CHAPTER 10 MEETING FUTURE TRANSPORTATION NEEDS OF OLDER ADULTS

KEY POINTS

- Transportation planning discussions should begin early and be revisited often.
- A holistic approach that incorporates assessment and intervention and that facilitates the transition to driving limitation or cessation when necessary is encouraged.
- A tiered assessment strategy offers potential advantages for gauging risk in clinical offices and licensing agencies, although more evidence is needed regarding content, efficiency, and effectiveness.
- Clinicians should be aware of and use driving evaluation resources in their area, including driving rehabilitation specialists (DRS's).
- As new technologies are developed, their role in enhancing safety of older adult drivers, passengers, and pedestrians should be assessed.
- Clinician involvement and communication with driver licensing agencies should be encouraged and facilitated.
- Coordination among clinicians, licensing agencies, and relevant state/local/community agencies/organizations is encouraged to help older adults and their caregivers become aware of and able to access transportation resources in their community.

The previous chapters provide the clinical team with recommendations and tools for enhancing the driving safety of older adults. As in other aspects of patient care, however, further research will lead to more effective care. Further progress on the following would be beneficial:

- In-office tools that can help predict crash risk or determine fitness to drive
- Improved access to driver assessment and rehabilitation
- Training in the appropriate use of advanced technology in vehicles as these technologies evolve
- Safer roads
- Expansion of transportation alternatives
- Increased crashworthiness of vehicles
- Intervention trials to lower risk, maintain driving life expectancy, and/or improve driving safety

To accomplish these objectives, coordinated efforts among the health care and transportation communities, policymakers, community planners, the automobile industry, and government agencies are needed to achieve the common goal of safe transportation for the older population. As this population continues to expand and live longer, the challenge is to keep pace with its transportation needs. Although many transportation alternatives are developing (e.g., fully automated vehicles, golf cart communities, private car rideshare programs), review of the use of these by older adults is beyond the scope of this chapter.

This chapter discusses the research, initiatives, applications, and system changes deemed essential for improving driving safety of older adults.

VEHICLE DESIGNS TO OPTIMIZE SAFETY OF OLDER ADULT DRIVERS AND PASSENGERS

Age-related changes in vision, cognition, and motor ability may affect an individual's ability to enter/exit a motor vehicle with ease, assess critical driving information, and handle the complexities of a motor vehicle in traffic safely. Older adults are also less able to endure and recover from injuries sustained in an automobile crash. Vehicle manufacturers are encouraged to explore and implement enhancements in vehicle design to address and compensate for these physiologic changes, such as:

- Designs based on the anthropometric parameters of older adults (i.e., physical dimensions, strength, fragility, and range of motion) may be optimal for entry/exit; seating safety and comfort; seat belt/restraint systems; and placement and configuration of displays, mirrors and controls.
- Headlamp design improvements that enhance nighttime visibility and reduce glare.
- High-contrast legible fonts and symbols for in-vehicle displays, to help compensate for age-related changes in vision.[1]
- More prominent analog gauges that are easier to see and interpret than small digital devices.[2]
- Continued use of computers which have revolutionized the motor vehicle industry by managing airbag safety systems, antilock brakes, and navigation systems.
- In-vehicle tools to assess for high-risk conditions that are entering the marketplace (such as a driver monitoring system that can monitor a driver's gaze position and eyelid closure ratio to assess for distraction and fatigue and can provide a warning).
- Vehicle designs that offer enhanced crash protection and restraint systems designed for fragile occupants that may enhance the safety of older adult drivers and passengers in the event of a crash.
- Add-on features that may also make current vehicle designs safer and more accessible for older adult drivers. For example, handholds and supports on door frames may facilitate entry/exit for both drivers and passengers. Padded steering wheels and seat adjuster handles (rather than knobs) may benefit drivers with decreased hand grip, and adjustable steering wheels and foot pedals may aid drivers with limited range of motion or who are of smaller stature.[3]

