the patient is competent to drive given the functional decline associated with the medical condition(s). The

Table 1: Physician Reporting Requirements and Physician Protection, by Province

Province	Responsibility for Physician Reporting	Legislated Protection for Physicians
Alberta	Discretionary for MD; mandatory for patient to report change in medical condition	Yes
British Columbia	Mandatory if patient continues to drive after being warned	No
Saskatchewan	Mandatory	Yes
Manitoba	Mandatory	Yes
Ontario	Mandatory	Yes
Quebec	Discretionary	Yes
New Brunswick	Mandatory	Yes
Nova Scotia	Discretionary	Yes
Prince Edward Island	Mandatory	Yes
Newfoundland	Mandatory	Yes
Northwest Territories	Mandatory	Yes
Yukon	Mandatory for both physician and patient	Yes
Nunavut	Mandatory	Yes

Table 2: A Re-categorization of Medical Conditions in Terms of Acute vs. Chronic Outcomes

	Acute Conditions	Chronic Conditions
Definition	Effects are sporadic and unpredictable.	Effects are relatively stable and enduring.
Examples	Epileptic seizure, syncope, hypoglycemic reaction.	Diabetic retinopathy, congestive heart failure.
Course of action for determining if patient should be driving	If singular problem, follow CMA guidelines. If comorbidity problems (age, other medical conditions, multiple medications), these add complexity beyond guidelines. Clinical judgment necessitated.	Changes can be measured. Driving assessment recommended.

importance of chronic outcomes is that they are directly measurable through an appropriate and effective assessment of the person’s ability to drive.

The most challenging cases are patients with more subtle cognitive impairment. Table 3 provides a listing of medical conditions that serve as “red flags”, alerting the physician that a focused examination for ability to drive is necessary.^{10,11} The presence of these medical conditions does not indicate that the patient is no longer competent to drive. The most judicious action is to send patients with questionable competence for a driving evaluation. Physicians can rely on available indices of cognitive or functional decline, their clinical judgment and consultations with family members to help make the referral decision. Considerable caution should be exercised in relying on the patient’s own judgment about their ability to drive safely. When cognitive abilities are affected, insight into performance often declines. Research has found that a group of patients with dementia rated their driving ability as being superior to that of a group of matched, healthy controls.¹²

Driving Evaluations

In-car assessments should provide the best measure of current driver fitness. Yet, not all driving assessments are the same and some may even be misleading. By default, the standard road test given to

entry level drivers is undoubtedly the most widely used in North America. However, despite the widespread use of entry level provincial or state road test procedures, these evaluations are of limited utility for assessing the competence of medically impaired, experienced drivers. The entry level driver’s test was designed to evaluate basic skills being developed in novice drivers. This emphasis can be problematic for evaluating the competence of experienced drivers because basic, over-learned skills may be preserved in drivers with cognitive decline. Moreover, the scor-

ing procedures are based on “rules of the road”, and many experienced, cognitively competent drivers make errors that violate these rules (e.g., rolled stops, speed) and thus risk being falsely identified as incompetent. Unpublished findings from our own research have shown that almost 30% of healthy older drivers would have failed the entry level driving test using the Alberta criteria.

Many jurisdictions have driver rehabilitation specialists, which most often are occupational therapists located within hospital facilities. These professionals are especially skilled in physical rehabilitation and/or modifying a vehicle to accommodate the person’s physical disability. The driving tests are developed based on their professional judgment but have not been developed or validated through science.

