

Designing Spaces for Healthy Aging

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Aging is changing the American demographic landscape at an unprecedented pace as this generation lives longer and healthier lives than those that came before. The elderly population (aged 65 and older) numbered 37.3 million in 2006. In 2019 the baby boomer generation will number 75 million.² The number of older Americans will grow to 1 in 5 by the year 2030, up from 1 in 8 in 1994.¹ In North Carolina it is projected that by 2030, 75 of the 100 counties in the state will have more people over the age of 60 than under the age of 17.³

Considering this rising number of older adults, how the built environment affects the health and well-being of the elderly should be understood. This includes the workplace, institutions, and home. The workplace must be considered because many boomers will work well into retirement. The home must be considered because an American Association of Retired Persons (AARP) report found that 71% of Americans age 45 and older say they want to remain in their current residence as long as possible.⁴ Interestingly, 70% of older adults actually do spend the rest of their lives in the home they lived in at age 65.⁵

Accommodating the restrictions and activities of all age groups in how we construct buildings, pathways and landscapes is called Universal Design (UD). These techniques can be adapted into seamless, integrated, noninstitutional forms, ensuring that both the aging boomer and older adult will consider its use as a support for their independence and successful healthy aging.

The Americans with Disabilities Act (ADA), signed into law in 1992, moved the public one step towards independence by prohibiting discrimination against disabled persons and removing barriers that limit full access and participation in society.⁶ This law mandated that commercial businesses and institutions comply with means of egress and space planning that allow those with disabilities to maneuver with ease. This legislation

prompted the addition of items such as ramps, wide doors, grab rails, elevators, Braille signage, and larger bathrooms with varied sink heights in public and commercial buildings.

ADA and Commercial Space: Vision, Lighting, and Healing

As we age, certain physiological changes take place that differ in degree from individual to individual. Physiological changes include the loss of vision, hearing, strength, flexibility, and mobility. Environmental Gerontology studies the older person's relationship with their environment.⁷ This research into one's surroundings does not look at a snapshot in time, but rather looks at behaviors, emotional responses, and successful

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adaptations over a period of time. Designing spaces with these physiological changes in mind will allow older adults to continue to work in their area of choice and to age-in-place at home, both of which add to their quality of life.

To appreciate the need for such environmental changes, it is important to look at the sensory losses that confront many older adults. Vision changes include the yellowing of the lens, weakening of the muscle controllers, cornea opacity, cornea crazing, and flattening of the lens, a condition known as farsightedness. In viewing color, a loss of the sensitivity to the

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intensity of color occurs. Other losses include a reduction in seeing the color blue and other cool colors, loss in ability to distinguish related colors, and loss of ability to discriminate fine detail or closely related distances such as curbs and steps.⁸ As color is perceived differently by an older adult, one solution for interior space is to choose warmer colors and visual contrasts in color value (darkness or lightness of a color) between floors, doorways, furniture, and walls. This will allow an older adult to more easily see furniture, doorways, and walls and successfully navigate space. Adequate contrast increases depth perception by providing proximal cues to object location.

Older adults also experience a one-third reduction in the amount of absorbed light that enters the eye, compared to a 20-year old. This reduction is due to the thickening of the lens, which also creates glare.⁸ To compensate for this reduction, the general lighting in interior spaces should be indirect lighting (such as cove or sconce) and direct lighting for specific tasks (such as lamps and fluorescent strips under cabinets). Interior lighting can be strategically placed to reduce shadowing. Control of natural light can be achieved with the use of blinds, shades, and draperies. Glare can be problematic for older adults, therefore transition and light adjustment from outside to the inside of buildings is also a consideration in design. Entrances to buildings should be designed to gradually reduce the amount of light to facilitate the user's transition. Glare reduction can also be achieved with the use of materials; for example, counter and floor surfaces with a matte or honed finish should be used instead of a polished or glossy finish.

Ergonomics: Strength, Flexibility, and Mobility

Beyond vision changes, older adults also experience a decline in muscle strength, flexibility, and mobility due to a loss of strength in the lower extremities. Additional changes include reduced ability to bend the knee at an acute angle. Older adults can also experience early onset of discomfort when seated due to tissue loss over the ischial tuberosities. As a result in this loss in strength, some older adults may be unable to stand for any length of time. Due to a greater reliance upon arm strength needed to lift one's center of gravity from the seated position and to stabilize the body between the standing to sitting transition, furniture with arms should be provided. Additionally, space underneath the front of a chair is needed for an older person to have room to gain momentum to rise from the seated position.⁹ It is not uncommon for some older adults to also experience a transition to a shuffling gait, early morning or end of day tremor, and loss in grip strength (palm) and tip prehension strength (fingers). Not surprisingly, such changes along with chronic cardiac or pulmonary diseases can cause older adults to fatigue quickly.⁹ To ease any difficulties in performing tasks, D-shaped cabinet and drawer pulls, drawers on glides, utensils with good grips, and a bench to rest upon on long ramps are excellent solutions.