Crashes involving older adult drivers and fatality rates have fallen in recent years, despite the increased fragility of older adults. It may be possible to enhance these gains by better understanding the factors that enter into older drivers' vehicle selection and incorporating the issues outlined above into this process.[4] An effort to promote the selection of vehicles that may be a better fit for older adults is in place at the American Automobile Association website.[5] Other adjustable controls and displays may allow older drivers to tailor their vehicle to their changing abilities and needs. Safety features that may benefit older adults include smart headlights, emergency response systems, reverse monitoring, blind spot/lane departure warning, stability control, assisted parking, voice-activated controls, crash mitigation systems, and drowsy driver alerts.[6] Electronic stability control is now standard equipment on all new vehicles and may lead to further safety gains as it becomes more prevalent in the vehicle fleet.[7]

Vehicle technology is advancing and being implemented at a rapid pace. Fully automated vehicles have captured media and public

attention, as well as scrutiny of their safety and liability concerns. In spite of this, many individual technologies are becoming available on existing vehicles.[8] Although these may not often consider age or functional limitations in their development, they will be used by drivers with a range of capabilities, who have varying needs, expectations of, and preferences for such technologies.[9,10] Thus, there may be concerns about weighing benefits versus risks of these technologies for older drivers. Several recent studies have demonstrated potential benefits of some technologies, highlighting the importance of older persons' knowledge of, and training in, the appropriate use of these technologies.[11-13]

IMPROVED CLINICIAN TOOLS FOR ASSESSMENT OF DRIVING SAFETY

Clinicians need an assessment approach that reliably identifies older adult drivers at increased risk of a car crash. A tiered assessment strategy can be considered for clinical settings in which older adult drivers are screened routinely (on the basis of certain risk criteria) or if concerns about their driving arise (a similar strategy for licensing agencies is discussed below). Depending on screening results, the driver would be scheduled for more detailed assessment or an on-road driving evaluation. Fully implementing such a strategy in different clinical settings would involve logistical challenges. The ideal tests would assess the primary functions related to driving and form the basis for interventions to correct or ameliorate any identified conditions or functional deficits. In addition, this tool should be brief, inexpensive, easy to administer, and validated to predict crash risk and/or ability to pass a performance-based, standardized, reliable and valid road test.

At present, no one comprehensive tool is available, in part because of the multifactorial nature of driving ability and because of the limitations of potential measures. Global cognitive measures are easy to administer and score but do not adequately address the complex abilities necessary for safe driving. The limited ability of global cognitive measures to predict adverse driving events has increasingly led to a focus on other measures that address relevant cognitive domains such as executive function, attention, information processing speed, or visuospatial ability. Again, no single measure has stood out, in part because of the multifactorial nature of driving risk and because studies involve heterogeneous groups of drivers who may have very different risk factors. One approach is to narrow testing to individuals with a specific disorder or particular disease (e.g., glaucoma, dementia); however, this will obviously not be broadly applicable. Another approach is to look at combinations of tests that capture common risk factors.[14] A recent study demonstrated one analytic approach for combining tests to optimize predictive ability.[15] As several large longitudinal studies (e.g., Candrive, LongRoad) continue, their findings may continue to advance our understanding of these issues in the near future.

Clinical teams desire a quick, cost-effective, widely available comprehensive tool to determine driving recommendations. Until such a tool is available, given the multiple complexities of driving, the clinical team may be better served by tailoring assessment and intervention to the particular strengths and limitations of each older adult driver. Clinicians can evaluate older adults' potential driver risk by assessing functions related to driving (see Chapter 3) and reviewing the presence and/or severity of important medical conditions, functional deficits, and use of potentially driver-impairing medications (see Chapter 9). Given the projected increase in prevalence of dementia, clinicians should also try to ascertain caregiver concerns and

factor these into the assessment and intervention process.[16] Clinicians should discuss transportation planning early in the course of disease and revisit the topic frequently as the condition progresses.[17]

INCREASED AVAILABILITY AND AFFORDABILITY OF DRIVER REHABILITATION SERVICES

When the results of clinician assessment are unclear, or when further correction of functional deficits through clinical team management is not possible, DRS's are an excellent resource. DRS's can perform a focused clinical assessment, observe the older adult during the actual driving task, and train him or her in the use of adaptive techniques or devices to compensate for medical conditions or functional deficits (see Chapter 5).

