Housing Across the Life Span:

Consumer knowledge, preferences, and barriers

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Table of Contents

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Executive Summary

Aging in place is a high priority for many adults age 50 and older. Architectural barriers may make it difficult for adults to achieve this goal as they enter later stages of life when physical disability or activity limitation are more common. Design solutions are available to mitigate the impact of disability. However, these solutions have not been widely implemented in private housing. The discrepancy between consumer preferences and housing options available exists for a variety of reasons. Research indicates that individuals, families, and communities may benefit by increasing the implementation of design solutions to support successful aging in place.

As a result, the Dakotas Housing Study was conducted to explore consumer knowledge, motivation, and barriers to the implementation of accessible and universal design. In 2018, 668 participants were recruited from South Dakota and North Dakota to complete a survey which gathered demographic data, measured perceived importance of housing traits for older adults, assessed familiarity with universal design, and evaluated housing preferences using three vignettes.

This report finds that study participants seemed aware that the current stock of homes is not appropriate for aging in place, but had limited knowledge about design solutions. The results of this study have yielded the following conclusions:

1. Homes that meet the changing needs of families over time are largely absent in the current housing stock in South Dakota and North Dakota.
2. Participants seem aware that delaying investment in housing designed to support successful aging in place has financial implications for families.

3. Affordable housing for older adults may be poorly understood.
4. The lack of consumer demand for universal design may be overstated.
5. Jargon and terminology play an important role in consumer perception.

Recommendations and strategies were developed based on the results of this study, input from professionals involved in the housing industry or advocacy for universal design, and existing research. Overarching recommendations are as follows:

1. Universal design (UD) is the gold standard for creating homes that meet the needs of diverse occupants overtime; however, widespread implementation may be cumbersome because of its unique aspects. The design solution, visitability, may provide a more use-friendly alternative and may reduce the need for significant and costly structural changes.
2. Establish community or regional workgroups that include residents, housing industry professionals, health care professionals, service providers, funders, and other stakeholders to identify barriers, develop solutions, coordinate efforts, and advocate for visitability and UD.
3. The widespread absence of accessibility in the existing housing stock indicates that many homes will require renovations for older adults to achieve their goal of remaining in the home. Therefore, strategies and resources are needed to encourage homeowners at all stages of life to include visitability in renovation projects.
4. Knowledge about the relationship between home design, health, and wellbeing outcomes, particularly around older age and end-of-life

care, is limited. An accreditation or certification process may be an important element of increasing consumer knowledge and awareness by establishing an easy to understand home design rating system

In addition, there are suggested education, training, marketing, industry and research strategies to increase implementation offered in the report.

Chapter 1:
Introduction

According to the U.S. Centers for Disease Control and Prevention (2009), aging in place refers to the ability of a person to remain in their home and community safely, independently, and comfortably, regardless of age, income, or ability level. According to Binette & Vasold (2018), three out of four adults age 50 and older prefer to stay in their homes and communities as they age. A study conducted in South Dakota found that 89% of participants said that it was either 'very' or 'somewhat important' to receive end-of-life care at home (Schrader, Nelson, & Eidsness, 2009).

Unfortunately, the goal of aging in place may be difficult to attain because of need for services, risk of isolation, access to transportation, home and community design, and lack of sufficient planning among families. This report will focus on how home design creates barriers to successful aging in place. According to the Joint Center for Housing Studies of Harvard University (JCHS; 2014), most housing in the United States is missing one or more basic accessibility features, including lever style door handles and faucets; extra wide hallways and doors; accessible electrical controls; no-step entry; and single-level living (i.e., bedroom and accessible bathroom on main level). Not only are these basic accessibility features missing, the building industry and homeowners alike seem reluctant to prioritize accessibility or other design solutions (Bringolf, 2010; Fuller, 2008; Powell, Mackintosh, Bird, Ige, Garrett, & Roys, 2017; Saville-Smith & Saville, 2012).

As a result, home modifications, environmental adaptions with a goal of supporting activity performance, are needed for individuals with either permanent or temporary disabilities to remain in the home (JCHS, 2014). Examples include ramps or walk-in tubs. Modifications are typically not added until an individual develops a disability or physical limitation (Powell et al., 2017). In addition, modifications are often delayed (cost, shame, denial, etc.) which reduces overall effectiveness of environmental adaptations, resulting in poorer health and wellness outcomes (Howse, Ebrahim, & Gooberman-Hill, 2004; McCallion & Ferretti, 2017; Severinsen, Breheny, & Stephens, 2015). This cyclical pattern of constructing inaccessible housing that requires home modification is inefficient and costly for many reasons.

A design solution has existed since the 1980s that has the potential to end this cyclical pattern by constructing homes that need minimal, if any, modifications to meet the needs of people with disabilities and older people (Mace, 1998). In addition, the 'accessibility features' blend seamlessly with the design of the home to become virtually undetectable. This design solution is called universal design (UD; Mace, 1998). Unfortunately, implementation has been sparse.

The purpose of the Dakotas Housing Study was to explore existing gaps in consumer knowledge, motivation, and barriers to the implementation of accessible and UD housing options. This report will provide an overview of current research on older adults and housing, describe the study findings, discuss research conclusions, and provide recommendations. It is our hope that this report will provide stakeholders across North Dakota and South Dakota tangible guidelines to increase the availability of housing to support successful aging in place.

Chapter 2:
Review of Literature

While the risk of disability increases in later stages of life, the increase in the number of older people (age 65 or older) is not the lone impetus for prioritizing UD housing. The American Community Survey estimates that 12.8% of the population in the United States had disabilities in 2016 (Kraus, Lauer, Coleman, & Houtenville, 2018). Over half (58.7%) of the people with disabilities are under the age of sixty-five (Kraus et al., 2018). In addition, accident or injury can happen at any age to temporarily limit mobility and make interacting with the home environment difficult. Beyond the occupant developing a disability or temporary injury, it is likely they will have a friend or loved one with disabilities. Therefore, it is reasonable to anticipate someone older, with a disability, or temporary injury will interact with most homes in the housing stock, whether as an occupant or visitor (Smith, Rayer, & Smith, 2008). Increasing access to UD housing cannot be achieved without a firm understanding of the context of the situation. This section will discuss population aging, modern households, the living arrangements of older adults, the existing stock of homes, design solutions, barriers to the implementation of design solutions, and the benefits of housing designed to support successful aging in place.

Population aging refers to an increase in the median age. This phenomenon is occurring across the globe because of scientific advancements that have improved health and wellbeing outcomes (Roberts, Ogunwole, Blakeslee, & Rabe, 2018). The median age in the United States in 1900 is estimated to have been 22.9 years old (Bernstein, 1995). The 2013-2017 American Community Survey 5-Year Estimates indicate the median age in the United States is 37.8 years old (U.S. Census Bureau, 2018). The Baby Boom Generation is often described as the driving force behind population aging. However, changes in overall fertility and mortality are the key factors driving the increase in the median age. In short, less people are born and die per 1,000 people now than in the past. Without significant changes in mortality, fertility, or immigration, the size of the older adult population in the United States is expected to peak in the 2030s and stabilize around twenty percent (He, Goodkind, & Kowal, 2016).

Not only is the median age projected to be higher, the composition of households is changing. According to AARP & the National Building Museum (2019), single people living alone is the most common household type and less than 30% of households include children age 21 and under (See Figure 1). This suggests that the inventory of homes needs to be updated to reflect modern households and demographics.