The challenge of developing an evidence-based evaluation was put to the research group of the principal author in the early 1990s. The goals were to: (1) develop a scoring system based on the discovery of the driving errors that are associated with cognitive decline and excluding those errors shown to be “bad habits” of experienced, competent drivers; (2) identify the attributes of a road course that reveal the competence-defining driving errors of medically impaired

Table 3: Examples of Illnesses and Medications Acting as “Red Flags” for Driving Impairments

Cardiovascular disease (e.g., congestive heart failure, cardiac arrhythmia, valvular heart disease, hypertrophic cardiomyopathy, artificial cardiac pacemakers).
Cerebrovascular disease (e.g., cerebral vascular accidents).
Neurological disease (e.g., head injury, Parkinson’s disease, multiple sclerosis, tumour, narcolepsy, sleep apnea).
Respiratory disease (e.g., chronic obstructive pulmonary disease, respiratory failure).
Metabolic disease (e.g., diabetes, hypothyroidism).
Renal disease (chronic renal failure).
Dementia (e.g., Alzheimer disease, multi-infarct dementia, frontal temporal dementia, Picks, Huntington’s, alcoholic dementia).
Psychiatric illnesses (e.g., schizophrenia, depression, chronic alcoholism, personality disorder).
Medications (e.g., antidepressants, antihistamines, analgesics, sedatives, hypnotics, anxiolytics, stimulants, some antihypertensives).

Table 4: Locations and Contact Information for DriveABLE Assessment Centres

DriveABLE in New Westminster	Saint Mary's Hospital 220 Royal Ave. New Westminster, BC V3L 1H6	Phone: 604-527-3236
DriveABLE in Victoria	1964 Fort Street, Suite 210, Victoria, BC V8R 6R3	Phone : 250-595-4414
DriveABLE in Vancouver	Suite 300, 2497 Marine Drive, West Vancouver, BC V7T 1B8	Phone: 604-921-3355
DriveABLE at Holy Family Hospital	Providence Health Care, 7801 Argyle Street, Vancouver, BC V5P 3L6	Phone: 604-321-2661
DriveABLE Assessment Centres Inc.	Suite 202, 10050-112 Street, Edmonton, Alberta T5K 2J1	Phone: 780-433-1494
DriveABLE in Calgary	25C Haysboro Plaza, 9620 Elbow Drive SW, Calgary, Alberta T2V 1M2	Phone: 403-252-2243
DriveABLE Program	Seniors Bridges Program, Chinook Health Region Unit 207, 200-4th Ave. South, Lethbridge, Alberta T1J 4C9	Phone: 403-317-1463
DriveABLE in Red Deer	Rehabilitation Services, Red Deer Regional Hospital 3942-50A Avenue, Red Deer, Alberta T4N 6R2	Phone: 403-309-6180
DriveABLE in Medicine Hat	2805-13th Ave. SE, Medicine Hat, Alberta T1A 3R1	Phone: 403-528-4860
DriveABLE in London	Parkwood Hospital, RoomA241, Geriatric Day Hospital 801 Commissioners Road, London, Ontario N6C 5J1	Phone: 519-685-4028
DriveABLE in Windsor	Windsor Regional Hospital, Geriatric Assessment Program 1453 Prince Rd., Windsor, Ontario N9C 3Z4	Phone 519-257-5112
DriveABLE in Toronto	Saint Elizabeth Health Care, 2 Lansing Square, Suite 600 North York, Ontario M2J 4P8	Phone: 416-498-3805 Ext. 2295
DriveABLE in Nova Scotia	The Physioclinic, Spring Garden Road, Lord Nelson Arcade Halifax, NS B3J 1H1	Phone: 902-423-2605
West Melbourne, Florida	East Central Florida Memory Disorder Clinic 1934 Dairy Road, West Melbourne, FL 32904	Phone: 321-768-9575
Boca Raton, Florida	Florida Atlantic University, 1551 West Royal Palm Road Boca Raton, FL 33486	Phone: 561-297-4235
St. Petersburg, Florida	AAA Pascas-Pinella, 9887-4th North, Ste. 100 St. Petersburg, FL 33702	Phone: 727-570-9696 Ext. 234
Osceola, Florida	Osceola CCA, 1099 Shady Lane, Kissimmee, FL 34744	Phone: 407-846-0413
Orlando, Florida	Senior Resource Alliance, 988 Woodcock Road, Suite 200 Orlando, FL 32803	Phone: 407-228-1800

