

Chapter 4

Physician Interventions

Despite your encouragement, Mr. Phillips declines to take ADReS because “I don’t see the need for it.” You reiterate your concerns for his safety, and give him a copy of the Am I A Safe Driver? worksheet to complete at home. In addition, you counsel Mr. Phillips on the Successful Aging Tips and Tips for Safe Driving. Mr. Phillips agrees to allow his son to observe his driving, and you give his son the How to Help the Older Driver resource sheet. You document all of this in Mr. Phillips’ chart.

At Mr. Phillips’ next visit, you ask him if he has tried putting any of the Tips into practice. He admits that he had another near-miss, and the son states he observed several driving errors. These motivated Mr. Phillips to complete the Am I A Safe Driver worksheet. He claims that this was an eye-opening experience, and he is now willing to undergo ADReS.

On ADReS, Mr. Phillips completes the rapid pace walk in 9.5 seconds. His visual acuity is 20/70 OU. His motor strength is 4-/5 in both lower extremities, and 4/5 in both upper extremities. He has limited range of motion on the finger curl and neck rotation; ankle plantar flexion and dorsiflexion are within normal limits. It takes him 82 seconds to complete the Trail-Making Test, Part B, and his clock drawing is scored as ‘normal’ for all eight criteria.

Now that your patient has undergone ADReS, what does his/her performance indicate? In this chapter, we will help you interpret your patient’s test performance by providing you with scoring cut-offs. We also provide examples of interventions to help you manage and treat any functional deficits that are identified through ADReS.

As you review the recommended interventions,* remember that the goal of physician intervention is to identify and correct any functional deficits that may impair the patient’s driving performance.

Visual Acuity

Although many states currently require far visual acuity of 20/40 for an unrestricted license, current research indicates that there is no scientific basis for this cut-off. In fact, studies undertaken in some states have demonstrated that there is no increase crash risk between 20/40 and 20/70, resulting in several new state requirements.¹

General recommendations regarding visual acuity and driving are stated below. Please note that these recommendations are subject to each state’s licensing requirements.

For visual acuity less than 20/40, the physician should:

- Ensure that the underlying cause of vision loss is adequately treated, if treatment is possible. If the patient is not currently under the care of a specialist, referral is recommended.
- Ensure that the patient has and uses the appropriate glasses or contact lenses. Again, if the patient is not currently under the care of a specialist, referral is recommended.

- Recommend that the patient reduce the impact of decreased visual acuity by restricting travel to low-risk areas and conditions (eg, familiar surroundings, non-rush hour traffic, low speed areas, daytime, and good weather conditions).
- Be aware that the patient may require future re-testing of visual acuity for vision decline caused by chronic, progressive diseases.

For visual acuity less than 20/70, the physician should follow the recommendations stated above, and:

- Recommend an on-road assessment performed by a driver rehabilitation specialist to evaluate the patient’s performance in the actual driving task, where permitted and available.

For visual acuity less than 20/100, the physician should follow the recommendations stated above, and:

- Recommend that the patient not drive unless safe driving ability can be demonstrated in an on-road assessment performed by a driver rehabilitation specialist, where permitted and available.

Visual Fields

Research indicates that visual field loss can significantly impact driving safety. In an examination of 10,000 volunteer California license applicants, significant deterioration in visual fields was found among drivers over 60 years old. In addition, drivers with binocular visual field loss had driving accident and conviction rates more than twice as high as age- and gender-matched drivers with normal fields.²

* Please be aware that the recommendations stated in this chapter are subject to your state’s reporting laws and driver licensing requirements.

While it is known that adequate visual fields are important for safe driving, there is no conclusive evidence to define what is meant by “adequate.” Most likely, this varies widely from patient to patient. For example, a driver with limited peripheral vision but excellent scanning ability may drive as safely as a driver with unrestricted peripheral vision but poor neck rotation.¹

General recommendations regarding visual fields and driving are stated below. Physicians should be aware of their state’s visual field requirements, if any, and adhere to them.

