alternatives for transportation. Matching individuals to volunteer drivers and using car-sharing programs have been successful in some communities. It is generally agreed that voluntarily giving up a driver's license, rather than having it revoked, is associated with more positive outcomes (Oxley & Charlton, 2009). Specialized driving cessation support groups aimed at the transition from driver to nondriver may also be beneficial in decreasing the negative outcomes associated with this decision (Dobbs et al., 2009).

IMPLICATIONS FOR GERONTOLOGICAL NURSING AND HEALTHY AGING

Assessment of functional capacities often neglects driving ability. Assessment should include evaluation of whether an individual can drive, feels safe driving, and has a driver's license. The mnemonic SAFE DRIVE (McGregor, 2002) addresses key components in screening older drivers (Box 16.6). Box 16.7 presents a self-assessment of driving that can be shared with individuals. The American Automobile Association also provides an interactive driving evaluation available on-line or in DVD format (Box 16.1). These kinds of tools can be effective in raising awareness of threats to driving fitness (Dugan & Lee, 2013). Box 16.8 presents other suggestions in assessment of driving safety.

There is no gold standard for determining driving competency, but driving evaluations are offered by driver rehabilitation specialists through local hospitals and rehabilitation centers and private or university-based driving assessment programs. State Departments of Motor Vehicles (DMVs) also conduct performance-based road tests.

EMERGING TECHNOLOGIES TO ENHANCE SAFETY OF OLDER ADULTS

Advancements in all types of technology hold promise for improving quality of life, decreasing the need for personal care, and enhancing independence and the ability to live safely at home and age in place. Emerging technologies will play a larger role in ensuring care for older people in the future. Assistive technology is any device or system that allows a person to perform a task independently or that makes the task easier and safer to perform. Assistive technology is decreasing the number of older people who depend on others for personal care in ADLs and presents cost-effective alternatives to human services and institutionalization (Daniel et al., 2009). Gerotechnology is the term used to describe assistive technologies for older people, and these technologies are expected to significantly influence how we live in the future. Health care technologies, robotics,

BOX 16.6 Safe Driving

S Safety record
A Attention skills
F Family report
E Ethanol use
D Drugs
R Reaction time
I Intellectual impairment
V Vision and visuospatial function
E Executive functions

BOX 16.7 Driving Skills and Safety Factors

Directions

If you answer "yes" to one or more of the following questions, you may want to limit your driving or take steps to improve a problem.

If you answer "yes" to most of the questions, it may be time to consider letting someone else do your driving.

- Does driving make you feel nervous or physically exhausted?
- Do you have difficulty seeing pedestrians, signs, and vehicles?
- Do cars frequently seem to appear from nowhere?
- At night, does the glare from oncoming headlights temporarily "blind" you?
- Do you find intersections confusing?
- Are you finding it harder to judge the distance between cars?
- Do you have difficulty coordinating your hand and foot movements?
- Do you have difficulty staying in a lane?
- Are you slower than you used to be in reacting to dangerous situations?
- Do you sometimes get lost in familiar neighborhoods?
- Do other drivers often honk at you?
- Have you had any tickets?
- Have you been pulled over by the police?
- Have you had an increased number of traffic violations, accidents, or near-accidents in the past year?
- Do you have any vision problems?
- Do you have any hearing problems?
- Do you take any of the following medications: antihistamines, antipsychotics, tricyclic antidepressants, benzodiazepines, barbiturates, sleeping medications, muscle relaxants?
- Do you have any memory impairment?
- Do you have any muscle stiffness or weakness?

Adapted from Carr D, Ott B: The older adult driver with cognitive impairment: "It's a very frustrating life," *JAMA* 303:1632–1641, 2010.

BOX 16.8 Tips for Best Practice

Driving Safety

- Include the person in all discussions about driving safety.
- Encourage the individual to conduct a self-assessment of driving abilities.
- Assess vision and hearing and ensure appropriate use of corrective lenses and hearing devices.
- Evaluate medical conditions that may interfere with driving ability (arthritis, Parkinson's disease, dementia, stroke) and ensure appropriate treatment, as well as adaptations that may be necessary to enhance driving safety.
- Discuss the impact of medical conditions and sensory impairments on driving safety.
- Suggest vehicle adaptations and elder driving assessment programs if indicated.
- Encourage the individual to modify driving habits, such as not driving on unfamiliar roads, during rush hour, at dusk or at night, in inclement weather, or in heavy traffic.
- Discuss strategies to decrease the need to drive, including arranging for home-delivered groceries, prescriptions, and meals; having personal services provided in the home; asking a caregiver to obtain needed supplies or act as a copilot; and exploring community resources for transportation.
- If the individual has driving safety risk factors and should not be driving, ask the individual's health care provider to "prescribe" driving cessation. This may be better received than reporting the individual to the DMV.
- Ask the family to have the family lawyer discuss with the individual the financial and legal implications of a crash or injury.

From Carr D, Ott B: The older adult driver with cognitive impairment: "It's a very frustrating life," *JAMA* 303:1632–1641, 2010; Gray-Vickrey P: Enhancing driver safety in dementia, *Alzheimers Care Today* 11:147–148, 2010.

telemedicine, mobility and activities of daily living (ADL) aids, and environmental control systems (smart houses/intelligent homes) are some examples of assistive technology.

