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Design Guidelines for an Apartments for Life Community

Sarah Elizabeth Walkup

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Design Guidelines for an Apartments for Life Community

Sarah Elizabeth Walkup

Thesis submitted to the
Davis College of Agriculture, Natural Resources, and Design
at West Virginia University

in partial fulfillment of the requirements for the degree of

Master of Science in
Design and Merchandising
with a Graduate Certificate in Disability Studies

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Morgantown, West Virginia
2014

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Long Term Housing, Aging in Place, Assisted Living, Nursing Homes,
Apartments for Life, Health Care Design, Programming, Design Research

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ABSTRACT

Design Guidelines for an Apartments for Life Community

Sarah Elizabeth Walkup

This study pilots a process for programming and collecting data to inform the design of this type of elder housing community. The thesis follows that process to develop a list of user requirements and design recommendations, or design guidelines, for a prospective long-term elder housing community in Morgantown, West Virginia, inspired by the Apartments for Life model established in Rotterdam, Netherlands by Stichting Humanitas Rotterdam. This study uses design research and evidence-based design, with data collection from focus groups, interviews, and surveys, to develop a set of objectives and potential design solutions for an Apartments for Life community and facility, intended for use in the United States.

DEDICATION

I dedicate this thesis to my friends and family who have been sounding boards, sources of encouragement, and voices of reason throughout the entire graduate school process.

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I am honored to have worked with exceptional faculty, without whose advice, guidance, and instruction this project would not have been possible.

I am so grateful for Cynthia Beacham, Ph.D., my personal advisor and committee chair, for her support and encouragement. She has challenged me and I would not be the person I am today without her instruction.

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LIST OF ABBREVIATIONS

ADA	Americans with Disabilities Act
ADLs	Activities of Daily Living
AL	Assisted Living
EBD	Evidence-Based Design
CCRC	Continuing Care Retirement Community
OLLI	Osher Lifelong Learning Institute
SNF	Skilled Nursing Facility

CHAPTER 1

Introduction

Population Changes in the United States

As a result of medical and technological advances, individuals are now able to live longer and healthier than in years past. The 2010 United States Census found individuals aged 65 and older number 40.3 million, equivalent to 13 percent of the population (United States Census Bureau, 2011). This is an increase of 15.1 percent from the 2000 census data. The “Baby Boomer” population, comprised of individuals born from 1946-1964 is aging, evidenced by the 45-64 age bracket increased 31.5 percent from 2000 to 2010, to 81.5 million (United States Census Bureau, 2011) (Table 1.1). The U.S. Census Bureau estimates that the number of Americans aged 65 and older will increase to 72.1 million by 2030, and comprise approximately 19% percent of the population (Vincent & Velkoff, 2010). As of the 2010 census, the “Baby Boomer” population was more than double the existing 65 and older population, so it can be expected that as they age, there will be a need for new care and housing facilities, and approaches to design and development of these facilities.

Table 1.1

Population by Age: 2000 and 2010

<u>Selected Age Groups</u>	2000		2010		Change, 2000 to 2010	
	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>
Total Population	281,421,906	100.0	308,745,538	100.0	27,323,632	9.7
Under 18 years	72,293,812	25.7	74,181,467	24.0	1,877,655	2.6
18 to 44 years	112,138,705	39.9	112,806,642	36.5	622,937	.6
45 to 64 years	61,952,636	22.0	81,489,445	26.4	19,536,809	31.5
65 years and over	34,991,753	12.4	40,267,984	13.0	5,276,231	15.1
<i>Note.</i> This table illustrates the changes in age groups within the United States population from 2000 to 2010. Adapted from “Age and Sex Composition: 2010” by the U.S. Census Bureau, 2011.						

In 2000, 14% of people over 65, totaling 4,898,845 individuals, required long-term care, and 1.5 million of those individuals, or 4.2% of the entire 65+ population, received care in skilled nursing facilities. Of all individuals with long-term care needs, those aged 65 and over comprised 63 percent of the total (Rogers & Komisar, 2003) (Figure 1.1). More recent data has not yet been published, but it can be expected that these trends will continue.

Figure 1.1

Note. This figure illustrates the number and proportion of individuals receiving long-term care in the United States in 2000. Adapted from “Who needs long-term care?” by S. Rogers and H. Komisar, 2003, *Long-Term Care Financing Project*: Georgetown University, p. 1. Copyright 2003 by Health Policy Institute: Georgetown University.

Changing Needs of the Aging Population

As individuals age, their health needs change and often increase. Older adults as a population are diverse in the amount and type of care that they need on a regular basis (Van Hoof & Kort, 2009). Van Hoof and Kort (2009, p. 294) write that “symptoms [of aging] can be divided into three kinds: (i) impairment in activities of daily living (ADL), (ii) abnormal behavior, and (iii) loss of cognitive functions”. Activities of daily living, or ADLs, are certain tasks that are necessary to living independently. The six categories of ADLs are bathing, dressing, using the toilet, transferring in or out of bed and chair, continence, and feeding (Drageset, 2004). The transition into total loss of ADLs is

generally gradual, and there are often intermediate levels of decline, such as loss of ability to drive, cook, or self-administer medication. For some individuals, a time will come when adequate support for activities of daily living and medical needs cannot be provided at home, and the individual must seek out alternatives. Within the United States, long-term care is most often provided by in-home nursing care providers, or at a nursing home or skilled nursing facility. Nursing homes are important providers of care for elders, especially for those who have functional impairments or who cannot perform activities of daily living (Bishop, 1999). However, this presents an interesting problem, because while nursing homes support functional mobility and independence, individuals residing in nursing homes may experience more depression and a lower quality of life than their peers who are receiving home-based care (Karakaya, Bilgin, Ekici, Kose, & Otman, 2009).

Current Elder Housing Preferences and Concerns

Many of the existing long term housing options pose significant challenges. Individuals who age in their own homes may find that the home does not accommodate their changing physical needs and also poses safety risks. Nursing homes are a common alternative. However, nursing homes are sometimes considered frustrating or sad environments in which to live (Imamoglu, 2007). Nursing homes, as well as skilled nursing units in hospitals, often appear institutional or cold in nature, and may not provide an environment conducive to building relationships or pursuing hobbies and maintaining life skills.

Elders who choose not to age in their own homes often encounter stress during a move or housing transition, as they gradually lose autonomy, privacy, and a sense of

ownership of their space (L. A. Morgan, Eckert, Piggee, & Frankowski, 2006; Shippee, 2009). Ultimately, many elders who have either lost or anticipate losing the ability to perform activities of daily living are faced with a potentially difficult decision: move to a long-term care facility and face the challenges involved with the transitions, or stay at home in an environment that may not be conducive to safety, medical care provision, or supportive of activities of daily living.

There is a growing need for elder housing that provides independence and autonomy in a safe, accommodating environment with provisions for appropriate medical care. In Europe, new approaches to elder housing are being considered and new facilities constructed. The Apartments for Life concept is one such housing model. This housing model began in the Netherlands during the mid 1990's. The apartment units are designed to adapt to the individual's changing physical needs, and medical care is provided in-home by physicians and nurses who serve the building. Rather than the general approach to elder housing in the United States, where the resident moves between units and even communities as his or her needs change, in the Apartments for Life concept, the apartment has been designed to adapt to the needs of the elder. As a result, the resident does not need to move along a continuum of housing options. This concept has also been adopted in Australia, yet has not been widely seen as a housing option within the United States.

Purpose of Study

New approaches to elder housing in the United States have not been greatly explored since the late 1980s, and it is evident that there is room for improvement in the United States' approach to long-term housing. The Apartments for Life model could be a

viable alternative to both aging at home and aging in assisted living or nursing care in the United States. Because this option of elder housing has not been significantly explored in the United States, there is no precedent or model for design of the residences, or the community at large. This study provides a process for programming and collecting data to inform the design of these elder care communities. The context for the pilot of this process is Morgantown, West Virginia. In this study, the programming process is used to determine how the Apartments for Life concept could be adapted to suit local culture. The process developed in this study could be implemented to evaluate user needs in other locations, or to evaluate the adaptability of other approaches to long-term housing.

The result of the data collection and programming process presented in this study is a set of design guidelines for a theoretical aging-in-place care community in Morgantown, West Virginia. These guidelines are inspired by the Apartments for Life principle and design features, and informed by the specific needs and preferences of American elders and their health care providers.

During the course of this study, the researcher explored the changing needs of aging individuals, as they relate to housing and community environments. Additionally, specific environmental elements critical to continued quality of life in long-term care were identified. Existing research and theory on person-environment fit, environmental psychology, and environment and behavior were also considered throughout the development of the design guidelines. The goal of this project was not to determine how logistically feasible this project is in Morgantown, West Virginia, or to address location and funding specific topics, since it is purely theoretical and focused on understanding user needs. Instead, through the programming process presented in this study, the

researcher captures the attitudes and needs of local elders and other stakeholders at a given point in time. Similar studies could be replicated in other communities where new approaches to long-term housing have true development potential. The findings of this or similar studies could be used to inform the design of an actual community.

Current research shows that existing housing options in the United States leave American elders with unmet needs, and that through thoughtful community planning and facility design, elders can live out their final years with improved physical, emotional, and social quality of life. This thesis will explore these concepts, as well as historical and current housing trends both in the United States and abroad, and ultimately develop guidelines for a housing community that more fully meets the complex needs of American elders.

Definitions

Throughout this study some terms will be used which require definition. These terms may be unusual to readers or may have multiple common definitions. For the purpose of this study, these words are defined below.

Baby Boomers – The United States Census Bureau defines the Baby Boom generation as the individuals who were born between 1946 and 1964, during a dramatic post-World War II increase in birth rates (U.S. Census Bureau, 2006). As of 2014, these individuals range in age from 50 to 68.

Community - Although the term *community* can be used to define both a group of like-minded or somehow similar individuals, as well as the physical place where these individuals reside, for the purpose of this study the term will refer to living environment.

In elder care, a housing community is often a place where elders live together, either in the same building or in close proximity to one another, and also have access to various shared amenities and services. Unless the term "social community" is used, the researcher is referring to this general type of elder housing. Within this type of housing community, relationships may develop, and as a result, social community is necessarily one byproduct or factor within the more broadly defined *community*. The term *housing facility* is used interchangeably.

Elders - The World Health Organization defines elders as individuals who are aged 65 and over, and notes that a majority of developed countries have also accepted this definition of elders (World Health Organization, 2012). Sixty-five tends to be the accepted age for elders in the United States because this is the age at which an individual can begin to receive full pension benefits and is eligible for Medicare (Medicare.gov, 2012; Social Security Online, 2011). The World Health Organization notes that in the United Nations, 60 years of age is another accepted threshold. Because of the healthcare and financial benefits that American individuals are eligible to receive after the age of 65, many individuals choose to continue living at home and working until this age; it is typically not until after they are eligible for full retirement benefits and Medicare that they retire and begin to seek alternative housing.

CHAPTER 2

Review of Literature

Theoretical Frameworks

The ecological model (Figure 2.1), as used by the U.S. Department of Health and Human Services (2000) illustrates the relationships between social and physical environments, and an individual's biology (health) and behavior. Each of these components – physical environment, social environment, and the individual, are inter-related and a change in one realm necessarily results in a change in its relationships with the other factors.

Figure 2.1

Note. Ecological Model. Determinants of Health (Detail). Illustrates relationships between physical environment, social environment, and the individual. Adapted from “Healthy People 2010”, U.S. Department of Health and Human Services. Copyright 2000 by U.S. Department of Health and Human Services.

For example, as individuals age and their physical (biological) abilities change, the individual may begin to find significant safety needs unmet due to medical conditions and physical limitations. When a housing environment fails to support the physical safety and mobility of an elder, the person-environment fit (Figure 2.2) is no longer

satisfactory and health and productivity outcomes decline; this could be resolved by a change in environment or an addition to the individual's resources (i.e. medical care, therapy, daily ADL assistance). Similarly, a change in social environment can result in a change in the individual's behavior or attitudes.

Figure 2.2

Note. Person-Environment Fit model illustrates outcomes of relationships between individual capacities and environmental demands and supports. Adapted from “Basic Issues in Occupational Stress Research”, A.B. Leonova in *Psychology: IUPsyS Global Resource*, by D. Wedding and M.J. Stevens. Copyright 2009, London: Psychology Press.

The person-environment fit model (Iwarsson, 2005; Leonova, 2009) was developed as a framework for understanding factors and results of occupational stress, where environmental factors include job demands, management organization, and

physical environment components as well. Outcomes were measured in terms of health and work productivity and adequacy. However, a more recent study uses the person-environment fit model to analyze and understand the impacts that the physical housing environment has on elders' well-being and ADL performance (Iwarsson, 2005).

While elders may not have control over their personal capabilities, they are capable of seeking environments which, through social and physical components, improve their life safety and satisfaction (improved person-environment fit). Abraham Maslow's Hierarchy of Needs (Figure 2.3) identifies factors that are integral, or at least desirable, to a safe and satisfied human life. Maslow established that basic needs must be met before higher needs can be fulfilled; in essence, the needs build on one another, from basic survival needs to the ultimate attainment in life: self actualization or *joi de vivre*. Maslow's hierarchy provides a framework by which we can understand how individual decisions and actions are motivated; individuals are constantly pursuing or desiring a higher level of need satisfaction.

Figure 2.3

Note. Maslow's Hierarchy of Needs illustrates a motivation theory in which actions are prompted by a desire to fulfill human needs related to safety, satisfaction, and fulfillment. Adapted from *Abraham Maslow*, http://www.abraham-maslow.com/m_motivation/Hierarchy_of_Needs.asp.

When this theory is applied to elders' decision making, it allows an understanding of the motivations behind housing type selection, and the decision to move. As individuals age and their physical abilities decrease, they may begin to find significant safety needs unmet due to medical conditions and physical limitations. Maslow's Hierarchy theorizes, and evidence shows, that when faced with a decision in which they must decide between a physically safe and supportive environment, and one in which

social, emotional, and esteem needs are met, elders will opt for the environment in which safety and security needs are met, at the expense of other, less immediate needs.

Design

While historically design was considered the creation of a physical appearance of an object or space, a new wave of designers see themselves as "change-makers", manipulating our physical world to improve the well-being and quality of life of its users. Sir George Cox, as cited on the U.K. Design Council's website (Design Council, n.d.) states that "Design is what links creativity and innovation. It shapes ideas to become practical and attractive propositions for users or customers. Design may be described as creativity deployed to a specific end."

In the field of interior design, a space is created to meet the multiple needs of a client and to support the users' health, safety, and well-being. The National Council for Interior Design Qualification (NCIDQ, 2004) states that design solutions are "functional, enhance the quality of life and culture of the occupants and are aesthetically attractive." NCIDQ also holds that the process of design follows a well-defined methodology which includes research and analysis, and synthesis of collected information into a creative solution that satisfies the needs of the client.

Design Research

In order for a design to be truly effective in improving the quality of life of its users, designers must be aware of both the needs of users, and of the impacts that design has on those who encounter it. Design research is an emerging type of research, not specifically qualitative or quantitative, which can be used to study historical design

precedents, determine user needs, inform decisions during the design process, and evaluate the impacts of an implemented design. It is context specific, and can benefit individuals engaged in design in any field, from architecture to education. Although it takes many forms, design research always pertains to understanding or improving the tangible, or measuring its effect on quality of life.

Edelson (2002) writes that design research is characterized by "iterative design and formative research in complex real-world settings" (p. 106). Further, design research is a strategy for testing theories and is often comprised of four components:

1. The development of a theory
 2. The derivation of principles for design from the theory
 3. The translation of the principles into concrete design
 4. The assessment of the designs to test whether they work as anticipated
- (p. 106)

In education, this process may take the form of establishing curriculum deficiencies, identifying student learning styles and needs, developing new coursework, implementing the coursework, and testing students to determine the impacts of the new coursework implementation. For interior design, this process often includes identifying the needs of a space's users, developing a design (with decisions based on existing research and theory), implementing the design, and conducting a post-occupancy evaluation on the building and users.

Evidence-Based Design as a Resource

Design decisions, especially in healthcare related design, are not made arbitrarily, but rather should be informed by credible research and data (Whitemyer, 2012).