For visual field deficits noted on clinical exam, the physician should:

- Ensure that the underlying cause is adequately treated, if treatment is possible. If the patient is not currently under the care of a specialist, referral is recommended. Automated visual field testing may help define the extent of the deficit.
- For binocular visual fields of questionable adequacy (as deemed by clinical judgment), an on-road assessment performed by a driver rehabilitation specialist is strongly recommended. Through driving rehabilitation, the patient may learn to compensate for decreased visual fields. In addition, the driver rehabilitation specialist may prescribe enlarged side and rear-view mirrors as needed and train the patient in their use.
- Be aware that the patient may require future re-testing of visual fields for visual field deficits caused by chronic, progressive diseases.

Cognition

Although the following cognitive tests are scored separately, interventions are recommended if the patient reaches designated cut-off values (as described below) on either of them.

Trail-Making Test, Part B

A time for completion of greater than 180 seconds signals a need for intervention.³

Numerous studies have demonstrated an association between performance on the Trail-Making Test, Part B (TMT-B) and cognitive function and/or driving performance. In a study of 1,700 drivers aged 65 and older applying for renewal of their North Carolina driver’s license, TMT-B test results were strongly associated with recent prior crash involvement.⁴ A study of 105 drivers in Nebraska aged 65-88 indicated that on-road driving performance significantly correlated with TMT-B performance (correlation coefficient -0.42).⁵ Most recently, data from the Maryland Pilot Older Driver Study[†]—a study of 2,508 drivers aged 55 and older, including license renewal applicants, medically referred drivers, and older drivers in a residential community—demonstrated a significant correlation between TMT-B performance and future at-fault crash in the license renewal sample (odds ratio 2.21).³

Clock Drawing Test, Freund Clock Scoring for Driving Competency

Any incorrect element in the Freund Clock Scoring signals a need for intervention.

Clock drawing tests (CDT) have been found to correlate significantly with traditional cognitive measures, and to discriminate healthy older patients from

ones with dementia.⁶ Several versions of the CDT are available, each varying slightly in the method of administration and scoring.⁷ The Freund Clock Scoring is based on eight ‘principal components’ (as outlined on the ADReS Score Sheet), which were derived by analyzing the clock drawings of 88 drivers aged 65 and older against their performance on a driving simulator. Errors on these principal components were found to correlate significantly with specific hazardous driving errors, signaling the need for formal driving evaluation.^{8,9}

If the patient’s performance signals the need for interventions, the physician should:

- Perform (or refer for) more detailed cognitive testing as needed.
- Identify the cause of the cognitive decline:
 - Based on historical data and the results of physical and cognitive testing, order lab tests as needed to evaluate for causes of cognitive decline: CBC for anemia or infection; comprehensive metabolic profile for electrolyte imbalance and renal function; finger stick for transient hypoglycemia; pulse oximetry for hypoxia; TSH for hypothyroidism; liver function tests; Vitamin B12 and folate for vitamin deficiency dementia; noncontrast CT or MR for dementia or stroke; etc.¹⁰
 - Based on level of suspicion, screen for depression.¹¹
 - Based on level of suspicion, review the patient’s medication regimen and the side effects of the medications, and question the patient about the onset of cognitive decline with new medications or dosage changes. Be aware of the potential effects of polypharmacy on cognitive ability.

† Among the tests used in the Maryland Pilot Older Driver study, performance on the Motor Free Visual Perception Test, Visual Closure Subtest was most predictive of at-fault crash involvement by drivers in the license renewal sample. However, this test was not included in ADReS because it is not readily accessible to physicians.