Of the 30.6 million older householders in the United States, 78% were owners and 22% were renters (U.S. Census Bureau, 2017). Older adults were mostly living in a household with other family members (67.6%; Roberts et al., 2018). The next largest household type for older adults was living alone (25.9%). A small percentage (3.4%) were living in nonfamily households. Finally, 3.1% of older adults were living in group facilities such as a nursing home (Roberts et al., 2018). Older adults strongly report a preference to remain in their home (Binette & Vasold, 2018). Unfortunately, the current stock of homes contains barriers that may make it difficult for older adults
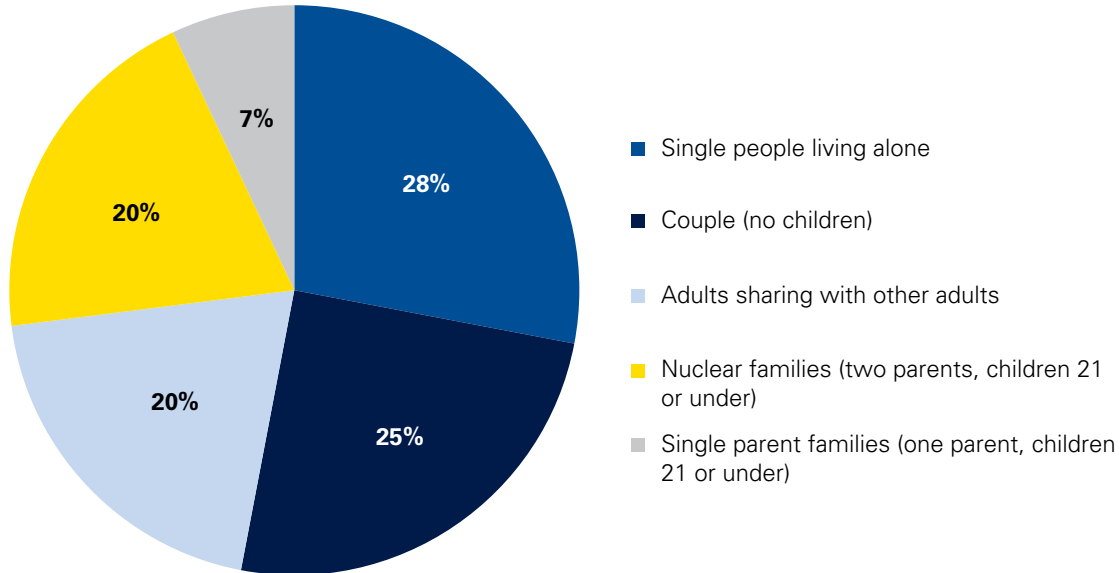
America's Households by the Numbers

Figure 1. America's Households by the Numbers

to achieve their goal because of increasing risk of disability in later stages of life.

According to the JCHS (2014), five features are needed to make a home accessible to people with impaired mobility or challenges grasping/grabbing, including, lever style door handles and faucets; extra-wide hallways and doors; accessible electrical controls; no-step entry; and single-floor living. Estimates suggest many homes are missing one or more of these accessibility features. Single-floor living refers to having both a bedroom and a bathroom on the entry level and is the most common accessibility feature (available in 76% of units) in the U.S. housing stock (JCHS, 2014). The least common feature is extra-wide hallways and doors (7.9%). While newer homes are more likely to include these features, implementation is sparse (JCHS, 2014). For example, only one out of every six newer homes has extra-wide hallways and doors. Homes least likely to have multiple accessibility features are smaller multifamily buildings (fewer than 10 units) and attached single-family units (e.g., duplex units; JCHS, 2014).

Unfortunately, homes with all five basic accessibility features may still pose challenges to successful aging in place or people with disabilities. For example, features of the kitchen or laundry room may make it

difficult for the occupant to perform the most basic tasks (preparing meals, washing clothing, etc.). To improve the function of housing for its occupants, the concept of universal design (UD) was developed by Ron Mace in 1988.

UD is meant to meet the needs of diverse people in a single space. In contrast, other design solutions, such as accessible design, barrier-free design or visitability, provide prescriptive specifications to meet the needs of certain sub-groups of people with disabilities. For example, accessible design includes specifications for lower countertop heights to allow access to a person

"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." (Mace, 1998)

who uses a wheelchair. Visitability, a movement started by Eleanor Smith in 1987, promotes design features in the home to ensure that a person with mobility impairments or using a wheelchair can visit a home, move between doorways independently, and use the bathroom for personal care (Bringolf, 2009; National Council on Independent Living, 2019).

As an alternative to prescriptive approaches, UD is an iterative process of assessing the function of a space or product and identifying ways to improve its performance. At its purest form, potential universal design solutions are implemented and evaluated for function and performance with diverse users (women, men, children, people with disabilities, taller than average, shorter than average, etc.). The goal is to ensure that a solution for one individual does not become a hindrance for another. For example, a lowered countertop may only be comfortably used by the person with the disability or children, leaving the needs of other members of the household unmet. A UD solution would offer multiple counter levels in a single kitchen or install an adjustable height counter system which highlights the final hallmark of UD. There are multiple options available to address barriers to successful aging in place.

Despite the preferences for aging in place, barriers in the housing stock, and the availability of a design solution, integration of UD into building practices has not occurred on a large scale. Research indicates a variety of reasons for the discrepancy between consumer preferences and available housing options, including:

- UD requires explanation and examples which leads advocates to use disability or aging specific examples (Bringolf, 2008, 2010; Yusof & Jones, 2013).
- The emphasis on aging and disability has led consumers to not see UD as representative of their needs (Bringolf, 2008; Larkin, Hitch, Watchhorn, & Aang, 2015; Watchorn, Larkin, Hitch, & Ang, 2014; Yusof & Jones, 2014).
- UD is used interchangeably with terms like accessibility or barrier-free design, creating confusion and lack of agreement about the preferred terminology (Bringolf, 2008, 2010, 2011; Bringolf & Schraner, 2009; Larkin, et al., 2015).
- UD is seen as expensive and unattractive, which leads housing professionals to perceive the lack

Design Solutions

1. **Accessible Design** – A design protocol in which the needs of people with disabilities are specifically considered (Bringolf, 2009). Accessibility sometimes refers to the characteristic that products, services, and facilities can be independently used by people with a variety of disabilities. In general, it provides specific prescriptions of what should be included in the space. Examples include sufficient clear floor space for wheelchairs, lower countertop segments, lever and loop type handles on hardware, seats at bathing fixtures, grab bars in bathrooms, knee spaces under sinks and counters, etc. These elements are typically permanent features of the space.

2. **Adaptable Design** – This is a flexible form of accessible design that allows some accessibility features to be omitted or concealed until needed (Bringolf, 2009). Structural accessibility features would be included at initial construction (e.g., extra wide doors). The design would include elements that would allow for easier implementation of accessibility. For example, kitchen flooring that extends under cabinets allows for easier removal if under-cabinet knee space becomes a need. In contrast, flooring installed after cabinets means that removing any cabinets will likely require new flooring for the whole space.

3. **Barrier-free Design** – To be active, a person with a disability should be able to commute between home, work and other destinations. Barrier-free design ensures that the whole built and transport environment meets the needs of people with physical, sensory or cognitive disabilities (Saville-Smith & Smith, 2012).

4. **Usable Design** – Usability refers to the ease with which a person can learn to operate a product and remember its operation upon subsequent uses (Bringolf, 2009). The usable design approach may not account for the experiences of people with disabilities.

