Safe Housing for Senior Residents: Alterations and Renovations to Improve Safety
Introduction

In countries around the world, populations are rapidly aging due to rising life expectancy and decreased birth rates. In fact, data suggests that the current growth of the population aged 65 and older in the US is one of our most significant demographic trends in history. Moreover, the number of Americans aged 65 and older is projected to double by the year 2060, and comprise around 24% of the total population of the country. As the age distribution of the American public is changing, new challenges come into focus, not least among them housing.

The growth of the nation’s elderly demographic has also coincided with an increase in dual-career and single-parent households, leaving less adult children to act as fulltime caregivers. While in the past, grown children would often simply absorb aging parents into their households, this type of household exists in far fewer numbers today. Consequently, elderly individuals may become isolated in their own homes. The caregiver roles once played by family members are now assumed by paid and volunteer staff at service organizations, including staff at day care centers, volunteers delivering meals, or individuals who - simply make periodic visits to interact with the elderly service population.

Individuals who engage seniors on a regular basis become their link to the outside world. Acting in this role affords staff an opportunity to protect the elderly from many of the risks that accompany the aging process.
Staff members and volunteers who work regularly with elderly clients are often the first ones to spot signs of trouble, including elder abuse, changes in physical ability, psychological decline, medication problems, self-neglect, and potential household hazards. Staff members’ interaction and willingness to help their elderly clients may prevent injury and stop problems from escalating to a dangerous point.

Staff members and volunteers should be supported in identifying and correcting downside risks associated with serving elderly clients. Service organizations must teach their staff the signs and symptoms of problems and the appropriate methods to improve a situation without making matters worse. Proper training, screening and supervision are essential in reducing the potential for harm to elderly clients, by assisting staff and volunteers in appropriately assessing situations, making a report when a situation is deemed dangerous, and determining the most appropriate methods and additional assistance necessary to correct the situation.

Seniors who reside in apartments and housing units share a variety of special challenges with other seniors in the country. These challenges change and evolve over time and may be related to specific health issues or simply due to aging. Some of the challenges that senior residents face include difficulty seeing clearly, grabbing door handles, reaching for cabinets and climbing stairs. Many seniors report difficulty navigating accident-prone areas of the home, including the bathroom and kitchen. Some seniors require special modifications in order to perform basic daily activities such as cooking, using the restroom or bathing.

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**Defining the Senior Population**

Defining who fits into the elderly or senior demographic is a challenge, partly because there is no true consensus. Even when defining the term by age is possible, most individuals that fit into the category share very few characteristics.

Stereotypes and generalizations about the elderly population rarely prove accurate since, just as in the general population, elderly individuals vary greatly in terms of physical ability, intellectual capability, and almost every other characteristic.

Some companies and restaurants provide “senior” discounts to those over the age of 50, but in most legal and governmental contexts, seniors are those aged 65 and older.
This booklet provides information to assist your organization in understanding the risks and challenges associated with housing seniors, and suggestions for renovating housing units to make them suitable for senior residents.

Providing Safe Housing for Senior Residents

Implications for Housing Agencies

Housing agencies provide housing units that are home to a diverse population of residents, from single adults, to large families, to individuals with physical and mental disabilities, to single and married seniors. Challenges in finding appropriate housing are different for every family and resident residing in housing units.

For senior residents, it is important for housing managers to recognize mobility and other challenges that may increase with advanced age. When there is an opportunity to build new units or renovate and rehabilitate existing buildings used by a housing organization, a growing number of housing agency managers are embracing “universal design” as a model for coping with demographic shifts.

Additionally, it is important to acknowledge that housing that is built for one age group or family type today may be used for an entirely different group or population subset in the future. Housing that is designed for large, young families may become housing for seniors in the not-so-distant future, especially as the senior age group continues to grow. Because of the change in the US demographic, housing organizations have come to realize that units that are built and designed to effectively accommodate more than one type of resident are a wise investment. However, making new buildings appropriate for a variety of resident groups can be challenging.
Due to budgetary constraints on building new housing facilities, often the most cost-effective and realistic approach to increasing the availability of housing is by modifying the existing housing units that are already available. Continuing into the foreseeable future, renovating current housing facilities is likely to be the most economically reasonable option for housing agencies seeking to better accommodate the specific needs of senior residents, while continuing to plan for future demographic changes.
What is Universal Design?

