





Cognitive Aging: Progress in Understanding and Opportunities for Action

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6

Community Action: Health, Financial Management, Driving, Technology, and Consumer Decisions

Cognitive aging can affect judgment in a wide variety of situations, from choosing when to make a left turn while driving a car through a busy intersection to deciding whether a new investment is a wise choice or a financial scam or determining the best way to take care of one's health. People make these kinds of decisions every day. Thus, there is a need for local and national communities to provide sound, unbiased information to those who need it; there is a need for programs to help people compensate for their cognitive changes; and there is a need for policies to protect those having trouble making decisions on their own. Many public and private organizations already make valuable contributions in these areas. This chapter provides a brief overview of these topics, includes a sample of available resources, and identifies areas in which resources need to be developed or expanded. Extra attention is given to issues surrounding financial decision making since this area is frequently not addressed in discussions about cognitive aging.

SUPPORTING AND MAINTAINING THE PUBLIC'S COGNITIVE HEALTH

As discussed in Chapter 4C and detailed in Recommendation 3, there is evidence that individuals and their families can make changes to reduce cognitive decline and promote healthy cognitive aging. Individuals vary widely in their cognitive capacity and in the extent to which these actions will affect their cognitive function. Nevertheless, the committee recommends that individuals make an effort to promote their own cogni-

tive health and that communities—small and large, local and national—play a significant role in developing partnerships and programs to promote and sustain these changes. Community organizations, senior centers, state and local public health departments, and public–private partnerships can play a significant role in identifying and disseminating evidence-based information and best practices and developing, implementing, and evaluating programs and resources. In fact, many programs are already in place. For example, the Healthy Brain Initiative has brought together a number of partners to develop local, state, and national initiatives (Alzheimer’s Association and CDC, 2013).

The three health- and behavior-related actions identified by the committee with the strongest evidence for effectiveness in positively affecting cognitive aging are:

- engaging in physical activity,
- reducing cardiovascular disease risk factors, and
- managing medications effectively.

The following sections describe a number of local and national programs that support older adults making these changes in their lives. The World Health Organization has a website with information on international cities that are working to be more age-friendly (WHO, 2015). As discussed in Chapters 4A, 4B, and 4C, other actions have shown positive cognitive benefits in some studies amid other positive health outcomes.

Learning more about what interventions are successful, what other risk factors are linked to cognitive aging, and what programs are most effective will require that older adults participate in research efforts and in the evaluation of community programs. A new federal collaboration, Recruiting Older Adults into Research (ROAR) from the Administration for Community Living (ACL), National Institute on Aging (NIA), and the Centers for Disease Control and Prevention (CDC) is aimed at encouraging older adults to participate in research with an initial focus on studies in Alzheimer’s disease and dementia (NIA, 2014c). ROAR works through federal, nonprofit, and pharma collaborations and through partnerships implemented by a network of centers under the direction of NIA.

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Engage in Physical Activity

Community support for increasing physical activity can take many forms, from offering varied and affordable physical activity classes to promoting more walkable communities with well-maintained sidewalks, safe parks, and accessible public transportation. Opportunities to provide information on or previews of physical activity programs can also be embedded in community group meetings. For example, civic or retiree groups, such as the Rotary, Kiwanis, or Lions clubs, or the National Active and Retired Federal Employees Association, are often looking for interactive educational programs, and members may be interested in learning about community resources for physical activity and other healthy practices for cognitive aging.

In 2014, CDC published guidelines for physical activity in older adults with a section on resources to support physical activity (CDC, 2014b). In 2007 the CDC Prevention Research Centers Healthy Aging Research Network published *Moving Ahead*, a brief guide to develop and sustain effective community-based physical activity programs (Belza and the PRC-HAN Physical Activity Conference Planning Workgroup, 2007). Information resources available to promote physical activity in older adults include Go4Life[®], an exercise and physical activity campaign from NIA (NIA, 2014a). Go4Life[®] helps adults 50 years of age and older to keep fit and to add exercise into their daily routine. The program offers exercise instruction and success stories on its website, and it provides exercise guidebooks (available in both English and Spanish) and an exercise video that can be viewed online or delivered by mail free of charge.

SilverSneakers[®] is an example of a growing public–private partnership focused on encouraging and incentivizing older adults to become more physically active (Healthways, 2014). This program is offered by a private sector company through health insurers that are part of the Medicare Supplement and Medicare Advantage programs. The health insurer, in cooperation with Medicare, agrees to pay for a gym membership for its Medicare beneficiaries to encourage and support regular physical activity and reduce the cost barriers to physical activity. Linking physical activity to health insurance highlights the importance of physical activity for improving older adult health outcomes.

Some organizations are promoting the development of senior-friendly communities by making communities more walkable and by supporting transportation alternatives to driving. For example, the Na-

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tional Center on Senior Transportation provides model community transportation programs (NCST, 2014). The Alzheimer's Society in the United Kingdom has a program that aims to create dementia-friendly communities, which has applicability to other community efforts aimed at responding to cognitive aging (Green and Lakey, 2013).

Reduce Cardiovascular Disease Risk Factors

The management of cardiovascular risk factors encompasses physical activity, healthy eating, healthy weight management, and smoking cessation. For example, the American Heart Association's Life's Simple 7™ goals for health (AHA, 2014) are:

1. Get active
2. Control cholesterol
3. Eat better
4. Manage blood pressure
5. Lose weight
6. Reduce blood sugar
7. Stop smoking

The AHA program encourages individuals to set tangible goals for improving cardiovascular health. Based on the data presented in Chapter 4B of this report, working toward these goals may help improve cognitive health.