5. **Visitability/Visitable** – Where a building allows independent wheelchair entry to the property, access to lower levels, ability to move between rooms and access to the toilet (Bringolf, 2009).

of consumer demand (Bringolf, 2010, 2011; Fuller, 2008; Larkin, Dell, & Hitch, 2016; Larkin et al., 2015).

- The use of the life cycle theory in housing (consumer architypes with different needs and wants), while neglecting that many families spend several stages of life (Fledgling Teens and Early Twenties; Courting, Nest Building, Full Nest, Empty Nest, and Sole Survivor) in the same home (Bringolf, 2010).
- The difficulty of identifying a point-of-entry in the building industry because it is both complex and fragmented at the same time, with many professionals involved in the availability of housing (developers, designers, builders, government officials, consumers, rental property owners, etc.) (Bringolf, 2010, 2011; Saville-Smith & Saville, 2012).

Increasing the availability of homes that can facilitate successful aging in place through the implementation of design solutions is challenging. However, overcoming them will likely benefit individuals, families, and communities. Universal design housing may offer the following benefits:

- Reduced risk of injury from falls and other mishaps (Eriksen, Greenhalgh-Stanley, & Engelhardt, 2015; Keall et al., 2015; Pynoos, Steinman, Do Nguyen, & Bressette, 2012; Saville-Smith & Saville, 2012; World Health Organization, 2018).
- Risk of injury to family and professional caregivers may be reduced (World Health Organization, 2018).
- The need for home modifications may be reduced, which lowers the risk of complications that emerges when individuals delay installing them (Powell et al., 2017; Saville-Smith & Saville, 2012).
- Reducing the need for home modification may also lead to savings for government and non-profit agencies that provide home modifications for low income older adults and people with disabilities (Pettersson, Slaug, Granbom, Kylberg, & Iwarsson, 2018; Saville-Smith & Saville, 2012).
- Health and wellness outcomes may improve (World Health Organization, 2018). For example, an individual may be better able to prepare nutritious meals in a kitchen that is designed with UD features.
- Isolation risk may decline because the home will have at least one no-step entrance that will allow people with disabilities to enter and exit the home more independently (World Health Organization, 2018).
- May reduce the risk of relocation to institutional settings (Guzman, Viveiros, & Salomon, 2017a; June, 2003; Kendig, Gong, Cannon, & Browning, 2017; Pynoos et al., 2012; Saville-Smith & Saville, 2012; Slaug, Chiatti, Oswald, Kaspar, & Schmidt, 2017; Stineman et al., 2012; Wahl, 2017).
- Reduced risk of experiencing housing cost burden that may accompany relocation. For example, monthly housing costs (including property taxes, insurance, and utilities) for older homeowners without a mortgage are less than older adults with a mortgage and older renters (JCHS, 2014).

In summary, changing demographics and household composition indicate a need to better understand the discrepancy between consumer preferences and homes available in the housing stock. While significant barriers exist, research indicates that individuals, families, and communities will benefit from increased access to housing designed to facilitate successful aging in place. This study seeks to understand how consumers think about housing and aging in place. It will specifically explore their knowledge, their motivation, and barriers to the implementation of design solutions better able to account for the needs across the life span.

Chapter 3:
Methods

A mixed methods approach was used to explore consumer knowledge, motivation, and barriers to increasing the availability of homes that can support successful aging in place. The researchers developed an instrument that included three vignettes, the importance of traits of housing for older adults, familiarity with UD, perceptions of UD, demographic characteristics, location, and whether or not a member of the household had a disability.

Three vignettes or stories were created for the survey with the intent to distinguish beliefs, attitudes, values, and perceptions of three varying housing situations. One story involved a young couple (age 39 and age 33) with children looking for age-friendly housing, the second was a friend who uses a wheelchair coming to visit, and the final story depicted an 85-year-old person. Gender neutral names (except the young couple story) were used to reduce the risk of gender stereotypes.

It should be noted that the term, age-friendly, was used in the story about the young couple with children. Age-friendly is not the same as universal design. The use of age-friendly was meant to convey to the participant that the actors in the story were thinking about their goals for older age.

Within the survey participants were asked to rate the importance of the following traits when deciding where to live when older: access to transportation, affordability, opportunities to volunteer, sense of community, closeness to family, access to healthcare and medical resources, and easy upkeep. Participants were asked to indicate which of the traits was least and most important.

Finally participants were asked if they were familiar with UD. Those who were familiar with the term were asked to define UD. Those who were not familiar with the term were provided with a definition. Participants were then asked to rate the relevancy UD had to their lives; level of environment consciousness; attractiveness, expensiveness, and impact on historical preservation. Participants were asked to provide their sex, age, race/ethnicity, education level, homeownership status, and household income. Along with state and county information participants were also asked if anyone in their household had a disability.

Participants were recruited from South Dakota and North Dakota from January to March of 2018. The researchers requested assistance from professional colleagues inside and outside SDSU Extension and North Dakota State University Extension to recruit participants. They were asked to share an invitation to participate in the study with their professional networks. Other means were used to recruit participants which included social media and newspaper advertisements or letters to the editor. There were two options on how to complete the survey, online or paper copy. The primary method to participate was an electronic survey. However, potential participants could request a paper copy of the survey.

Responses were reviewed in aggregate to examine characteristics of the group, responses to vignettes, perception of important traits, and knowledge about UD. Frequency of responses was used to evaluate participant knowledge, motivation, and barriers to the implementation of accessible and UD housing options.

Chapter 4:
Findings

Responses to the survey provided information about who participated in the project. Participant responses to the vignettes allowed for housing preference themes to be evaluated. The remaining elements of the survey gave insight about important characteristics to consider when selecting where to live when older and knowledge of UD. The following section will provide detailed information about participant responses to the survey.

Characteristics of Participants

Table 1 provides detailed demographic information about the participants. The median age of the sample was 48 years old. Participants were typically female (78.3%), with income levels of $70,000 or more (53.9%), and an education level of college graduate or higher (67.4). In addition, 87.3% of participants identified as white. South Dakotans represented 62.2% of participants. Approximately one out of every three (36.4%) participants lived in a rural area. Finally, 18.4% of participants indicated that someone in the household had a disability.

Vignette 1: David and Abby Seek an Age-friendly Home

David is 39 and Abby is 33. They are married and are the parents of two young children. They are hoping to buy a house where they can raise their young and busy family. However, they also want an age-friendly home that can meet their needs if they develop a disability later in life. Because they value your opinions, they have talked to you about the different houses of which they are looking. Please share your opinion on their situation by rating your agreement with the following statements.

Responses to the first vignette provide valuable insight about the thoughts participants had about a young family seeking an age-friendly home. Table 2 shows that 30.5% of participants 'agree' that housing that works well for young families and older adults are difficult to find. Participants provided insight about financial implications for David and Abby. For example, 36.2% of participants 'agree' that remodeling a home to add age-friendly features costs more than including them at initial construction. Nearly one in three (32.5%) 'agree' that buying an age-friendly home makes more sense than moving when older. Participants that made less than $70,000 annually were more likely to agree with this statement than those who made above. Finally, slightly more than half of participants (52.8%) either 'disagree' or 'strongly disagree' that David and Abby are too young to worry about their living arrangements when they are older.

Vignette 2: Alex is Coming for a Visit

Your family friend, Alex, is 42. Last year, Alex was paralyzed after a car accident and, as a result, is now a wheelchair user. Alex is going to be in town for a visit in a couple of months and you have invited Alex to stay in your home. However, you want to make sure Alex can be comfortable in your home before Alex comes to visit. Please review the checklist below.