Universal Design, also known as Inclusive Design, Design-for-All and Lifespan Design, is designing and creating an environment that can be accessed and utilized by as many diverse groups as possible, regardless of their age, disability or size.

This video walks through the BraunAbility Universal Design Living Laboratory. Advocates for Universal Design believe that it is a fundamental requirement of good design to meet these standards and consider the potential diverse populations that may use a new space.

The term universal design was originally coined by Ronald Mace at North Carolina State University (NCSU). In keeping with his legacy, the Center for Universal Design at NCSU has published a wide range of resources on the topic, including the 7 Principles of Universal Design, which were adopted in 1997 to guide design. In summary, these principles are:

1. **Equitable Use:** The design is useful and accessible to people with diverse abilities
   - Example: Power doors at entrances that provide hands-free entry

2. **Flexibility in Use:** The design accommodates a wide range of individual preferences and skill levels
   - Example: Desks designed for both right- and left-handed users

3. **Simple and Intuitive Use:** Design is easy to understand, regardless of knowledge or experience
   - Example: Graphic labels, such as on a television remote control

4. **Perceptible Information:** The design communicates necessary information regardless of the user’s sensory abilities
   - Example: Redundant messaging, such as the use of voice and signage in train stations

5. **Tolerance for Error:** The design minimizes hazards and the risk of unintended consequences
   - Example: Word processing software allows users to “undo” unwanted changes

6. **Low Physical Effort:** The design can be used efficiently with little fatigue
   - Example: Door levers, allowing the user to open doors using a fist or elbow instead of the full hand needed for a traditional doorknob

7. **Size and Space for Approach and Use:** Appropriate size and space is provided regardless of the user’s size or mobility
   - Example: Wide hallways in office buildings, to allow for users with wheelchairs and other mobility devices
Housing Risks, Challenges and Specific Strategies

Seniors face a number of mobility and related challenges in their day-to-day lives that may be especially difficult in their housing situations. Many of the challenges these seniors face at home in housing units can be eased through minor alterations or more major renovations in the housing units where they live. Some of the challenges that may be partly or wholly remediated with special renovations and modifications in housing units are described in the following sections.

Visual Impairment Risks and Challenges

The likelihood of having impaired vision and blindness increases substantially with age, particularly for those over age 65. Senior residents living in housing units may even have greater vision impairments than average, due to a lack of appropriate medical care or poor nutrition. Visual impairments may include trouble distinguishing between different colors, decreased vision in sunlight due to glare on surfaces, trouble seeing changes in the level of the floor, or seeing steps or thresholds, and difficulty reading warning signs or instructions. This can lead to a number of other risks for seniors, including an increased risk of falling, increased risk of depression, difficulty identifying medications, and difficulty moving about their homes.

Visual Impairment Housing Strategies

♦ Reduce glare by adding features to prevent reflections and direct sunlight. Features might include blinds and other window shadings reducing direct sunlight, and non-gloss coverings on walls and other surfaces
♦ Install glow-in-the-dark light switches to enhance visibility
♦ Increase lighting features throughout the home, especially in working areas such as the kitchen, bathroom and reading areas
♦ Enhance visibility by using contrasting paint colors and flooring to help individuals distinguish between different areas of the home
♦ Install rounded mirrors at hallway corners to allow better visibility of blind spots
Hearing Loss Risks and Challenges

By the time they reach age 65, one out of every three people has some degree of hearing loss. Having trouble hearing is often confused for aloofness or confusion, and may even be incorrectly attributed to mental disability, such as the onset of Alzheimer’s disease. In the home, hearing loss can decrease an individual’s ability to hear the phone ringing, the doorbell ringing, or a smoke alarm sounding in the night.