Many community resources, programs, and opportunities are aimed at reducing cardiovascular risk factors. For example, the evidence-based Chronic Disease Self-Management Program for adults with chronic conditions, originally developed at Stanford University's School of Medicine, is now offered at sites around the United States (Stanford School of Medicine, 2014). The program helps people with chronic conditions learn to manage and improve their own health and has the additional benefit of reducing health care costs. Coordinated in most states through state divisions or departments of aging or public health, the program relies on a network of trained volunteer and professional leaders working through community recreation centers, senior centers, libraries, hospitals, and other locations. The RE-AIM framework (Reach, Efficacy, Adoption, Implementation, Maintenance) has also been proposed for evaluating the dissemination and diffusion of evidence-based chronic disease management and wellness and prevention programs for older adults

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(Glasgow et al., 1999). This framework may serve as a useful model for assessing cognitive aging programs as well. Results from a survey of 40 state aging and public health professionals showed that these stakeholders supported using the framework, although those with direct experience with RE-AIM mentioned some challenges, including the need for assistance with applying the framework (Ory et al., 2015). Examples of the many other relevant programs include the Million Hearts[®] program, a partnership between public and private organizations to focus on reducing the risk for heart attacks and stroke (HHS, 2014b).

Manage Medications

As described in Chapter 4B, a number of medications can have a negative effect on cognition when used alone or in combination with other medications. These effects can be temporary or long-term. Organizations, such as senior centers, faith communities, and civic groups, can connect individuals and family members with evidence-based resources that include lists of medications that may affect cognition and can encourage the discussion of their use with health care providers and pharmacists (see Table 6-1).

TABLE 6-1 Online Resources for Safe Medication Use in Older Adults

- American Geriatrics Society Beers Criteria (including public education resources) (AGS, 2012)
- American Geriatrics Society—*What to Do and What to Ask Your Healthcare Provider If a Medication You Take Is Listed in the Beers Criteria for Potentially Inappropriate Medications to Use in Older Adults* (AGS Foundation, 2014)
- National Institute on Aging—*Safe Use of Medicines* (NIA, 2010)
- NIH Senior Health—*Taking Medications Safely* (NIH Senior Health, 2014b)
- CDC—*Adults and Older Adult Adverse Drug Events* (CDC, 2014c)
- FDA—*Medicines and You: A Guide for Older Adults* (FDA, 2014)
- Institute of Medicine report *Preventing Medication Errors: Quality Chasm Series* (IOM, 2007)
- Institute for Safe Medication Practices (ISMP, 2014)
- Health in Aging—*Medications and Older Adults* (Health in Aging, 2012)

Efforts to increase awareness and action on this issue should include changing the prescribing behaviors of health care professionals as well as

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helping consumers feel comfortable talking with their prescribers about the potential cognitive side effects of the medications they use. In response to the American Board of Internal Medicine's Choosing Wisely[®] campaign (ABIM Foundation, 2015), the American Geriatrics Society recommends against the use of benzodiazepines and other sedative hypnotics as the first choice for treating insomnia, delirium, or agitation in people 65 years or older due to the increased risk of motor vehicle accidents, falls, and hip fractures (AGS, 2012). The EMPOWER (Eliminating Medications through Patient Ownership of End Results) study found that it is possible to reduce the use of benzodiazepines in adults 65 years and older (Tannenbaum et al., 2014). Study participants were given information about the risks of using benzodiazepines, therapeutic alternatives, and a tapering protocol. The strategy encourages the older adult to gain control and take the initiative to wean or find safer substitutes. Additionally, community consultant pharmacists have a role to play in reducing the use of high-risk or potentially inappropriate medications (ASCP, 2014).

Public awareness and education about medication management is critical since older adults and their family members may notice cognitive changes that could be reversible with changes in medications. Potential adverse effects of medications are frequent topics of discussion at senior centers, senior housing communities, and older adult learning initiatives such as Osher Lifelong Learning Institutes, which is associated with universities and colleges across the United States (Bernard Osher Foundation, 2014). Needs in this area include the evaluation of medication awareness and education programs and materials.

Sustaining Behavior Changes in Habits That Promote Cognitive Health

Sustaining behavior change can be challenging. Although effective means to promote behavior maintenance receive less attention in the literature than effective means to promote behavior change (Rothman, 2000), studies with long-term follow-up have identified some factors that may be important for behavior maintenance. These factors include frequent contact, satisfaction with behavioral outcomes, realistic expectations, enjoyment of the activity, feeling responsible for positive outcomes, having social support, monitoring and coping with relapse, feeling self-efficacy, and perceiving opportunities for safe activity (Bellg, 2003; Look AHEAD Research Group and Wing, 2010; Rothman,

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2000; Van Dyck et al., 2011; Van Stralen et al., 2009; Wadden et al., 2011). Public health researchers and others are working to understand which incentives, programs, and supports will help individuals with transitioning a newly developed behavior to a permanent behavior. This section provides a brief discussion of ways to sustain changes in physical activity. Reducing cardiovascular risk factors and many other relevant lifestyle and health behaviors has been and continues to be the focus of efforts to sustain behavior change (see Chapters 4A and 4B).