Evidence-based design, or EBD, is now practiced regularly not only in healthcare, but in education and institutional facility design, among others. This research often pertains to the impacts of the built environment (e.g., ventilation, light, color, furnishing) on a user's well-being. In EBD, data can come from a number of sources, including existing research and publications, as well as the designer's own qualitative or quantitative research.

Effects of Housing Environment on Well-Being

The built environment can support the changing physical needs of individuals as they age, and can have an impact on behavior and state of mind. The physical environment in which an elder lives can compensate for the limited physical function associated with aging, as well as the decreasing ability to understand and adapt to changes in the environment. The physical environment also can be designed in such a way as to encourage social interaction, to help an individual orient him or herself within a building, and to assist way finding (Day & Calkins, 2002). Additionally, accessibility features and technology can assist an elder in performing activities of daily living more independently.

Various forward thinking long-term housing providers, as well as scholars on the subject, have developed guidelines for developing, designing, and managing assisted living and long-term care facilities in order to specifically support the emotional, social, and physical/medical needs of the residents. Regnier (2002) writes that these housing

providers tend to support those needs through attention to several factors, which fall into three rather distinct categories, and which can all be impacted or improved by attention to design features within the facility or community:

1. Structure and physical design of facility
 - a. Design a homelike appearance
 - b. Create a sense of familiarity within the building
 - c. Stimulate the senses
 - d. Optimize orientation and self-location of residents
 - e. Provide safety and security
2. Recognition of individual as a person
 - a. Assure privacy
 - b. Enable independence/autonomy
 - c. Promote choice/control
 - d. Allow personalization of environment
 - e. Treat elder as an individual
 - f. Adapt to changing circumstances
3. Forming of social relationships
 - a. Create opportunities for social interaction
 - b. Improve the resident's relationship with family

Effect of environment on the individual. An organization or facility can support the individual needs of an elder by creating privacy, autonomy, and treating the resident as an individual rather than a "case". Chapin and Dobbs-Kepper (2001) write that homelike care environments tend to support autonomy and privacy better than large-scale institutional settings. New models of long-term care, which provide supportive services within more conventional types of housing, can permit residents to live with a greater level of autonomy, for a longer period of time (Regnier & Denton, 2009). The physical appearance of an environment, which includes color, lighting, furniture, and finishes, as well as the arrangement of space, can improve elder well-being and life satisfaction, and impact the emotional state and mental comfort of a space's users. A study by Bicket et al. (2010) reinforces this theory. This study found that a higher environmental quality score for assisted living facilities was positively correlated with quality of life in patients with Alzheimer's disease, and negatively correlated with Neuropsychiatric Inventory (NPI) scores, which measure occurrences of confusion, anxiety, irritability, and hallucinations, among other neuropsychiatric symptoms. Altus (2010) writes that residents of a small-scale alternative nursing home in Asbury, Kansas are becoming both more joyful and more mobile as a result of the positive, supporting environment.

Effect of the environment on community. A study by Gaugler (2006) suggests that residents of long-term care facilities that engage and formally involve family members may enjoy their environment and surroundings more than residents whose families are not as engaged. Gaugler also notes that residents who "reported and appeared to have the greatest well-being were also those who had family members and staff who were

‘on the same page’ in terms of care responsibilities and understanding of the needs, desires, and past histories of residents” (2006, p. 93).

The design of a building and its site can impact the relationships between elders, their families, caregivers, and the community. Kochera and Bright (2005) write that:

The physical aspects of one’s home are an important element of the livable community for many reasons. It is a setting that must be safe and secure and also is where people frequently interact with friends and neighbors, and it is the point at which people plan and prepare for social activities elsewhere. (p. 33)

Van Hoof and Kort (2009, p. 295) argue that “a good living environment can reduce confusion and agitation, improve way-finding and encourage social interaction among older adults with dementia.” La Gory and Fitzpatrick (1992) found that environmental factors, including accessibility, neighborhood, and social support, played a significant role in depression among the elderly.

Housing Transition and its Effects on Elders' Well-Being

Many aging Americans have become accustomed to the independence and freedom of choice that living alone or at home can provide (Victor Regnier, 2002). For a majority of individuals, home is the preferred place of care during their final years, although, for some, home is a symbolic concept reflecting love and care, as much as a physical environment (Gott, Seymour, Bellamy, Clark, & Ahmedzai, 2004). As Gott et al. (2004) found, however, elders are often concerned about the quality of care that can be provided at home, and agree that total aging at home may not be a realistic, or safe, option.

Regardless of the type of long-term housing, many elders have similar experiences when transitioning into a new living arrangement. The move to a long-term care facility can be stressful. Elders who move to this type of housing often experience loss of community, identity, autonomy, and privacy (Saunders & Heliker, 2008; Shippee, 2009). However, the decision to move to a long-term care facility is often made by the elder as a result of the realization that they cannot safely care for themselves independently in their home. Ultimately, many elders who have either lost or anticipate losing the ability to perform activities of daily living are faced with a potentially difficult decision: move to a long-term care facility and face the challenges involved with the transitions, or stay at home in an environment that may not be conducive to safety, medical care provision, or supportive of activities of daily living.

Elder Care and Housing Models in the United States

Over the course of America's history, the approach to housing and caring for elders has changed as a result of external factors such as federal funding of healthcare, as well as more internal cultural and social factors. While aging at home was once a commonly utilized option for the elderly, those internal and external forces resulted in a shift toward institutionalized care in nursing homes, and the eventual adoption of amenity-filled housing communities in which individuals can age. The most recent development in elder care and housing is a renewed recognition of the value of family and community, with care facilities involving and encouraging families to participate in the residents' lives and care.

Aging at home. The concept of aging at home has existed for centuries, and was the first model of elder care practiced in the United States. Some elders continue to

choose to age in their own homes, with support from family members and home-care medical staff. Gott et al. (2004) state that a majority of elders prefer to age in place for a number of reasons. According to Mezey, Dubler, Mitty, and Brody (2002), although 43% of elders would prefer to spend their final days at home, only half of that number (approximately 19%) are able to do so, with the remainder passing away at hospitals and long-term care facilities.

Safety is a major concern with aging at home. Many elders who choose to move to nursing homes do so because they have experienced a fall or no longer feel that they can live safely in their own home (Morgan, et al., 2006; Shippee, 2009). With appropriate design interventions a home can often be made safe and accessible for elders. However, affordable in-home care is often an obstacle for aging Americans. In northern European and other countries, the government provides substantial subsidies for home health care, which allows the elderly to affordably age in their own homes (Regnier & Denton, 2009).

For elders who opt to receive skilled in-home medical care, as with nursing homes and hospital nursing units, some medical services may be covered by Medicare. However, home health care services are covered by Medicare only if a) a doctor has decided that the individual must receive the care at home, b) the individual needs intermittent skilled nursing care or therapy, c) the health agency is Medicare-certified, and d) if the individual is homebound. Twenty-four hour nursing care, meal delivery, and assistance with ADLs if no other medical attention is needed, are not covered by Medicare (Medicare.gov, 2010). Home health care covered by Medicare must not exceed 8 hours per day, or in most cases 28 hours per week. As a result of these limitations,

elders with significant healthcare needs may have no other choice but to receive care in more formal settings.

Skilled nursing units & nursing homes. Individuals who are not able to safely age in their own homes may turn to a nursing home, or in more extreme cases, a hospital's Skilled Nursing Unit (SNU). Nursing homes and SNUs provide 24-hour nursing care. In some cases nursing homes are affiliated with or attached to hospitals, while others attempt to create a more home-like atmosphere (NIH: National Institute on Aging, 2012).

Nursing homes have existed in the United States since the 1860s, when they grew out of traditional almshouses, or housing for the poor, criminal, and indigent. During the 19th century, the United States grew and families dispersed. Children began to move away from their families, in some cases leaving parents to care for themselves. Federal assistance for the aging population did not exist, and those who could not afford private care turned to almshouses. The increasing aging population in these facilities caused them to transform into what Bohm (2001) calls "public nursing institutions".

During the 1960s, federal government programs that fund nursing home care, such as Medicare and Medicaid, were established, causing nursing homes to be more widely used. Nursing homes became the most important, and common, type of institutional care for the American elderly (Bohm, 2001; Wilson, 2007). This federal funding also resulted in strict regulations being placed on nursing home administration, construction, and care provision. In addition to federal funding changes, caregiver stress is another factor contributing to increasing nursing home admission. A child or family

member may struggle to manage a job, their own family, and caring for an aging relative, as well as the potential financial implications associated with being a family caregiver (Spillman & Long, 2007).

Currently, Medicare and Medicaid continue to fund some nursing home care. While the Original Medicare Plan generally does not cover nursing home care, since a majority of the care provided is assistance with ADLs, care provided in certified skilled nursing facilities is often covered because it is more medical in nature (Medicare.gov, 2010). Under the Original Medicare Plan, the first 100 days of care in a skilled nursing facility are covered, but after that initial period the patient is responsible for the full cost of services delivered (Centers for Medicare & Medicaid Services, 2007).

Assisted living. Assisted living facilities have existed in the United States since the late 1970s, as a movement away from the then well-established nursing home model of care. Some elders were discontented and dissatisfied with nursing home care, perceiving it as institutional and impersonal. Assisted living communities were developed to provide a more desirable environment in which elders could age, by lowering environmental and organizational stress while providing supportive services to enable independent living as much as possible (Wilson, 2007). This type of facility is intended for elders who may need help with some tasks, such as cooking or laundry, but are still capable of performing most activities of daily living. Elders in assisted living are granted a high level of independence, and yet have meal, laundry, and other services at their disposal (Assisted Living Today, 2011).

Assisted living can provide a resort-like atmosphere where elders who have no major health concerns can live. In fact, many individuals opt to reside in assisted living because of the amenities and atmosphere. A 1998 NIC study cited in Chapin and Dobbs-Kepper (2001) of assisted living community residents found that “services offered” were of the highest importance when selecting a community, followed by location and physical appearance of the facility. These ranked higher than quality of staff and even the monthly fees for living in the community

Continuing care retirement communities. For elders who want to reside in independent or assisted living facilities, and take advantage of the amenities included, but anticipate further decline and do not want to make a major transition to an outside facility as their medical needs increase, continuing care retirement communities, or CCRCs, are an option. These communities have existed since the 1980s, and typically include independent living and assisted living units as well as nursing home rooms, allowing the elder to move between housing units and care levels as their medical status and ability to perform ADLs decline.

Continuing care retirement communities tend to be the most expensive type of housing for the elderly, often with an entrance fee of between \$100,000 and \$1 million, and monthly fees typically ranging from \$3,000 to \$5,000 (AARP, n.d.). As a result of the costs, residents are provided the benefit of a community that they will not have to leave, a distinct difference from other elder housing models such as assisted living.

Alternative nursing care and assisted living models. A more recent trend is toward facilities that allow the resident to age in place within a group setting, similar to

nursing homes (Liebig, 2001) but often on a smaller scale and without the institutional feeling and the associated costs. These models vary slightly depending on the location, but primarily aim to create a more humane atmosphere and promote a sense of unity among and between the residents and the surrounding community. The leadership/management structure, as well as the building itself, are designed to improve relationships between residents, their caregivers, and the community.

The Green House Project, a concept developed by Dr. William Thomas and first constructed in 2003, is an innovative approach to housing elderly individuals who can no longer live independently or with relatives. Green House residences provide an alternative to nursing home care, with an emphasis placed on community, relationships, and the resident's involvement in decisions regarding their care and lifestyle. These residences are purpose-built on a smaller scale than traditional nursing homes, with most residences housing approximately 10 elders. Many residences are integrated into neighborhoods or other residential communities, and do not bear the appearance of hospitals or institutional care settings. Elders in the residences may require tube feedings, catheterization, oxygen, medication, or end of life care (Rabig, Thomas, Kane, Cutler, & McAlilly, 2006)

Although a majority of Green Houses are designed for elders who do not exhibit symptoms of Alzheimer's disease or other dementia, Green House residences are a potential housing option for elders with dementia whose needs may otherwise limit them to nursing home care. In Westwood, Massachusetts, *White Oak Cottages*, an anticipated Green House Project residence, is planned to house 24 elderly residents with dementia (Scher, 2011).

Angelelli (2006) writes that the initial Green Houses in Tupelo, Mississippi, as well as a similar community in Australia, are different from traditional care and housing models because the elders are considered during decision making, rather than only maximization of operational efficiencies.

Trends in Elder Care and Housing in Europe

Housing models. Home health care is more widely used in other countries than in the United States, although the approach to providing and funding care may vary slightly depending on government and culture. Europe in particular has made advances in elder housing models, moving toward in-home care and small-scale residential care facilities similar to the Green House Project model (Leibrock & Harris, 2011). The residential group-care facilities are similar to nursing homes but often on a smaller scale and without the institutional feeling (Liebig, 2001).

Liebig (2001) writes of policies developed with the intent of potentially reducing the costs associated with institutional care. Some countries in Northern Europe have put restrictions on the construction of nursing homes in order to promote alternative types of elder housing (Leibrock & Harris, 2011; Liebig, 2001). In addition, policies address the modification of existing homes to create environments where the individual can receive services and age in place, providing access to community-based and in-home services, and advocating systems where the elderly provide housing for non-family members in exchange for services and other types of support.

Lee, Dilani, Morelli, and Byun (2007) researched "health supportive" design features in specific Swedish elderly care homes that were perceived as having quality

architecture and interior design. Two of the three facilities studied have open kitchen/living/dining rooms, and each facility provides private bedrooms and bathrooms with showers for each resident. The designs created contact with nature through protected balconies, patios, gardens, and windows. The facilities also tended toward small-scale, as is common in Sweden, and two of the facilities provided amenities such as massage rooms and activity centers.

A Swedish study by Wimo et al. (1991) studied the cost per patient of group living care, comparing it to nursing home or institutional care. Although this study was performed in northern Europe, where different medical cost coverage exists, the overall cost per resident was lower in a group living environment, especially after the first six months of care. This is due in part to the reduced need for constant skilled monitoring that exists in institutional care settings.

Emerging trends in northern Europe. Victor Regnier (2002), an architect and design theorist who has spent significant time traveling and studying assisted living facilities both in the United States and abroad, specifically in northern Europe, has established several design features that are found in many facilities in Europe. Regnier and Denton (2009) developed a list of ten new and emerging design trends in these types of care facilities. Some of these principles apply directly to the design, organization, and function of care facilities, while others concern general models of housing and provision of care.

The ten trends that Regnier and Denton (2009) observed in elder housing facilities and units are

1. Small scale cluster [of units] connected to a larger scale service provision system
2. Non-institutionalized appearance of interior and exterior design features
3. Focus on visual and physical access to outdoor spaces
4. Support of life skills and activities of daily living by encouraging residents to care for themselves and supporting independence through unit design
5. Involvement of friends and family
6. Movement and use patterns; utilizing design to encourage social interactions, movement, and exercise
7. Design of dwelling units to create privacy and sense of ownership
8. Apartments for Life
9. Home care support
10. Stimulating senses and creating happiness

Apartments for Life

Mentioned in Regnier's (2009) list of emerging trends is the Apartments for Life concept, which was initially developed in Rotterdam, Netherlands in 1996 by Humanitas, a non-governmental agency involved in housing and care for the elderly (The Benevolent Society, 2009). What began as one apartment complex with 195 units has since grown into 15 apartment complexes with 1700 units, housing approximately 2500 individuals in the Netherlands (The Benevolent Society, 2009), and the housing model is beginning to

appear in other countries across northern Europe as well as Australia (Leibrock & Harris, 2011; The Benevolent Society, 2009).

The principle behind Apartments for Life is allowing elders to remain in one environment as they age, regardless of how their needs change. Additionally, housing and healthcare are separated as much as possible, which is a movement away from the traditional nursing home model, where the residents essentially live in a healthcare facility. Stewart (2009) states that in the Apartments for Life model, residents are “master of the house” (p. 2). The residents have control over their homes, can have overnight visitors, and are encouraged to rely on themselves as much as possible. According to Leibrock and Harris (2011), approximately one third of the residents receive skilled nursing care in-home, one third receive assistance with daily activities, and one third are living completely independently. This blending of ability levels helps to prevent a feeling of institutionalization and allows a wide variety of activities and relationships to develop and be sustained.