Ergonomic considerations are important in commercial settings such as banks, hotels, restaurants, and offices. For instance, the ability to visually communicate with and complete

transactions with a teller or to check in at a hotel requires a lower counter for the seated patron.

As baby boomers work longer their changing needs will impact the design of workplace environments. By 2016, workers aged 65 and over are expected to account for 6.1% of the total workforce, a sharp increase from 3.6% in 2006.¹⁰ Environments that can be easily changed to fit each user with respect to ergonomics may include items such as adjustable seating, keyboard trays, and desks that raise and lower for sitting or standing. Flexibility is the key to accommodating different users of all ages and abilities.

Hearing

Hearing loss begins around the age of 40 and frequently includes prebycusis (loss particularly in the higher frequencies) and loss in distinguishing low-volume sound.⁸ Older people have less ability to discern conversation, especially in areas with background noise. To help minimize the effect of these changes, the environmental properties can be changed to control and absorb noise by utilizing the addition of pleasant and controllable music, the use of acoustic materials for walls and floors, and the installation of baffles in ceilings. Sound control can also be a problem in office environments, and the use of a sound masking system to buffer the typical office noises helps with this issue.

Safety

Safety is a consideration, and use of flooring material, such as carpet, has been shown to be preferential over hard-surface flooring (vinyl) in environments for the elderly. These materials enable older adults to walk more efficiently and feel more confident and secure.¹¹ Other design considerations for safety include radius edges on furniture and counter tops as well as large text on egress directions and restaurant menus. To prevent tripping, it is important to manage wires related to portable electronics, use additional railings on sloped walkways, and select lights that turn on when you approach a porch or enter a house.

Universal Design and Home Modifications

Universal Design (UD), also known as barrier-free design, has emerged as a means to further independence for everyone: young and old, tall and short, people of all sizes and shapes. As defined by Ron Mace, "Universal design is the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design."¹² Mace contends that the purpose of UD is to simplify life for people of all abilities and ages by making products, communications, and the built environment more usable by as many people as possible with little or no expense.¹²

"Advocates for housing modifications have long argued that environments, not people, are 'disabled,' and that independence-promoting environments improve the level of functional ability."⁴ UD and home modifications can assist the elderly already

experiencing some of the above problems with aging-in-place and can also be an asset to boomers thinking ahead. Safety is a prime consideration; the National Centers for Disease Control and Prevention (CDC) suggests that “one-third of home accidents could be prevented by structural modification and repair.”¹³ Home modification bolsters the chances that older people will retain independence injury-free, stay in their homes, and remain active much longer in their own communities.”¹⁴

Home safety is best addressed in all spaces and passageways, beginning at the entrance to the dwelling. The house should include at least one no-step level entry and a door with a side-light window or view with abundant light to illuminate visitors. The house should also include an accessible half-bath or full-bath on the main level for family and guests. In the bathroom a wall-hung telephone within reach of the floor provides extra safety in the event of a fall, while a night light can help prevent falls. Other bathroom features that offer safety and accessibility may include a roll-in shower, a roll-under sink, or a sink that adapts for seated use. To increase safety when bathing and toileting, include a hand-held shower head on a slide, an adjustable shower seat, and grab bars in the shower and around the tub and toilet. A non-slip, low maintenance floor reduces fall risk in the bathroom, an area where falls most often occur.

Typical UD features in a kitchen include a side-by-side refrigerator/freezer, raised or drawer-style dishwasher, counter-height microwave, and a flat cooktop with front controls. Stoves should have an open space underneath for use by a seated person, and it is useful to have a separate comfort height wall

oven. Varied counter heights offer options for dealing with tasks when sitting or standing.

For new construction, it makes sense to plan ahead for home modifications by adding blocking in walls around the toilet and shower, hallway, and stairs so that grab bars or railings can be added as needed. Builders should also provide programmable thermostats, raised electrical outlets, lowered rocker light switches, as well as radius or beveled corners on counters, furniture, and walls. Washer and dryer units should be raised and have front load and controls. Lever door handles should be used instead of traditional door knobs. Doorways should be 36 inches wide, and hallways should measure 42 inches in width. Stairways pose great risk for falls which can be reduced by adding railings on both sides and plenty of light for navigation. Additionally, new technology can assist children of older adults a way to monitor parents using home security motion detectors strategically placed in the house that log daily activities in an unobtrusive way, providing a way to check without cameras.

America continues to age and typical physiological changes occur in most people of middle-age and beyond. These changes, including vision, hearing, strength, and mobility, take place at different ages and different rates. Whether an older adult is at home, in the workplace, or shopping in a mall, compensation for aging can be successfully handled through environmental design. Such modifications allow an older adult to navigate and perform in the built environment independently. Maintaining this independence is one key to healthy aging. **NCMJ**

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