Unfortunately, access remains a major barrier to use of DRS's by older drivers and referring clinicians. DRS's are not available in all communities, and there may be too few to provide services to all older drivers in need. Another common barrier is cost because driver assessment and rehabilitation are often not covered by Medicare and private insurance companies.

The American Occupational Therapy Association (AOTA) is addressing both issues through a number of initiatives. AOTA has devised a framework to increase the number of DRS's within the occupational therapy (OT) profession, including strategies to promote older driver expertise among current OT practitioners, curriculum content for continuing education programs, and training modules for entry-level OT educational programs. AOTA also continues to actively lobby for consistent Medicare and insurance coverage of OT-performed driver assessment and rehabilitation, under the premise that these services fall within the scope of OT practice and that driving is an instrumental activity of daily living.

A new model for occupational therapy generalists, OT-DRIVE, has been developed to help assess underlying functional abilities and determine when to refer to DRS's.[18] Other initiatives are addressing when to incorporate non-OT driving evaluators.[19]

In the effort to keep older adult drivers on the road safely as long as is reasonable, increased access to and affordability of driver assessment and rehabilitation are essential. Clinicians need to be aware of DRS services and programs in their area and use these resources whenever possible. Further research in this field is encouraged to demonstrate the efficacy and cost-effectiveness of DRS services, and to create standardized off-road and on-road driving tests that have respectable levels of reliability, validity, and test stability. Correlating results of on-road tests with prospective at-fault crash data remains an important area of future study.

INCREASED INVESTIGATION INTO USE OF SIMULATORS AND COMPREHENSIVE ASSESSMENT METHODS AND TECHNIQUES

Validated driver assessment technologies may help make driver assessment more widely available to older drivers. Simulated driving assessments offer a number of potential advantages compared with on-road testing, including standardization of the driving environment and scenarios encountered during testing, time efficiency, and safety for testing high-risk individuals. However, a number of challenges exist, including potential trade-offs between fidelity/realism versus cost/complexity of systems, tolerability and motion sickness in an older adult population, and complexity of scoring results. It remains to be seen whether simulator testing will remain an adjunct to the assessment process or can reliably substitute for on-road

evaluations, particularly in a population less familiar with simulator use. It will be useful to determine if familiarity with computers and electronic games by successive aging cohorts affects the outcome of simulator performance and/or reduces crashes. As interventions develop, it will be useful to determine the role of simulator training in relation to classroom and on-road training. Naturalistic driving assessment utilizing instrumented vehicles or technology placed in drivers' own vehicles may offer a closer approximation of real-world driving experiences as instrumentation technology and data analytic capabilities advance and become more accessible. A recent textbook reviewed the potential uses of driving simulation.[20]

Efforts should continue to better understand the complex role the central nervous system plays in operating a motor vehicle.[21,22] As new diagnostic tools are developed to better delineate different disorders, it will be helpful to determine the role these can play in determining driver risk. State licensing agencies and driver rehabilitation programs are encouraged to investigate the use of simulation and naturalistic driving to increase availability of reliable driver assessment services to the public. Such approaches, if integrated into or aligned with current practices, could help form an intermediate step between clinician assessment and driver rehabilitation or increase the licensing agency's capacity to offer specialized driver assessment to at-risk drivers.

ENHANCED ROLE OF THE STATE LICENSING AGENCY IN PROMOTING SAFETY OF OLDER DRIVERS

As the agency that ultimately issues, renews, restricts, and revokes driver licenses, each state's driver licensing agency has the task of distinguishing unsafe drivers from safe drivers. Although each state has its own procedures, potentially unsafe drivers are usually identified by one of four means: failure of the individual to meet licensing or license renewal criteria; report from the individual or family; report from clinicians, DRS's, law enforcement officers, and others; and judicial report.