The initial Apartments for Life project, Humanitas Bergweg, consists of small two-and-three room apartments. The units are designed to be fully accessible to elders in wheelchairs and hospital beds, with space that will accommodate a spouse and live-in help as needed (Leibrock & Harris, 2011). Humanitas Bergweg is constructed with an ambulatory health care facility on the first level. Residents who are able may visit the doctors and dentists, and care is provided in-home to those that are not ambulatory.

Each Apartments for Life complex includes a "village square", with amenities such as cafes, restaurants, shops, and salons which are utilized by the residents as well as

by people from the surrounding community. The village square also includes a light-filled atrium with ample space and tables to socialize. The facilities provide space to accommodate interactions between the residents and the community, and allow access to the surrounding city. The Humanitas Bergweg community also includes plants and sunlight for the benefit of elders who cannot easily leave the complex. Elders can easily live in the community, and will rarely, if ever, be required to leave for any reason other than to receive care for severe health issues or dementia. Although this concept may appear similar to Continuing Care Retirement Communities, it has some distinct differences as illustrated in Table 2.1.

At this time little research has been completed on a) the success of this type of housing, b) impacts of Apartments for Life on residents' quality of life, or c) the elders' perceptions and experiences of living in this type of facility. However, this approach to elder housing bridges the "gap" seen between the housing environment in which many American elders want to age (home), and the type of environment they believe is actually most appropriate (long-term care or skilled nursing facility). Although the benefits of Apartments for Life communities have not been empirically researched, it could be a potentially beneficial model of care for a population that has not seen many advances in housing options over the past two decades.

<p>Table 2.1</p> <p><i>Differences between Apartments for Life and Continuing Care Retirement Communities</i></p>		
<u>Factor</u>	<u>Apartments for Life</u>	<u>CCRC</u>
General Approach	Designed so that residents are not required to move even as health needs increase. Homes or apartments accommodate decreased function and in-home medical care provision.	Residents move into Independent Living units and progress to separate Assisted Living and Skilled Nursing units as medical needs increase.
Independence and Individuality	Necessary resources (e.g., laundry, medical care, grocery store) are located in the facility so residents may access them easily and without assistance. The community follows a "Use it or lose it" approach, encouraging residents to stay active and use life skills to the greatest extent possible.	Communities are sometimes located near amenities such as grocery stores and physician's offices, though they are often outside of a city's limits. Residents must often utilize transportation to access local resources.
Amenities and Resources	Coffee shops, fitness rooms, dining opportunities, space for arts, music, and cultural events, etc., as appropriate for the local culture.	Coffee shops, fitness rooms, dining opportunities, space for arts, music, and cultural events, as appropriate for the local culture.
Health/Safety	Medical care is provided to each resident's unit as medical needs increase.	Medical care is provided in-room to residents in the Skilled Nursing Units. Individuals in Independent or Assisted Living generally receive no in-home medical care.
Community/Family	Residents own their homes so they may entertain and host people as they choose. The Apartments for Life facility provides amenities for the larger community. Spouses may live together in the same apartment as they age, regardless of the level of care one spouse may need.	Residents in Independent Living units can generally host guests. Residents in Assisted Living units may also host guests, depending on the community. Skilled Nursing units are generally a single room, not meant for guests other than daytime visitors. Spouses often separated when one needs more care.

Indicators of Satisfaction Among Elders

As individuals age, their concepts of well-being and life satisfaction may change. In addition, their perception of how well a housing environment meets their needs may be altered. In order to develop a housing model that supports elder well-being, it is important to understand what constitutes well-being and satisfaction for elders, both with life and more specifically within a housing environment.

Farquhar (1995) states that elders measure their own quality of life not only in terms of health and physical ability, but also in family relationships, social contacts, and activities that greatly contribute to quality of life. Within the context of housing, Kahana, Lovegreen, Kahana, and Kahana (2003) write that person-environment fit is a major influence on the well-being of elders. They state that when there is an adequate person-environment fit, elders experience not only psychological well-being but residential satisfaction as well. The authors also note that the housing community or neighborhood environment is a better indicator of residential satisfaction than are actual housing features. Kahana et al. also identified several factors that contribute to housing satisfaction; however they did note that depending on age, gender, and physical ability, elders may have different preferences within each of these categories. The identified components are

1. Physical aesthetics/amenities,
2. Resource amenities (availability of services and other resources)
3. Safety.

Additionally, there are 3 dichotomous categories; the majority of elders will tend to prefer one of the options over the other within each category:

4. Stimulation vs. tranquility,
5. Homogeneity vs. heterogeneity,
6. Interaction vs. solitude.

While elders may have different preferences, specifically related to the latter three categories, these six elements can greatly influence residential satisfaction, and ought to be considered when developing a housing environment.

Design Objectives for Elder Housing

Various authors, researchers, housing community developers, and municipalities have published sets of goals or objectives for the construction of elder housing communities. Although these lists can be quite extensive, there are several objectives that appear consistently on multiple lists. These common objectives also tend to relate to one or more of four broad categories, which are Individuality, Aesthetics/Amenities, Health and Safety, and Social Community/Family.

1. Individuality

- a. Provide opportunities for privacy, within residences and the community.
- b. Allow residents to express their uniqueness.
- c. Support residents' independence.
- d. Serve individuals of all physical ability levels.

2. Aesthetics/Amenities

- a. Have a residential appearance.
- b. Allow for easy aging in place by providing necessary amenities and resources, such as home health care and therapy.
- c. Provide opportunities for privacy, within residences and the community.
- d. Create visual connections to the building's site and the community in which it is located.
- e. Provide an interesting and sense-stimulating environment.
- f. Respond to the site's geographical, cultural, and historical context.
- g. Allow residents to orient themselves within the buildings by providing visual access to landmarks outside the building, as well as unique and easily identifiable interior and architectural elements.

3. Health and Safety

- a. Allow for easy aging in place by providing necessary amenities and resources, such as home health care and therapy.
- b. Encourage elders to exercise and stay mobile.
- c. Serve individuals of all physical ability levels.
- d. Include intuitive way finding
 - i. Allow residents to orient themselves within the buildings by providing visual access to landmarks outside the building, as well as unique and easily identifiable interior and architectural elements.

4. Social community/Family

- a. Support family involvement
- b. Support development and maintenance of social groups.

(American Institute of Architects, 2007; Pynoos & Regnier, 1991; Reed, Leigh, & Tremblay, 2007; Victor Regnier, 2002; Whole Building Design Guide, 2012)

While these objectives serve to inform the design of a community, some of them are very general and can be met in a number of ways, depending on the users, the culture, and location of the facility. As a result, although these objectives inform the ideal outcomes of the building, not all of them describe specifically how those outcomes can be attained. An understanding of the social, emotional, and physical needs of the space's users is necessary in order for a designer or developer to appropriately design a facility for its users. Through this study, a thorough view of local elder and healthcare provider needs and preferences will be obtained. This deep view will provide a foundation for development of specific design guidelines which could help designers and developers meet the objectives described above.

CHAPTER 3

Methodology

During the course of this research project the design process was used to create a process which resulted in a set of user needs and potential design solutions, also referred to as design guidelines. These guidelines inform the design of a theoretical Apartments for Life community in Morgantown, West Virginia. Because context is an influence in any design project, the guidelines are influenced by the culture and context of Morgantown, West Virginia. This study develops and pilots a process for evaluating user needs for a long-term care community inspired by the Apartments for Life approach, with the result of the process being a comprehensive set of design guidelines.

An Apartments for Life community is intended for use by elders age 55 and over. Although in the U.S. elders are generally defined as individuals over age 65, this project is intended for use by individuals over age 55, which matches the target population of the original Apartments for Life community in Rotterdam. The theoretical community will adapt to accommodate residents' changing physical, medical, emotional, and social needs, as well as provide an environment for delivery of home health care and ADL assistance.

The guidelines produced during this study serve to inform not only the design of individual spaces, but of the community as a whole. The community should accommodate elders at any stage of aging – from independent living to receiving full-time observation and care, and create an environment in which elders not only want to remain, but in which they can safely age without compromising their well-being. The culture and context-specific guidelines developed in this project provide a practical way for designers and developers to meet the very general design objectives established in

Chapter 2 (pp.31-33). Focus groups and interviews were used as primary data collection methods during this project, and were organized using the design process. Evidence-based design was also utilized in this project; the final set of design guidelines was informed by both direct and indirect research.

The overall goal of this project was to adapt the Apartments for Life concept for use by American elders and their healthcare providers, to support medical/physical needs and improve social and emotional quality of life during the aging process. Additionally, the project was guided by three research questions (Table 3.1)

1. What are the housing needs and preferences of local American elders that impact the design of an elder housing environment for implementation in Morgantown, West Virginia?
2. What are the needs and preferences of local healthcare providers that influence the design of a housing environment?
3. How do the above factors inform and impact the design of an Apartments for Life community?

Table 3.1 <i>Research Goals and Data Sources</i>			
<u>Research Question</u>	<u>Data Source</u>	<u>Goal</u>	<u>Data Collection Method</u>
What are the housing needs and preferences of local American elders that impact the design of an elder housing environment?	Members of the Morgantown, WV OLLI Community aged 55 and older.	Determine the physical preferences and needs for housing environment, centered around categories established by Kahana et al. (2003).	Focus group and interviews: 18 participants
What are the space and equipment needs of local healthcare providers that influence the design of a housing environment?	Home health care providers involved in elder care in the Morgantown, WV area	Identify design features to improve work efficiency and safety, as well as emotional well-being for healthcare providers.	Interviews, using a purposive sample of three home health care providers.
How do the above factors inform and impact the design of an Apartments for Life community?	1. Healthcare design professionals 2. Evidence-based design (post-occupancy evaluations and empirical research).	Identify potential challenges which would be encountered during the design of an Apartments for Life community and determine design features which will have a positive impact on quality of life.	Interviews with design professionals, using a purposive sample of three professionals. Existing research data will be utilized for EBD as needed.

The first question was answered by conducting interviews and one focus group with elders from Morgantown, West Virginia, in order to understand their specific and contextual needs and preferences as they pertain to housing environments. The goal of the interviews was to determine what should be included in an ideal long-term housing community in Morgantown. Additionally, the interviews uncovered what the elders

perceive as important to their health, safety, and well-being. The second question was answered through interviews with home health care providers, who provide care to the local aging population. Topics covered during these interviews included daily routines, concerns related to delivery of care and ADL support, and specific equipment and technology that is used on a regular basis. To answer the third question, interviews were conducted with design professionals involved in healthcare or design for aging, in order to understand additional concerns and challenges associated with this type of design. Existing research was also be used as a resource throughout the process of developing guidelines which satisfy both the needs of the elders and their health care providers.

Research Purpose

During any design project, an identification of and commitment to a project and client is the first step. In this study, the commitment was to

1. Create a set of design guidelines for a housing community, for use by Morgantown, West Virginia elders and their health care providers,
2. which allows for support of aging in place and accommodates physical/medical needs,
3. while supporting emotional and social quality of life,
4. inspired by the *Apartments for Life* model.

Research Goals

For this research-based project, the boundaries of the project were limited to

1. Use the design process to develop of a set of guidelines that serve to inform the design of a community and the amenities and units within it,

2. using evidence-based design as a resource,
3. in accordance with appropriate building codes, user needs, and health care design guidelines.

Design Research

This project follows Edelson's (2002) four components of design research, as discussed in Chapter 2. Edelson's four components are:

1. The development of a theory
2. The derivation of principles for design from the theory
3. The translation of the principles into concrete design
4. The assessment of the designs to test whether they work as anticipated

(p. 106)

Although this project does not result in a constructed facility, it is still design research. The product of this study is a completed programming document which describes the user needs and presents design guidelines for a facility which would theoretically meet those needs. This study pilots the process of collecting data and synthesizing it into design guidelines which are useful for informing the design of an Apartments for Life inspired long-term housing community.

The theory for this project is that the Apartments for Life community could be a viable addition to the current spectrum of long-term housing options in Morgantown, West Virginia. As a result of this theory, the researcher developed principles for design, or design guidelines, based on information collected from the theoretical community's users and other stakeholders

Instead of translating the principles into concrete design (i.e. a built environment), the researcher translated those principles into a mock advertising packet for the theoretical community, which was presented to the participants for assessment. During the assessment phase, participants were able to indicate whether the design guidelines are functional and potentially useful for informing the design of an actual community, thus concluding the four-part design research process established by Edelson (2002).

Data Collection and Analysis

Once the boundaries of a project have been stated, the next step is to determine the specific user needs. Imperative to this step of the design process is data collection from a number of sources, which necessarily includes the space's users and other stakeholders. The data collection process, as well as the result from the analysis phase – a comprehensive set of needs to be accommodated by the design - is referred to by interior designers as “programming”. For this project, data came from a variety of sources:

1. Elders from Morgantown, West Virginia
2. Home health care providers from the Morgantown, West Virginia
3. Design professionals experienced in elder care or healthcare design
4. Existing evidence-based and empirical research

Selection of participants. The general population who would use this type of community are American individuals over the age of 55. However, because context naturally influences design decisions, the resident subjects for this study were delimited to elders from Morgantown, West Virginia. This allowed the capture of a single region's

opinions, needs, and preferences and creates opportunities for replication of the study in other locations.

For this study, a purposive sample of elders, selected from the Osher Lifelong Learning Institute (OLLI) at West Virginia University, was used. OLLI is a program which exists on campuses across the United States, and offers non-credit educational programs on a variety of subjects to adults over the age of 50 (Osher Foundation, 2005). Members of OLLI are elders from Morgantown, West Virginia who have chosen to remain active in their community, and to continue pursuing education. Many OLLI members are retired university faculty. These factors make OLLI members a unique population within West Virginia. This sets the stage for future replication of this study among other diverse socio-economic populations within West Virginia and the rest of the United States. Data was collected from 18 elders in individual or small group interviews.

Additionally, because the facility is designed not only as a residence but as a place of care, home health care providers are a second population for which the community would be designed. Therefore, data collected from health care providers will inform the design guidelines. A purposive sample of three home health care providers who practice different types of service for the elderly was interviewed. Finally, a purposive sample of three design professionals who are involved in design for aging and healthcare design was interviewed.

Data collection process

Interviews with elders. The goal of the elder interviews was to collect information related to their specific housing preferences and needs. While existing

research can inform the design as it relates to elders' general physical, mental, emotional, and social needs, there are additional housing preferences that are influenced by an individual's personal history and cultural context. As a result, it was necessary to establish the housing preferences that are specific to high-SES elders from the Morgantown, West Virginia area. These questions are derived from the four general guideline categories established in Chapter 2: individuality, aesthetics/amenities, health and safety, and social community/family.

1. What would be your ideal living situation as you age?
2. What types of amenities or services would you want or need in a housing environment, in order to happily live there without needing to move?
3. What are your concerns regarding health and safety as you age?
4. What types of spaces would allow you to interact with others, in the ways that you want?
5. What is your reaction to the Apartments for Life community concept?
6. Is there anything else that you think I should know? Do you have additional questions, ideas, or concerns?

Although the initial plan was to conduct 4-6 focus groups with elders, due to scheduling difficulty, only one focus group was conducted. The remainder of the data was collected in one-on-one interviews. The focus group process was informed by Morgan's (1996) and Krueger and Casey's (2008) considerations and methods for conducting focus groups. A written description of the Apartments for Life concept was provided to the participants (Appendix D).

During the focus group, elders were given color-coded index cards, with each color assigned to one question (Questions 1-4), and asked to list their responses, writing one response per card. Participants used as many cards as they desired for each question. Beginning with question 1, the cards were laid face-up on a table and grouped into categories, as the participants saw common themes begin to emerge. This initial process of sharing ideas led into a discussion regarding why certain issues and preferences were seen as important, and whether those views were shared by others in the group. Following discussion, participants were given an additional card and asked to rank the top three responses for each question. The listing and ranking process was informed by Krueger and Casey's (2008) guide to conducting focus groups. Questions 5 and 6 were addressed in a different manner; the researcher asked the question and an open discussion followed.

. The focus group and interviews with elders (N=18) were semi-structured, as outlined in Kvale and Brinkmann (2008). Researcher involvement in the process was moderate, allowing the elders to discuss and come to conclusions with little guidance. The researcher clarified points of confusion, or verbally established themes that appear to be emerging. The researcher did ask additional questions related to Kahana et al.'s (2003) factors of housing satisfaction, if these topics did not arise organically during the interview. These factors are:

1. Amenity availability
2. Resource amenity availability
3. Safety
4. Stimulation vs. tranquility

5. Homogeneity vs. heterogeneity
6. Interaction vs. solitude

Each interview was recorded in its entirety using a digital recording device.