Telehealth

Telehealth (telemedicine) is defined as "the use of electronic information and telecommunication technologies to support long-distance clinical health care, patient and professional health-related education, public health, and health administration" (Grady, 2014, p. 39). Telehealth offers exciting possibilities for managing medical problems in the home or other setting, reducing health care costs, and promoting self-management of illness, particularly in rural and underserved areas. The number of telehealth programs is increasing worldwide, and these programs offer exciting possibilities for nurses, particularly advanced practice nurses (Mars, 2010; Rutledge et al., 2014; Wamala & Augustine, 2013).

Telehealth nurses may practice in any setting in which on-site access to health care providers is limited. Remote-monitoring devices allow patients to connect with telehealth nurses from their homes or from a community setting such as a senior center. Remote physical assessment (pulse oximeters, weight scales, blood glucose monitors, and intelligent toilets that collect data on weight, blood pressure, and urine glucose level) allow nurses and primary care providers to track trends in patient data. The nurse may use a digital stethoscope to auscultate lung sounds or a digital camera to assess and document wound healing. A home care telehealth nurse can "see" many more patients through virtual visits (Grady, 2014; Rutledge et al., 2014).

A number of studies have reported that telehealth technology improves patient outcomes and decreases hospital readmissions and health care costs (Grady, 2014; Rutledge et al., 2014). Factors driving the adoption of telehealth include rising health care costs, the desire to age in place, increasing comfort with technology, the new generation of nurses who expect to incorporate technology into their practice, and the profit motive of device manufacturers. Factors slowing widespread development include concerns about privacy, fear of diminishing human contact and caring, and limited reimbursement (Fuji et al., 2014; Grady, 2014).

Smart Homes

Smart medical homes are being studied as a way to aid in the prevention and early detection of disease through the use of sensors and monitors. These devices keep data on vital signs and other measures such as gait, behavior, and sleep and provide an interactive medical-advising system. Devices to monitor gait and detect balance problems, such as the iShoe and the "smart carpet" (a sensor system embedded in the carpet that detects gait abnormalities that may predispose the person to falls and also detects falls and summons assistance), are being developed (Aud et al., 2010; Rantz et al., 2008). SmartSoles, shoe insoles with an embedded GPS device, are being developed and may be an aid to locate individuals with dementia who wander from their home.

Remote-controlled houses are becoming more popular and allow the individual to control the house from anywhere (e.g., devices that turn lights on and off, automatically water plants, or feed pets; motion detectors; and leak detectors). The first of a series of smart houses to enable older people to live safely in their own homes is already on the market. An example is the

ClientCare 24-hour monitoring service. This system uses an ordinary home security infrastructure to monitor the house and transfers information about the occupant's daily living activities, triggering when a normal routine is broken. Caregivers and family can perform virtual check-ins with their older relative over the Internet (Bezaitis, 2009).

Motion and pressure sensors may be useful in the homes of older adults with cognitive impairment. These sensors can detect movement and the absence of movement. If there has been no movement for a period of time, a monitoring system is activated and a plan of action initiated depending on the person's response or lack of response. Pressure sensors can be used under the mattress and can turn on bedside lights when the individual gets out of bed or activate an alarm if he or she does not return to bed in a specified period of time. Sensors placed in entry doors can detect if a person leaves the home and can send messages to caregivers that the individual has left the house (Daniel et al., 2009). Medical alert devices are now available that automatically call for help in the event of a fall, without requiring the user to push a button (American Association of Retired Persons Bulletin, 2015).

In hospitals and long-term care facilities, devices such as wireless pendants that track people's movements, load cells built into beds that create an alert when individuals get out of bed, and monitor weight and sleep patterns, and bed lifts that allow individuals to go from lying down to standing up with the push of a button are being used. Wheelchair technology that enables the user to go down stairs, move to an upright position, be reminded to change positions to alleviate pressure, or use mechanical arms to change a light bulb or get things out of the refrigerator are other developing technologies.

Robots

Robotic technology for health care is more advanced in Europe and Japan than in the United States at this time, but we can expect to see increased development and use of robotics in nursing. On the horizon are technology developments such as robots that can help lift both individuals and objects, remind patients to take their medicine or administer the medication, check a person's vital signs, provide help in the event of a fall, and assist with baths and meals. A child-size therapist robot on wheels with a humanlike torso is being developed for use in homes and long-term care facilities to assist with the high level of attention individuals with dementia require for safety and function. Many ethical issues have been raised about the use of robots, and nurses will play an important role in ensuring that technological competence is balanced with caring to enhance the well-being of the individual (Campling et al., 2007; Fuji et al., 2014).

As the baby boomers and future generations age, comfort with technology will be increased, and people will seek options for better, safer, and more independent ways not yet imagined. At this time, many of the assistive technologies can be cost-prohibitive for older people, but with advances in development they may be more accessible and affordable for more people. Research is needed on assistive technologies and their acceptance among older people. It is important for nurses to be aware of available technology to improve safety.