Hearing Loss Housing Strategies

♦ Install a flashing light indicator in living areas of the home that will notify the resident when the doorbell rings, or when a kitchen timer goes off
♦ Install a strobe light connected to the smoke alarm in the unit so there is sound and visual indicators in the case of a fire
♦ Add insulating materials throughout the unit to minimize background noise and enhance the ability to hear primary noises (i.e. carpeting, soundproof flooring)

Strength and Dexterity Risks and Challenges

Aging causes changes throughout the body and the mind. One common change is in muscle mass. As a person ages, muscles begin to shrink and lose their mass, a process that can be accelerated by a lack of movement and reduced mobility. Bones and joints also show signs of age. Bones become less dense, and arthritis can develop as cartilage in the joints begins to weaken and become less elastic. These changes can make it difficult for seniors to use traditional doorknobs, unlock doors and latches, open heavy doors, and manipulate other items commonly found in the household.
Strength and Dexterity Housing Strategies

♦ Add levered handles to kitchen and bathroom sinks to allow for easier control
♦ Change traditional light switches to rocker switches
♦ Change out older and more traditional cabinet handles with U- or D-shaped handles for easier grip
♦ Lower the temperature setting on the water heater, or install temperature-limiting valves on existing showers and tubs to prevent the risk of water burns to senior residents who may have difficulty adjusting water temperature.
♦ Install grab bars in the bathroom, especially near the toilet and in the shower or the tub

Mobility Risks and Challenges

Many seniors who live in housing units experience difficulty walking or getting around in their homes, in the buildings where they live, in the shops they visit to buy necessities, and in their neighborhoods. Mobility challenges may require the use of a supporting device such as a cane, walker, or wheelchair.

Mobility Housing Strategies

♦ Remove under-sink cabinets and hardware in bathrooms and kitchens to allow a senior resident in a wheelchair to wheel up close to the sink
♦ Modify doors and entryways to provide at least 32 inches of clearance so that wheelchairs can fit through
♦ Replace high thresholds between rooms with lower, beveled or ramped thresholds to create a smoother transition from room to room
♦ Replace shag or high pile carpeting with low pile carpeting or another type of floor covering to reduce tripping hazards
In many instances, it is the combination of one or more of the challenges described in the previous sections that create major risks and special needs for seniors in the home. For example, visual difficulty making it hard for a senior resident to see a change in threshold from room to room may be made worse by reduced mobility and the need to use a walker for stability support. Because of this combination of challenges, the senior resident faces an increased risk of falling when moving throughout their home.

Falls: A Serious Threat to Senior Safety

Although people of any age can suffer a fall, as a person ages falls become more common and may result in more serious and long-term injuries. Some of the modification and renovation ideas suggested in this booklet may help your organization reduce the number of falls for seniors. This is important because it can increase the safety of senior residents, reduce claims against your organization, and help your organization plan for smart renovations in current and future facilities.

Available statistics about seniors and falls, especially falls in the home, demonstrate the importance of making personal and common spaces as safe as possible and remedying identified hazards that may cause falls. Some startling facts and statistics about falls involving older adults include:

- One in three older people falls each year
- Falling once doubles your chance of falling again
- More than 95% of hip fractures are caused by falling, usually falling sideways
- One out of five falls causes a serious injury such as broken bones or a head injury
- Falls are the most common cause of traumatic brain injury (TBI)
- Every 19 minutes, an older adult dies from a fall

The risk of falls and the associated injuries are very great, especially for older adults and seniors. Even those seniors who have not suffered a fall may choose to limit their activities, movement and social activity because they simply fear that a fall may occur.
It is important to also remember that the areas surrounding the house may pose a significant risk as well. Properly remove all snow and ice, and salt sidewalks and parking lots as required during the winter months. Each removal and treatment should be recorded.

Renovating for The Aging Population

In the following sections, alterations and renovations that can reduce hazards in housing for senior residents are discussed in detail. In some situations, minor modifications and the simple addition of safety devices such as grab bars or ramps can make housing units more appropriate for elderly occupants. While these minor but important changes may be completed by in-house maintenance teams, in some instances major changes to the design of bathrooms, kitchen, hallways and other living areas may require the use of outside contractors.

Accessible Rooms

Kitchens

Preparing meals and cooking is an essential daily activity for all self-sufficient adults, including seniors living in housing units. Kitchens are often considered to be the focal point of a home, and making some simple modifications and space utilization decisions about the layout of a kitchen can help senior residents make better use of the space and be safer while doing so by helping prevent avoidable accidents. Watch this video about creating an accessible kitchen, or consider making some of the following modifications or adding some of the design features described in the following section:

- **Location** - Ideally, the kitchen should be located with easy access to at least two entrances or exits from the home
♦ **Doorways** - There should be no doors separating the kitchen from adjoining rooms, and any doorways should be with little to no threshold, and wide enough for a wheelchair to pass through comfortably (32-36 inches, as recommended by the Americans with Disabilities Act (ADA))