Sustaining Behavior Changes in Physical Exercise

A 5-year follow-up study of a trial to promote exercise found that older adults who had more positive feelings toward exercise and higher self-efficacy at Year 2 of the study were more likely to still be active 3 years later (McAuley et al., 2007). People who make physical activities a habit may have greater sustained levels of activity over time (van Stralen et al., 2009). However, those with strong existing habits may be resistant to efforts to increase their level of activity (van Bree et al., 2013).

Making permanent changes to the built environment may facilitate the maintenance of physical activity over time. The Community Preventive Services Task Force (2004) recommended improving access to places for physical activity through urban design and land-use policies. The strategy of environmental and policy interventions is to increase opportunities for leisure- and transportation-related physical activities as a way of increasing the overall physical activity levels of the population. Improvements to the built environment can include creating walkways, bike paths, parks, and recreation centers or improving their usability, utility, aesthetics, accessibility, and safety (e.g., by adding lighting or crosswalks). Researchers have found positive relationships between these types of improvements to built environments and the amount of walking or cycling done by the general population (McCormack and Shiell, 2011). Studies in adults have shown that amount of walking is correlated with safety improvements and mixed land use, and with having sidewalks, a nearby mall, or good recreation facilities, although there are fewer studies demonstrating this in older adults (Kerr et al., 2012). These authors also noted that older adults mentioned traffic control measures (e.g., traffic signals that allow enough time to cross the street at a slower gait, more frequent cross walks, and additional stop signs) as critical issues to address (Kerr et al., 2012). Because existing infrastructures vary widely, it is important for communities to involve older adults in deter-

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mining which elements of the built environment need improvement. A systematic review of programs that promote physical activity for all age groups found that creating community rail-trails was very cost-effective (Laine et al., 2014), although costs for changes to the built environment may vary from community to community, based on the existing infrastructure.

FINANCIAL DECISION MAKING

Financial decision making, including managing current financial affairs and planning for one's financial future, is an aspect of financial capacity that can be quite complex and that requires high levels of cognitive function. It reflects a balance between fluid and crystallized intelligences. In financial terms, fluid intelligence refers to the abilities to manipulate and transform financial data, while crystallized intelligence involves knowledge and experience with financial products. Older adults with declines in their fluid intelligence are more likely to experience declines in financial capacity, but these declines may be off-set by greater degrees of crystallized intelligence, particularly financial knowledge and experience (Li et al., 2015). An additional but relatively understudied determinant of financial capacity is the ability to judge trustworthiness and risk, which may be processed differently as people age (Castle et al., 2012; Samanez-Larkin and Knutson, 2014).

Older adults may be vulnerable to financial fraud or abuse just at the time in their lives when substantial financial decisions and financial planning need to be made (e.g., due to the start of retirement, Social Security, or other life changes). Results from the Health and Retirement Study indicate that at least one-third of surveyed participants who were 50 years old and older lacked sufficient numeracy to understand debt risk, compound interest, inflation, or investment risk (Lusardi and Mitchell, 2011). The same authors described the concept of "financial frailty" in older adults, explaining that as people age, they understand less about key differences in defined benefit versus defined contribution or Individual Retirement Accounts for retirement income (Lusardi and Mitchell, 2013). Furthermore, in a study of 645 community-based adults without dementia, the older of these adults exhibited lower financial literacy for decision making than did the mid-life adults (Boyle et al., 2013). Of note, the study authors measured financial literacy in practical terms of understanding Medicare financial options. They suggested that

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having diverse resources (e.g., education, memory, executive function, etc.) contributes to financial literacy, but they also suggested that as much as half of the effect of age on financial literacy is due to decrements in executive function and episodic memory (Boyle et al., 2013).

Older adults may rely more on strategies that use biases or heuristics to help them make decisions than do younger adults (Carpenter and Yoon, 2011). This poses obvious risks for financial decisions in which analysis of large amounts of complicated information may be needed. It has been suggested that providing more simple information about expected value can improve financial decision-making performance (Carpenter and Yoon, 2011). However, others have concluded that there is little evidence that additional disclosure and consumer education are by themselves sufficient to improve financial choices in the context of cognitive aging (Agarwal et al., 2009). As a result, older adults are more likely than middle-aged adults to make less-than-advantageous decisions across a range of scenarios involving financial transactions such as credit cards and mortgages—decisions that can result in increased costs to them (Agarwal et al., 2009).

In 2010 alone, victims of financial elder abuse lost an estimated \$2.9 billion, which included loss of money and goods to legitimate businesses, scams, and family and friends, and indirect losses through medical insurance fraud (MetLife Mature Market Institute et al., 2011). Age-related changes in cognitive abilities may put older adults at risk for financial fraud or exploitation (NAPSA, 2014). The Financial Fraud Enforcement Task Force, established in 2009, defines elder fraud as “an act targeting older adults in which attempts are made to deceive with promises of goods, services, or financial benefits that do not exist, were never intended to be provided, or were misrepresented” (Financial Fraud Enforcement Task Force, 2014). It also defined financial exploitation as “the illegal or improper use of an older adult’s funds or property.” A self-reported survey of older adults showed that 20 percent of Americans aged 65 years and older have been taken advantage of financially by means of unsuitable investments, inappropriately high fees for financial services, or blatant fraud (Investor Protection Trust, 2015). Another study found that among a sample of older adults, a subgroup showed poor performance on a measure of risk–reward processing, which was associated with poor recognition of deceptively advertised products and a greater willingness to purchase these products (Denburg et al., 2007).