The second vignette (see Table 3) asked participants to complete a checklist for their friend Alex, who is visiting and uses a wheelchair. The questions accessed the availability of basic accessibility features. The results for a no-step entrance showed that 77.5% of participants did not have this feature. It was also

found that 86.3% of participants stated 'no' to having a bathroom on the main floor that was accessible. However, 83.6% of participants did have a bedroom or spare room on the main floor and 69.1% of participants reported that electrical outlets could be reached in a seated position.

At the end of the vignette, participants were asked to rate the appropriateness of their home for their visiting friend. Figure 2 illustrates that 52% of participants indicate that their home was 'inappropriate' or 'very inappropriate' for Alex to come for a visit. Only a small portion of participants indicated that their home was either 'appropriate' (5.9%) or 'very appropriate' (3.1%) for Alex to come for a visit.

Table 1. Participant Characteristics

Sex	Percentage
Male	21.70%
Female	78.30%

Age	Percentage
Less than 37	25.00%
37-48	25.50%
49-59	24.40%
60+	25.20%

Race/Ethnicity	Percentage
American Indian or Alaska Native	6.70%
Asian	0.14%
Black or African American	0.43%
Hispanic and/or Latino	0.72%
Native Hawaiian or Other Pacific Islander	0.14%
White	87.30%
Two or more races	3.60%
Other	0.43%
Not Specified	0.60%

Education	Percentage
Trade school or below	12.90%
Some college	19.70%
College degree	47.40%
Professional or Graduate degree	20.00%

Disability in household	Percentage
Yes	18.40%
No	80.00%
Uncertain	1.60%

Income	Percentage
Less than $10,000	2.40%
$10,000 to $29,999	10.40%
$30,000 to $49,999	17.00%
$50,000 to $69,999	16.50%
$70,000 to $99,999	24.30%
$100,000 or more	29.60%

Home	Percentage
Owned with a mortgage or loan	55.00%
Owned without a mortgage or loan	26.80%
Rented for cash	17.00%
Occupied without payment of cash rent	1.30%

State	Percentage
North Dakota	35.20%
South Dakota	62.20%
Other	2.60%

Geography	Percentage
Rural	36.40%
Urban	63.60%

Table 2. David and Abby Participant responses

Question	Strongly Agree	Agree	Somewhat agree	Somewhat disagree	Disagree	Strongly disagree
It is difficult to find a house that works well for both young families and older adults.	14.40%	30.50%	27.80%	12.40%	11.50%	3.40%
It is less expensive to buy or built a house that includes age-friendly features than it costs to remodel later.	10.50%	36.20%	27.60%	13.70%	9.90%	2.20%
It would make more financial sense for David and Abby to buy an age-friendly house now than it would be to move when they are older.	10.90%	32.50%	24.70%	18.30%	12.20%	1.50%
David and Abby are too young to worry about the living arrangements they will have when they are older.	1.90%	8.40%	14.40%	22.40%	34.20%	18.60%

Due to rounding, number presented on this page may not add up to 100%.

Table 3. Summary of Responses to Home Checklist

Question	Yes	No	Uncertain
Does your home have at least one no-step entrance?	22.50%	77.50%	---
Does the main floor have a bathroom shower that has no barrier and can fit a wheelchair?	13.00%	86.30%	0.70%
Does the main floor have a bedroom or a room that can be used for sleeping?	83.60%	16.40%	---
Does the main floor have extra-wide hallways (minimum 48") and doors (minimum 36")?	42.10%	49.80%	8.20%
Can main floor electrical controls and outlets be reached from a seated position?	69.10%	27.20%	3.80%
Does the main floor have lever style handles on doors and faucets?	35.70%	63.50%	0.90%

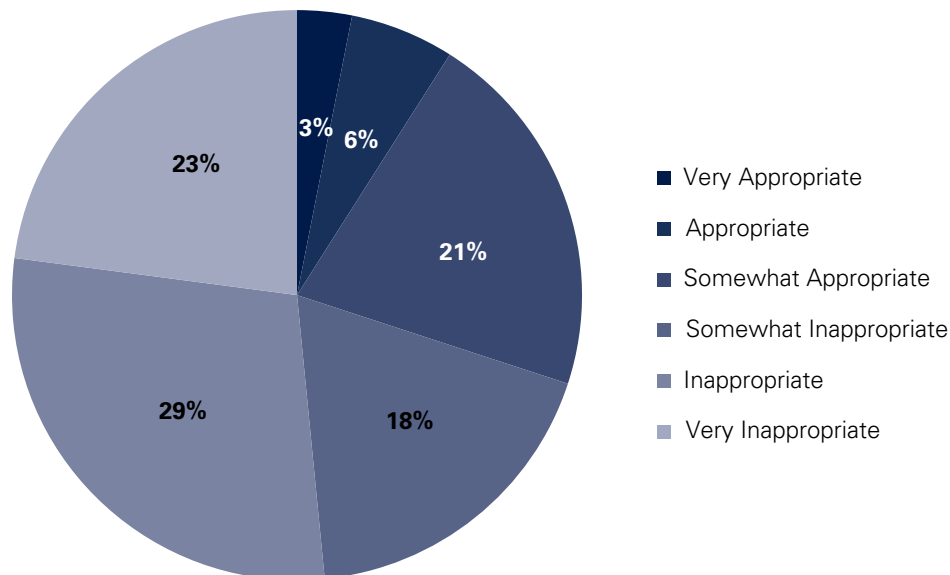# Appropriateness of Home for Alex to Come Visit

Figure 2. Appropriateness of Home for Alex to Come Visit
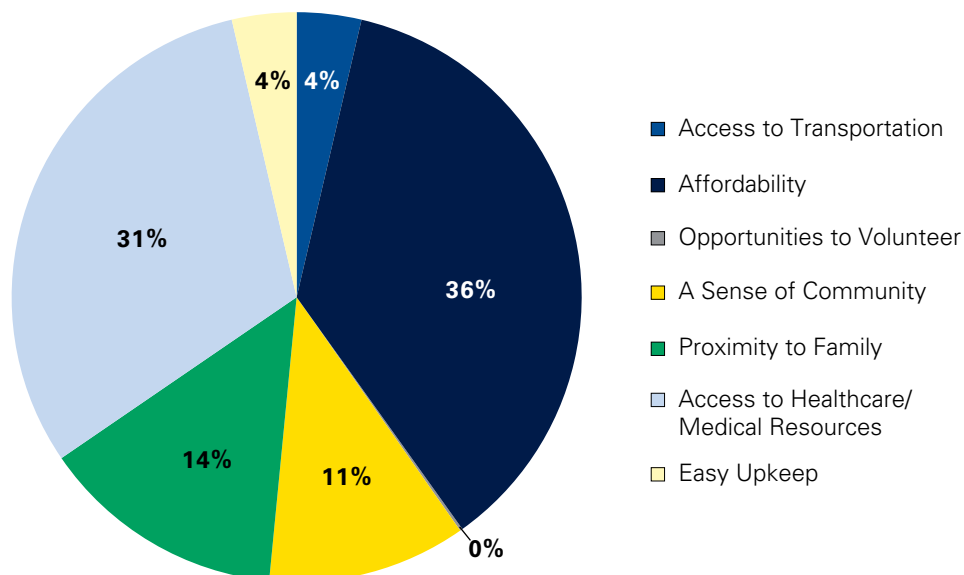
Most Important Trait

Figure 3. Most Important Trait

Vignette 3: Where Should Pat Live

Pat is 85 and lives in the same house that was purchased with Pat's now deceased spouse when they were first married. However, as Pat has grown older, it has become more difficult to keep up with the large yard and multi-story home. Furthermore, Pat no longer drives. Pat has some money saved up and is looking into different options. One is for Pat to stay at home, but pay for a housekeeper and gardener to come work a couple times a week. Pat's oldest child, who works full time, also recently moved into a house in the suburbs about six hours away and invited Pat to come live in the new house at no cost. Pat has also looked into moving into a retirement community on the outskirts of town that is part of a multi-level care facility. Below is a list of the pros and cons for each option.