♦ **Cabinets**

- Upper cabinets should be low enough that they are within reach without having to strain or climb to reach them (suggested 3 inches lower than normal height). If lowering existing cabinets is not possible, consider installing pull-out shelving units within the cabinets to help bring items to a manageable reach. Pull-out shelving can also be helpful for lower cabinets, to reduce the need to reach, and to increase usable space

- Consider creating roll-under work stations by removing lower doors and cabinets to accommodate wheelchairs

- Cabinet pulls and handles should be functional even for people with reduced dexterity due to arthritis or poor hand mobility. Consider adding U- or D-shaped handles to accommodate the greatest number of individuals with different capabilities

♦ **Countertops**

- Consider adding countertops at different levels throughout the kitchen. This accommodates people of different abilities, as well as those who are standing and those who are sitting

- Countertops should have rounded edges to reduce risk of injury. Also consider making the edges of the countertop a different color than the rest of it to provide a visual indicator of where the countertop ends
Lighting

- Lighting in the kitchen is very important for proper food preparation and safety. Ensure there is sufficient lighting, and consider adding under-cabinet lighting to increase the visibility of countertops.
- Light switches should be as large and visible as possible, and placed in a low position. When possible, light switches and outlets should be placed on the outer sides of the cabinet to facilitate easy reach and use.

Flooring

- A type of non-slip flooring should be used to help with the prevention of falls and slips. Rugs are not ideal for this space.
- The flooring should also be visibly different from adjoining rooms so seniors with visual impairments are able to easily differentiate between the spaces. Also consider that anti-glare types of flooring will prevent difficulty seeing the change in location.

Appliances

- Kitchen appliances should be selected based primarily on ease of use. Control panel buttons and knobs should be easily visible and reachable. Consider color-contrasting appliance controls to make them more usable for seniors with visual impairments.
- Assess the ease with which users can open and close, turn on and off, and otherwise manipulate all existing appliances. Choose appliances with controls at the front to allow access to seniors who may be in a wheelchair.
Stovetops should have front-mounted controls so leaning over hot burners won’t be necessary. Additionally, ensure that color indicators are installed that signify that burners are on or hot, even when the cooktop is not on.

Ovens should be side-swing instead of the traditional front-swing to allow users to reach the oven from the side or from above.

Consider installing fire extinguishers directly on the stovetop or hood to allow for ease of access.

**Sinks**

Sinks are one of the most often used parts of a kitchen. Consider installing shallow sinks (suggested 6” deep) to allow seniors, especially those in wheelchairs to see the contents of the sink from any vantage point.

When possible, install a motorized sink that can raise and lower depending upon the height of comfort for the user. Also consider removing cabinetry below the sink area to allow access for someone using a wheelchair.

Install a hands-free or levered faucet on the side of the sink to limit the amount of reaching necessary to turn on the water.
Bathrooms

Bathrooms can be the most dangerous place in a home, especially for seniors. Slippery floors, sharp edges and tight quarters in an area with lots of water can prove to be quite hazardous. Statistics suggest that the majority of senior falls occur in the bathroom, so modifying and adding design features to reduce the risk of a fall or other injury is a top priority in safety. Watch this brief video for a few tips on renovating a bathroom, and review the below ideas for modifying bathrooms to make them safer and more accessible:

♦ **Dimensions**

  - For wheelchair accessibility, doorways should be at least 32 inches wide. The ADA requires a 5-foot turning radius once inside the bathroom, and ensuring that there is reasonable space for a person in a wheelchair to maneuver is very important
  - The bathroom door should swing outward to provide more space inside the bathroom. Also consider installing pocket doors if the space is very small or an outward-swinging door is not possible

♦ **Shower and Tub**

  - Install a curbless shower, ideal for people in wheelchairs, using walkers, or with otherwise reduced mobility. In curbless showers, the opening to the shower is level with the floor with no threshold, and sloped to the drain. In showers where a wheelchair may be too large to fit, consider adding a rolling shower seat
  - Showers should be fitted with seating. All seating should be lined with non-slip texture to prevent falls from the seated position
Nonslip flooring is essential for showers, and should be carefully considered. Adding a textured tile, or a textured matting or wood over the flooring can greatly increase stability and prevent falls.

Also consider installing a walk-in tub, which allows a senior user to walk directly into the tub area without having to step over the side.