Advance planning for financial decisions as a protective strategy merits the same attention as advance planning for health care decision

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making (Sabatino, 2011). Triebel and Marson (2012) and Widera and colleagues (2011) provided additional rationales for earlier attention to declines in financial capacity; described practical warning signs for risks of financial neglect, abuse or exploitation; and emphasized the need to encourage planning for financial protections. According to the National Council on Aging, the top 10 financial scams targeting older adults include telemarketing, Internet scams, and sales of anti-aging products (NCOA, 2014). Strategies that address individual planning and monitoring should be accompanied by system-level strategies that allow financial institutions to identify and intervene in suspicious or concerning transactions. These include giving institutions the authority to place a short-term hold on a suspicious or unsuitable transaction to allow time for investigation and intervention, clarifying privacy laws to allow this reporting, creating a national database of those who commit financial abuse and exploitation of elders, and revising databases that record consumer complaints so that the reporting of suspected fraud or exploitation does not appear among complaints about a financial advisor or institution. In 2010, Washington State enacted a law allowing a 10-day hold on any suspicious transaction involving a vulnerable adult to allow time for investigation and possible intervention.¹ The law also includes requirements for the training of financial institution employees about the financial exploitation of vulnerable adults.² Furthermore, standards are needed for how to present financial information requiring a decision so that it can be understood by someone who has cognitive changes seen with aging and to verify that the consumer has made a decision that meets his or her financial means and objectives. For example, California enacted the Reverse Mortgage Elder Protection Act of 2009³ to promote older adults making informed decisions about reverse mortgages and to ensure that those involved in the sale of reverse mortgages act in the consumer's best interest.

¹Financial Exploitation of Vulnerable Adults, Washington State Legislature Revised Code of Washington (RCW) 74.34.215 c 133 § 3 (2010).

²Financial Exploitation of Vulnerable Adults—Training—Reporting, Washington State Legislature RCW 74.34.220 c 133 § 5 (2010).

³Reverse Mortgage Elder Protection Act of 2009, California State Assembly AB 329 c236 (October 11, 2009).

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Programs to Increase Awareness and Education About Elder Financial Fraud and Exploitation

Many federal, local, nonprofit, and private organizations are responding to the changes in older adults' capacity to make financial decisions and to their vulnerability to financial abuse by creating programs to increase the public's awareness and access to information resources. The target audiences for these programs are not only older adults but also their families, bankers, and financial advisors. These programs alert families to red flags or signs of change in financial capacity that might indicate a need for assistance or supervision. The signs can include changes in the filing of important papers or taxes, stacks of paid and unpaid bills, uncharacteristic errors with checkbooks or tipping, or changes in investment interests (e.g., a conservative investor with a new unexplained interest in get-rich-quick schemes). These programs also can help people learn how to identify a potential scam. Furthermore, some large investment advising organizations are now routinely asking new clients for the names of proxy or surrogate decision makers. The U.S. Department of Justice and the Federal Bureau of Investigation both work to investigate and address financial crimes against older adults (DOJ, 2014; FBI, 2013), and financial fraud directed at older adults has been the subject of many congressional hearings (e.g., U.S. House of Representatives, 2013; U.S. Senate, 2003). Examples of these programs and others are listed in Box 6-1.

BOX 6-1

Examples of Federal and Community Programs to Increase Awareness and Education about Elder Financial Abuse

Federal, local, nonprofit, and commercial organizations are responding to older adults' risk of financial abuse from international and national sources, community services, and even family members. Examples include:

AARP: AARP partners with local police and sheriff's departments in many states to hold "Scam Jams," which are information sessions for older adults about financial risks and protections. The organization has a free "Fraud Watch Network" that sends alerts and news about scams, fraud, and identity theft to those who sign up for the service (AARP, 2014c).

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Federal Trade Commission (FTC): The FTC's financial fraud campaign, "Pass it On," is a consumer education program aimed at older adults which discusses identity theft, imposter scams, charity fraud, health care scams, paying too much, and "You've won!" scams (FTC, 2014). Grounded in an empowerment message, this program encourages older adults to share what they have learned about financial fraud with their friends and family, regardless of whether they themselves have been the target of a financial scam.

Wells Fargo Investment: Elder Client Initiatives is a program that provides information for its network of advisors to help them recognize suspicious financial decision-making or possible fraud in their clients' accounts (Braswell, 2014).

Additional online resources:

Consumer Federation of America: *Nation's Top Ten Consumer Complaints* (CFA, 2014)

Federal Bureau of Investigation (FBI): *Fraud Target: Senior Citizens* (FBI, 2014)

Financial Fraud Enforcement Task Force: *Protect Yourself: Elder Fraud and Financial Exploitation* (Financial Fraud Enforcement Task Force, 2014)

National Council on Aging: *Top 10 Scams Targeting Seniors* (NCOA, 2014)

Many state attorneys general offices provide online resources, such as pamphlets and links, regarding fraud and financial safety. At least one state has a program that will give presentations to senior groups about crime prevention, safety, identity theft, and frauds and scams (Virginia Office of the Attorney General, 2014).

Senior Medicare Patrols are grant-funded projects that help Medicare beneficiaries and their families across the United States prevent, identify, and report errors, fraud, and abuse in their Medicare benefits (ACL, 2015). These projects provide counseling and education by working with individuals or giving presentations to groups. The projects are funded by ACL, and together they served more than 1 million people in 2013.