Staying in Home and Hiring Extra Help
Pro
- Close access to shops and public transportation
- Able to stay in beloved community that has many volunteer opportunities, friends, and memories

Con
- Higher Cost
- Still have responsibility of multi-story house and yard

Moving Away to Live with Child
Pro
- Lower Cost
- Close to Family

Con
- No access to public transportation and no one will be available to drive Pat during weekday
- Pat does not know anyone else in this community

Moving to Retirement Community
Pro
- Close access to health and medical resources
- Many opportunities to interact with other older adults

Con
- Cost
- Limited transportation, may be more difficult than before to see old friends and volunteer at different organizations

Slightly more than half (52.4 %) of participants indicated that the best option for Pat was to move to a retirement community, followed by staying in current home (30.4%) and moving in with oldest child (17.2%). Participants were not asked to indicate why they selected the option they did.

Important Traits when deciding where to live when older

Participants were asked to rate the importance of the following traits when selecting where to live when older on a scale to 'very important' to 'very unimportant':
- Access to Transportation
- Affordability
- Opportunities to Volunteer
- A Sense of Community
- Proximity to Family
- Access to Healthcare & Medical Resources
- Easy Upkeep

Most participants indicated all of the traits above were either 'very important', 'important', or 'somewhat important'. However, Affordability (67.4%) and Access to Healthcare/Medical Resources (71.6%) were more likely to be rated as 'very important' than other traits. Participants were also asked to indicate which of the traits above was the 'most important' and 'least important'. Opportunities to Volunteer was overwhelming selected as the 'least important' trait (70.0%). Affordability (36.5%) was identified as the 'most important' trait, closely followed by Access to Healthcare/Medical Resources (30.9%). More than half (56.4%) of respondents who said Affordability was the 'most important' trait suggested that Pat should move to a retirement community. Figure 3 provides additional information about how frequently other traits were selected as 'most important'.

Universal Design

When participants were asked how familiar they were with UD, 73.8% indicated they were not familiar. These participants were provided a definition of UD. All participants were asked to provide their perspective on the following items. Participants familiar with UD and those who were not did not show meaningful difference on their perspective so responses were grouped together.
- Relevancy to themselves
- Environmental consciousness

- Appearance
- Cost
- Impact on historical preservation

Figure 4 reveals that participants believed UD is 'relevant' (39.09 %) or 'somewhat relevant' (28.4 %) to their everyday lives. It was asked if UD was or sounded as if it was 'environmentally conscious'. Many reported that it is 'very environmentally conscious' (16.9%), 'environmentally conscious' (49.2%), and 'somewhat environmentally conscious' (34.1%). See Figure 5 for details. Figure 6 illustrates participant ratings of how attractive UD sounded to them. Approximately, two out of five (38.7%) indicated that it sounded 'attractive'. Figure 7 depicts the perception of expense that participants had. One in three (34.0%) participants indicated that UD sounded 'expensive' and 12.7% said UD sounded 'very expensive'. Figure 8 shows there was no clear consensus about the impact that UD has on the goal of historical preservation.

Participants who were familiar with UD were asked to provide a definition. Two out of three participants familiar with UD provided a broad perspective of it being design that meets the needs of all people, or is usable by the greatest possible number of people. UD was framed as multigenerational by one in five participants. One in four participants more clearly defined UD as focused on specific 'products or housing elements' that could accommodate those individuals with unique physical challenges. A small portion of participants (6.8%) define UD as features that address a 'specific age or physical condition'. Nearly one in three (31.5%) defaulted to a specific age/condition or products/elements to define UD.
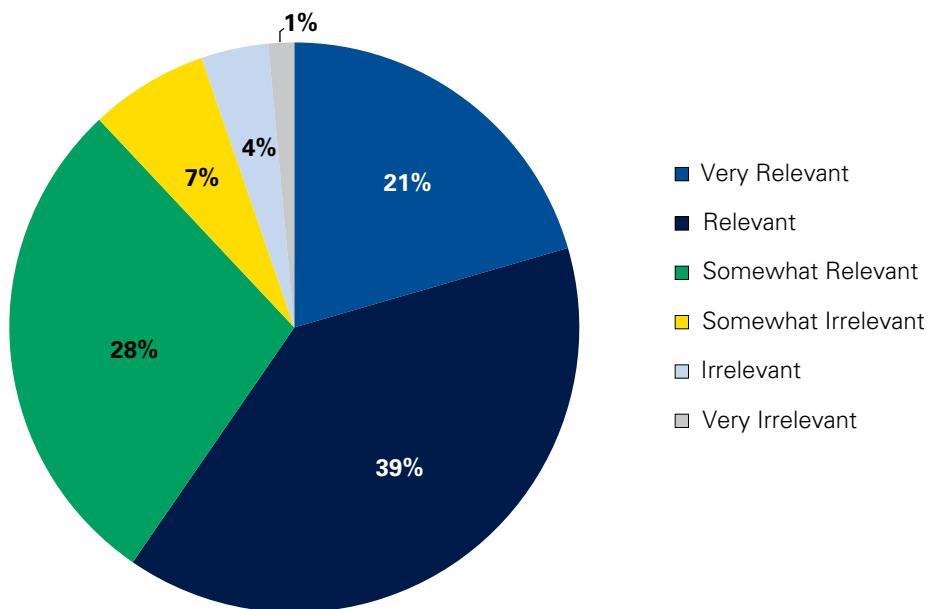
How relevant is universal design to your everyday life?

Figure 4. How relevant is universal design to your everyday life?
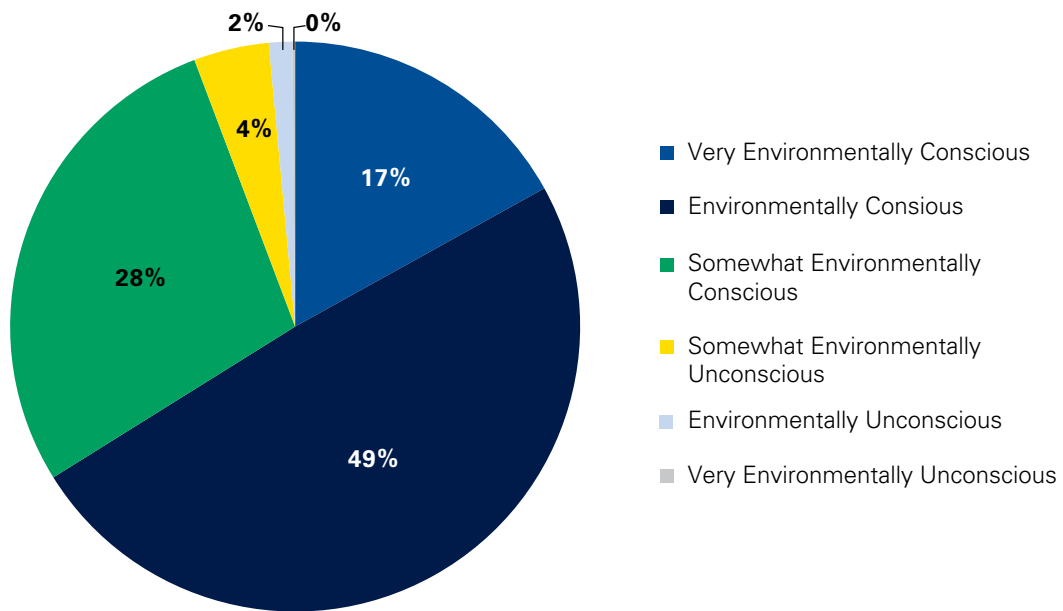
Universal Design Sounds…