Relevant portions of the discussion were transcribed.

Interviews with health care providers. Interviews with health care providers (N=3) were semi-structured interviews, as outlined in Kvale and Brinkmann (2008). The goal of health care provider interviews was to understand the routines and challenges of providing home health to the elderly. A written description of the Apartments for Life concept was provided (Appendix D). The basic roles of healthcare providers within this type of long term housing community were also discussed. With this understanding of the integration of healthcare and housing community, six questions were discussed:

1. What is your reaction to the Apartments for Life concept?
2. Describe your (the healthcare provider's) routine when visiting a patient's home.
3. What about your daily routine could be simplified?
4. Is there any equipment that you use on a regular basis with elders?
5. What are your experiences with elders' housing needs and preferences, as they relate to individuality and independence, amenity/aesthetic preferences, health and safety, and social community?
6. Is there anything else that you think I should know? Do you have any ideas, questions, or concerns?

Because these interviews were semi-structured, additional questions were asked if the previous response required follow-up or provided new topics of discussion. The interviews were digitally recorded and transcribed.

Interviews with design professionals. During interviews with design professionals (N=3), particular limitations, challenges, and additional concerns as they relate to the interior design process were discussed. The Apartments for Life concept was presented to participants (Appendix D), and their feedback on feasibility and challenges related to the design of this type of community was discussed. These were also semi-structured interviews, as outlined in Kvale and Brinkman (2008). As with the healthcare provider interviews, these interviews were digitally recorded and transcribed.

1. What is your reaction to the Apartments for Life concept?
2. What design features do you believe should be included in residences for healthcare or aging?
3. What are obstacles that may be encountered while designing an "Apartment for Life"
4. Is there technology or equipment that should be included?
5. What are some potential approaches to developing a residential-feeling, yet safe, environment?
6. Is there anything else that you think I should know? Do you have any ideas, questions, or concerns?

Analysis of Interview Data

The recorded interviews were transcribed. Coding and analysis followed Miles and Huberman's (1994) coding recommendations, and Bickman and Rog's (2009) recommendations for quantitizing qualitative interview data to evaluate frequency and priority of identified themes or responses. The researcher identified each interviewee's specific responses to each question, clustered similar responses together, and counted the frequency of each response. High-frequency responses were assigned a high priority, since the frequency of the response indicated it was an important issue, need, or preference to many of the participants. This allowed the researcher to see common patterns and ideas that were established through the data collection process.

Post-Analysis Development of Design Guidelines

The needs and preferences communicated in the interviews and identified during the coding and analysis process were synthesized into a set of design guidelines. Because design is an iterative process, data collection and research continued during this phase, and included secondary data collection from existing published material. This phase of the research included:

1. Development of a list of factors to be included and addressed within the design of a facility,
2. based on interview transcripts and analysis results, as well as data from secondary sources (evidence-based design)

Evidence-based design. In addition to collecting primary data, existing research was used as a source of secondary data. Primarily, post-occupancy evaluations of

existing elder care facilities, and empirical research on effects of housing environment on elder behavior, were reviewed, in order to study design components that are not influenced by local culture, such as safety, technology, and impacts of design on behavior and health. Reviewed post-occupancy evaluations must have been published since 2002 and relate to long-term elder housing. Evaluations pertained to design guidelines or features established in chapter 2, as well as those that emerged during the interview and focus group process. The selected post-occupancy evaluations and research studies were reviewed, and their findings were used to add additional detail to the guidelines that resulted from the interviews.

Building codes. The design guidelines also give consideration to the 2012 International Building Code, and although the community would not be licensed as part of a nursing home or health care facility, design requirements and recommendations from the 2010 *Guidelines for Design and Construction of Health Care Facilities* were taken into consideration and incorporated into the final product. The researcher made every effort not to include guidelines or recommendations that are in opposition to the 2010 *Guidelines for Design and Construction of Health Care Facilities*.

The 2012 International Building Code is a set of regulations and requirements for design and construction of commercial buildings, and has been adopted by a majority of the United States, including West Virginia. The International Building Code includes laws related to building occupancy, construction types, egress, finishes and materials, fixtures, and fire prevention. The 2010 *Guidelines for Design and Construction of Health Care Facilities* recommends “minimum program, space, functional program, patient handling, infection prevention, architectural detail, and surface and finishing

needs for clinical and support areas of hospitals...and nursing and other residential care facilities” (Facility Guidelines Institute, 2012).

Review of Design Guidelines

Because the outcome for this study was a set of design guidelines, a printed set of the final guidelines was presented for further evaluation and critique to all of the original participants (N=24), as a second round of data collection. The guidelines, in the form of a printed document, were presented to all participants. For this project, evaluation took the form of feedback, via survey, on the design guidelines (Appendix A). The goal of this second round of data collection was to evaluate whether the users perceive their needs to be reflected in the design guidelines, and to determine how well the guidelines would inform the construction of an actual long-term housing community. All participants were asked how well the guidelines reflect the needs and preferences discussed during the focus groups and interviews. Responses were measured on a Likert scale, and respondents also had an opportunity to share additional thoughts via open-ended questions. Feedback was analyzed, with Likert items aggregated and reported as averages for each population's individual survey questions. These averages were reported; open-ended questions were transcribed and included in Appendix C. Further directions for research or development of the guidelines, based on this feedback, will also be discussed in Chapter 5.

Limitations

Because this study used a series of purposive samples by both SES and regional culture within the context of Morgantown, West Virginia, external validity is limited. Although the design guidelines may be adaptable to other populations and locations, the

attitudes and needs identified during the interview and analysis process, and the resulting design guidelines, are specific only to the subjects interviewed.

Limitations during the data collection phase of this project included participants limited knowledge or personal bias to housing related decisions they have already made. Morgantown does not have an abundance of long-term housing options and the OLLI member participants may have been unaware of the possibilities and lifestyles available to the aging population, therefore limiting the ideas they were able to communicate when asked about their ideal lifestyle or their response to the Apartments for Life approach to housing.

The home health care professionals who participated in this study are limited in their knowledge of design and architecture related subjects, which may have affected their responses to questions related to local elders' housing related needs, or their response to the Apartments for Life concept. Because they are not design professionals, they may not have been able to accurately assess whether the design guidelines presented in this study would pose a safety threat.

Similarly, the design professionals interviewed in this study are not gerontologists or experts in aging, though they have designed environments for aging. Their knowledge of the needs and preferences of the local aging population may be limited or biased by their own personal experiences, rather than informed by existing research or widely accepted truth.

Lastly, the current pool of post-occupancy evaluations for Apartments for Life communities or similar approaches to housing is limited and the number of studies

published in the past decade is very small. This limited the researcher's ability to draw a significant amount of usable information from existing secondary data sources.

CHAPTER 4

Findings

Upon completion of interviews with local elders, home health care providers, and healthcare facility designers, a list of user needs was generated.

Rather than conducting three large focus groups as anticipated, due to lack of response the researcher conducted small-group and individual interviews with eighteen OLLI members. Three home health care providers from a local agency, as well as three designers who have participated in local healthcare related projects also participated. These guidelines add a local, cultural component to the design objectives introduced in chapter 3 of this thesis, as the findings are specific to the needs and preferences of elders in Morgantown, West Virginia.

OLLI Member Interviews

Eighteen local individuals, primarily from the Osher Lifelong Learning Institute (OLLI) were interviewed. Because of low response rates from OLLI, the researcher added three additional participants who are not OLLI members but who are a similar demographic - college educated, residents of the Morgantown, West Virginia area, and over the age of 55.

During the course of the interviews, a number of housing needs and preferences were identified. These responses are detailed in Table 4.1. Responses are presented following the question with which they were associated. The top 25% of responses for each question are marked as high priority, while the middle 50% are marked as medium priority and the bottom 25% of responses are marked as low priority.

Table 4.1 <i>Responses from OLLI member interviews</i>		
<u>Comment</u>	<u># Occurrences</u>	<u>Priority</u>
Question 1: Describe your ideal living situation as you age.		
Near town	13	High
Single level home	13	High
Maintenance provided	11	High
Access to garden or yard	11	High
Mixed community, or open to residents of the city	11	High
Walkable campus	10	High
Private rooms	10	High
Ability to cook for self	9	Medium
Personal balcony or porch	8	Medium
Room to house guests	8	Medium
Stand-alone home	7	Medium
Access to public gardens or parks	7	Medium
Someone to check in periodically	6	Medium
Access to nature	6	Medium
Prefer to stay in current home	5	Medium
Prefer to live near friends	5	Medium
Prefer to live near family	5	Medium
Lots of windows and light	5	Medium
Prefer not to live in a large city	5	Medium
Large yard	4	Medium
Ability to keep pets	4	Medium
Spacious or open floor plan	4	Low

Space to store/display artwork and collections	3	Low
Lots of kitchen or other storage	3	Low
Environmentally conscious home	3	Low
Smart house with energy and safety technology	2	Low
Large city living is acceptable	2	Low
Outdoor social area with tables and chairs	1	Low
Question 2: What types of resources or amenities would allow you to happily age in place?		
Music and arts	14	High
Easily accessible healthcare	13	High
Cafes and/or restaurants	12	High
Grocery store	11	High
Access to transportation for travel in and out of town	11	High
Indoor recreation	9	Medium
Learning and lecture opportunities	9	Medium
Outdoor walking paths	8	Medium
Swimming facility	7	Medium
Library	5	Medium
Ability to attend athletic events	4	Medium
Music instruments and equipment	4	Medium
Airport, bus, or train station	4	Medium
Off-site activities	4	Medium
Lake to walk around	3	Medium
Movie theatre	2	Low
IT support	2	Low
Hands-on classes (i.e. art and cooking)	2	Low

Outdoor fitness facilities (i.e. golf and tennis)	1	Low
Workshop or wood shop	1	Low
Question 3: What are your concerns regarding health and safety as you age?		
Building security	6	High
Emergency communication	5	High
Being alone	4	Medium
Physical or cognitive changes	4	Medium
Falls	3	Medium
Appliance safety	1	Low
Question 4: What types of spaces would allow you to interact with others, or pursue personal interests, in the ways that you want?		
Kitchen space	11	High
Room to entertain in home	9	High
Lecture room for lifelong learning	8	High
Religious building	7	Medium
Common area for socialization	7	Medium
Small space in home for small groups	7	Medium
Space to be alone or pursue small hobbies (i.e. knitting and writing)	5	Medium
Space to entertain large groups outside the home	4	Medium
Office space	4	Medium
Space for painting and creating other art	4	Medium
Community dining room	1	Low
Question 5: What is your reaction to the Apartments for Life concept? What are the positive features and what would you want to change?		
Prefer not to live in a multistory complex	9	High
Openness to community is a positive feature	7	High

Prefer units arranged in clusters or pods	6	Medium
Prefer smaller scale - maximum 50 units	4	Medium
Apartment style living is a positive feature	3	Medium
Prefer to live with 5-6 other elders and a caretaker in a small home (The Green House Project concept)	2	Low
Should add counseling services as part of the approach to care	2	Low

Interviews with Healthcare Providers

The second population interviewed for this study were three home health care providers. These individuals work for a home health agency affiliated with a local hospital and provide nursing services to homebound individuals within the community.

During the course of the interviews, the researcher identified housing-related needs that, if met, would improve quality of life for residents and allow for improved delivery of medical care. These responses are detailed in Table 4.2. Responses are presented following the question with which they were associated.

Table 4.2 <i>Responses from health care provider interviews</i>	
<u>Comment</u>	<u># Occurrences</u>
Question 1: What is your reaction to the Apartments for Life concept?	
This approach could be difficult to finance	2
Not a medical model (positive feature)	1
Keeps elders out of facilities (positive feature)	1
Question 2/3: Describe your routine when visiting a patient's home. What could be simplified or improved?	
Need for designated supply storage with home	2
Need for a surface to place equipment	2
Better furniture for care provision	2
Need for simplified paperwork and charting	1
Need easier access to pharmacy and central medical equipment storage	1
Question 4: Is there any equipment that you use on a regular basis?	
Wound care items	2
Oxygen canisters	2
Basic nursing bag supplies (i.e. scopes, BP cuffs)	2
IVs and blood draw equipment	2
Question 5: What do you perceive to be elders' housing needs and preferences, as they relate to individuality/independence, amenity/aesthetic preferences, health and safety, and social community?	
Transportation	3
Accessible or barrier-free homes	3
Single-level homes	3
Reduced fall hazards (i.e. rugs)	3
Reduced clutter	2

Alternative to hospital beds	2
Companionship	2
Convenient shopping	2
Bathroom fixtures for easy bathing	2
Opportunities for socialization	2
Emergency response/communication systems	1
Support for family caregivers	1
Privacy	1
Easily navigated community/home	1
Ability to keep personal items	1
Outdoor space	1
Homelike environment	1

Interviews with Design Professionals

The final population interviewed for this study were architects and designers who have experience with healthcare and long-term housing facility design. One architect and two designers were interviewed, and all have worked either for local firms or on local healthcare facility projects.

During the course of the interviews, the researcher identified design features that should be included in the Apartments for Life inspired community. Additionally, the participants made recommendations for how to meet some of the objectives outlined in chapter 2. These responses are detailed in Table 4.3. Responses are presented following the question with which they were associated. Responses with two or more participants in agreement are marked as high priority, while responses with only one occurrence are marked as low priority.

Table 4.3 <i>Responses from design professional interviews</i>	
<u>Comment</u>	<u># Occurrences</u>
Question 1: What is your reaction to the Apartments for Life concept?	
Apartment living may not be desirable for locals	2
It is important to keep individuals in the same environment as much as possible	1
Question 2: What design features, qualities, or spaces do you think should be included in residences for healthcare or aging?	
Accessibility/Universal Design	3
Informal seating areas	3
Grocery store	3
Single-level buildings	2
Short walking distances between areas of interest	2
Furniture designed for people with limited range	2
Central community area	2
Disguised clinical items	2
Computer area	2
Fitness space	2
Restaurant	2
FF&E selection to reduce falls	2
Recessed lighting over bed	2
Indirect lighting throughout buildings	2
Well exhausted rooms	2
Space for cultural events and activities	2
Desk area for nurses	1
Space for activities	1

Gardens and outdoor space	1
Alternative to apartment units	1
Daylight and windows	1
Warm hues of light	1
Color selections appropriate for aging vision	1
Finish and lighting selection for minimal glare	1
Nature inspired motifs in decor	1
Pet friendly	1
Separate space for family and guests to stay	1
Task lighting for nurses	1
Different unit configuration options	1
Windows in hallways for wayfinding	1
Lighting cycled to match circadian rhythms	1
Flooring and finish selections to aid wayfinding	1
Question 3: What are obstacles that may be encountered while designing an Apartments for Life inspired community?	
Funding	3
Designing space that functions well for all users	1
Efficient care provision and monitoring	1
Question 4: Is there technology or equipment that should be included?	
Call system	2
Mobile carts for charting	1
Monitoring equipment	1
Standard hospital/SNF room equipment	1
Question 5: What are some potential approaches to developing a residential-feeling, yet safe, environment?	
Eliminate carpet for infection control	3

Seamless vinyl flooring	2
Keep medical equipment hidden in casework	1
Use wallpaper rather than only paint	1
Ensure walls and furniture have rounded corners	1
Luxury vinyl tile flooring	1
Radiant heat flooring	1
Acoustical privacy	1

Detailed Responses

The data collected during the interviews helps to create a picture of the housing-related needs and preferences of local elders and their healthcare providers, as they pertain to the design of an Apartments for Life inspired community. The following sections detail the responses collected via interviews, which were listed in Tables 4.1, 4.2, and 4.3 above. Some responses, which would be considered impossible to implement within this type of community (e.g. the preference to stay in a current home or live in a rural environment), or which are unrelated to design, have been omitted. Since this research is meant to be translational (i.e. to guide professional practice), the findings are presented in the order that they would be considered in a design project, from broad to specific

General community design

Connection to city center. Thirteen of the elders interviewed expressed a desire to live in a community within walking distance of a city center. For individuals who are still mobile, city centers offer opportunities for entertainment, socialization, and

enjoyment of the arts. The most significant obstacle, were this project to become a reality, is the lack of developable space in proximity to Morgantown's city center.