To meet the standards for licensing, the driver licensing agency initially requires individuals to pass assessments of knowledge, vision, and driving skills. License renewal tends to be less stringent, with many states permitting renewal by mail. In recent years, certain states have increased their efforts to identify at-risk drivers by stipulating special renewal procedures based on different criteria. These procedures include shortened renewal intervals, in-person renewal, and mandatory reassessment of knowledge, vision, or driving skills.

Numerous studies have examined safety confounders for older adult drivers and hypothesized about the most beneficial approach. A review of studies in this area summarized the evidence as suggesting that in-person renewal was associated with lower fatal crash risk, license restrictions were associated with decreased exposure, and more renewal requirements or medical reporting were linked with delicensure.[23] Whether the latter findings are viewed as a positive outcome depends on individual perspective. If those targeted for restriction or more intense renewal requirements are truly at increased safety risk, then public safety may benefit. If not, those individuals' mobility may be adversely affected without clear gains in public safety.

This area warrants further investigation. States are encouraged to maintain or adopt renewal procedures for the most effective identification of at-risk drivers (see also Enhanced Role of the

Medical Advisory Board, below). States are also encouraged to base their standards for licensing on current scientific data. For example, visual acuity standards based on outdated research may be unnecessarily restrictive to all drivers and to older adult drivers in particular. In addition to the vision screens currently in use, driver licensing agencies may also wish to use newer tools (e.g., contrast sensitivity and the useful field-of-view test) that have been shown to correlate with crash risk.[24,25] Some of these tools, along with other tests of function and driving skills, have been field tested by the California Department of Motor Vehicles as part of its three-tier assessment system. Although this approach has many conceptual advantages, as tested there were limitations in its effectiveness.[26,27] Many lessons can be learned from this large- scale, practical experiment, and all jurisdictions would benefit from a better understanding of what worked well, what did not, and how to improve on the approach and implementation. In Maryland, a tiered approach is used to identify and assess medical fitness to drive in clients for whom decline in cognitive function is raised in materials submitted to the licensing agency. Most of the drivers in the cohort are older adult drivers. A free, five-element screening test is routinely used to assess these individuals.[28,29]

Driver licensing agencies could also create a more supportive system for older drivers. For example, the agency can work more closely with the at-risk driver's clinical team or the medical advisory board to correct functional deficits through treatment, if possible. Drivers with a high potential for rehabilitation can be referred by the licensing agency to a DRS to learn adaptive techniques and devices. Licensing agencies can also consider the older adult's driving needs by issuing restricted (e.g., geographic or time of day) licenses whenever possible to help the driver maintain driving ability while protecting his or her safety. For older adult drivers who must relinquish their license, the agency can provide guidance in seeking alternative transportation and linkages to other agencies that might be helpful in identifying available resources.

At-risk drivers can also be brought to the attention of the driver licensing agency by clinician referral. However, many clinicians are not aware of their state's referral procedures, and others fear legal liability for breach of confidentiality.[30] With the advent of the Health Insurance Portability and Accountability Act (HIPAA), clinicians may have questions about the extent and detail of patient information they should or can provide in a referral. Driver licensing agencies can encourage clinician referral by establishing clear guidelines and simple procedures for referral (e.g., comprehensive referral forms that can be accessed online) and promoting clinician awareness of these guidelines and referral procedures. A 2012 review critiqued the forms used by 52 jurisdictions in North America and made a number of recommendations on best practices.[31] In many states, clinicians who refer older adults to their state's driver licensing agency are not granted legal protection against liability for breaching the patient's confidentiality. Indeed, several states encourage or require clinicians to report impaired drivers without specifically offering this legal protection. Most statutes that provide immunity for reporting in good faith apply to physicians only.

Clinicians should join advocacy groups in their states to pass fair laws that protect clinicians who report in good faith and that ensure anonymity for reporting. Statutes providing immunity should include all members of the clinical team who are involved in the care and evaluation of drivers for whom there are concerns about medical fitness to drive (e.g., physicians, nurse practitioners, physician assistants, DRS's, social workers, pharmacists,

occupational therapists, nurses, psychologists, etc.). State legislatures are encouraged to establish or maintain good-faith reporting laws that provide immunity from breach of confidentiality lawsuits for clinicians and others who report potentially impaired drivers to their state licensing authority.

