

CHAPTER 4 CLINICAL INTERVENTIONS

Key Points

- The goal of clinical evaluation is to identify, correct, or stabilize any functional deficits that may impair the older adult's driving performance and to consider referral to a driver rehabilitation specialist (DRS), if appropriate
- Screening for visual field cuts is important, because most older adults with visual field loss are unaware of the deficit until it becomes quite significant.
- Failure to pass any measure of cognition in the Clinical Assessment of Driver-Related Skills (CADReS) toolbox should elicit a referral to provide opportunities for older adults to optimize cognitive function and perhaps explore their potential to continue to drive safely. Local resources will vary and may include occupational therapy, speech-language pathologists, neuropsychologists, driving rehabilitation specialists, or other medical specialists.
- If the only problems are with motor and/or somatosensory areas, these individuals should be referred to a DRS to take advantage of advancements in technology and possible adaptive equipment for the vehicle.

Despite encouragement, Mr. Phillips (introduced in previous chapters) hesitates to go through the assessment tools you recommend from the Clinical Assessment of Driver Related Skills (CADReS) toolbox. He states, "I don't see the need for it." You discuss your concerns for his safety and explain how to access NHTSA's Driving Safely While Aging Gracefully online self-assessment as well as provide a copy of the Am I a Safe Driver? handout to take home (www.nhtsa.gov/people/injury/olddrive/Driving%20Safely%20Aging%20Web/index.html). You also counsel Mr. Phillips using The Hartford's We Need to Talk brochure (www.thehartford.com/mature-market-excellence/family-conversations-with-older-drivers). Mr. Phillips agrees to allow his son to observe his driving, and you advise the son on how to access the online Fitness-to-Drive screening measure (<http://ftds.php.ufl.edu/>) as well as a print copy of NHTSA's How to Understand & Influence Older Drivers (or the How to Assist the Older Driver handout (see Appendix B).

You document all of this in Mr. Phillips' record and schedule a follow-up appointment. At Mr. Phillips' next visit, you ask him if he has had a chance to review the materials provided on his last visit. He admits that he had another close call while driving, and his son states he observed several driving errors, including turning left in front of an oncoming vehicle. These events have motivated Mr. Phillips to complete the self-assessment. He believes the self-assessment recommendation for further evaluation is a reasonable idea and is now willing to be assessed. From the CADReS toolbox, Mr. Phillips takes 11 seconds to perform the Rapid Pace Walk. His visual acuity is 20/50 on the right and 20/70 on the left. He has limited range of motion on neck rotation, but his ankle plantar flexion and dorsiflexion are within normal limits. It takes him 182

seconds to complete the Trail-Making Test, Part B, and his clock-drawing test is scored as "normal" for all seven criteria.

Now that Mr. Phillips has been assessed, what does his performance indicate? This chapter provides information to support interpretation of CADReS assessment outcomes. However, recommendations stated here are subject to individual State reporting laws and State licensing agency requirements. Links to individual State requirements are provided in chapter 8. Examples of interventions that may help manage and treat any functional deficits identified through CADReS are also provided.

Remember that the goal of clinical evaluation is to identify, correct, or stabilize any functional deficits that may impair the older adult's driving performance and to refer to a DRS, if appropriate (see Chapter 5). Contributing medical conditions, and potential medication effects as discussed in the Beers criteria¹ are discussed further in chapter 9.

The Clinical Assessment of Driver-Related Skills (CADReS)

Motor and sensory ability, vision and cognition are all important for driving. However, they may not be equally important for a particular older adult. Depending on the older adult's medical conditions, one area of function may warrant greater attention than another. Depending on the assessment outcome in each area, the outcome action may be different.

Vision

Screening for visual field cuts is important, because most older adults with visual field loss are unaware of the deficit until it becomes quite significant, especially if their medical condition warrants examination (e.g., stroke, macular degeneration). In most cases, referral to an eye specialist is the best outcome if there is any cause for concern.