- If possible, treat the underlying disorder and/or adjust the medication regimen as needed.
- Refer the patient to a neurologist, psychiatrist, or neuropsychiatrist for treatment as needed.
- Recommend an on-road assessment performed by a driver rehabilitation specialist to assess the patient's performance in the actual driving task. A comprehensive on-road assessment is particularly useful for assessing the patient's sustained attention while driving.
- If the patient's cognitive decline is chronic and progressive, be aware that the patient may require re-testing at regular intervals. Strongly recommend that the patient begin exploring alternative forms of transportation now, and encourage the patient to involve family members/caregivers in these discussions. (See also Figures 4.1 and 4.2)

Motor Ability

Although the following tests are scored separately, interventions are recommended if the patient reaches designated cut-off values (as described below) on any of them.

Rapid Pace Walk

A time for completion of greater than 9.0 seconds signals a need for intervention.³

The rapid pace walk assesses lower limb mobility, trunk stability, and balance. In a prospective cohort study of 283 drivers aged 72 years and older, subjects who took longer than 7 seconds to complete the test were twice as likely to experience an adverse traffic event (traffic crash, violation, or being stopped by the police) in the year following the test.¹⁴ More recently, data from the Maryland Pilot Older Driver Study—a study of 2,508

Figure 4.1 Dementia and Driving

We encourage all physicians to pursue a diagnosis of dementia where appropriate. Dementia is one of the most serious disorders in the older population, and it affects 4 to 5 million persons in the United States.¹² However, it is frequently unrecognized and undocumented by primary care physicians¹³—a situation that is particularly unfortunate since early treatment and planning may slow the course of the disease and improve the safety and comfort of the patient.

With regards to driving, patients with progressive dementia ultimately become unsafe to drive, yet often lack the cognitive abilities to be aware of this. When it becomes unsafe for these patients to drive, it frequently falls upon family members and caregivers to enforce driving cessation and arrange alternative forms of transportation. With early diagnosis, patients and their families have the opportunity to plan early for a smooth transition from 'driving' to 'non-driving' status. (For a more detailed discussion of driving cessation and the dementia patient, see Chapter 6.)

Figure 4.2 The Co-Pilot Phenomenon

Co-piloting 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. In contrast to passengers who lend the driver company and provide simple navigational aid (eg, reading a map or finding an address), co-pilots participate more actively in the driving task. For example, patients with dementia may rely on co-pilots to tell them where to drive and how to respond to driving situations, while patients with vision deficits may require passengers to alert them to traffic signs and signals.

The use of co-pilots is not rare. In a study of the prevalence and cessation of driving among older men with dementia, about 10% of the 59 subjects still driving relied on co-pilots.¹⁶ It has even been recommended that individuals with mild to moderate cognitive decline (Global Deterioration Score 2, 3, 4) drive only with a co-pilot,¹⁷ and that state driver licensing agencies accommodate these individuals by permitting on-road assessment with co-pilots.¹⁸

Nonetheless, patients should not continue driving unless they are capable of driving safely without the use of a co-pilot. In many traffic situations, there is insufficient time for the co-pilot 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/herself in danger, but also the co-pilot and other road users. Furthermore, the use of co-pilots to meet standards for licensure raises questions of who, exactly, is licensed to drive, how the presence of the co-pilot can be ensured, and what standards for medical fitness-to-drive should be applied to the co-pilot.¹⁹

Patients who are not safe to drive should be recommended to retire from driving, regardless of the use of a co-pilot. *Co-pilots should never be recommended to unsafe drivers as a means to continue driving.* Instead, efforts should focus on helping the patient find safe transportation for himself/herself and the co-pilot.

drivers aged 55 and older, including license renewal applicants, medically referred drivers, and older drivers in a residential community—demonstrated a correlation between performance on the rapid pace walk and future at-fault crash in the license renewal sample (odds ratio 1.70).³

Manual Test of Motor Strength

Less than grade 4/5 strength in either upper extremity or the right lower extremity signals a need for intervention. (If the patient drives a vehicle with manual transmission, or if the patient reports using both feet to operate the brake and accelerator pedals,^{††} this applies to the left lower extremity as well.)