Next Steps: Financial Decision Making

Credible consumer financial education programs are offered through community and civic groups, retirement housing communities, faith communities, and state, regional, and county aging networks. Few of these programs have been rigorously tested or in place long enough to measure outcomes. Educational programs or materials targeting older

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adults may be more effective with pro-active language such as “savvy saving” rather than negative or stigmatizing language such as “victim,” which can imply a loss of control or independence. The challenge for most programs aimed at financial advisors or directed to consumers is that new scams and threats to financial security of older adults outpace the capacity to keep the public and financial and law enforcement professionals adequately informed. Ongoing public–private partnerships and collaborations will be essential to reach specific targeted groups and diverse communities at a sufficiently fast pace.

Education and empowerment are essential tools for addressing the challenges of cognitive aging on older adults’ financial security. However, systems-level revisions are needed as well. These could include developing and disseminating approaches that compensate for the cognitive changes seen with aging by verifying that the consumer has made a decision that meets his or her financial means and objectives. These approaches should include using lay person, everyday language that considers financial literacy. Techniques, such as using interview questions to assess a person’s ability to make a financial decision or solve a financial problem (e.g., Lai and Karlawish, 2007; Marson et al., 2000), could also help increase the likelihood that a consumer understands and appreciates the financial choice he or she has made.

Furthermore, financial institutions should also be able to identify and intervene in suspicious or concerning transactions. Strategies to consider include giving financial institutions the authority to place a short-term hold on a suspicious or unsuitable transaction to allow time for investigation and intervention, enacting clear privacy laws to allow this type of reporting, creating a national database of those who commit elder abuse and financial exploitation, and revising databases that record consumer complaints so that a financial advisor’s or institution’s reporting of suspected fraud or exploitation does not appear as a complaint about the advisor or institution.

DRIVING

Driving an automobile safely relies on several elements of cognition, such as processing speed, decision making, and multi-tasking. Memory, visuospatial skills and executive functioning are also crucial (NHTSA, 2014b). Furthermore, various sensory (e.g., hearing and vision) and physical abilities (e.g., neck flexibility in turning to look to the side and

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behind) are needed. All of these faculties can decline in older age. On the other hand, older drivers often bring decades of driving experience and lessons learned to bear on their driving. For individuals and their families who must make decisions about when and whether to limit driving or to stop driving altogether, the weighing of the risks and benefits of age-related cognitive and physical changes on driving skills can be a difficult process.

Restricting an older person's driving affects independent living, self-esteem, and safety for older adults and the public, which only adds to the importance of communities and society as a whole addressing this issue (Connell et al., 2013; Curl et al., 2014). Drivers who were 70 years or older were more likely to be involved in two-vehicle crashes than drivers between the ages of 30 and 69 years old (NHTSA, 2011). Drivers who were 80 years or older posed more risk of death to themselves and their passengers than did drivers between the ages of 40 and 70 years old (Tefft, 2008). These statistics raise the question of how best to simultaneously promote both autonomy and safety for older adults. Fortunately, there is a range of community resources focused on older adult driving that offers tools, information, and support for training programs, raising awareness, and assistance in considering when to limit driving.

Defensive driving courses are available for older adults, often with hands-on practice in behind-the-wheel strategies. For example, the American Automobile Association offers a course called RoadWise Drive (AAA, 2011), while AARP offers a Smart Driver Course (AARP, 2014b). Laws in 34 states and the District of Columbia require that auto insurance companies offer discounts to those who participate in these types of classroom safety courses. Twenty-three of those states and the District of Columbia require that online classes be covered in these discounts as well. The discounts can vary by age, location, driving record, etc. (AARP, 2014a). The Insurance Institute for Highway Safety has reported that evaluating the impact of these courses is difficult because "drivers who choose to take these courses are not representative of all drivers in their age group. Typically, they have lower crash rates before taking the course than those who do not choose to take them" (IIHS, 2014). The ACTIVE study showed that those trained to enhance visual processing speed were significantly less likely to be involved in at-fault crashes (Ball et al., 2010). Researchers have also found that older adults who receive driver training using a simulator improve their scanning behavior at intersections (Romoser, 2013).

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A range of driving assessment tools is available to provide older drivers and their families with feedback on driving issues and concerns. For example, the California Department of Motor Vehicles provides a 15-question online self-assessment (California DMV, 2014). The University of Florida has developed the online tool, Fitness to Drive Screening Measure (University of Florida, 2013), which helps proxy raters (caregivers, friends, or family members) or occupational therapists determine whether an older adult is potentially able to drive safely; based on the results of the screening, recommendations may be provided for further instruction or resources. Resources are also available to assist health care providers in determining driving risk. A retrospective cohort study found that a screening tool called the 4Cs could be helpful in assessing driving competence (O'Connor et al., 2010). It is an interview-based tool for health providers to identify someone who is at risk for unsafe driving by examining the individual in regard to four domains: crash history, family concerns, clinical condition, and cognitive function. Regardless of the format of the assessment tool, driving assessments should be carefully validated before they are widely disseminated to ensure that they are providing the intended benefit on driver safety (Bedard et al., 2013; Gifford, 2013; Woolnough et al., 2013).