The state licensing agency should be involved in outreach education to clinicians, law enforcement, drivers, and their caregivers to improve awareness of their obligations regarding the reporting of medical conditions to the agency, which could promote earlier interventions. A website with easily accessible information and resources is essential. Ideally, the medical review unit staff and/or members of the medical advisory board should be available for outreach efforts and should partner with appropriate agencies and groups (e.g., departments on aging, health care professional societies, etc.) to facilitate outreach education.

Future older adult drivers will present with increasingly complex driving ability questions. For instance, palliative care providers may be confronted with an older adult's determination to continue driving past the time of medical fitness to drive. Such cases will challenge medical understanding, ethics, and legal counsel.[32] Health care teams and licensing agencies should anticipate preparing for diverse driving capacity scenarios in the years to come.

ENHANCED ROLE OF THE MEDICAL ADVISORY BOARD

A medical advisory board (MAB) is generally composed of state-licensed clinicians who work in conjunction with the driver licensing agency to determine whether mental or physical conditions may impair an individual's ability to drive safely. MABs vary among states in size, role, and level of involvement. For example, the MAB of the Maryland Motor Vehicle Administration reviews the fitness of individuals to drive safely, while California's MAB provides recommendations to licensing agency staff for use in developing policies that affect medically and functionally impaired drivers.[33] Many states lack an MAB or have one that is suboptimally used.

Each state driver licensing agency is encouraged to enhance the role of its MAB to provide improved capacity for assessment, rehabilitation, and support to older adult drivers. States that lack MABs are also encouraged to create a multidisciplinary team of medical experts to develop and implement recommendations on the medical fitness of their state's licensed drivers. Such recommendations should be based on the most current scientific data and implemented in an efficient review process.

The National Highway and Traffic Safety Administration and the American Association of Motor Vehicle Administrators completed a study of each state's MAB practices.[34] This project detailed the function of each state's MAB, its regulatory guidelines, and barriers to implementation of screening, counseling, and referral activities. The executive summary of this study had many important recommendations for states that license medically impaired drivers, including:

- Each state should have an active board to set standards and guidelines and to be involved in fitness-to-drive evaluations.
- Board members should be adequately compensated.
- Clinicians should be granted immunity for reporting.
- National standards and forms, and referrals for mobility counseling and/or DRS's, should be considered.

INCREASED PUBLIC AWARENESS OF MEDICATION ADVERSE EFFECTS THAT MAY IMPAIR DRIVING

Many prescription and over-the-counter medications have the potential to impair driver performance. Despite warnings on the label and counseling by clinicians, many older adults and their caregivers are unaware of these risks.

To address this problem, the National Transportation Safety Board (NTSB) recommended that the U.S. Food and Drug Administration (FDA) establish a clear, consistent, and easily recognizable warning label for all prescription and over-the-counter medications that may interfere with ability to operate a vehicle. This recommendation was the focus of an FDA/NTSB joint public meeting held in November 2001.[35] This meeting hosted presentations of epidemiologic and controlled data on the effects of sedating drugs and crash risk, as well as presentations from innovators of devices designed to test the degree to which drugs may impair driving. As a result of the meeting, the FDA and NTSB concluded that steps must be taken to better educate the public and prescribing clinicians on adverse effects of potentially driver-impairing medications. Efforts to increase older adult driver, caregiver, and clinician education and to clarify labeling for consumers are encouraged.

Currently, manufacturers of medications do not routinely test their products for effects on driving, and they are not required to do so. The identification and routine use of effective testing parameters to identify medications that may interfere with the ability to drive safely is encouraged. Similarly, such parameters could be used to identify medications that do not typically impair drivers when used as directed.