Additionally, the concept of an open community was appealing to eleven of the eighteen elders interviewed. The idea of living in a community only frequented by other elders was not desirable for many. A long term housing community located near a city center has potential to be a magnet for other city residents, if the amenities and resources are open to the public.

Central community area. Two of the designers interviewed recommended a central congregation space within the community. The elder participants did not specifically request a community building, but seven of the interviewees did mention that they would like a common area within the community for socialization. Two designers also recommended limiting the distance between areas of interest within the community, to enable individuals to easily move throughout the community without requiring assistance.

Private units and personal living space. Ten elders expressed a desire for private rooms rather than shared dwelling space, a concept that is reinforced by post-occupancy evaluations in existing long-term care facilities (Kane, 2009). Ownership of a private unit is part of the Apartments for Life concept, and it appears that this part of the Apartments for Life model is well received in the United States.

Although some long-term housing facilities offer private bedrooms and shared living spaces, the collected data indicates that local elders prefer an entire private home,

rather than just a sleeping room. Seven elder participants mentioned wanting a stand-alone home.

Alternative to apartment living. Many of the individuals interviewed, both in the elder interviews as well as in interviews with design professionals, mentioned that apartment living is not ideal. Nine elders and two designers stated that an alternative to apartment living should be considered. One elder mentioned that this is because corridor living is impersonal, and too similar to skilled nursing or traditional assisted living facilities. Six OLLI participants suggested clustering cottages in groups of 3-5, while four noted that a community with more than 50 units was not desirable. Three participants, however, were open to apartment style living and viewed it as a positive feature.

Universal Design. All of the designers interviewed expressed the importance of creating a safe and usable environment. Because there is a wide range of health needs and ability levels among local elders, it is necessary to design spaces that will function well for all users, regardless of ability. The designers referred to Universal Design, a term which refers to "the design of products and environments to be usable by all people to the greatest extent possible, without adaptation or specialized design" (North Carolina State University Center for Universal Design, 2013).

Essentially, Universal Design makes things safer, easier, and more convenient for all users. There are seven basic principles of Universal Design which should inform design decisions of all types (Table 4.4). While the Americans with Disabilities Act dictates such design features as grab bars and ramp grades, Universal Design includes and goes beyond this, guiding decisions related to space planning, furnishings,

appliances, signage, and even details such as window operating systems and cabinet pulls.

Table 4.4 <i>Seven Principles of Universal Design</i>	
<u>Principle</u>	<u>Definition</u>
Equitable Use	Design is useful and marketable to people with diverse abilities
Flexibility in Use	Design accommodates a wide range of individual preferences and abilities
Simple and Intuitive in Use	Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or concentration level
Perceptible Information	The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities
Tolerance for Error	The design minimizes hazards and the adverse consequences of accidental or unintended actions
Low physical effort	The design can be used efficiently and comfortably and with a minimum of fatigue
Size and space for approach and use	Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility
<i>Note:</i> Adapted from "The Principles of Universal Design," by North Carolina State University Center for Universal Design, 1997. Copyright 1997 North Carolina State University.	

Unit design

Floor plans. One of the designers interviewed recommended offering a variety of floor plans for the dwelling units, rather than one plan which is duplicated throughout the community. Four participants specifically requested a large or spacious floor plan. Additionally, thirteen OLLI participants expressed a preference for single-level units.

Private outdoor access. A recurring theme during interviews with local seniors was the desire to engage in nature. Eleven OLLI members included garden or yard access as part of their ideal living situation. Additionally, eight of the elder participants mentioned a balcony or porch as part of their ideal living situation, which is another method of providing access to the outdoors.

Pet friendly environment. Some of the elders interviewed own pets and four participants specifically indicated a preference for a pet-friendly housing environment. One participant mentioned that a primary reason she wants to age at home is so she can keep her pets. One of the designers also recommended that the community and units should be welcoming to pet owners.

Storage and display space. Three of the respondents in this study are collectors or artists and said that their ideal home for aging would include space to store and display artwork and items that they have collected. Additionally, three of the elders are involved in hobbies, such as skiing or baking, which require extra storage space for supplies and equipment.

Environmentally conscious home. Three of the participants expressed a desire to live in environmentally conscious homes. Specifically, they mentioned alternative

energy use and use of technology and fixtures to reduce power consumption and waste of resources such as water. Low-flow plumbing fixtures, energy monitoring devices, natural lighting, and passive heating and cooling, were mentioned by participants as potential approaches to designing environmentally conscious homes.

Social community related design needs

Guest housing. The desire to accommodate visiting family members was a recurring theme during the elder interviews, with eight of the elders mentioning that they would like space to house guests. One healthcare designer recommended providing visitor accommodations outside of the elders' main living space, in the form of guest cottages or hotel-like rooms, so that family and friends may visit without creating extra work for the elders they are visiting.

Informal congregation areas. One OLLI member and all three design professionals recommended informal seating areas throughout the community. Specific locations include near mailboxes, in common areas, and in corridors, to provide opportunities for residents to meet up with one another during the course of their day.

Religious building. Religion is a theme which arose during seven elder interviews. Although not all of the participants practice the same religions, these seven indicated that they attend church or other meetings locally, and would like to continue doing so as they age.

Group meeting spaces. Seven of the elders interviewed participate in book clubs or other small groups of 5-10 individuals. These meetings are held both in and out of the

home, and these elders mentioned a need for an appropriate meeting space within their own units. Additionally, nine OLLI members requested space to entertain dinner guests.

The final social need for the community's residents is a large entertainment space, for the residents who enjoy entertaining but do not want to do so in their own home. Four participants specifically requested space to entertain large groups outside the home. Some of these individuals entertain groups of up to 30 individuals, but do not anticipate being able, or necessarily wanting, to host groups this large within their own home. Participants mentioned that they might use this type of space for meals, parties, or other events.

Resources and amenities

Music and arts. Fourteen of the elders interviewed mentioned that music and arts were an important amenity in their ideal community. Some of the fourteen expressed an interest in either performing or listening to live music. For some, this is a result of a lifetime playing music alone or with friends, while others have seen first-hand the positive impacts of music on very frail elders in nursing homes, and feel they would enjoy those same experiences in their old age. Others of the fourteen arts-minded elders attend orchestra and theatre performances at West Virginia University's Creative Arts Center in Morgantown, and mentioned that they would like to continue attending these types of events as they age. These participants said that transportation to and from these events would allow them to continue accessing this resource.

Grocery shop and delivery. Of all responses identified during the data analysis process, the need for grocery shopping or delivery services in the community was one of

the most important to elders, designers, and healthcare providers alike. Eleven elders, two healthcare providers, and three design professionals mentioned that convenient grocery shopping is an important part of aging in place. Additionally, four elders mentioned that they have specific dietary needs and preferences which they feared could not be met in the communal dining setting often found in long-term housing communities; the ability to shop and cook for themselves for as long as possible is an important part of upholding these dietary preferences.

Dining. Another concept that was repeated in many interviews was the desire to have on-site dining. The participants expressed interest in two types of on-site dining.

Cafes and restaurants. Twelve of the elders interviewed expressed an interest in having dining options on-site. The original Apartments for Life community is constructed with a restaurant and cafe inside the facility, a concept which was well received by the study's participants. One participant expressed a desire for a community dining room similar to those found in traditional long-term housing communities, mainly because she views mealtime as an opportunity to socialize and spend time with other residents.

Lecture room. Because of the elder population interviewed for this study, the need for lifelong learning and on-site education and lecture opportunities was a recurring theme during data collection. OLLI is a lifelong learning program and its members value education as part of their lifestyle. Nine OLLI members want to continue attending lectures and classes during their later years.

Art and project space. Four of the local participants have hobbies which would require dedicated project space for activities such as painting, pottery, woodworking, and making stained glass. Two participants mentioned that access to supplies and equipment, as well as a designated room to pursue these hobbies, would be nice.

Two of the participants also mentioned that they might enjoy taking hands-on classes in subjects such as art and cooking. One local long-term housing community has a large open kitchen space for classes, which one participant thought she would enjoy in an Apartments for Life inspired community.

Library. Another commonly mentioned resource among the elders interviewed was a library. Five of the OLLI members mentioned that they enjoy reading and expressed a desire to continue reading as they age. In addition to enjoying the public library, one participant referenced the small library in a local continuing care retirement community, where residents can donate books that they have finished reading or do not have space for, as another convenient resource.

Walk-in clinic. When asked for their thoughts on the original Apartments for Life community, the concept of a walk-in clinic was well received by elders, with thirteen participants indicating that they want easily accessible healthcare within their housing community. Many long-term housing residents who are not receiving skilled nursing care must currently travel to their personal physician. These elders mentioned that having on-site medical care would put their minds at ease.

Parks and outdoor fitness. One very evident theme during the interviews with elders was their desire for outdoor space to enjoy and exercise in. Eight OLLI members

expressed an interest in walking paths, with three participants recommending paths designed around an area of interest, such as a lake or other landscape feature. One participant also mentioned that an outdoor area with tables, chairs, and a fire ring would be a positive asset within a housing community.

Indoor fitness. The importance of maintained health and fitness was another recurring concept during the elder and healthcare designer interviews. Nine of the elders exercise regularly and would ideally continue to do so regardless of their housing situation. All nine of the participants who requested fitness opportunities expressed an interest in indoor fitness, with amenities such as weights and treadmills, and an open fitness room for yoga and pilates. Seven participants also requested a swimming facility in or near the community.

Transportation. Mobility and vision both decrease with age, which can make traveling and leaving home difficult. Eleven elders and three healthcare providers agreed that having transportation provided by the Apartments for Life inspired community would greatly improve ease and quality of life. One local long-term housing community provides transportation upon request, to anywhere within a 10-mile radius. Four participants also want convenient access to out-of-town transportation, in the form of bus, train, or air travel.

Movie theatre. Two of the OLLI participants enjoy watching movies and said that they would like to have a movie theatre or multipurpose room with viewing equipment within their community.

Computers and IT support. In our current age of technology, more and more seniors use computers to communicate and work. Two of the OLLI members were interested in having a computer area to work and learn computer skills in, similar to a space found in the original Apartments for Life community. One of the designers also recommended having a computer room, since it provides opportunity to elders to stay mentally engaged and in touch with friends and family.

Health related design details

Healthcare storage. The healthcare providers interviewed expressed two primary concerns related to healthcare equipment and storage. The first concern, indicated by two participants, is that there is often no sanitary surface on which to place their bag and equipment while they are working. Their protocol states that equipment bags should not be placed on the floor, although in some homes they visit that is the most convenient location.

Secondly, these home health nurses currently carry bags of supplies and equipment from house to house. Occasionally, a patient will need an unexpected medical supply which the nurse does not have on hand. One nurse noted that a central supply area in the community, equipped with backup medical equipment and supplies, would improve efficiency at work.

Communication and monitoring. A health and safety concern among five of the elders interviewed revolved around communication. They expressed concern that they would fall or have another health related emergency, and be unable to call for help. One

healthcare provider and two designers recommended built in communication devices, such as an emergency call button in key rooms.

Two of the elders interviewed mentioned that perhaps monitoring technology could be installed in the units, to detect abnormal activity and potential emergency situations. Although this technology is not yet widely used, the participant responses indicate that it may be well received.

Wayfinding. Wayfinding was an important consideration among the design professionals who participated in this study. Several approaches to creating intuitive wayfinding were recommended during the interviews. One designer suggested including windows in the corridors of any buildings. The windows would look out on landscape or site features, to help residents orient themselves within the building. Another recommendation by a designer was to use wall or flooring finish changes to help distinguish one part of a building from another, which would be particularly helpful in corridor intersections which might otherwise be confusing. Recessed doorways into units, in an apartment-style community, where residents can display personal items, is an additional design feature which could aid wayfinding.

Furniture, fixtures, and equipment

Healthcare equipment. The healthcare providers noted that large equipment such as ventilators and oxygen canisters, and more portable equipment such as blood pressure cuffs and scopes are used regularly in elder care. Two designers suggested using casework to house and disguise larger equipment, which could be moved in to the unit when the resident requires it.

Appliances. One OLLI participant was concerned about kitchen safety in old age, considering that many kitchen appliances are heat-producing. One healthcare provider recommended appliances with automatic shut-off features and simple controls, as an approach to improving kitchen safety.

Furniture. Although residents will likely bring their own furniture to their homes, two designers mentioned that furniture in public spaces ought to be selected carefully, and should function well for individuals with low range of motion. Raised seat heights, such as those found in hip chairs, and rounded corners are two of the design features recommended by these design professionals.

Two healthcare providers recommended furniture such as lift chairs, medical recliners, and hospital beds for elders who are receiving regular care. They noted that this type of furniture helps them perform their jobs more easily and safely.

Bathroom fixtures. All three designers recommended Universal Design principles throughout the home, and two healthcare providers specifically mentioned that bathrooms need to be well designed. They mentioned raised toilet seats, accessible sink area, grab bars, and space to transfer to the toilet or tub either with or without assistance, to create a safe and usable environment. One designer was concerned about the institutional appearance of grab bars, and recommended choosing finishes and styles that look luxurious or residential.

Lighting and finishes. The lighting and finishes selected in a community for aging are important, as age related vision changes can impact an individual's safety within his or her home. Additionally, creating a residential feeling environment was one

of the objectives established in chapter 2. The design professionals who participated agreed that finish selection is an important factor when creating a cozy, homelike aesthetic.

Lighting. One designer stated that a well lit environment not only improves safety and function, but can help regulate circadian rhythms and promote a positive emotional state of mind. Five OLLI members, as well as all three designers, mentioned that having well-lit spaces within the home is important. The designers recommended some types of artificial lighting, while the elders specifically mentioned windows and natural light as a housing preference.

Lighting for safety. Two designers recommended bright, indirect light, which would provide adequate illumination without glare, which is sometimes a problem for aging eyes. One designer suggested that lighting in corridors and public spaces ought to have slightly dimmed cycles based on the sun and natural circadian rhythms.

Task lighting for care provision. Two designers also agreed that lighting is an important factor when designing a space in which medical care is provided. They recommended recessed lighting in the residents' bedrooms to provide ambient lighting and ensure that medical professionals have light available to perform procedures. One designer also recommended installing bright task lighting near a designated work surface for the healthcare providers, similar to what is installed in most hospital rooms.

Flooring. One home safety risk, which was of significant concern to all three home health providers interviewed, was the risk of falls. Falls in the home are often

flooring-related, due to thresholds, flooring changes, and rugs, and result in injury and broken bones. Injury due to falls is a concern with hard flooring,

All of the designers interviewed during this study expressed that flooring selection can greatly impact the hominess and residential feel of a healthcare facility. While they agreed that carpet is perceived as very homey, they noted that installation of carpet also poses some problems, especially with transporting patients who use wheelchairs, as well as infection control. Additionally, all of the healthcare providers mentioned that local elders often use area rugs in the home, which, when installed over carpet, can be a fall hazard. Local designers recommended selections such as seamless non-slip vinyl sheet goods with a wood-look, or luxury vinyl tile, as both homey and appropriate for healthcare, due to their slight shock absorbency and cleanability.

Finishes. In order to create a residential-feeling atmosphere, the designers agreed finishes should be selected thoughtfully. The designers interviewed suggested using wallpaper and wood-look sheet vinyl flooring or luxury vinyl tile to create a residential atmosphere. One designer recommended radiant heat flooring because it makes hard floors feel more cozy and is comfortable for aging bodies.

Follow-up Survey

Following the collection of interview and focus group data, the researcher synthesized the findings into a set of design guidelines which could be used to inform the design of this theoretical community. Each of the participants was sent a mock marketing brochure for this theoretical community, which summarized the design guidelines (Appendix D) as well as a follow-up survey to collect their reactions and

feedback on the guidelines (Appendix A). Participant survey responses are recorded in Appendix C.

Of the 24 subjects interviewed, 16 responded to follow-up surveys. Respondents included 12 OLLI members, one health care provider, and three health care facility designers. The data displayed in Table 4.5 indicates that participants felt their input was well reflected in the guidelines (Questions 1), and that there were relatively few guidelines with which participants disagreed (Questions 2). Additionally, healthcare provider responses to Question 3 indicate that the guidelines pose no known health or safety concerns. Healthcare facility designer responses to Question 3 indicate that these guidelines would be mostly helpful in informing the design of a long-term care facility.