State departments of motor vehicles, insurance companies, and community organizations often take an active role in providing information to older adults and their families and in developing safety plans focused on older adult drivers (examples in Table 6-2). Efforts at the community, state, and national levels are under way to make communities more accessible and walkable, with transportation options for older adults that do not involve driving. One research agenda for aging and transportation identified several key areas for further work: screening and assessment, remediation and rehabilitation, vehicle design and modification, technological advancements, roadway design, transitioning to not driving, and alternative transportation options (Dickerson et al., 2007). For example, Michigan has developed a Senior Mobility and Safety Action Plan with the goal of reducing the rate and severity of road accidents for older adults (Senior Mobility Work Group, 2013). The plan includes short- and long-term objectives for research and for making driving on roadways in Michigan safer for older drivers, such as by adding back plates to traffic lights facing east-west so that lights are easier to see.

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TABLE 6-2 Online Resources for Older Adult Driving

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- NHTSA:
 - *Traffic Safety Plan for Older Drivers* (NHTSA, 2014a)
 - *How to Understand and Influence Older Drivers* (NHTSA, 2013)
 - NIA: *Older Drivers* (NIA, 2014b)
 - NIH's Senior Health: *Older Drivers: How Aging Affects Driving* (NIH Senior Health, 2014a)
 - New York State Office for the Aging: *Understanding and Helping an Older Driver* (NYSOFA, 2014)
 - AAA Foundation: *How to Help an Older Driver* (AAA Foundation, 2014)
 - Examples of state resources:
 - Maryland Motor Vehicle Administration: *Additional Resources* (Maryland MVA, 2014)
 - Massachusetts Registry of Motor Vehicles: *Mature Drivers* (Massachusetts RMV, 2014)
 - Pennsylvania Department of Transportation: *Talking with Older Drivers: A Guide for Family and Friends* (Pennsylvania DOT, 2014)
 - Vermont Department of Motor Vehicles: *Mature Drivers* (Vermont DMV, 2014)
 - Virginia Grand Driver: *Driver Safety Tips* (Virginia Grand Driver, 2014)
 - Washington Department of Licensing: *Safe Driving for Seniors* (Washington State Department of Licensing, 2014)
-

CONSUMER DECISIONS

Many consumer products are being developed and marketed in response to consumers' interest in methods to prevent, slow, or reverse cognitive aging as well as its effects on people's daily lives. The challenge for consumers—including both middle-aged adults hoping to prevent cognitive aging and older adults and their families—is to sort through product claims and identify which products or actions are evidence-based and effective and which are not.

The large number of adults from middle to older age who are concerned about losing their cognitive abilities has created a vast potential marketplace for cognition-related products. Since older adults are an increasing proportion of the U.S. and world population (see Chapter 1), this marketplace will only grow over time. The potential for a lucrative market, coupled with the steadily growing number of research findings in this area and accentuated by the cognitive vulnerabilities that may affect some older adults, makes this a particularly important area in which to

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have independent, authoritative sources of information and regulatory oversight. Consumers need to be able to make informed choices among products that have evidence of effectiveness. Furthermore, because many of these products are not free, the need to make informed choices becomes even more important as many older adults have fixed incomes and may not be able to afford spending their limited financial resources on products with potentially false claims of improving cognitive function.

Many groups need independent and evidence-based information: Individuals and their families; professionals in the health care, public health, and long-term care areas; and senior centers, exercise facilities, and numerous other locations. Chapter 7 provides details on communication strategies that may be effective for disseminating this type of information to the appropriate audiences.

Product Evaluation Criteria

To assist consumers in evaluating product advertisements and claims, the committee recommends developing an authoritative source of information and providing criteria for product evaluation. Consumer evaluations of the wide array of cognition-related products—ranging from pharmacologics and DNA testing to games and computer applications for self-testing cognition—could be informed by clear product evaluation criteria. Knowing which questions to ask, which issues to consider, and the potential pitfalls and tradeoffs of one product versus another is a good starting point for consumers trying to make well-informed decisions. Recommendation 8 (later in this chapter) calls for the development of product evaluation criteria for cognition-related products. Questions and issues that may be considered include:

- *Real-world effectiveness*: Has the product demonstrated its effectiveness for real-world tasks that are of concern to the consumer (e.g., driving safety, living independently, etc.)?
- *Research quality*: Has the product been evaluated by comparing an experimental group with a control group, both of which have individuals with the same expectations of cognitive benefit?
- *Length of effectiveness*: Does the product demonstrate long-term benefits?
- *Other factors that affect the product's effectiveness*: Are there factors (e.g., age, health, motivation, general cognition ability) that moderate the benefit of the product?

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- *Independent verification*: Have the benefits of the product been replicated by independent groups that do not benefit in any way (financially or otherwise) from the research findings?
- *Comparative effectiveness*: Have the benefits of the product been compared to the benefits of other products or lifestyle choices such as physical activity, intellectual engagement, social interaction, or diet that may impact cognitive health?

Information Gateway or Portal

An independent trusted online source of cognitive aging information is needed. Although information about cognitive aging is indeed available (as discussed throughout this report), the information is spread across numerous websites of government agencies, nonprofit organizations, research facilities, and private-sector corporations. An authoritative online gateway or portal could include evidence-based lay summaries of recent research findings in cognitive aging as well as links to resources from validated sources, advice on where to obtain additional information, and fact sheets on evaluating consumer products, understanding and using new technologies, and many additional topics. Such an information gateway would need to provide information in a clear and concise manner that meets health literacy standards. Keeping the website up to date would be of paramount importance. Furthermore, older adults without online access should in some way be able to have access to these same information resources.