Contrast sensitivity is a good screen for all older adults, followed by providing appropriate education and information to the older adult driver and caregiver on how to compensate for a deficit. A problem solely with contrast sensitivity does not merit a report to the State licensing agency.

Visual Acuity: Although many States currently require far visual acuity of 20/40 for an unrestricted license, there is little evidence that links static visual acuity to crash risk. In fact, studies undertaken in some States have demonstrated that there is no increased crash risk between 20/40 and 20/70, resulting in several new State requirements.² However, some studies have found that States that require visual testing for license renewal for older adults have lower crash rates.^{3,4}

General recommendations on visual acuity and driving are given below, but note that they are subject to each State's licensing requirements.

For corrected visual acuity worse than 20/40 (i.e., more impaired), the clinical team member should:

- Refer to a vision specialist (ophthalmologist or optometrist) for diagnosis and treatment (if possible) of the underlying cause of vision loss. The older adult should obtain and use the appropriate glasses or contact lenses. If the older adult is not currently under the care of a specialist, referral is recommended.
- Recommend that the older adult reduce the impact of decreased visual acuity by restricting travel to low-risk areas and conditions (e.g., familiar surroundings, non-rush hour traffic, low speed areas, daytime, and good weather conditions). We recognize that the evidenced-based literature on restriction is equivocal, but still believe this to be good practice.
- Be aware that the older adult may require more frequent (e.g., yearly) assessment of visual acuity to detect further visual decline caused by chronic, progressive diseases such as age-related macular degeneration and glaucoma.

For corrected visual acuity worse than 20/100 (i.e., more impaired), the clinical team member should:

- Follow the recommendations above.
- Recommend that the older adult not drive unless safe driving ability can be demonstrated in an on-road assessment performed by a DRS, where permitted and available. Check to see if low-vision driving rehabilitation is available in your area.

Visual Fields and Contrast Sensitivity: Research shows that visual field loss can significantly affect driving safety. In a study of 10,000 volunteer California license applicants, visual fields deteriorated significantly among drivers >60 years old. In addition, drivers with binocular visual field loss had driving crash and conviction rates more than twice as high as age- and gender-matched drivers with normal visual fields.⁵ In another study, most drivers with moderate binocular visual field loss (i.e., horizontal field ranging from 78 to 165 degrees) displayed acceptable on-road driving skills.⁶ Recently, in studies focused on a more homogeneous group of older adults with a specific condition known to impair visual fields (e.g., glaucoma), increased crash risk was correlated with moderate to severe field defects.^{7,8}

Although an adequate visual field is important for safe driving, there is no conclusive evidence to define “adequate.” Most likely, this varies widely from person to person and may depend on the presence of other comorbidities. For example, a driver with a restricted visual field but excellent scanning ability may drive as safely as a driver with an unrestricted visual field but poor neck rotation.⁹ Screening for visual field cuts is important, because most older adults with visual field loss are unaware of the deficit until it becomes quite significant, especially if their medical condition warrants examination (e.g., stroke, macular degeneration).

General recommendations on visual field and driving are stated below. Physicians and other clinical team members should be aware of and adhere to their States’ specific visual field requirements.

For visual field defects noted on confrontation testing, the clinical team member should:

- Refer to a vision specialist (ophthalmologist or optometrist) for diagnosis and treatment (if possible) of the underlying cause of vision loss. In addition, automated visual field testing may help define the extent of the defect; ophthalmologists have a number of useful instruments for measuring visual fields.
- For older adults with a binocular visual field of questionable adequacy (as deemed by clinical judgment), strongly recommend an on-road assessment performed by a DRS. Through driving rehabilitation, the older adult may learn how to compensate for decreased visual fields. In addition, the DRS may prescribe equipment such as enlarged side- and rear-view mirrors and train the older adult in their use.
- Consider contrast sensitivity testing, which is a good screen for all older adults, followed by providing education and information to both the older adult driver and caregivers on how to compensate for a deficit by minimizing low-light driving conditions (at night, in bad weather). Vision specialist referral is desirable, but a problem solely with contrast sensitivity does not merit a report to the State licensing board.