ELDER-FRIENDLY COMMUNITIES

Developing elder-friendly communities and providing increasing opportunities to age in place can lead to enhanced health and well-being. Aging in place is the ability to live in one's own home and community safely, independently, and comfortably, regardless of age, income, or ability level (CDC, 2013). Many state and local governments are assessing the community and designing interventions to enhance the ability of older people to remain in their homes and familiar environments. These interventions range from adequate transportation systems to home modifications and universal design standards for barrier-free housing.

Components of an elder-friendly community include the following: (1) addresses basic needs; (2) optimizes physical health and well-being; (3) maximizes independence for the frail and disabled; and (4) provides social and civic engagement. Fig. 16.1 presents elements of an elder-friendly community. An outgrowth of age-friendly communities is the Dementia Friendly America Initiative to foster dementia-friendly communities across the United States, which will support those living with dementia and their caregivers and families (Weiss, 2016) (see Chapter 25) (Box 16.1).

KEY CONCEPTS

- Thermoregulatory changes, chronic illness, and medications may predispose the older adult to hypothermia and hyperthermia. Careful attention must be paid to temperature monitoring and provision of adequate heat and cooling in weather extremes.
- Transportation for older adults is critical to their physical, psychological, and social health.
- Driving safety for older people is an important issue and health care professionals must be knowledgeable about assessment, safety interventions, and transportation resources.

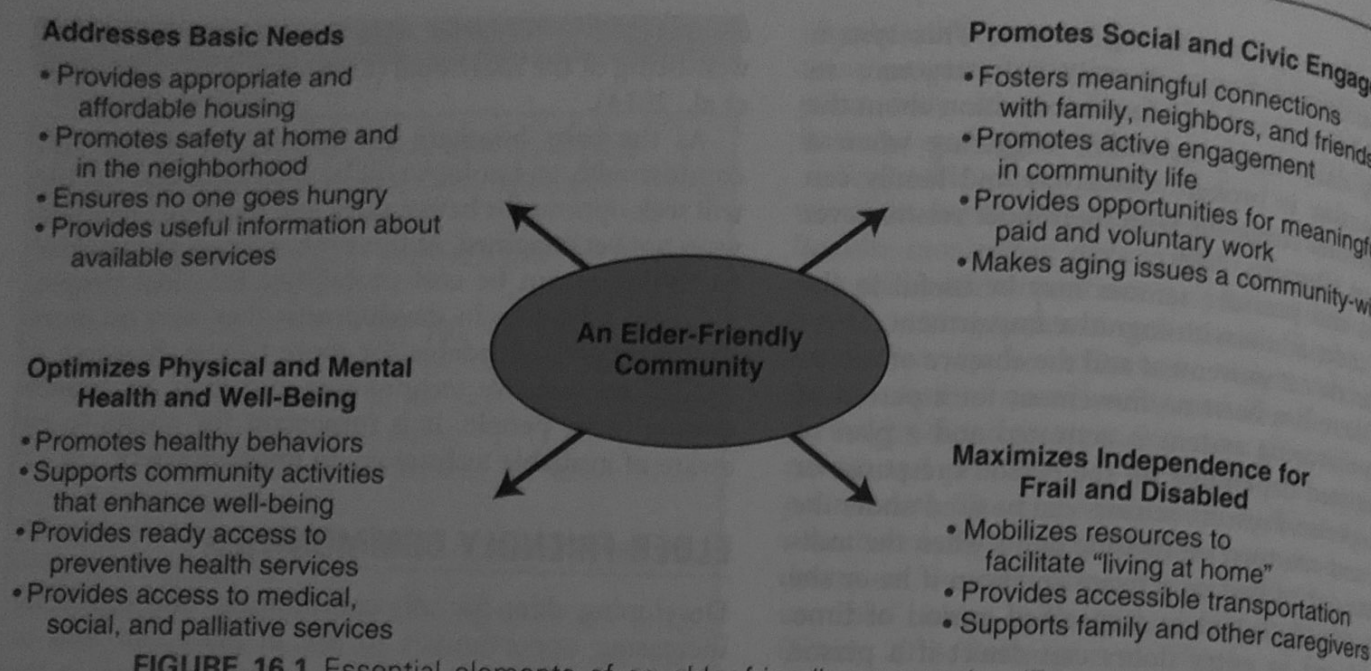

FIGURE 16.1 Essential elements of an elder-friendly community. (From AdvantAge Initiative, Center for Home Care Policy and Research, Visiting Nurse Service of New York.)

- Technology advances hold promise for improving quality of life, decreasing need for personal care assistance, and enhancing independence and ability to live safely.
- Efforts to make communities more elder friendly are underway across the globe. New and innovative ideas for aging in community will continue to change living options for older adults.

ACTIVITIES AND DISCUSSION QUESTIONS

1. What interventions are important to prevent hypothermia in an elder undergoing surgery? In a frail elder residing in a long-term care facility?
2. Locate low-cost housing in your area and assess for convenience and safety.
3. Evaluate the safety of your living quarters or the living quarters of your parents/grandparents.
4. What types of support does your community provide to assist elders safely age in place?

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