Table 4.5 <i>Follow-up Survey Response Data</i>		
<u>Question</u>	<u>Number of Respondents</u>	<u>Average Likert Value (of 4)</u>
Elder Survey Responses		
1	12	3.75
2	12	1
Health Care Provider Survey Responses		
1	1	4
2	1	1
3	1	1
Health Care Facility Designer Survey Responses		
1	3	3.33
2	3	1.67
3	3	3.67

Participants were given the opportunity to provide written comments on the design guidelines. Transcriptions of the written comments are included in Appendix C. In the comments, OLLI members requested more integrated technology, systems for checking in on residents daily, coordinated events for socialization, roofs over porches and patios, and gathering rooms large enough to invite friends to attend events. The health care provider who returned the survey offered no written comments.

The healthcare facility designers raised concerns about the limited availability of antimicrobial upholstery, questioned how well-received integrated technology would be among the elder population, and expressed the need for lighting other than overhead fixtures. One designer reiterated that he was "not a fan of high-rise (apartment) units for

seniors", while another designer noted that the guidelines should include more discussion related to appropriate finish color and patterns.

Response to Research Questions

The objective of conducting these interviews was to answer the research questions defined in Chapter 3:

1. What are the housing needs and preferences of local American elders that impact the design of an elder housing environment for implementation in Morgantown, West Virginia?
2. What are the needs and preferences of local healthcare providers that influence the design of a housing environment?
3. How do the above factors inform and impact the design of an Apartments for Life community?

Needs and preferences of local elders. Through the interview process, local elders expressed their perceived needs and preferences related to housing and community for aging (Table 4.1). Each of the responses identified in Table 4.1 relates to these elders' preferred lifestyles. The way an individual lives should ultimately impact their dwelling environment, since an inadequately designed community may prevent an individual from living how he or she wants. As a result, each of the responses in Table 4.1 is a factor which should ideally impact the design of a suitable long-term elder housing environment. The identified needs and preferences fall into broader themes which should be taken into consideration during the development of design guidelines. These broad

themes relate to independence, individuality, activity, pursuit of education and arts, safety, and relationships with others.

The elders who participated in this study value independence, which includes the need for stand-alone homes, private rooms, the ability to eat when and where they choose, and a walkable community where individuals can travel and function without assistance. The elders also value individuality, which was evidenced in their preference for space to pursue hobbies such as woodworking, gardening, and pottery. The need for individuality was also expressed in the elders' diverse lifestyles and use of free time, which affect the type of space an individual would need at home to experience quality of living.

Many of the elders need or prefer an active lifestyle, which necessitates accommodation for indoor and outdoor fitness. Others value education and arts, which would also impact the types of spaces and facilities a long-term facility should include, in order to provide a quality aging experience. The health changes that elders experience as they age also impact how a dwelling community should be designed, with many participants requesting easily accessible healthcare and accessible or barrier-free homes.

The elders' social preferences, ranging from a desire for seclusion and quiet to the need to spend lots of time with others, would also impact the design of a living community. Just as the elders were diverse in how they enjoy spending time, they are diverse in who they enjoy spending time with. To provide a quality aging experience for local elders, these needs should be taken into consideration and should impact the design of a housing environment.

Needs and preferences of local healthcare providers. The second research question can be answered through the healthcare provider interviews. An understanding of these healthcare providers' daily routines, their equipment, and their knowledge of the local elder population, which was learned during the interview process, allows design decisions to be made which reflect not only the needs of the community's residents, but the needs of other stakeholders as well. Because home health care providers will be the main source of medical care for local elders in this theoretical community, their behavior, needs, and preferences should impact the way each unit and the larger community is designed. In the same way, the equipment that these health care providers use should be accommodated by each dwelling, whether it is large built-in equipment or smaller portable equipment that needs a surface to rest on during visits. These units need to function well for health care providers in order for the health care providers to provide quality, efficient, and safe care to the elders. Each response from the interviews (Table 4.2) has the potential to impact the design of a long-term housing community, and should be accommodated to the greatest extent possible during the development of design guidelines.

Interviews with design professionals. The third question discusses how the user needs and preferences may inform or impact the design of this theoretical long-term housing community. To begin answering the third research question, the responses from local healthcare facility design professionals can be used (Table 4.3). These experts have experience accommodating the needs of both elders and healthcare providers in a single dwelling, room, or unit. Each response from the design professionals has potential to impact the design of this long-term housing community, and also provides potential

approaches for accommodating both the elders' and health care providers' needs in one space. Many of the design professionals' input relates to aesthetics, finishes, and other design features which would contribute to a safe and healthy environment for aging - factors that elders and healthcare providers agree is important, but which they do not have the expertise to recommend themselves. The designers were also able to recommend design features that would enable aging in place, the main premise of Apartments for Life. Each interview response from the design professionals (Table 4.3) allow the researcher to begin developing design guidelines which are informed by the needs and preferences of local elders and health care providers.

The final research question can also be answered through evidence based design and creative thinking. Because design is in part a creative, problem-solving process, it is possible that a single user need may be met in a variety of ways. The design guidelines discussed in Chapter 5 and presented in Appendix B will describe potential design solutions that can be implemented to address each of the user needs and preferences discussed in Tables 4.1, 4.2, and 4.3. The way that these design guidelines respond to the user needs and preferences will illustrate how those needs have informed the design of this theoretical community.

CHAPTER 5

Discussion

As discussed in Chapter 2, the design objectives and guidelines for most long-term housing projects can be organized into four categories, which are Individuality, Aesthetics/Amenities, Health and Safety, and Social Community/Family. Because these categories were used as inspiration for interview questions, the topics discussed during the interviews with OLLI members all relate to these four topics. Within these categories lie broad design objectives, which were initially identified in Chapter 2.

1. Individuality/Independence

- a. Provide opportunities for privacy, within residences and the community
- b. Allow residents to express their uniqueness
- c. Support residents' independence
- d. Serve individuals of all physical ability levels

2. Aesthetics/Amenities

- a. Have a residential appearance
- b. Allow for easy aging in place by providing necessary amenities and resources, such as home health and therapy
- c. Provide opportunities for privacy, within residences and the community
- d. Create visual connections to the building's site and the community in which it is located
- e. Provide an interesting and sense-stimulating environment

- f. Respond to the site's geographical, cultural, and historic context
- g. Allow residents to orient themselves within the buildings by providing visual access to landmarks outside the building, as well as unique and easily identifiable interior and architectural elements.

3. Health and Safety

- a. Allow for easy aging in place by providing necessary amenities and resources, such as home health care and therapy
- b. Encourage elders to exercise and stay mobile
- c. Serve individuals of all ability levels
- d. Include intuitive wayfinding
 - i. allow residents to orient themselves within the buildings by providing visual access to landmarks outside the building, as well as unique and easily identifiable interior and architectural elements

4. Social Community/Family

- a. Support family involvement
- b. Support development and maintenance of social groups

(American Institute of Architects, 2007; Pynoos & Regnier, 1991; Reed, Leigh, & Tremblay, 2007; Regnier, 2002; Whole Building Design Guide, 2012)

As previously discussed, these objectives are not culturally influenced and although they provide important goals for a long-term housing project, they do not inform a designer or developer on how to actually meet those goals. However, with the data collected from local elders, health care providers, and designers, it is possible to create potential design solutions, or guidelines, to help a project meet these objectives. The findings presented in chapter 4 allow the researcher to understand the needs and preferences of local stakeholders, as they relate to the long-term housing environment. It is at this point that those needs and preferences can be synthesized into usable design guidelines.

Summarized Design Guidelines

The complete table of design guidelines (Appendix B) provides a synthesized summary of the research findings. They are grouped according to the broad design objective categories outlined in Chapter 2 (p. 31-33), and which were discussed in the previous section: Individuality, Independence, Aesthetics, Amenities, Health/Safety, and Social Community/Family. Additionally, a section dedicated to general concepts and overarching changes to the Apartments for Life concept has been added. The included project objectives are based on the general community design objectives discussed in Chapters 2; additional objectives were added as a result of responses from elders, designers, and health care providers. Some objectives from Chapter 2 are omitted because they were more specific than the scope of this project allowed (i.e. discussing site-related issues, when this is a theoretical project with no actual site). Objectives added as a result of participant input are italicized. Participants' recommendations, requests, needs, and preferences, as well as a review of existing research, informed the list of

design solutions. The design solutions describe how the project objectives may be obtained. Although there may be multiple approaches to fulfilling any given objective, the design solutions presented are representative of the data collected from the study's participants. Following each potential design solution, a parenthetical note indicates whether each solution is drawn from data collected in elder interviews (E), health care provider interviews (H), design professional interview (D), or from existing published research (R).

Design Guideline Development

During the development of the design guidelines for this project, it was important to take into consideration all of the information collected through interviews. The interview data allowed the researcher to create design guidelines for a community that goes beyond the standard Continuing Care Retirement Community (CCRC) which is offered in many locations throughout the U.S., instead creating a theoretical community that more fully meets the needs of local elders and their healthcare providers in areas related to independence, individuality, aesthetics, amenities, health and safety, and social community.

Individuality. The participants in this study live unique lives, each with their own interests, routines, and hobbies. As a result, the traditional approach to long-term housing: identical apartments or cottages, often connected to each other and to a large building which houses amenities, does not best suit the lifestyles of local elders. Many of the elders interviewed requested stand-alone cottages with individual outdoor space, although some do prefer apartment living. To best meet these needs, this theoretical Apartments for Life inspired community will comprised of approximately 7 clusters of 3-

5 stand-alone cottages. The clusters will circle a community building, which houses necessary amenities and resources on the first level, with apartments on the second floor for individuals who prefer corridor or apartment style living

Because the elders were diverse in the ways they like to spend their time, both alone and with others, the best way to accommodate their varied needs is to provide multiple floor plan options for the cottages. Three different floor plans would suit the needs of the majority of participants. Two of the options would be approximately 1000 square feet. One will offer an open, connected kitchen and living area for entertaining. The second will have a more formal floor plan with separate living, kitchen, and dining rooms. The third cottage floor plan would be a compact plan with 600-800 square feet and a combined living/dining area for those with minimalist lifestyles.

Each of the stand alone cottages will have private yards with space to garden or take an animal outside. A small private deck for cottage owners would be an addition that meets the needs and desires of many of the participants. Apartment units should have private balconies attached to each unit so that all residents may spend time outdoors regardless of mobility level.

Within each unit, built in cabinetry and shelving should be included for storage and display of personal items and collections. For cottage dwellers, garages should be large enough to provide storage space for large items. Small storage lockers should be added in the apartment parking area to house bikes, skis, or other large items for individuals who choose to live in the apartments.

Each cottage and apartment should include one room that could function as a guest room, office, studio, or any other space that the resident wants. This room should be near a bathroom and include a window in order to function well as a guest room. It should be a completely enclosed space and should be soundproof, for individuals who want it to function as an office or other private room.

One feature of the original Apartments for Life community which was appealing to local individuals was the multi-generational interactions that the facility fostered. Locating this community near an active part of town would provide opportunities for the residents to leave the community and spend time with others, and would increase the possibility that residents of Morgantown would come to the community to use its amenities. One potential location in Morgantown is the area around the Suncrest Town Center, a newly developed area which is home to a large grocery store, many restaurants and shops, as well as physicians' offices and other resources such as a pharmacy and bank.

Independence. Maintained independence is one goal of the original Apartments for Life community. OLLI members, healthcare providers, and healthcare designers agreed that maintained independence is an important part of quality of life for aging individuals. This theoretical community can support independence by enabling residents to use, understand, and travel within the community without assistance.

The usability of a space influences how independent an individual can be within that space. For example, a person who relies on a wheelchair for transportation will likely not be able to function independently in a multi-level home unless appropriate

technology is installed. The designers who were interviewed as part of this study were in agreement that Universal Design principles must be taken into consideration in the design of an Apartments for Life inspired community in order to create spaces that are suitable for all potential users.

Universal Design principles would be considered during the design of this facility. Although the number of design decisions that would be influenced by Universal Design principles is beyond the scope of this project, it is an important consideration. All space plans, FF&E selections, and other design decisions should be made with Universal Design in mind.

In keeping with Universal Design principles, bathrooms must be barrier-free with easy to use equipment. Raised toilet seats, accessible sink area, and space to transfer to the toilet or tub either with or without assistance, are some recommended design features which would create a safe and usable environment, in which elders could function better without assistance. Additionally, grab bars in non-institutional styles or finishes, or blocking for anticipated grab bars, should be included in all bathrooms.

Aesthetics. One goal of this project was to create guidelines that would inform a home-like, residential feeling environment. Many of the elders in this study would prefer to age in their own homes if given the option. Because that may not always be possible, the units within this theoretical community would feel like a home, in spite of being a place where medical care is also provided. The designers interviewed during this study most frequently mentioned finishes, furnishings, and lighting as design components which will influence the hominess of a space.

Finishes. The finishes used throughout the community and units can impact not only the health and safety of residents and other users, but can be used to evoke a home-like, comfortable atmosphere.

One home safety risk, which was of significant concern to the home health providers interviewed, was the risk of falls. Falls in the home are often flooring-related, due to thresholds, flooring changes, and rugs, and result in injury and broken bones. In this Apartments for Life influenced community, it is relatively simple to ensure zero-grade thresholds and seamless flooring transitions.

Solid wood and tile floors, though easy for wheelchair and walker users to use, can contribute to fall-related injuries due to low levels of shock absorbency. The researcher recommends tight, low-pile commercial-grade carpet throughout the majority of the building, for aesthetic and comfort reasons. Seamless wood-look vinyl flooring may be used in dining and craft areas where cleanability is most needed. Both of these flooring options are slightly shock-absorbent, especially when installed with a shock-absorbent cellular underlayment such as dual-stiffness flooring. Knoefel, Patrick, Taylor, and Goubran (2013) found that dual-stiffness flooring significantly decreased fall-induced fractures, when compared to traditional solid flooring.

Flooring throughout the community spaces would be low-contrast and low glare. Highly reflective surfaces can cast strong shadows or highlights which may be confusing or difficult to discern for individuals with low-vision. High contrast flooring patterns may be mistaken for obstacles such as steps or holes, and should be avoided as well.

Within individual units, residents would be permitted to choose their own flooring, since the home is to be a reflection of its owner. When residents begin to use wheelchairs or other mobility devices, it is recommended that they install low-pile carpet or a smooth surface such as tile, wood, laminate, or vinyl, to improve mobility. In the case of smooth surface flooring, shock absorbent flooring such as laminate or vinyl with a shock-absorbent underlayment is recommended. Radiant heating under kitchen and bathroom floors in each unit is recommended to create a warmer, more comfortable environment.

Color and motif. Though residents may choose the finishes within their individual units, color and motif selection in the communal areas should be done thoughtfully. Wall and floor finishes provide an opportunity to bring a sense of nature into the community building, through use of color, texture, and pattern. Carpet with tone-on-tone leaf or vine patterns, woodgrain flooring, grasscloth wallpaper, and nature inspired artwork, are some approaches that may be used to bring nature indoors.

Finishes would be in warm or neutral colors including shades of gold, warm green, brown, reds, and coppers, rather than cool tones. The use of warm colors and lighting throughout the building will accommodate age-related vision changes and allow elders with yellowing vision to differentiate and appreciate the variety of colors used throughout the building, instead of viewing them as shades of dull gray and brown, as would be the case with cool colors seen with yellowing vision. Finishes should be selected thoughtfully to aid in wayfinding. Wall color changes at intersections throughout the community building can help residents navigate and understand where they are within the building.

Furnishing. Because living in a home-like environment is so important to the potential residents of this community, they should be allowed to bring their own furniture to use within the dwelling units. Throughout the community building, antimicrobial upholstered armchairs and firm sofas with elevated seat heights can provide casual impromptu seating areas and a more residential aesthetic.

Lighting. Bright, indirect light would be installed throughout the community. This type of lighting would provide adequate illumination without glare, which is sometimes a problem for aging eyes. Lighting would be diffused, either through baffles or by the use of uplight fixtures which allow light to be reflected off of ceilings or walls. Lighting in corridors and public spaces would to have slightly dimmed cycles based on the sun and natural circadian rhythms, to help regulate the residents' sleep cycles. Additionally, lighting in this facility facilities should be 25-50% brighter than in other types of facilities, so light fixtures would be frequently spaced (Hunter, 2002).