Visual fields may need to be retested in the future for visual field defects caused by chronic, progressive diseases.

Cognition

Screening for cognitive deficits is essential, along with careful interpretation of the findings. There is clear evidence that the Mini-Mental State Exam is not related to outcomes in crashes or driving abilities.^{10,11} However, the tools recommended in the CADreS have been particularly chosen to provide reasonable information in the office-based setting on skills known to be related to driving. Any cognitive screen that clearly demonstrates the older adult has moderate or severe cognitive impairment is sufficient evidence for a provider to recommend driving cessation.¹² No further referral is necessary for evaluation of driving performance. A referral to a general practice occupational therapist for further evaluation of IADLs or to a neuropsychologist for appropriate testing and diagnosis is warranted and may be an important resource for improving or extending quality of life and safe mobility.

For older adults with mild cognitive impairment or early dementia (with or without motor impairment), more information should be obtained to explore the reversibility of the cognitive impairment, the etiology and the potential and strategies for compensation, if memory loss is not severe. Failure to pass any measure of cognition in the Clinical Assessment of Driver-Related Skills (CADreS) toolbox should elicit a referral to provide opportunities for older adults to optimize cognitive function and perhaps explore their potential to continue to drive safely. Local resources will vary and may include occupational therapy, speech-language pathologists, neuropsychologists, driving rehabilitation specialists, or other medical specialists. Although the following cognitive tests are scored separately, interventions are recommended if the older adult reaches designated cut-off values (as described below) on any of them. Potential

interventions will vary depending on the area of cognitive impairment demonstrated (impulsiveness, judgment, memory, visuospatial, etc.).

Montreal Cognitive Assessment (MoCA): The MoCA was designed as a rapid screening instrument for mild cognitive dysfunction. It assesses different cognitive domains: attention and concentration, executive functions, memory, language, visuoconstructional skills, conceptual thinking, calculations, and orientation. Time to administer the MoCA is approximately 10 minutes. The total possible score is 30 points; a score of 26 or above is considered normal. One point is added for any individual who has 12 years or fewer of formal education.¹³ In individuals with cognitive impairment, there was a significant relationship between MoCA score and on-road outcome. Specifically, an individual was 1.36 times as likely to fail the road test with each 1-point decrease in MoCA score, with a score of 18 or less of concern regarding driving safety.¹⁴ The MoCA is free for public use as it is not copyrighted, and is widely available in multiple languages via their website.

Trail-Making Test, Part B (TMT-B): A time for completion of >3 minutes (>180 seconds) indicates a need for intervention,¹⁵ such as a review of causes for the abnormal result (e.g., dementia, sedating medication, depression), and/or referral to a DRS. Numerous studies have demonstrated an association between performance on the TMT-B and cognitive function and/or driving performance. In a study of 1,700 drivers ≥65 years old who were applying for renewal of their North Carolina driver's licenses, TMT-B test results were strongly associated with recent prior crash involvement.¹⁶ A study of 105 drivers in Nebraska 65 to 88 years old showed that on-road driving performance significantly correlated to TMT-B performance (correlation coefficient -0.42).¹⁷ Further data from the Maryland Pilot Older Driver Study¹⁸ demonstrated a significant correlation between TMT-B performance and future at-fault crash in the license renewal sample.

Clock-Drawing Test, Freund Clock Scoring for Driving Competency: Any incorrect or missing element on the Freund Clock Scoring criteria signals a need for intervention, such as a review of causes for the abnormal result (e.g., dementia) and/or referral to a DRS.

Clock-drawing tests have been found to correlate significantly with traditional cognitive measures and in some studies discriminate healthy individuals from those with dementia.¹⁹ Of all the measures that have been correlated with impaired driving performance in older adults with dementia, tests of visuospatial skill ability have had the highest predictive value.²⁰ Several versions of the clock-drawing test are available, each varying slightly in the method of administration and scoring.²¹ The Freund Clock Scoring is based on seven "principal components" (as outlined on the CADReS Score Sheet in Appendix C) that were derived by analyzing the clock drawings of 88 drivers ≥65 years old against their performance on a driving simulator.²² Errors on these principal components correlated significantly with specific hazardous driving errors, signaling the need for formal driving evaluation.