- ■ Very Environmentally Conscious
- ■ Environmentally Consious
- ■ Somewhat Environmentally Conscious
- ■ Somewhat Environmentally Unconscious
- ■ Environmentally Unconscious
- ■ Very Environmentally Unconscious

Figure 5. Universal Design Sounds

The Appearance of Universal Design Sounds…

- ■ Very Attractive
- ■ Attractive
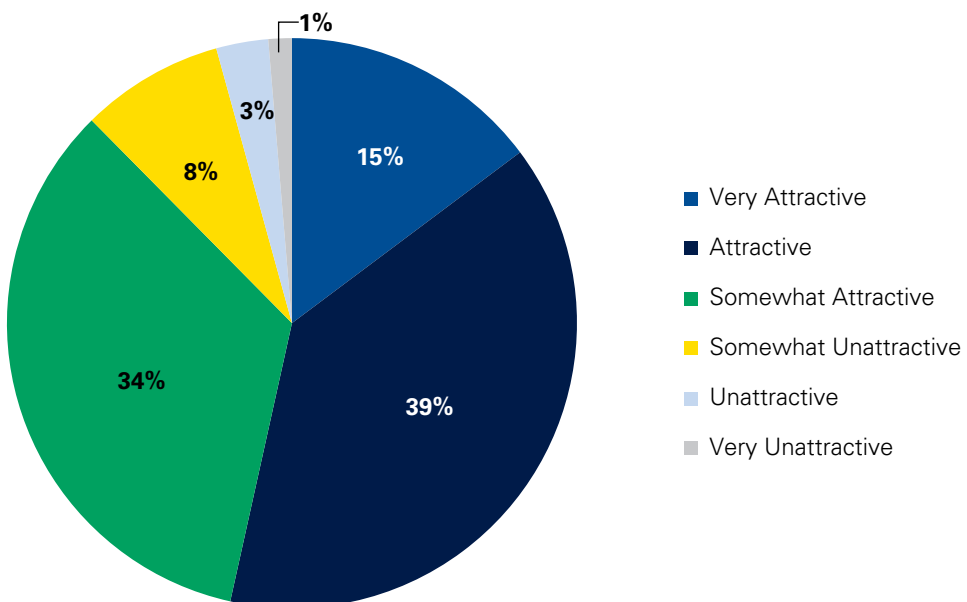- ■ Somewhat Attractive
- ■ Somewhat Unattractive
- ■ Unattractive
- ■ Very Unattractive

Figure 6. How attractive universal design sounds

Compared to a traditionally built home, a universally designed home sounds…

Legend:
- Very Expensive
- Expensive
- Somewhat Expensive
- Somewhat Inexpensive
- Inexpensive
- Very Inexpensive

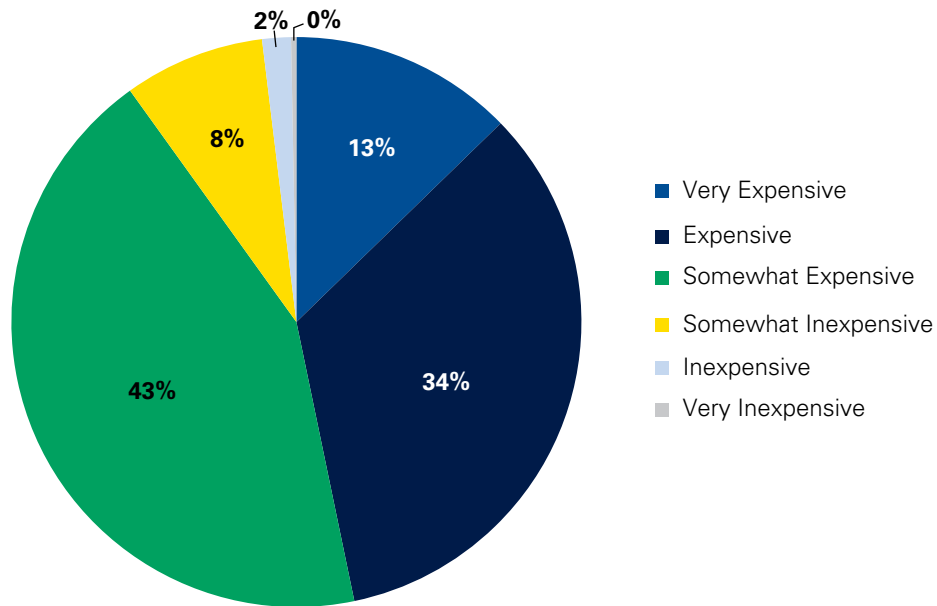Values: 2%, 0%, 13%, 34%, 43%, 8%

Figure 7. Compared to a traditionally built home, a universally designed home sounds

Does it sound like universal design would conflict with the goal of historical preservation?
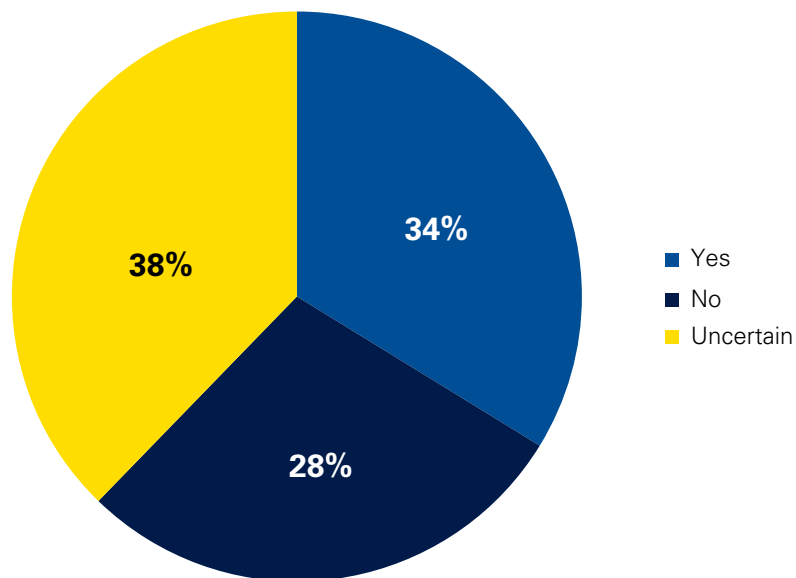

Legend:
- Yes
- No
- Uncertain

Values: 34%, 28%, 38%

Figure 8. Does it sound like universal design would conflict with the goal of historical preservation?

Chapter 5:
Research Conclusions

The results of this study have yielded the following conclusions:

1. Homes that meet the changing needs of families over time are largely absent in the current housing stock in South Dakota and North Dakota.