Information gateways have been set up as resource tools for a variety of public health concerns. For example, the Child Welfare Information Gateway is a joint effort of the Department of Health and Human Services' Children's Bureau and the Administration for Children and Families that offers an extensive website of resources, information, and a toll-free information phone line to help protect children (HHS, 2014a). The Environmental Protection Agency provides the Pollution Prevention Information Clearinghouse as a free information service which is focused on "reducing and eliminating industrial pollutants through technology transfer, source reduction, education and public awareness" (EPA, 2014).

Several federal agencies have websites that could serve as information gateways for cognitive aging. Examples include CDC's Healthy Brain Initiative website (CDC, 2014a), ACL's Brain Health website (ACL, 2014), and the website of the National Institute of Health's National Center for Complementary and Integrative Health, which is updat-

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ed regularly with evidence-based reports on products and practices (NIH, 2015). The gateway should be reviewed periodically to ensure that useful information is presented in a meaningful way. An example of an appropriate review is the evaluation of the Agency for Healthcare Research and Quality's National Guidelines Clearinghouse™ (AHRQ, 2011).

TECHNOLOGY

At the same time that the number of older adults is growing rapidly, technology is becoming ubiquitous and integrated into many aspects of everyday life. Technology innovations offer both promise and potential pitfalls for cognitive aging. On the one hand, new technologies can provide older adults with ways to adapt to and compensate for cognitive changes and help them maintain their independence and active lifestyles. For example, the availability of numerous online courses on a myriad of topics increases opportunities for older adults to engage in new learning, while technologies such as email and social network tools can foster social connectivity and help alleviate social isolation and loneliness. Social networking site use among older adults has increased substantially over the past few years (Zickuhr and Madden, 2012).

On the other hand, new technologies are often not intuitive to older adults, and they are complicated to use, so older adults may avoid using them or, if they do use them, they may become frustrated by the technologies. In fact, an age-related digital divide remains despite an increased uptake of technology among older adults. This divide is especially evident when looking at technology use among adults who are 75 years or older and among older adults of lower socioeconomic status (Smith, 2014). To help bridge this divide, system designers need to perceive older adults as an important user group and to consider their needs, preferences, and abilities in the design process. Strategies to ensure that older adults have “meaningful access” to technology are also needed (Sharit et al., 2009). Extensive community and private-sector resources are already focused on addressing these areas. Because technology is such a broad topic with so many applications, this report highlights just a few examples where technology may be useful to or adapted for older individuals who are experiencing cognitive changes.

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Smart Homes

Environmental adaptations and “smart homes” have been developed as a way to keep older adults safer at home, maintain or enhance their independence, improve early recognition of signs of illness, and improve quality of life. Many of these interventions consist of technologies that are integrated into the home environment to assist older adults by interpreting their needs and alerting providers or family members of possible emergencies or changes in physical or mental functioning. These technologies are able to monitor mobility, daily activity patterns, and physiologic parameters such as oxygen and glucose levels. They often employ home sensors or video cameras that detect such things as motion, the opening of the refrigerator door, or the toilet flushing or that assess such things as gait or walking speed (Jacelon and Hanson, 2013; Kang et al., 2010; Rantz et al., 2013).

Studies have also begun to test portable wearable devices that can track mobility and activity (Mudge et al., 2007). These studies have not examined the use of smart homes for the enhancement or maintenance of cognitive outcomes for older adults without cognitive impairment. Although these technologies do not directly measure cognition, they do monitor other elements of health that one may be less aware of as cognition changes. To be useful, the data from the sensors need not only to be collected and monitored but also to be interpreted and used to improve outcomes. These interventions have the potential to lessen the likelihood of illness and injury and to allow older individuals to live independently longer.

Teaching Older Adults to Use Technology

Not knowing how to use technology, or having a fear of using it, could stop older adults from wanting to incorporate technology into their daily lives. Older adults are interested in using, and capable of learning to use, technology applications, but it may take them longer to learn, and they may need more support than younger adults (Czaja et al., 2013). Older Adults Technology Services (OATS) is a nonprofit organization that receives funding from corporations, foundations, and government agencies to teach and support older adults in using technology. It has technology laboratories across New York City and serves more than 20,000 people each year (OATS, 2014). Analyses have shown that OATS training increases older adults’ confidence, ability, and use of

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technology; increases access to information, including health and medical information; and reduces social isolation (Gardner, 2010). OATS also has a pilot project to bring computer training, home Internet access, and electronic devices to minority and low-socioeconomic-status older adults in an attempt to combat the social isolation that can set in for many older adults. OATS is expanding to rural areas and adding online courses in Internet essentials as well as pilot courses on health and financial information. There are also guidelines available for design training and instructional programs for older adult learners (e.g., Czaja et al., 2013).