Maze Test: The Snellgrove Maze Test measures only those skills required for safe driving: attention, visuoconstructional skills, and executive functions of planning and foresight. In a sample of older adults with mild cognitive impairment or early dementia, the Maze Test time

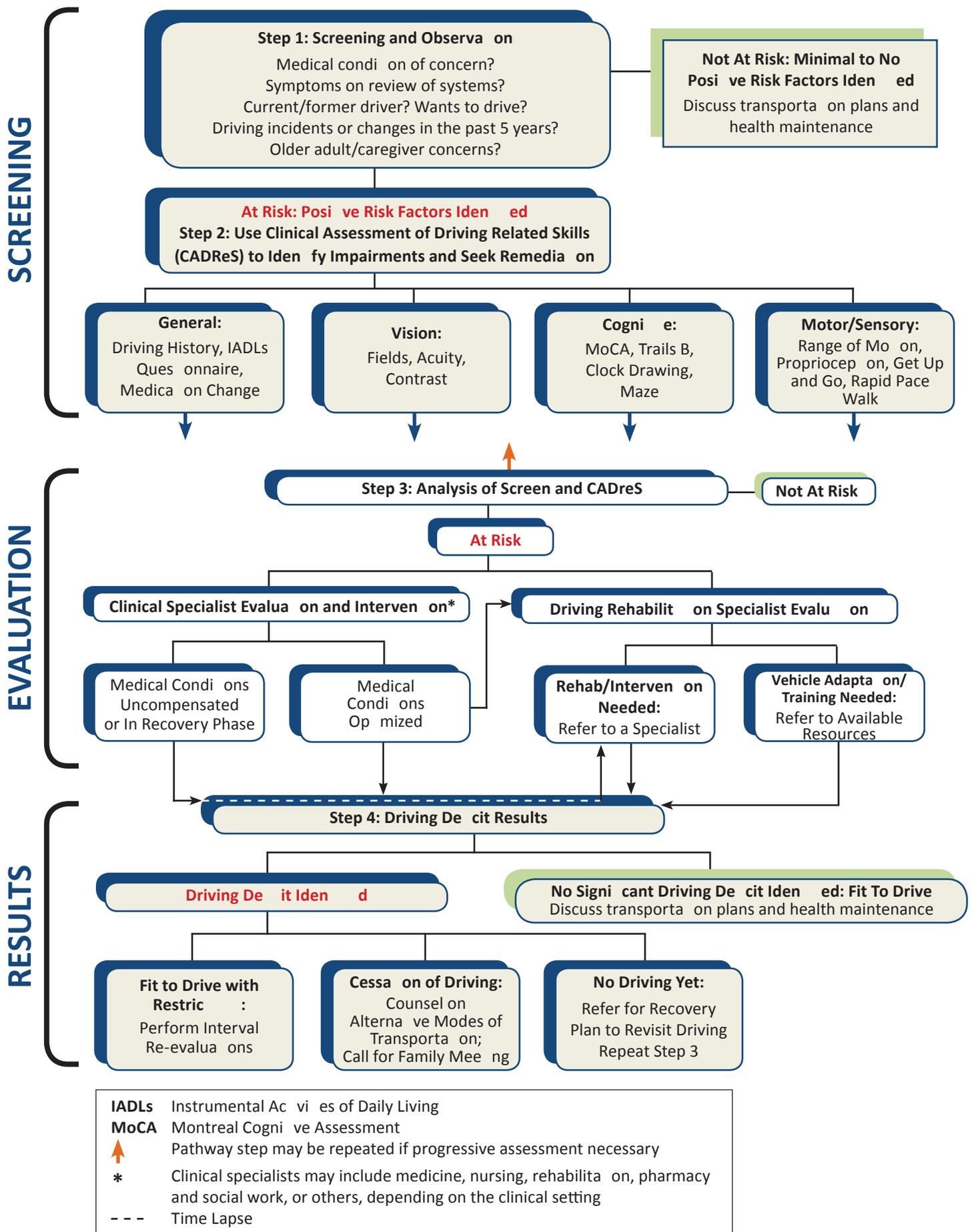
and error scores predicted on-road driving competence with high sensitivity, specificity, and overall accuracy.²³