PROMOTION OF SELF-AWARENESS AND APPROPRIATE SELF-REGULATION

Generally, older adult drivers modify their driving routine by self-regulation. Some drivers participate in educational programs or occupational therapy interventions in an effort to decrease crash risk by increasing their awareness of questionable driving habits and learning adaptive strategies. Occupational therapy interventions assist older adult drivers to develop objectivity in themselves and their driving environment.[36] In late life, both women and men compensate for individual changes in their health and capacity to drive, but a recent study found that older women were somewhat more likely than older men to stop or limit driving over time and that the factors associated with these changes differed by gender.[37] Another recent study, using naturalistic driving data, found that older women accounted for many of the age and sex differences noted in driving frequency compared with younger and middle-age drivers.[38]

OPTIMAL ENVIRONMENTS FOR OLDER ADULT DRIVERS AND PEDESTRIANS

To promote aging in place, clinical teams are encouraged to be realistic regarding environmental features essential for older adults. A recent review noted that older adults prioritized safety considerations when making mobility choices. Additional desirable elements included aesthetics (clean surroundings), land use (commercial/residential availability), format of street networks, and the older adult's cognitive and physical abilities to utilize these characteristics of their environment.[39] Many older adult drivers are at a disadvantage on roads and highways that are most heavily used by and traditionally designed for a younger population. In a telephone survey of 2,422 people 50 and older, nearly one of five participants considered

inconsiderate drivers to be a major problem. Other commonly identified problems included traffic congestion, crime, and fast traffic.[40]

These problems may be ameliorated through traffic law enforcement and better road and traffic control designs. One of the top requests of the nearly 200 Iowans (older drivers, transportation professionals, and senior-related professionals) attending the Iowa Older Drivers Forum was the enhanced enforcement of speed and aggressive driving laws.[41] In terms of road and traffic engineering, the Federal Highway Administration has recognized and addressed the needs of older adult drivers in its Handbook for *Designing Roadways for the Aging Population*, a supplement to existing standards and guidelines in the areas of highway geometry, operations, and traffic control devices.[42] These design features may be implemented in new construction, renovation and maintenance of existing structures, and "spot" treatment at certain locations where safety problems exist or are anticipated. The Federal Highway Administration handbook is updated periodically to incorporate the latest research on the effectiveness of design and engineering enhancement to accommodate older adult drivers.

BETTER ALTERNATIVES TO DRIVING

Alternatives to driving are often less than ideal or nonexistent. When faced with the choice of unsafe driving or losing mobility, older adults may risk their own safety and that of other road users by continuing to drive.

A systematic review and meta-analysis confirmed the potential negative effects of driving cessation.[43] One study demonstrated that out-of-home mobility, as defined by the Life Space Diameter, decreased gradually over time with age, but substantially with driving cessation.[44] Curl and colleagues found that cessation had negative effects not only on the former driver, but also on their spouses.[45] On the positive side, Rapoport reviewed the literature on cessation interventions and found that while there are relatively few studies, with varying methodology, they did show a benefit.46 While access to and ability to use technology can be a limiting factor, several studies have shown that programs that provide technology access and training can be beneficial.[47,48] Ryerson described an ongoing collaboration of the AARP Foundation and several organizations to determine if access to and assistance with a ride hailing service will benefit health.[49]

Existing forms of transportation clearly need to be optimized for use by older adults. In a telephone survey of 2,422 people 50 and older, ride-sharing was the second most common mode of transportation (after driving); however, nearly a quarter of the survey participants cited feelings of dependency and concerns about imposing as a barrier to use. Public transportation was the usual mode of transportation for fewer than 5% of survey participants, with many citing unavailable destinations, problems with accessibility, and fear of crime as barriers to use. Fewer than 5% used taxis as their usual mode of transportation because of the high cost.[40] Until such barriers are addressed, these forms of transportation will remain suboptimal for many older adults.

Transportation programs created specifically for the older population, such as senior shuttles and vans, exist in certain communities. A number of locations have adopted the independent transportation network model.[50] These programs address the Five A's of Senior-Friendly Transportation: availability, accessibility, acceptability, affordability, and adaptability (see below).[51] As the older population continues to grow in numbers, the creation of

new programs or expansion of existing ones is encouraged to keep pace with passengers' needs, as well as stronger community outreach to increase awareness of such programs.