Improving Web Usability

While the Internet can be beneficial in terms of supporting older adults and providing a source of new learning and cognitive engagement, many websites have usability problems and are difficult to navigate. Many Internet applications can be adapted so that they are easier to use by broad and diverse groups. The World Wide Web Consortium (W3C) is an international organization that develops standards for making the Internet more accessible to all people, including those with cognitive limitations. Its membership includes government, academic, nonprofit, and commercial institutions. It has developed standards for how to make website content and the user interface easier to understand and use. Examples include increasing website readability by providing definitions for unfamiliar words and using clear language, increasing website ease of use with the consistent presentation of navigation tools and repeated components, increasing the ability to correct and avoid mistakes by being able to review submissions and receive information on correcting errors, and suggesting compatibility between browsers and across platforms to maintain stability even on an unfamiliar device. W3C has also recommended alternatives for typing, writing, and clicking through keyboard controls for mouse tasks, voice recognition, and touchscreen capabilities. It provides design recommendations, such as predictive text for those who have difficulty remembering addresses, names, phone numbers, and so on (W3C, 2014). Furthermore, designers should take into account the credibility of information, privacy, trust, and ease of training (Czaja et al., 2012; Sharit et al., 2009).

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Simple Technology

Technology does not have to be complicated or expensive to be helpful to a person with cognitive aging. Setting up a household utility account for automatic electronic bill payment may be a helpful alternative to remembering to pay bills on time. An online calendar can automatically send e-mail reminders for appointments and can be shared with family members. A global positioning system can be used while driving to prevent getting lost. These seemingly simple modifications may go a long way towards helping people maintain independence and confidence.

Technology holds great promise for aiding older adults with their daily activities, although it can be inaccessible to them due to cost or complexity. When developing new technologies to help those with cognitive aging, the end user should not be forgotten. It is important to remember those who are aging as well as their friends, families, and caregivers and to learn what they need most and what will be most useful to them (IOM and NRC, 2013), while also considering how to design devices so that they are simple to use, easy to understand, and available to those who need them.

SUMMARY

As described throughout this chapter, communities across the country have been working to improve accessibility, independence, health, and quality of life for older adults. Many positive outcomes have already been achieved, but these programs need to be expanded to reach more people, new programs need to continue to be developed, and current programs need to be evaluated to determine best practices. With the wide variety of programs and activities available to the public, there is the possibility that some programs could have unintended consequences, so program evaluation will be especially important. Positive outcomes can be reached via many mechanisms and with innovation from organizations big and small, public and private.

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RECOMMENDATIONS

Recommendation 8: Develop Consumer Product Evaluation Criteria and an Independent Information Gateway

Centers for Disease Control and Prevention, National Institutes of Health, and the Administration for Community Living, in conjunction with other health and consumer protection agencies, nonprofit organizations, and professional associations, should develop, test, and implement cognitive aging information resources and tools that can help individuals and families make more informed decisions regarding cognitive health.

Specifically,

- A central, user-friendly, easily navigated website should be available to provide independent, evidence-based information and links relevant to cognitive aging including information on the promotion of protective behaviors and links to effective programs and services. The information should be presented in a way that takes health literacy into account.
- Consumer-relevant criteria should be developed and widely disseminated to provide individuals and families with guidance on evaluating cognition-related products (e.g., cognitive training products, nutraceuticals, and medications).

Recommendation 9: Expand Services to Better Meet the Needs of Older Adults and Their Families with Respect to Cognitive Health

Relevant federal and state agencies (including the Administration for Community Living [ACL], the Centers for Disease Control and Prevention [CDC], the National Highway Traffic Safety Administration [NHTSA], and the Consumer Financial Protection Bureau), nonprofit organizations (such as the Financial Industry Regulatory Authority), professional associations, and relevant private sector companies and consumer organizations should develop, expand, implement, and evaluate programs and services used by older adults relevant to cognitive aging with the goal of helping older adults avoid exploitation, optimize their independence, improve

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their function in daily life, and aid their decision making.

Specifically,

- Financial decision making:
 - The banking and financial services industries and state and federal banking and financial regulators should develop and disseminate banking and financial policies, services, and information materials that assist older adults and their families in making decisions that meet their financial means and objectives, that reduce the opportunities for unsuitable decisions, and that mitigate the harms of such decisions.
 - Surrogacy mechanisms, such as powers of attorney or multi-party accounts, should have appropriate safeguards to protect the interests of the older adult.
 - The financial services industries and relevant state and federal agencies should develop, strengthen, and implement systems approaches, best practices, training, and laws and regulations to help verify that financial transactions are not fraudulent or the result of diminished capacity or undue influence.
 - Systems should be strengthened for reporting or taking other protective actions against potential financial fraud, exploitation, or abuse to relevant enforcement and investigative officials. Laws and regulations should be revised to mitigate civil liability and professional harms resulting from such protective actions.
- Driving and transportation:
 - NHTSA, states' departments of motor vehicles, and relevant professional and consumer organizations such as the American Automobile Association should expand, validate, and disseminate tools and informational materials to assist older adults in maintaining and assessing their driving skills and to assist older adults and their families in making decisions about safe driving.
 - The automobile industry should expand and evaluate technologies that enhance decision making and safety for older drivers.

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- State and local transportation authorities, local planning commissions, private developers, and community groups should expand efforts to develop and implement alternative transportation options to accommodate changes that occur with cognitive aging, including efforts to ensure safe and walkable communities to promote physical activity.
- Technology:
 - Technology industries should develop and adapt hardware, software, and emerging technologies to accommodate the needs of older adults that are related to cognitive aging.
 - CDC, ACL, and other relevant agencies, organizations, and private sector companies should support evidence-based programs that educate older adults in the use of emerging technologies.
- Health information:
 - Health information providers including private sector companies and government agencies, should ensure that their websites (including patient health portals), packaging (including medication packaging), and other consumer health information relevant to cognitive aging meet health literacy standards.

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