Again, these tests should not be the sole determinant as to whether an older adult should drive.²⁴ However, impairments on these tests are associated with increased risk, and referral for further evaluation, such as performance-based road testing, should be considered. In addition, it is unlikely that future fitness-to-drive evaluations will rely on one test but likely will use a battery of tests such as are currently being tested as part of the CANDRIVE II/Oz Candrive multicenter prospective cohort study or the Rockwood Battery.^{25,26}

If the older adult's performance warrants interventions, the clinician should:

- Gather (or refer for) more information to include detailed history and examination of cognitive and functional abilities, as needed.
- Identify or interview a reliable informant (e.g., family member or caregiver) who can assist with the evaluation.
- Work with the older adult's clinical team for further diagnostic evaluation aimed at identifying the cause of the cognitive decline.
- Evaluate for reversible causes of cognitive decline. Based on history, examination, and cognitive testing, order laboratory tests as needed, including CBC for anemia or infection, comprehensive metabolic profile for electrolyte imbalance and renal function, finger stick for blood sugar, pulse oximetry for hypoxia, TSH for hypothyroidism, liver function tests, vitamin B₁₂ and folate for vitamin deficiency, and based on prior probability, noncontrast CT or MRI scan.
- Screen for depression and treat if positive.²⁷
- Review the older adult's medication regimen and the adverse effects of the medications, and ask the older adult and caregivers about the onset of cognitive decline as related to new medications or dosage changes. Older adults may be unaware of the potential effects of polypharmacy on cognitive ability and driving.
- If possible, treat the underlying disorder and/or adjust the medication regimen as needed. Remember, it is critical that every older adult have a complete evaluation to identify the underlying cause(s) and receive proper treatment.
- If needed, refer the older adult to a neurologist, psychiatrist, or neuropsychologist for additional diagnosis or treatment as needed.
- Recommend a comprehensive driving evaluation performed by a DRS to assess the older adult's performance in the actual driving task. An initial comprehensive on-road assessment with retesting at regular intervals is particularly useful for those with progressive dementing illnesses.
- Strongly recommend that the older adult begin exploring alternative forms of transportation now, and encourage him or her to involve caregivers in these discussions.

See the Plan for Older Drivers' Safety (PODS) diagram on the next page.



Motor Ability

If the only problems are with motor and/or somatosensory areas, these individuals should be referred to a DRS to take advantage of advancements in technology (see Chapter 5). For older adult drivers who are cognitively intact, learning to compensate for motor and/or somatosensory deficits warrants getting expert advice on strategies, available vehicle adaptations or devices, the type best suited for individual issues, and the training to use them for continued driving. Although the following tests are scored separately, interventions are recommended if the older adult shows significant difficulty as described below on any of the individual tests.

Rapid Pace Walk or the Get Up and Go: Because each of these measure overall lower extremity strength, coordination, and proprioception in a functional task, they also serve to screen how well an older adult can function despite individual motor or range of motion deficits. Older adults with a history of falls have been noted to be at increased risk of motor vehicle crashes.²⁸ A Rapid Pace Walk score >9 seconds should trigger a referral to physical therapy for evaluation and treatment, as well as further evaluation by the clinical team for potential causes and treatments. A score of ≥ 3 on the Get Up and Go test should similarly be considered an indication for referral and treatment. If functional disability is quite severe, it may be wise for the older adult to refrain from driving until such time as their condition can be optimized or adaptive devices (e.g., hand controls) can be installed and the older adult can be trained in their use.