Ample windows would be installed throughout the community building, in corridors, and in each unit. The OLLI members who participated in this study expressed a desire for natural light in the home, for both aesthetic and energy-saving purposes. This can easily be accommodated by installation of windows, particularly on north and south faces. Windows which look out onto the community's grounds can help residents orient themselves within the building, and would be placed strategically in community rooms and corridors so that residents may view landscape or other architectural features.

Task lighting for care provision. The designers who participated in this study agreed that lighting is an important factor when designing a space in which medical care

is provided. Recessed lighting in the residents' bedrooms would not only provide ambient lighting, but would ensure that medical professionals have light available to perform procedures. Bright task lighting should be installed near a designated work surface for the healthcare providers, similar to what is installed in most hospital rooms.

Amenities. Among the many types of amenities that OLLI members requested during interviews, food and dining was a prevalent theme. It was important for many elders to be in control of what, when, and where they eat. As a result it was important to write design guidelines that accommodate independence and variety related to dining, something which is uncommon in current approaches to long term housing. Another important amenity for the elders was access to nature, for social, relaxation, and recreation purposes.

To meet the needs of this community's theoretical residents, the community building would house a small grocery store. The community would be located near a part of town which has its own large grocery store and other retail shops. The small in-community grocery store allows less mobile residents to shop for basic items independently. Grocery delivery service for goods purchased from the public grocery store or other local markets should also be provided as a resource for residents.

Within the community, two dining areas should be provided. The first is a small restaurant with dining tables appropriate for individuals who want to dine alone or in small groups. This restaurant should provide a seasonally changing menu with daily specials and diet sensitive options for vegans and vegetarians. The second dining area should be a casual cafe with comfortable seating for up to fifteen people, which is open to

the middle of the community building. This area can serve as a space for small groups to gather, as well as a place for residents to purchase coffee or small snacks. Bookshelves in the cafe space can house the community's lending library, where residents donate and borrow used books.

A park like garden with covered, paved walking paths to connect cottage clusters to the central community building would meet the residents' need to spend time outdoors and maintain an active lifestyle within a walkable community. Walking paths should be well lit, and ought to provide views of landscape features such as small ponds and raised garden beds. Picnic tables in the garden and comfortable benches along walking paths would allow residents to rest while exercising. They would also provide venues for socialization and relaxation.

Other amenities requested by the participants of this study mainly related to media and multimedia. A large sound proof space should be constructed, with music equipment for practice and performance, both by residents and visiting musicians from the community and local university. This space, furnished with comfortable seating and a projection system, may double as a lecture room and a venue for watching movies or small theatre productions. A computer room within the community building offers another location for skill building and educational classes, and provides equipment for residents to use for communication or leisure.

Lastly, two types of multipurpose rooms for hands-on classes and activities would meet the participants' need to pursue favorite hobbies and spend time with friends and family in a variety of ways. A large room with an open kitchen and a large table to seat

up to thirty people would serve as a cooking classroom. This space should also be rentable, so that residents may host larger gatherings for family and friends outside of the home. The second multipurpose room should include tables and equipment for crafts and art projects, including a work table for small crafts and woodworking, and floor space for easels. This would allow residents to pursue creative passions that may not be accommodated in other long term housing communities.

Other amenities which are not related to the design of the building, but which were of significant importance to the participants of this study were transportation and maintenance. Transportation should be provided upon request to locations within the community, and special trips to cultural districts, theatre and music performances, and local attractions. Maintenance services, provided by approved companies, should be provided to residents who request assistance with home repair and upkeep. This would allow residents to live more easily in their own homes.

Health and safety. One of the primary features which differentiates this theoretical community from CCRCs and other current long-term housing models is the accommodation of in-home medical care. Current long-term housing communities often expect residents to move into Assisted Living or Skilled Nursing units once they receive medical care. In this community, medical care can be provided easily in every dwelling unit. Additionally, a nurse-staffed walk-in health clinic in the community allows residents to be treated on-site for minor illnesses and injuries. Locked storage cabinets should be installed in the walk-in health clinic so that the in-home care providers may quickly access necessary equipment and supplies between house calls.

In-home health care. In-home healthcare is accommodated in part by implementation of monitoring and communication technology in every unit. Intercoms should be built into each unit so that residents can communicate both with guests at the door, and with nurses at the centrally located walk-in health clinic. Appliance sensors, such as those described by Chan et al. (2009) should be installed throughout each home to monitor the residents' activity and communicate abnormal usage or activity patterns to family and health care providers.

Each dwelling unit should include built-in casework which consists of lockable base cabinets, a countertop, and lockable upper cabinets. This casework unit should be located centrally in the home, and may function as storage and display space for residents who are not receiving medical care. This unit can double as healthcare supply storage and a work surface for home health care providers once the residents start having regular nurse visits. This would allow the home health care providers to place their bags and supplies on an elevated surface, which their protocol requires. Under cabinet lighting should be installed so that the nurses have adequate task lighting at the countertop work surface.

Residents should be permitted to use their own furniture in the home, although rentable medical furniture should be provided as needed once residents begin receiving regular care. This furniture includes lift chairs, medical recliners, and hospital beds, and is necessary to prevent work-related injuries for the health care providers.

Mobility and exercise. Residents should be encouraged to remain mobile, and many of the participants in this study expressed a desire to stay active as they age. In this

community, mobility must be both encouraged and accommodated. Mobility can be encouraged by limiting corridor lengths and providing informal seating areas along corridors for rest and socialization. With these design features, residents will feel less overwhelmed by the task of moving from one side of a building to the other, and are more likely to remain mobile. A small indoor fitness room with weights and stationary machines, as well as an open fitness room for group exercise, would allow residents to pursue fitness both alone and as part of a group. A small pool for leisure swimming and therapy would also be provided.

Social community. This community should include design features which accommodate the maintenance and development of relationships. These relationships include those between residents, family, and friends. A designated apartment unit should be constructed on-site for family and friends to rent for short-term stays. This allows residents to have guests without feeling burdened by the additional work of hosting guests in the home. The on-site rentable multi-purpose room provides an additional venue for hosting and entertaining guests outside of the home. Additionally, each dwelling unit should include a multi-functional room with a window that can serve as a guest room if the resident chooses. This type of space is particularly helpful if a family member wants to care for a resident during a period of illness or injury.

The cafe "commons" area within the central community building serves as a location for residents to gather and eat, play games, or spend time relaxing with other residents. Informal seating areas should also be provided throughout the community for impromptu chats; these areas may be found in corridors, at mailboxes, and near the community building's front entrance.

Many of this study's participants are spiritual or associate with a religion, and a multi faith chapel would be constructed on-site for residents to use alone or as part of an organized group. This allows residents with low mobility, who cannot travel to religious meetings, to engage in a faith community.

Participant Responses

Participant responses, as reported in the follow-up survey (Appendix C) were mostly positive, with no elders reporting negative reactions to the design guidelines. All participants felt that their input was at least mostly reflected in the design guidelines. One significant challenge with this project was the fact that it impossible to meet every participant's needs completely. Because each participant in this study is a unique individual with particular interests, lifestyle, and personal history, some compromises had to be made during the development of design guidelines. For example, one participant wanted to live in a multigenerational community while another wanted little to do with children near the home. The nature of design is that it finds the best possible solutions to meet as many needs as possible, a goal which survey comments indicate was well attained. In spite of most participants' preference to age in their current home, many commented that they would consider living in an Apartments for Life inspired community should it be built locally. This comment is exciting, since it indicates that a local Apartments for Life inspired community would bridge the gap between where local elders *want* to age, and where they *should* age for health and safety reasons. The positive survey responses also indicate that this study responded well to the initial research questions. These questions were:

1. What are the housing needs and preferences of local American elders which impact the design of an elder housing environment for implementation in Morgantown, West Virginia?
2. What are the needs and preferences of local healthcare providers that influence the design of a housing environment?
3. How do the above factors inform and impact the design of an Apartments for Life community?

Interviews and focus groups allowed the researcher to understand the housing needs and preferences of local elders and their health care providers. Interviews with designers provided insight into how to accommodate those needs and preferences within a long-term housing community. Positive responses to the design guidelines imply that the housing needs and preferences of elders and health care providers were understood well, and that they were adequately used to inform the design guidelines for this theoretical Apartments for Life community.

Use of the Design Process

As discussed in Chapter 3, this study used the design process to inform the steps of the project. The researcher used a review of literature to develop the theory that currently available housing options in the United States may not be adequate for all elders, and that the Apartments for Life concept could be a suitable addition to the spectrum of housing options currently available. This theory was the foundation for the development of design principles, or design guidelines, which were informed by data collected by the space's potential users and stakeholders. The researcher then used those design principles to create a product, in this case a mock advertising brochure for the

theoretical community. To assess the success of the final product, in this case the design guidelines and the mock advertising brochure, the original participants - the potential space's users and stakeholders - were interviewed for feedback. The process which led to the development and analysis of the design guidelines followed the 4-step design process as discussed by Edelson (2002).

Further Research Opportunities

This study presents a process for programming and collecting data to inform the design of elder care communities, and provides a cursory look at how an Apartments for Life facility would need to be adapted to function in local culture. There are numerous opportunities for continued research on this topic. This study could be replicated in various locations across the United States, and would allow researchers and designers to understand how any city or local culture might influence the adaptation and design of an Apartments for Life inspired community. A logical continuation of this particular project might be a local feasibility study, where issues related to healthcare law, funding, logistics, and building location and zoning could be studied in further detail. This would create a more complete of how the Apartments for Life concept could be applied to housing communities in Morgantown, West Virginia.

Conclusion

As a final thought, there is much potential for improvement and for implementation of new ideas in the United States' current approach to long-term elder housing, and this study provides a process by which other researchers can better understand the housing related needs of elders and stakeholders in other locations and contexts. The process established in this project revealed that the elders who participated

in this study overwhelmingly desire to stay in their current homes. It is important to provide a quality living experience for elders who, for safety reasons or lack of caregivers and support, cannot live safely at home. Apartments for Life could be a viable local alternative to Continuing Care Retire Communities. Apartments for Life inspired housing would provide an additional housing option for our country's aging Baby Boomer population, and could be a valuable addition to the spectrum of housing options which are currently available. This approach provides many of the amenities often found in quality retirement communities, but delivers them in an environment where family is welcomed, individuality is recognized, independence is encouraged, and healthcare is provided in every home.

APPENDIX A

Elder survey questions

1. How well do these guidelines reflect your input from the focus groups?
Not At All (1) --- (2) --- (3) --- (4) Completely
2. Are there guidelines with which you disagree?
None (1) --- (2) --- (3) --- (4) All
3. If there are guidelines with which you disagree, which ones are they (please include guideline number), and why?
4. Do you have additional comments or questions, or other needs or preferences that we did not discuss, or that are not included in these guidelines?

Healthcare provider survey questions

1. How well do these guidelines reflect your input from the interviews?
Not At All (1) --- (2) --- (3) --- (4) Completely
2. Are there ideas included in these guidelines with which you disagree?
None (1) --- (2) --- (3) --- (4) All
3. Do any of these guidelines pose any health or safety concerns?
None (1) --- (2) --- (3) --- (4) All
4. If there are guidelines with which you disagree, which ones are they (please include guideline number), and why?
5. Do you have additional comments or questions, or other needs or preferences that we did not discuss, or that are not included in these guidelines?

Healthcare designer survey questions

1. How well do these guidelines reflect your input from the interviews?

Not At All (1) --- (2) --- (3) --- (4) Completely

2. Are there ideas included in these guidelines with which you disagree?

None (1) --- (2) --- (3) --- (4) All

3. Would these guidelines be useful in informing the design of a long-term care community?

Not At All (1) --- (2) --- (3) --- (4) Completely

4. If there are guidelines with which you disagree, or which cause concern, which ones are they (please include guideline number), and why?
5. Do you have additional comments, questions, or ideas that we did not discuss during interviews, that you would like to share?

APPENDIX B

Table B1 <i>Design objectives and guidelines</i>	
Factor 1: General Changes	
<u>Objectives</u>	<u>Design Guidelines</u>
<ul style="list-style-type: none"> • <i>Provide an alternative to corridor or apartment-style living for the majority of residents</i> • <i>Create opportunities for multi-generational interactions</i> 	<ul style="list-style-type: none"> • Incorporate a central community building to house and provide amenities and resources (E, D) • Construct multiple small clusters of 3-5 detached cottages which comprise the larger community (E) • In addition to cottages, build 5-10 apartment units on the upper level(s) of the central community building (E) • Limit the entire community size to 50 cottages (E) • Locate the community near a well-visited part of town to increase potential for social and multi-generational interaction (E)
Factor 2: Individuality	
<u>Objectives</u>	<u>Design Guidelines</u>
<ul style="list-style-type: none"> • Provide opportunities for privacy, within residences and the community • Allow residents to express their uniqueness • <i>Accommodate a variety of lifestyles within the community</i> 	<ul style="list-style-type: none"> • Allow each resident to have a private unit with their own front door (E, R) • Provide each resident with their own personal living spaces, including living room, dining room, bedroom, and kitchen (E) • Provide open display and storage space within the units for personal collections and sentimental items (E, D, R) • Include closed storage in or near each unit for hobby equipment

	<p>and other personal items (E)</p> <ul style="list-style-type: none"> • Provide three floor plan options - one with an open plan, one suitable for more formal living, and one efficiency style unit, to suit multiple lifestyles (E, D) • Include a multifunctional room within each unit that can serve as a study, guest room, or art/hobby studio (E, D) • Locate the community within walking distance to either Morgantown's city center or in proximity to a developed area with additional shops, restaurants, religious buildings, and other amenities, such as the Suncrest Town Center (E) • Provide each unit with a private porch and yard (cottages) or balcony (apartments) for outdoor access and pursuit of hobbies (E)
Factor 3: Independence	
<u>Objectives</u>	<u>Design Guidelines</u>
<ul style="list-style-type: none"> • Serve individuals of all physical ability levels • Support residents' independence 	<ul style="list-style-type: none"> • Residences should be single-level, to enable independence for low-mobility individuals (E, H, D, R) • Incorporate necessary amenities within the community, such as a grocery store, physician's office, and laundry facility, so that residents can continue to care for themselves independently (E, H, D, R) • Implement Universal Design to enable self-mobilization and allow residents to function well in their homes without outside assistance (H, D, R)
Factor 4: Aesthetics	

<u>Objectives</u>	<u>Design Guidelines</u>
<ul style="list-style-type: none"> • Have a residential appearance • Provide an interesting and sense-stimulating environment • <i>Create an environment suitable to elders' changing vision, mobility, and cognitive abilities</i> • Allow residents to orient themselves within the building. • Include intuitive wayfinding 	<ul style="list-style-type: none"> • Install fall impact-reducing sub-flooring throughout the central community building (D, R) • Install radiant heat flooring under kitchen and bathroom floors in the units, to create a warmer, more comfortable environment (D) • Provide casework in the bedroom to house medical equipment (D, H) • Allow residents to bring and use their own furniture (E) • Include windows and natural lighting within each room in the housing units (E) • Install bright, diffused lights throughout the community building (D, R) • Allow corridor lighting in the community building to be dimmed in the evenings to match circadian rhythms (D) • Incorporate nature-inspired motifs in flooring and wall finishes throughout the community building (D) • Install recessed task lighting in the bedrooms for improved medical provision (D) • Install flooring with low contrast and glare (D, R) • Select finish colors with warm hues (D, R) • Use finishes thoughtfully to create visual interest and help individuals orient themselves (D) • Implement Universal Design principles with signage, for easier wayfinding (R) • Install energy and water saving appliances and fixtures in the units (E)