Bathtubs should have controls near the front edge of the tub to prevent straining or reaching to adjust the pressure or temperature. Install hand-held shower heads in showers to allow clients to reach all areas of their body without having to maneuver significantly.

All showers and tubs should have grab bars. This video demonstrates how to install grab bars. In a shower, consider installing grab bars on each wall, and in a tub, have at least two grab bars—one at sitting height and one at standing height.

**Toilet**

Grab bars are also important near the toilet to enhance safety and ease of movement. The most effective grab bars have a texture to make them easier to grip. Ideally, grab bars should be situated on either side of the toilet.

Ensure that the toilet paper holder is in an easily reachable place, and is designed for one-handed changing of rolls.
The ADA recommends that a toilet be placed 17”-19” above the ground, which is slightly higher than an average toilet. A toilet of this height is most comfortable for all users, and is easier to lower onto, stand from, and transfer to from a wheelchair or walker. An alternative is to add a thicker seat to add height without replacing the entire toilet.

**Sink Area**

Similar to the kitchen, consider installing pedestal sinks or removing lower cabinetry and doors to allow space for knees or a wheelchair under the sink. Also consider adding hands-free faucets. Alternatively, a single-handle lever faucet is a good option to allow for ease of use.

All water faucets in the bathroom sink, shower and bathtub should be water pressure controlled and include anti-scald controls to prevent burns. Also, all faucets should only require the use of one hand, preferably with a lever handle.

**Cabinets and Countertops**

Especially if storage area beneath the sink has been removed, there is bound to be a need for more storage space. Increasing the countertop space can be a good way to provide more usable space.

Consider installing a medicine cabinet in a medium-to-low position in the bathroom, ideally adjacent to the sink area.

Install mirrors at a slightly lower-than-normal height. Also consider adding tilting mirrors to allow senior residents to use mirrors from a sitting position.
Accessibility Throughout the Home

The kitchen and the bathroom traditionally pose the most risk for residents of all ages, especially seniors. However, other areas of the room should not be ignored or left alone. Below, some common elements of a home that can be found in most rooms and ideas for modification and alteration are discussed.

Entrances

For seniors, it is especially important to ensure that the entryway to their home is safe and appropriate. A brightly lit, hazard-free entrance is essential, and the following changes can be made to reduce risks associated with entrances to the home.

♦ Add increased lighting at the entrance area. This will help seniors be more comfortable entering and exiting their homes when outside lighting is reduced

♦ Consider installing a flashing light alarm or a sound amplifier to indicate a ringing doorbell for senior residents with hearing impairments

♦ Install two peepholes on the unit’s exterior door—one at the normal standing height, and another at seated height

Outlets, Switches and Locks

Especially for senior residents with reduced dexterity or strength in their hands, small controls and home features such as outlets, lights, other types of switches, and locks can prove to be a challenge. Fortunately, choosing features that accommodate the abilities of a variety of groups can be a cost-effective way to enhance resident safety.

♦ Place electrical outlets at least 27 inches above the floor in order to allow easy access by residents without bending. Outlets that are placed at 30-44 inches from the floor will be above the height of most furniture
Consider adding extra outlets in each room to prevent socket overloading or the use of extension cords, which can cause a tripping hazard.

Install large, rocker-style light switches throughout the housing unit. These types of switches are easier to use for residents with limited dexterity because a simple push by finger, hand or elbow can turn the switch on and off.

Consider making light switch and outlet covers a distinguishably different color from the wall, to make them easier to spot for residents with visual impairments. Additionally, adding glow-in-the-dark features will increase visibility in low light and darkness, and makes moving around in the night much easier.

Traditional locks with twist knobs can be replaced with lever-style locks that are easier for all users. Even when replacement is not possible or too expensive, adapters featuring levers can be installed over existing hardware.

**Stairs**

Stairs can also be a home feature that causes significant difficulty for senior residents with mobility difficulties. Whether your housing units have stairs inside units, or a single step leading to the front door, you should carefully consider what measures can be taken to reduce the risks associated with stairs, and to increase safety.

- For any stairway, install handrails on both sides so that any individual who has strength on only one side will have support as they ascend or descend the stairs. If the stairway is very wide, such as those found in public areas, or for some other reason providing handrails on both sides is not possible, consider installing a single handrail in the center of the stairway.

- Handrails should extend beyond the top and the bottom step because users will need to rely on support from the railings to get on and off the last step.