The clinical team member should also be aware that the amount of strength required for safe driving may depend on what vehicle is being driven. For example, an older adult who drives an older car that does not have power steering or who operates a large vehicle (e.g., an RV, which is not uncommon for retirees) may require greater strength to safely drive the vehicle.

Functional Range of Motion: If the older adult's range of motion is not within normal limits (i.e., range of motion is very limited, or good only with excessive hesitation or pain), this may signal the need for intervention. The inability to recognize an object presented directly behind an older adult (e.g., impaired cervical range of motion) has been correlated with increased risk of a motor vehicle crash.¹⁸

Scoring for range of motion is based on simple dichotomous outcomes (normal versus impaired) for several reasons:

- Most clinicians are neither trained in use of goniometers nor have the devices in the office setting.
- Range-of-motion requirements vary with automobile design, and thus it is difficult to specify exact requirements. Vehicle adaptation to compensate is also possible.
- The impact of limited range of motion on driving safety also depends on other functions (as discussed in the visual fields section).

- As with all the other tests from the CADReS toolbox, an older adult's poor performance should be a stimulus for optimization of function rather than for immediate driving restrictions.

If the older adult's performance on this test is not within normal limits, the clinician should be certain to elicit the reason: Do these movements cause muscle or joint pain? Does the older adult complain of tight muscles or stiff joints? Do these movements cause a loss of balance? Knowing the answers to these questions will help in management of the older adult's physical limitations.

If the older adult's performance warrants interventions, the clinical team member should:

- Encourage the older adult to drive a vehicle with power steering and automatic transmission, if he or she does not already do so.
- Recommend that the older adult maintain or begin a consistent regimen of general physical activity, including cardiovascular exercise, strengthening exercises, and stretching. Excellent resources are available through the Go4Life program sponsored by the National Institute on Aging (<https://go4life.nia.nih.gov/>).
- Refer the older adult to a physical therapist as needed for training and exercises to improve strength and/or range of motion, or to an occupational therapist if impairment is affecting daily tasks.
- Check with the older adult's primary care provider on providing effective pain control if pain is limiting range of motion or mobility. This may include prescribing analgesics or medications that treat the underlying disorder (e.g., a urate-lowering drug for gout or L-dopa for Parkinson's disease), or changing the time that the older adult takes pain medications so that relief is achieved before driving. Note that while many analgesics may improve driving through symptom relief, others (including narcotics and skeletal muscle relaxants) have the potential to impair driving ability and may be more deleterious to driving performance than the instigating symptoms. These medications should be avoided, if possible, or prescribed at the lowest effective dose. Older adults should be advised to refrain from driving when first taking these medications until they know whether the medications are tolerated well. Nonsedating and nonpharmacologic strategies for pain management are preferred whenever possible.
- Refer the older adult to a specialist for management of any joint disease, podiatry issues, or neuromuscular problems. Individuals who have had a stroke may have residual deficits that interfere with their handling of car controls and should also be referred.

- Recommend a comprehensive driving assessment (including an on-road assessment) performed by a DRS. A comprehensive on-road assessment is particularly useful for assessing the impact of physical fatigue, flexibility, and pain on the older adult's driving skills. The DRS may prescribe adaptive devices as needed (e.g., a spinner knob on the steering wheel to compensate for poor hand grip or an extended gear shift lever to compensate for reduced reach) and train the older adult in their use.

Next Course of Action

After administering CADReS assessment tools, three courses of action are possible (see also *Plan for Older Drivers' Safety*, Chapter 1):

- If the older adult performs well in all three areas from the CADReS toolbox, he or she can be advised that there are no medical contraindications to safe driving and offered counseling regarding health maintenance and future transportation plans. Older adults should be counseled on health maintenance by providing information such as *Ten Tips for Aging Well* and *Tips for Safe Driving* handouts, and the clinician should periodically follow-up on the older adult's driving safety. However, if there is evidence of a new onset of impaired driving behaviors (e.g., a decline from baseline) as described by the older adult and/or caregiver, further evaluation may be warranted despite a normal score.
- If the older adult performs poorly on any area of CADReS, but on clinical specialist evaluation the causes of poor performance are medically correctable, medical treatment and intervention should be pursued until the older adult's function has been optimized. The older adult may need to be counseled to limit driving as treatment proceeds. The level of improvement should be assessed with repeat administration of CADReS tools. Once the older adult performs well in all areas, he or she should be counseled on health maintenance (as above).
- If the poor performance on the CADReS toolkit cannot be medically corrected, or if no further potential for improvement with medical interventions is anticipated, the older adult should be referred to a DRS.