The Five A's of Senior-Friendly Transportation*

- Availability: Transportation exists and is available when needed (e.g., evenings, weekdays, weekends).
- Accessibility: Transportation can be reached and used (e.g., bus stairs are negotiable, seats are high enough, vehicle comes to the door, transit stops are reachable).
- Acceptability: Deals with standards, including cleanliness and safety (e.g., the transporting vehicle is clean, transit stops are in safe areas, drivers are courteous and helpful).
- Affordability: Deals with costs (e.g., fees are affordable, vouchers or coupons are available to defray out-of-pocket expenses).
- Adaptability: Transportation can be modified or adjusted to meet special needs (e.g., the vehicle can accommodate a wheelchair, trip chaining is possible, escorts can be provided).

* Source: *Supplemental Transportation Programs for Seniors,* The Beverly Foundation

The occupational therapy discipline has been at the forefront of driving and community mobility issues. This work reminds the clinical team to maintain a client-centered approach when counseling older adult drivers and to avoid the one-size-fits-all perspective. Most clinical team members and especially occupational therapists agree that often no single element of physical and cognitive capacity is sufficient to require driving cessation, but rather a multidimensional approach is necessary.[52] The number of different fitness-to-drive assessment tools and simulator evaluation techniques reflect the heterogeneity of the older adults these strategies are designed to assess.

To address these issues, the roles and responsibilities of all parties involved in the process need to be better defined, delineated, and disseminated. Drivers, caregivers, clinicians, DRS's, other health professionals, licensing authorities, and other community/state/national agencies and organizations have a role to play. Society as a whole needs to be involved in a discussion of acceptable thresholds of risk. In the process of identifying drivers potentially at increased risk of driving safety difficulties, a fair and appropriate assessment of risk is needed, identifying factors potentially influencing risk, considering interventions to lower risk, and identifying ways to facilitate the transition to driving limitations or cessation if drivers prefer to do so or if interventions are not possible or successful. More communication and coordination among the parties involved is needed, as well as demonstrating the effectiveness of different steps in the process, and more information on feasibility and sustainability. A holistic approach to the process is needed that considers not just driving but mobility in a broad sense.[53] An ideal system would also consider competing risks (e.g., falls, pedestrian safety) and interventions that might benefit these as well. A recent review highlighted progress in this area, as well as issues that still need to be addressed.[54]

Evidence emerging in the last 10–15 years has allowed a realistic consideration of expanding from a decision regarding driving versus not driving, or licensing versus revocation of licensing, to a discussion that includes interventions. Interventions have been developed that enhance relevant functional abilities, driver awareness of deficits, and clinician and caregiver awareness of how to address the issue, as well as that facilitate the transition to driving cessation.[55-64] Many of these studies have

been preliminary or small scale, and much more information is needed on how to broaden their applicability and to determine the ancillary effects.

Although these and other questions need to be answered, the good news is that much more preliminary information is available now than at any time in the past. Consequently, it is realistic to think holistically of a more comprehensive and integrated approach to driving safety and mobility that better balances individual autonomy, mobility, and safety with public health and safety. This holistic approach reflects many current national, state, and local efforts that more broadly consider the interrelationship and integration of transportation, health, housing, and environmental factors. Examples of such initiatives include the Interagency Partnership for Sustainable Communities by the Department of Transportation, the Environmental Protection Agency, and Housing and Urban Development. A number of other initiatives with similar or overlapping themes such as Aging in Place, Complete Streets, and Livable Communities have been advocated and investigated by AARP, the Centers for Disease Control, and the American Public Health Association, among others. Other initiatives, such as the Access and Mobility Partnership Grant Program (https://www.transit.dot.gov/funding/grants/grant-programs/access-and-mobility-partnership-grants) (formerly known as the Rides to Wellness Program), administered by the Federal Transit Administration of the U.S. Department of Transportation, directly address the link between transportation and health factors. Programs such as these are to be encouraged and studied, with the goal of enhancing and optimizing their effectiveness, efficiency, and sustainability.

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