- Handrails should be designed to ensure that users are able to completely grasp the rail between their thumb and fingers. This characteristic is essential to the safety of users.
Safe Stair Checklist

- All stairs are necessary and unavoidable (i.e. cannot be replaced with a ramp)
- Living spaces do not have arbitrary changes in height
- Any windows located on or near stairways are tempered to prevent shattering
- Steps are visually prominent (i.e. by the use of color contrast) to enhance visibility
- Each step is the same height, and rises no more than seven inches
- Each step is the same depth, providing at least 11 inches from front to back
- Thick carpeting or other floor coverings are not present on stairs
- If stairs are covered, the covering is securely attached to prevent tripping hazards
- Any stair covering is not visually distracting, or giving the perception that there is an object on the stairway
- There are no screws, nails or other sharp objects projecting from any stairway surface
- The stair edges are slightly rounded to prevent tripping and reduce injury
- Stairway lighting provides appropriate illumination and reduces shadows or glare
- Light switches are available at the top and bottom of the stairway
- The handrail extends the full height of the stairs without break
- Handrails are visually prominent and can be distinguished from surrounding surfaces
Ramps

Many design specialists suggest installing ramps whenever possible to deal with even slight changes in floor level. Ramps can prevent arbitrary thresholds or single steps, which may cause a significant tripping hazard, particularly for senior residents with slower reflexes. Ramps may create additional problems for some users when the slope is too great, particularly for those in wheelchairs. Also, some individuals with visual impairments may have difficulty correctly judging the distance and slope of a ramp.

♦ Exterior ramps should have a maximum slope of 1" of rise for every 20" of length

♦ The ADA recommends that interior ramps should have a maximum slope of 1" to 12" to allow people in wheelchairs to push themselves up the incline

♦ Flat areas or landings are necessary at the top and bottom of ramps, and also within the ramp if the ramp changes direction or rises higher than 3'. These intermediate landings provide rest areas and adequate maneuvering space for turning wheelchairs. Landings in any location should be at least 5' long

♦ Similar to stairways, try to provide handrails on both sides of the ramp, to provide stability and support for users

♦ To reduce slipping risk, treat all ramp surfaces with non-slip surface coverings. For exterior wooden ramps, paint mixed with sand can be a suitable surface. Several paint manufacturers make non-skid deck paints which provide the same type of non-skid surface

♦ Avoid covering interior ramps with carpeting, linoleum, or glossy paint
Final Thoughts

While some modifications and alterations may be beyond your agency’s current operating budget or time allocation, there are many small changes that can make a big difference for senior residents. Consider the following simple modifications as a starting point for committing to safe housing for all residents:

① Use non-glossy paint for all painted surfaces in your units, and use contrasting colors to help differentiate rooms and changing surfaces

② Install lever door handles that are easier for residents to use with one hand, or without grasping

③ Replace traditional light switches with easy-to-use rocker switches, and consider glow-in-the-dark features to make them more visible in all lighting situations

④ Ensure that all stairways and ramps are fitted with handrails that are appropriate textures, and allow for a full-hand grip

⑤ Replace water controls and faucets with lever handles to allow for simpler one-handed use

⑥ Consider adding sliding and pull-out shelves to existing cabinets in kitchens and bathrooms to allow for easier reach

⑦ Replace traditional cabinet handles and grips with U- or D-shaped handles for easier grip
Resources

Videos and Infographics

♦ 6 Ways to Accommodate Aging in Place – Easy Climber, www.easyclimber.com
♦ Creating a Wheelchair Accessible Bathroom – Paralyzed Living YouTube channel, www.youtube.com/user/blackpearlv6
♦ How to Prevent a Fall: Senior Safety Tips – Medical Guardian, www.medicalguardian.com
♦ How to Install Bathroom Grab Bars – Basic Plumbing Repair, www.basicplumbingrepair.com
♦ Making Your Home Wheelchair Accessible – SmartChair, www.kdsmartchair.com
♦ Universal Design Living Laboratory – BraunAbility, www.braunability.com

Websites and Articles

♦ Aging in Place Ideas, Age in Place, www.ageinplace.com/at-home/aging-in-place-home-ideas/
♦ The 7 Principles of Universal Design – North Carolina State University, www.ncsu.edu/project/design-projects/sites/cud/content/principles/principles