The CADReS toolbox is useful when supporting an in-office assessment, but it does not evaluate the older adult's performance in the actual driving task. Results, even if abnormal, are not sufficient to recommend driving cessation, except for vision and moderate/severe cognitive impairment. In this case, comprehensive driving evaluation with an on-road assessment performed by a DRS is needed. The DRS can more specifically determine the older adult's level of driving safety and potentially correct his or her functional impairments, if possible, through adaptive techniques or devices (see Chapter 5 and Appendix C).

State licensing policies are evolving, with each State establishing guidelines for issuing and revoking driver's licenses. Health care providers must be aware of the guidelines in their State and ideally other States in which the older adult drives, as available through chapter 8. The first responsibility, regardless of the State processes, is the identification of drivers who

exhibit a level of impairment potentially incompatible with continued driving. For those individuals, the message must be clear that driving must stop until further information is obtained. If the concern is medical (e.g., seizures, confusion), the individual must not drive until medical reports meet the State requirements for continued driving. If function on the road is in question, a comprehensive driving evaluation by a DRS provides the necessary evaluation data and intervention plan.

The recommendation for further evaluation is typically the result of a series of steps (as described in this chapter). Therefore, the driver should be informed both verbally and in writing that declining recommendations for further evaluation may put the patient and/or the public at risk for a crash or injury and could possibly start the State process for license revocation, including potential reporting to the State's Medical Review Board.

There will be cases when, in his or her best ethical judgment, the health care provider believes that the risk is very high and that the older adult will continue to drive despite the recommendation to stop driving. Clinicians must follow State laws for reporting to State licensing agencies and program/facility guidelines for informing the older driver and/or caregivers. Depending on the State's reporting laws, clinicians may be legally responsible for reporting "unsafe" drivers to the State licensing agency (for descriptions of legal and ethical responsibilities, see Chapters 7 and 8). In terms of best practice, the older adult should also be informed about this report.

The Copilot Phenomenon

Copiloting refers to a situation in which an individual drives with the assistance of a passenger who provides navigational directions and instructions on how to drive. Older adults with cognitive impairment may rely on passengers to tell them where to drive and how to respond to driving situations, whereas older adults with vision deficits may ask passengers to alert them to traffic signs and signals.

The use of copilots is not rare. In a study of the prevalence and cessation of driving among older men with dementia, about 10% of the 59 subjects who were still driving relied on copilots.²⁹ Older adults should be advised to not continue driving unless they are capable of driving safely without the use of a copilot. In many traffic situations, there is insufficient time for the copilot to detect a hazard and alert the driver, and for the driver to then respond quickly enough to avoid a crash. In such situations, the driver places not only himself or herself in danger but also the copilot and other passengers. Furthermore, the use of copilots to meet standards for licensure raises questions of who, exactly, is licensed to drive; how the presence of the copilot can be ensured; and what standards for medical fitness-to-drive should be applied to the copilot.³⁰

Older adults who are not safe to drive should be recommended to stop driving, regardless of their need or use of a copilot. Copilots should not be recommended to unsafe drivers as a means to continue driving. Instead, efforts should focus on helping older adults find alternative transportation for themselves and others who may depend on them. Conversely, some safe drivers feel more comfortable driving with a passenger who provides company and help with navigation. Although using a passenger to assist as a navigator is an acceptable practice, use of a copilot to provide instruction on how to drive is not recommended.

As long as older adult drivers have the ability to drive safely on their own, passenger assistance in navigation is an acceptable and advisable practice.

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