   Two questions in the survey were used to gauge participants' perception of the availability of housing that would be suitable for older adults. First, they were asked to report their agreement with the statement about the challenges of finding homes that work well for young families and older adults (see Table 3). Participants were more likely to report some level of agreement than disagreement. To gain a sense of the design of the homes of participants, they were asked to complete a checklist to determine the availability of basic accessibility features in their home. No-step entrance and wheelchair accessible main floor shower were features most likely to be missing in the homes of participants. Of particular interest is that participants in this study more frequently reported the absence of non-step entrance than the Midwest in general (86.3% versus 67.6%; JCHS, 2014). Finally, they were asked to rate the appropriateness of their home for a wheelchair user to visit (see Figure 2). Half of them indicated that their home was either 'inappropriate' or 'very inappropriate'.

2. Participants seem aware that delaying investment in housing designed to support successful aging in place has financial implications for families.

   Cost is often presented among the reasons for

excluding UD features among building industry professionals. By omitting these features at initial construction, the building industry may be unintentionally passing the cost to home and rental property owners. Not only that, they may also be driving up the cost of modifications to support aging in place or people with disabilities. For example, retrofitting homes to add features such as a main floor bathroom, laundry, or bedroom can be quite costly. Two questions were used to explore participants' outlook on the financial implications of age-friendly housing. Please note that age-friendly was used in the story to convey to participants that David and Abby were thinking about where they wanted to live when they were older adults. Table 3 provides details about participants' perspectives about the cost of home modifications or moving later, as opposed to investing in an age-friendly home initially. Three out of four participants showed some level of agreement that remodeling (i.e., home modification) is more costly than buying or building an age-friendly home. Two out of three participants had some level of agreement that it would make more financial sense to buy an age-friendly home now than to move when they are older. Perhaps most interesting is that participants who make less than $70,000 were more likely than individuals with a higher income to indicate it makes more financial sense to invest in age-friendly homes initially than to move when older.

3. Affordable housing for older adults may be poorly understood.

   Many older adults are home owners (78%) and

three out of four older homeowners own their home without a mortgage (U.S. Census Bureau, 2017). These adults had lower housing cost than those who had a mortgage or rented, suggesting moving may increase their monthly housing expenses (JCHS, 2014). Half of participants (52.4%) recommended that Pat (age 85) move to a retirement community. While it is difficult to ascertain precisely why participants made this recommendation, it is interesting given that 76% of adults age 50 and older said they preferred to remain in their current residence (Binette & Vasold, 2018). Two out of three participants (67.4%) indicated that affordability was either 'important' or 'very important' when deciding where to live when older. A third of participants (36.5%) indicated that affordability was the 'most important' trait for consideration when deciding where to live when older. Of participants who indicated that affordability was the 'most important' trait, 56.4% suggested that Pat move to a retirement community. Retirement communities may include additional services such as transportation, recreation, laundry service, meals, etc. that can affect the monthly cost. Taken together, these findings suggest participants may have limited knowledge about factors that contribute to affordable housing options for older adults (home ownership without a mortgage, retirement community amenities, etc.). Unless this knowledge gap is addressed, it may be difficult to ensure that housing options that older adults want are available in the residential housing market.

4. The lack of consumer demand for universal design may be overstated.

   Lack of consumer demand because of high cost and poor appearance are common reasons for not implementing UD in residential buildings. While consumers may avoid accessibility modifications for many reasons (cost, shame, appearance, etc.), they cannot have demand for design options outside their knowledge-base. The results of this study indicate consumers are not aware of solutions, such as UD, that can facilitate successful aging in place, without the stigma of accessibility modifications. Once provided the definition, few participants indicated that UD was irrelevant to their everyday life (see Figure 4). What's more,

they also perceived it to have some level of environmental consciousness (see Figure 5) and attractiveness (see Figure 6). Because the majority of participants indicated that UD sounded at least somewhat expensive (see Figure 7), they may not see the connection between an initial investment in UD housing and reducing the need for and cost of aftermarket home modifications. Overall, the responses that participants provided seem to suggest that consumer demand can be cultivated through marketing, education, and other avenues to increase knowledge and raise awareness.

5. Jargon and terminology play an important role in consumer perception.

   UD is an abstract term that was only familiar to approximately a quarter of the study participants. Even among those who were familiar with UD terminology, nearly one in three (31.5%) defaulted to a specific age/condition or products/elements to define UD. In addition, UD is easily misunderstood. For example, one participant defined UD as, 'all housing is the same'. Thanks to the passage of the Americans with Disabilities Act in 1990 the term accessibility is more familiar. Unfortunately, the focus on disability has obscured its broader application. For example a ramp in a business benefits a person using a wheelchair, a person making a delivery with a cart, and a parent with a stroller. Therefore, identifying a descriptive term that is more likely to convey the applicability to diverse households may help stimulate demand.

Chapter 6:
Recommendations

Prior to offering recommendations it will be helpful to revisit the structure of the housing industry. Figure 8 shows the different factors (businesses, individuals, policies, etc.) that contribute to the homes available to consumers. The housing options available emerge because of the complex interactions between various stakeholders and/or factors. Therefore, increasing the availability of homes that match modern demographics and households requires a multi-pronged approach.

Recommendations and strategies included in this section were developed based on the results of this study, input from professionals involved in the housing industry or advocacy for UD, and existing research (Bringolf, 2010; Fuller, 2008; Guzman et al., 2017a; Guzman, Viveiros, & Salomon, 2017b; Larkin et al., 2015; Mace, 1998; Maisel, Smith, & Steinfeld, 2008; Pettersson et al., 2018; Saville-Smith & Saville; 2012; Watchhorn et al., 2014; World Health Organization, 2018). Please see the acknowledgements section of this document to review the individuals who contributed their expertise to this section. Overarching recommendations will be provided. In addition, more specific recommendations will be outlined to illustrate strategies that may support efforts to increase the availability of housing to support successful aging in place.

Overarching recommendations

1. Universal design is the gold standard for creating homes that meet the needs of diverse occupants overtime. What sets UD apart from other design solutions is that it is an on-going process of assessing the function of a space and identifying ways to improve it. Therefore, any attempt

for widespread implementation will likely be cumbersome and counterproductive. Visitability provides a more user-friendly alternative. Please note that visitability does not account for the performance of tasks such as laundry or meal preparation which are important for overall health and wellbeing at every stage of life (pregnancy, disability, temporary injury, etc.). However, visitability may reduce the need for significant and costly structural changes.

Visitability Code example (Fuller, 2008):
- One zero-step entrance into the home
- One bathroom and bedroom on the same level as the zero-step entrance
- Bathroom wall reinforced for grab bars
- Minimum 42-inch wide hallways and 36 inch passageways
- Electrical wall outlets/receptacles shall be 15 inches above the finished floor
- Wall switches controlling light fixtures and fans shall be a maximum 48 inches above the finished floor
- All exterior and interior doors shall be 32 inches in width

Overview of Housing Industry
Factors/stakeholders involved in housing

Housing options available in communities emerge are a result of complex interactions between individuals, businesses or organizations, and other factors that tend to affect entire communities, counties, or states (e.g., Building codes). Therefore, points-of-entry to increase knowledge about and implementation of design interventions to facilitate successful aging in place can be difficult to identify.

Figure 9. Overview housing industry diagram

2. Establish community or regional workgroups that include residents, housing industry professionals, health care professionals, service providers, funders, and other stakeholders to identify barriers, develop solutions, coordinate efforts, and advocate for visitability and UD.