Additional DriveABLE Centres will open in early 2004: Toronto, Guelph, Sarnia, Owen Sound, Mississauga, Kingston and Ottawa

drivers; and (3) define a criterion for “unsafe to drive” that is based on normative driving error data of competent and impaired drivers. By the late 1990s, these goals were accomplished and a driving evaluation was developed using that information. Two safety factors were introduced because many cognitively impaired drivers are very dangerous drivers and the in-car driving evaluation is given on public roadways. First, the

evaluation is always given in a vehicle with a dual breaking system that enables evaluator intervention. Second, an in-office cognitive evaluation was developed that is highly accurate in identifying the most dangerous drivers without the need for in-car testing. These findings have now been taken from research to practice,¹³ as the scientific basis of the evaluation has made it attractive to medical and licensing communities. The

availability of the assessment, known as DriveABLE, along with contact information, is provided in Table 4.

Other Physician Concerns

Physicians often fear that approaching the driving issue will result in the loss of patients. This concern seems to be most widely held in rural communities where older patients are a significant proportion of a physician's practice. A systematic

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interview study by the principal author of the caregivers of 117 drivers who had been counselled to stop driving based on outcomes of the DriveABLE evaluation showed that none of those patients had changed physicians. Although physician changes may sometimes occur, it appears that addressing the driving issue, at least when a justifiable “arms-length” assessment is used, does not lead to the loss of patients.

Referring the relevant patients for an independent driving evaluation provides the physician with “arms-length” information as well as helps to reduce the patient’s perception that their physician is responsible for the assessment outcome. Risk management is becoming increasingly important and this necessitates documentation of discussions and actions pertaining to patients having medical conditions that could make them unsafe, dangerous drivers. Finally, reporting to the licensing authority patients who are known or suspected of being unsafe to drive does not inappropriately violate confidence, nor should it be seen as unduly punitive to patients. It is better viewed as part of a needed injury prevention program. ◆

References

1. Transport Canada. Canadian motor vehicle traffic collision statistics. (in cooperation with the Canadian Council of Motor Transport Administrators–CCMTA), 1979-1995. Database of design guidelines for usability of systems by elderly and disabled drivers and travelers, TELSCAN, 1997. Ottawa, Canada.
2. U.S. National Highway Traffic Safety Administration, Department of Transportation, Report # HS 808 769.
3. Canadian Medical Association. Guidelines for physicians in determining medical fitness to drive. 2000.
4. American Medical Association. Physician’s guide to assessing and counseling older drivers. 2003.
5. Folstein, MF, Folstein, SE, McHugh, PR. “Mini-mental state”. A practical method for grading the cognitive status of patients for the clinician. *J Psychiat Res* 1975;12:189-98.
6. Friedland RP, Koss E, Kumar A, et al. Motor vehicles crashes in dementia of the Alzheimer type. *Ann Neurol* 1988;24:782-6.
7. Gilley DW, Wilson RS, Bennett DA, et al. Cessation of driving and unsafe motor vehicle operation by dementia patients. *Arch Intern Med* 1991;151:941-6.
8. Lucas-Blaustein MJ, Filipp L, Dungan C, et al. Driving in patients with dementia. *J Am Geriatr Soc* 1988;36:1087-91.
9. Johansson D. Older automobile drivers: Medical aspects. Unpublished Doctoral Dissertation, 1997, Karolinska Institutet, Stockholm.
10. McCracken PN, Triscott JAC, Dobbs AR. Driving with dementia. *The Canadian Alzheimer Disease Review* 2001;4:14-20.
11. Triscott JAC, McCracken PN, Dobbs AR. Assessment of the older driver. *Can J CME* 2001;13:73-183.
12. Dobbs BM, Dobbs AR. Forced driving cessation: Predictors of non-compliance. The 26th Annual Scientific and Educational Meeting of the Canadian Association on Gerontology, Calgary, October 1997.
13. DriveABLE Assessment Centres Inc., www.driveable.com developed with notable financial assistance from the Industrial Research Assistance Program of the National Research Council and the Technology Commercialization Program of the Alberta Heritage Foundation for Medical Research. The author is the founder and president of DriveABLE.