The manual test of motor strength evaluates separate muscle groups in both the upper and lower limbs. The United States Public Health Service guidelines regarding musculoskeletal ability and driving state that a driver should have at least grade 4/5 strength in the right lower extremity and both upper extremities.¹⁵ The physician should also be aware that the amount of strength required for safe driving may depend on the vehicle driven by the patient. For example, a patient who drives an older car that does not have power steering may require greater strength to safely drive this vehicle.

Manual Test of Range of Motion

If the patient's range of motion is not within normal limits (ie, if the patient has a good range of motion with excessive hesitation/pain or a very limited range of motion), this signals the need for intervention.

The scoring for range of motion is vague, and this is due to several reasons: (1) Range of motion requirements vary with automobile design, and so it is difficult to specify exact requirements; (2) as discussed earlier in the visual fields section, the impact of limited range of motion on driving safety also depends on other functions; and (3) as with all the other tests in ADReS, a patient's poor performance should act as a stimulus for optimization of function, rather than for immediate driving restrictions.

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

If the patient's performance warrants interventions, the physician should:

- Encourage the patient to drive a vehicle with power steering, power brakes, and automatic transmission, if he/she does not already do so.
- Recommend that the patient maintain or commence a consistent regimen of physical activity, including cardiovascular exercise, strengthening exercises, and stretching. (*Successful Aging Tips*, found in Appendix B, includes some exercise suggestions.)
- Refer the patient to a physical therapist or occupational therapist as needed for physical conditioning.
- Provide effective pain control, if the patient's range of motion and mobility are limited by pain. This may include prescribing analgesics or medications that treat the underlying disorder (eg,

a urate lowering drug for treatment of gout) or changing when the patient takes pain medications so that relief is achieved prior to driving. Please note that many analgesics (including narcotics and narcotic-like substances) have the potential to impair driving ability and may be more deleterious to driving performance than the instigating pain. These medications should be avoided, if possible, or prescribed in the lowest effective dose.

- Refer the patient to a specialist for management of any joint disease, foot pain, or foot abnormalities that interfere with the patient's handling of car controls.
- Refer the patient to a specialist as needed for management of neuromuscular disorders and residual deficits from stroke.
- Recommend an on-road assessment performed by a driver rehabilitation specialist to assess the patient's performance in the actual driving task. A comprehensive on-road assessment is particularly useful for assessing the impact of physical fatigue on the patient's driving skills. In addition, the driver rehabilitation specialist may prescribe adaptive devices as needed (eg, 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 patient in their use.

^{††} Although this is not the recommended way of driving, many older drivers initially learned to drive using both feet to operate the pedals.

What do you do next?

After administering ADReS, you can follow one of three courses of action. (See also *Physician's Plan for Older Drivers' Safety* in Chapter 1.)

- If the patient performs well on all three sections of ADReS, you may recommend that he/she continue driving without further work-up or treatment. Counsel the patient on health maintenance by providing the *Successful Aging Tips* and *Tips for Safe Driving* (found in Appendix B), and periodically follow up on the patient's driving safety.
- If the patient performs poorly on any section of ADReS but the causes of poor performance are medically correctable, pursue medical treatment until the patient's function has improved to the fullest extent possible. The patient may need to be counseled to limit driving as treatment proceeds. Assess the patient's level of improvement with repeat administration of ADReS. If the patient now performs well on all three sections of ADReS, counsel him/her on health maintenance as above.
- If the patient's poor performance on ADReS cannot be medically corrected, or if the patient's function shows no further potential for improvement with medical interventions, refer him/her to a driver rehabilitation specialist (DRS).

ADReS is useful as an in-office assessment, but it does not evaluate the patient's performance in the actual driving task. For this, an on-road assessment performed by a driver rehabilitation specialist (DRS) is needed. The DRS can more specifically determine the patient's level of driving safety and help correct the patient's functional impairments, if possible, through adaptive techniques or devices. We will discuss the role of the DRS in the next chapter.

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