3. The widespread absence of accessibility in the existing housing stock indicates that many homes will require renovations for older adults to achieve their goal of remaining in the home. Therefore, strategies are needed to encourage home owners at all stages of life to include visitability (at a minimum) in renovation projects. In addition, resources are needed to support home renovations (financial, materials, training, work force, etc.) Unfortunately, some properties cannot be renovated to support successful aging in place. For example, split-level design with its staggered floors connected by multiple sets of stairs may be difficult to remodel for single-level living (bathroom and bedroom on entry level). Communities may need to identify innovative strategies to address units that cannot reasonably be modified for visitability.

4. Knowledge about the relationship between home design, health, and wellbeing outcomes, particularly around older age and end-of-life care, is limited. Furthermore, aftermarket accessibility modifications have been the solution for several decades. As a result, stakeholders are largely unaware of design solutions that may reduce the need for aftermarket accessibility modifications. An accreditation or certification process may be an important element of increasing consumer knowledge and awareness by establishing an easy to understand rating system. Lifemark (see Appendix A) is an example of a process that has been developed to rate the design of homes and make it easier to communicate with consumers about features of the home.

Strategies to increase implementation
Education and training strategies
1. Identify training or certification to increase knowledge and skills in home modifications, such as the Executive Certificate in Home Modification or Certified Aging-in-place Specialist (CAPS) for professionals involved in home construction or renovation (see Appendix B).

2. Develop and disseminate educational programming or content to increase consumer knowledge about UD, its relevance to their life, how to identify UD, strategies to communicate with contractors and other professionals about universal design, and other topics relevant to individual families.

3. Develop and disseminate educational programming or content for real-estate agents to increase their knowledge about UD, its broad relevance, marketing and communication strategies, and skills to identify and describe opportunities for UD renovations.

4. Develop and disseminate educational programming or content for government officials and building industry professionals that focuses on no-step entrances, implementation and retrofitting strategies, policy barriers, and how to address topographic barriers (hills, rocky terrain, etc.) in new construction.

5. Develop and disseminate educational programming or content for professionals involved in the building industry to address ethical concerns regarding home modifications, as well as cultural awareness. For example, recommending home modifications to an individual who is unable to afford routine home maintenance has ethical implications. Whereas cultural concerns can be examined in how a minority, immigrant, or Native American may have differences in cooking, eating, sleeping, socializing, praying, bathing, etc., that have implications for the overall layout of the home interior (Hadjiyanni, Hirani, & Jordan, 2012).

Market and industry strategies
1. Builder and developer plans will likely need updating to include, at a minimum, visitability features.

2. Identify not-for-profit agencies that work with local housing agencies to help implement visitability features.

3. Not-for-profit agencies will likely need to identify funding sources and other resources to update building plans with, at a minimum, visitability. Additional funding may be needed to train employees.

4. Government agencies and other businesses (e.g., insurance broker) may be able to offer incentives to increase the inclusion of visitability features in new and existing homes. Example of incentives might

include tax credits, reduced-price or waived permit fees, reduced-price long-term care insurance, mortgage discounts, priority review of building permits that include visitability, etc.

5. Government agencies and other interested individuals or organizations will likely need to explore funding sources to support incentives for individuals or businesses who include visitability in building plans. For example, a local community foundation might provide grant dollars to offset tax-discounts provided by local government.

6. Marketing & Promotion activities to increase knowledge and awareness:
   a. Developers and real estate agents have the opportunity to highlight visitability of property in marketing materials.
   b. Local government, chamber of commerce, or community building association could designate/distinguish builders who prioritize visitability and UD.
   c. Advocates and other interested businesses could develop a public service campaign using a tested messaging strategy (see Research Strategy 1) to increase knowledge and awareness among the general population about the visitability and other design solutions.

7. Local communities and developers can prioritize housing developments that account for the diversity of modern households (single people living alone, couples without children, adults sharing with other adults, nuclear families, and single parent families). For example, construct units with two or more master suites to increase the availability of private spaces in single units.

8. Businesses involved in rental housing can prioritize visitability in the construction of new rental properties or remodeling of existing properties. As an example, ensuring multi-floor complexes include an elevator.

9. State and local governments have the opportunity to amend building codes to include easy to implement standards (e.g., visitability).

Research strategies

1. Conduct research to explore consumer worldviews and widely held assumptions about housing and successful aging in place with a goal of identifying communication strategies that make the topic understandable, relatable, and, ultimately, leads to changes in new home construction that reduces the discrepancy between consumer preferences for aging in place and options available in the housing stock.

2. Identify or develop research informed trainings or programs that have been shown to bring about sustainable behavior change (i.e., increase rates of home renovation/construction to include, at a minimum, visitability).

3. Conduct a cost-benefits analysis to evaluate design interventions as a strategy to facilitate aging-in-place, delay entry into institutional settings, and reduce strain on government and non-profit agencies.

4. Evaluate the economic impact of design interventions on builders, developers, and availability of affordable housing. How do design interventions impact the availability of affordable housing?

5. Identify codes and ordinances that are barriers to visitability design features. For example, some states have laws that prevent municipalities from passing more stringent guidelines than those offered by the state. Strict historical preservation laws may also be an example of another barrier.

6. Identify funding sources to support the renovation of existing homes or rental properties.

7. Identify strategies to remodel existing U.S. Department of Housing and Urban Develop (HUD) homes.

8. Evaluate medical providers' protocol for assessing the quality of the home for healing and recovery for patients after health events, particularly those that limit mobility either permanently or temporarily.

Appendix A:
Resources for Housing Design

AARP Home Fit Guide
This guide provides information on how to make homes fit a person's individual needs and tools needed to assist on making these improvements. This guide ranges from do-it-yourself to resources for a Certified Aging in Place Specialist.

Link: https://www.aarp.org/content/dam/aarp/livable-communities/livable-documents/documents-2015/HomeFit2015/AARP-HomeFit-Guide-2015.pdf

Aging in Place Guide for Building Owners
This resource focuses on the layout of apartments and building complexes. It provides a walk through layout, entrances, and technology use like intercoms or key entrances.

Link: https://46u0j30o449zq8181dfurbcj-wpengine.netdna-ssl.com/wp-content/uploads/2016/10/AIP_2017_EN.pdf

Certified Aging in Place Specialist Courses
These courses are offered by the National Association of Home Builders and the Home Builders Association, they primarily focus on aging in place and how to incorporate these tools into personal markets. The benefits for this is that once a person is certified they can then offer to teach courses in a local area.

Link: https://www.nahb.org/en/learn/education-calendar.aspx

The Center for Universal Design North Carolina State University
The Center for Universal Design offers a variety of design resources, from affordable to complex Universal Design projects. One example incorporates Universal Design into a Habitat for Humanity Home.

Link: https://projects.ncsu.edu/design/cud/pubs_p/docs/AffordableUHomes.pdf

Lifemark
Lifemark® works alongside designers and builders to offer advice on how to make the best use of space in a home, based on the principles of Universal Design. Any new home design and any size home can be Lifemark® rated. It's about designing to have space in the right place. They have developed a rating system.

Link: https://www.lifemark.co.nz/

University of Southern California Executive Certificate in Home Modifications
This program is designed for professionals who work directly or indirectly in the field of supportive home environments. Students include remodelers/contractors, planners, personnel of organizations representing the elderly and people with disabilities, occupational and physical therapists, policymakers, and others interested in starting their own home modification business. The courses connect professionals from around the country who learn from each other as well as experts in the field.

Link: http://homemods.org/online-courses/

Appendix B:
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