	<ul style="list-style-type: none"> Place windows strategically in corridors within the community building, so that residents may look out on landscape features and to help orient themselves within the building (D, R) Select distinct floor and wall finishes for each corridor within the community building, to aid wayfinding (D)
Factor 5: Amenities/Resources	
<u>Objectives</u>	<u>Design Guidelines</u>
<ul style="list-style-type: none"> Include amenities and resources that simplify or improve quality of life <i>Provide resources that enable residents to enjoy favorite pastimes</i> 	<ul style="list-style-type: none"> Include within the community building a sound proof space with music equipment for practicing or performances (E) Allow the soundproof music space to double as a venue for watching movies or attending small theatre or related productions (E) Provide a small grocery store within the community building (E, H, D) Provide grocery delivery service or organized trips to specialty stores for individuals with specific diet preferences (E, H) Include a restaurant or other dining area within the community (E, D) Include a coffee shop with comfortable group seating within or near the community (E) Construct a park-like garden with paved fitness paths and landscape features (such as a pond) for residents to enjoy (E, R) Provide covered walking paths to connect the cottages to the central community building (E, R) Include raised beds in the garden for wheelchair users to enjoy (R) Ensure that the walking paths are well lit (R)

	<ul style="list-style-type: none"> • Provide picnic tables and comfortable outdoor furniture in the garden for socialization and relaxation (E) • Provide a library for residents to share and borrow books (E) • Include a computer or technology room with equipment for resident use (D) • Include transportation within the community, to enable individuals with low mobility to travel from building to building (E, H) • Include transportation to locations outside of the community (E, H) • Provide property maintenance services for interested elders (E) • Provide a multi-purpose room for cooking and art classes, which could double as a rentable gathering space in which residents can entertain guests.
Factor 6: Health and Safety	
<u>Objectives</u>	<u>Design Guidelines</u>
<ul style="list-style-type: none"> • Allow for easy aging in place by providing necessary amenities and resources • <i>Allow health care providers to efficiently and safely perform their jobs</i> • <i>Ensure that individual units do not pose any safety risks</i> • Encourage residents to exercise and stay mobile • <i>Minimize spreading of disease</i> 	<ul style="list-style-type: none"> • Provide a walk-in health clinic in the community (E) • Build intercoms/monitors into the units so residents can communicate both with guests at the door and with health providers who are either on or off-site (E, H, D) • Include locked storage within the central community building for health providers' personal supply storage (H) • Include a centrally located built-in shelf in each unit for the health care providers to place their bag and supplies (H) • Above or below the designated healthcare provider work surface in each unit, provide a lockable cabinet for medical items that the resident regularly needs (H)

	<ul style="list-style-type: none"> • Install task lighting above the health provider's work surface/shelf, which could double as display lighting when the shelf is not used by care providers (D) • Provide rentable furniture such as lift chairs and medical recliners, to allow easy medical care (H, D) • Recommend that residents install low-pile commercial carpet or hardwood floors when they begin to use wheelchairs. • Install appliance sensors throughout the unit to monitor the resident's activity and detect potential emergencies (E, R) • Eliminate stairs by designing a single-level facility and units (E, H, D, R) • Limit length of hallways and provide informal seating areas along corridors for rest and socialization (D) • Construct a small indoor fitness room with weights and other machines (E, D) • Construct an open fitness room for dance and yoga classes (E) • Provide a pool for leisure swimming and therapy • Install seamless flooring, such as sheet vinyl, to reduce disease spreading and improve cleanability (D) • Ensure that resident rooms are well exhausted and ventilated (D)
Factor 7: Social Community	

<u>Objectives</u>	<u>Design Guidelines</u>
<ul style="list-style-type: none"> • Support family involvement • Support development and maintenance of social groups 	<ul style="list-style-type: none"> • Construct designated apartment units for family and friends of residents to rent for short-term stays (E, D) • Provide a multi-functional room in each unit for family members to stay and care for the resident, if desired (E) • Include informal seating areas within the community building for impromptu/small gatherings (E, H, D) • Provide a common area in the community building with tables for eating, playing games, or spending time with other residents (E) • Include within the community a large space for residents to use for entertaining and gatherings, as well as for community events and classes (E) • Construct a multi-faith chapel within the community for use by various groups or individuals (E)
<p><i>Note.</i> Parenthetical notations indicate whether a guideline is drawn from data collected in elder interviews (E), health care provider interviews (H), design professional interviews (D), or from existing published research (R).</p>	

APPENDIX C

Note. Survey questions are located in Appendix A.

Table C1 <i>Elder Survey Response Data</i>		
<u>Question Number</u>	<u>Number of Respondents</u>	<u>Average Likert Value</u>
1	12	3.75 (out of 4)
2	12	1 (out of 4)
<u>Question Number</u>	<u>Comments</u>	
3	None	
4	<p>"Media/Lecture room should be large enough to accommodate guests who residents invite to attend"</p> <p>"Can your concept become a reality?! I'm ready to buy in!"</p> <p>"Patios or balconies should be partly covered so one can sit outside even in rain"</p> <p>"This is an excellent concept - if only it could be done! ...if only [a local CCRC] had this template. The plan seems to cover most possible eventualities"</p> <p>"Suggestion: a way to check in with each resident on a daily basis [to make sure they are active and in good health]"</p> <p>"Elderly moving to a new area need help meeting others - so mixers or other activities to introduce newcomers would help"</p> <p>"This really does sound like an ideal set up for seniors. The only question/concern would be the cost, and what happens to the property when the residents both die?"</p> <p>"Increased emphasis/ideas on emerging technologies would be good. For example, an app that would track motion/physical activity to monitor status"</p> <p>"I was pleasantly surprised at the many guidelines I had not even thought of e.g. subfloor heat, glare reducing features. This set of guidelines is extremely thoughtfully composed and inclines me <i>more</i> to a community based lifestyle."</p>	

Table C2 <i>Health Care Facility Designer Survey Response Data</i>		
<u>Question Number</u>	<u>Number of Respondents</u>	<u>Average Likert Value</u>
1	3	3.33 (out of 4)
2	3	1.67 (out of 4)
3	3	3.67 (out of 4)
<u>Question Number</u>	<u>Comments</u>	
4	<ul style="list-style-type: none"> • "Not a fan of high-rise buildings for seniors (speaking of apartment units)" • "I'm concerned about availability of antimicrobial upholsteries" • "Some of the technology aspects sound great but I'm concerned about how tech savvy or comfortable [the seniors may be]" • "Overhead lighting may not always be appropriate [in the units]. Need to use varied light levels in a space." 	
5	<ul style="list-style-type: none"> • Overall very good!" • "Intercom systems sounds like a simple nurse call system which is great and gives friends and family a peace of mind" • "Need more talk about color and patterns - what is appropriate." 	

Table C3 Health Care Provider Survey Response Data		
<u>Question Number</u>	<u>Number of Respondents</u>	<u>Average Likert Value</u>
1	1	4 (out of 4)
2	1	1 (out of 4)
3	1	1 (out of 4)
<u>Question Number</u>	<u>Comments</u>	
4	None	
5	None	
6	None	

APPENDIX D

Informational Material Provided to Participants

Apartments for Life

What is Apartments for Life?

Apartments for Life is a new model of housing and care which allows elders to age in their own home within a larger community. Because of the way the apartment units and community have been planned and designed, a move to a separate assisted living or skilled nursing facility or unit is not inevitable for elders living in Apartments for Life communities.

The Apartments for Life model not only allows elders to age in place, but encourages elders to take control over their lives and stay actively engaged in community.

In Apartments for Life communities, rather than elders living in healthcare environments, the approach is to provide healthcare to their individual homes.

How does Apartments for Life work?

Elders purchase or rent a unit within an apartment building. These buildings are resigned for individuals age 55+, and include spaces and amenities intended to make life easier and more enjoyable for people as they age.

Individuals who choose to live in Apartments for Life communities may have many different physical, emotional, and cognitive needs and abilities. The buildings are designed to support every resident, regardless of his or her needs. Dwellings are adaptable and accessible so that as people age, they can still live safely, and receive appropriate medical care, in their own home without needing to move.

Apartments for Life communities include a variety of amenities, ranging from cafes to grocery stores to fitness centers. These amenities are for use by the community's residents, as well as individuals and families who live in the surrounding area.

Resource: The Benevolent Society (2009). Apartments for life in Australia: Lessons for Australia from Humanitas in the Netherlands. The Benevolent Society.

Morgantown's

Apartments for Life

Community

Morgantown Apartments for Life is a housing community for locals over the age of 55. The concept is simple: you buy a home and stay in that home as long as you want.

In-home medical care, carefully designed residences and community buildings, and convenient amenities make it easier and safer to age in place.

Private and personal residences

- (1) This long-term housing community is located in a populated area like the Suncrest part of Morgantown, near grocery stores, physician's offices, restaurants, and shops. Within the community, a centrally located community building houses additional amenities and resources.
- (2) Morgantown's Apartments for Life community is made up of 30 stand-alone cottages, clustered in groups of 3-5. Up to 10 second-story apartments are also available in the centrally located community building.
- (3) Several cottage floor plan options are available to suit different lifestyles. Residents may choose casual open rooms, formal living and dining areas, or an efficiency unit.
- (4) Each cottage has its own small yard and porch (pets and gardening are welcome!). The apartment units offer private balconies so that all residents can spend time outside

Unlike some traditional retirement communities or skilled nursing facilities, this Apartments for Life community accommodates residents' needs for privacy and individuality, and recognizes that each resident has a unique way of life.

Safe, comfortable environment

In the home:

- (5) These homes provide a safe place in which to age and receive medical care, while maintaining a home-like atmosphere
- (6) Cottages are single-level, wheelchair accessible, and incorporate Universal Design principles, which state that spaces should be accessible and function well for all users, regardless of ability
- (7) Cottages have windows in each room and are situated to take advantage of natural daylight
- (8) Recessed overhead lighting throughout the homes create a well-lit environment for the resident, and allow health care providers to work more safely
- (9) Matte finishes on walls and floors reduce glare and improve comfort for aging eyes
- (10) Residents may bring their own furniture and use it as long as they choose
- (11) Radiant heat subflooring in kitchens and bathrooms provides warmth and comfort
- (12) Each unit includes energy efficient appliances and low-flow water fixtures

Each residence in this Apartments for Life community is designed to be safe for individuals of all ages and abilities, without sacrificing the hominess that is important to the residents' well-being and comfort.

Safe, comfortable environment

In the community building:

- (13) Throughout the building, diffused lighting dims to match circadian rhythms
- (14) Wallpaper and paint in warm colors accommodate age-related vision changes
- (15) Wallpaper and flooring include nature-inspired motifs and patterns
- (16) Low-pile carpet with shock absorbent padding to break the impact of falls
- (17) Windows throughout the building look out onto landscape features to help users locate themselves within the building
- (18) Each section of the building has a distinct paint color or wallpaper style, to help users find their way from one place to another
- (19) Antimicrobial, upholstered furniture with raised seat heights for comfort are used throughout the building

Public spaces throughout the community include design features to improve the health and safety of the people who are using them, from the placement of windows to the padding under the carpet.

Convenient amenities

- (20) Multipurpose room with seating for musical performances, movie viewings, and lectures
- (21) Small grocery store in the community building
- (22) Grocery delivery service to the residents' homes
- (23) Restaurant with tables for socializing and a seasonal menu, which can be visited at the residents' leisure, rather than at an assigned meal time.
- (24) Cafe with armchairs, tables, and space for small group meetings, near the center of the community building for convenient gathering
- (25) Small lending library in the cafe for swapping books with other residents
- (26) Computer room with equipment to use on your own time
- (27) Teaching kitchen and dining room for classes
- (28) Art studio with easels and tables for various projects
- (29) Walk-in health clinic in the community building
- (30) Transportation is provided within the community and to locations elsewhere in Morgantown. Occasional out-of-town trips are provided as well
- (31) On-site multi faith chapel, with transportation provided to residents' personal house of worship by request

Amenities throughout the building allow residents and their guests to enjoy favorite activities, either alone or as part of a group. Some amenities are for leisure, while others simplify life, allow residents to maintain independence, and improve health or fitness.

Outdoor space & fitness

- (32) Park-like garden with paved walking paths and a small pond to walk around
- (33) Raised garden beds in some areas for enjoyment from a wheelchair
- (34) Covered walking paths connect cottage clusters to the central community building
- (35) Picnic tables and outdoor benches for socializing and relaxing
- (36) Home-like indoor fitness room with weights, treadmill, and stationary bicycle
- (37) Open fitness space for group yoga and pilates classes
- (38) Swimming and therapy pool

Staying active is an important part of aging well, so this Apartments for Life community provides multiple opportunities for residents to pursue both indoor and outdoor fitness.

Safety and medical care

- (39) Each home has a built-in intercom system to communicate with nurses
- (40) Nurses are also available to video-chat via computer if residents have questions or need a visit
- (41) A built-in hallway cabinet and shelving unit may become supply storage and a work surface for the health care provider if residents begin receiving regular care. Under-cabinet lighting helps care providers perform their job safely
- (42) Built-in cabinets and shelves in the bedroom can be used to store and disguise medical equipment if it is needed
- (43) When needed, monitors on kitchen appliances track use and signal medical professionals if they detect something out of the ordinary
- (44) Hospital beds and medical recliners are available when needed, to improve health and ease of care
- (45) Short corridors and frequent seating alcoves in the community building allow residents to rest and socialize as they travel
- (46) Central medical supply storage in the community building allows nurses to quickly find backup supplies
- (47) Reinforced walls in bathrooms allow easy installation of grab bars when they are needed
- (48) Roll-in showers with seats are provided in addition to bathtubs for easy bathing with or without assistance

Design and technology features allow all residents to receive medical care in their own units. These design and technology features also allow residents to live more safely in their own, stand-alone home.

Space for friends and family

- (49) Designated apartment units can be rented by family and friends for short-term visits
- (50) Each unit has a multifunctional room which can serve a family member who wants to stay long-term with the resident
- (51) The community building's kitchen classroom space may be rented for large group gatherings and meals
- (52) Informal seating areas in hallways, vestibules, and other places throughout the community building provide a place to sit and chat
- (53) A table-filled common area connected to the cafe provides space for gathering

Last but certainly not least are the accommodations for residents' friends and families. Researchers agree that family involvement can dramatically improve an elder's well-being, and this community provides spaces that allow residents to make new friends and spend time with old ones.

REFERENCES

- AARP. (n.d.). Continuing care retirement communities: What they are and how they work
Retrieved March 20, 2012, from http://www.aarp.org/relationships/caregiving-resource-center/info-09-2010/ho_continuing_care_retirement_communities.html
- Agency for Healthcare Research and Quality. (1994). The characteristics of long-term care users:
U.S. Department of Health and Human Services.
- Altus, D. (2010, Winter). Green Houses: Providing Humane Care for Elders. *Communities*, 54-56.
- American Institute of Architects (Ed.). (2007). *Design for aging post-occupancy evaluations*.
Hoboken, NJ: Wiley.
- Angelelli, J. (2006). Promising models for transforming long-term care. *The Gerontologist*, 46(4), 428-430.
- Assisted Living Today. (2011). Assisted Living Retrieved March 19, 2012, from
<http://assistedlivingtoday.com/p/assisted-living/>
- Bicket, M. C., Samus, Q. M., McNabney, M., Onyike, C. U., Mayer, L. S., Brandt, J., . . .
Rosenblatt, A. (2010). The physical environment influences neuropsychiatric symptoms
and other outcomes in assisted living residents. *International Journal of Geriatric
Psychiatry*, 25, 1044-1054.
- Bickman, L., & Rog, D. *The SAGE handbook of applied social research methods*. Thousand
Oaks, CA: Sage Publications.
- Bishop, C. E. (1999). Where are the missing elders? The decline in nursing home use, 1985 and
1995. *Health Affairs*, 18(4), 146-155.

- Bohm, D. A. (2001). Striving for quality care in nursing homes: tracing the history of nursing homes and noting the effect of recent federal government initiatives to ensure quality care in the nursing home setting. *DePaul Journal of Health Care Law*, 2000-2001(1-4).
- Centers for Medicare & Medicaid Services. (2007). *Medicare coverage of skilled nursing facility care*.
- Chan, M., Campo, E., Esteve, D., & Fourniols, J. (2009). Smart homes - Current features and future perspectives. *Maturitas*, 64, 90-97
- Chapin, R., & Dobbs-Kepper, D. (2001). Aging in place in assisted living: philosophy versus policy. *The Gerontologist*, 41(1), 43-50.
- Day, K., & Calkins, M. P. (2002). Design and Dementia. In R. B. Bechtel & A. Churchman (Eds.), *Handbook of Environmental Psychology* (pp. 374-393). New York: John Wiley & Sons.
- De Lepelierre, J., Bouwen, A., De Coninck, L., Buntinx, F. (2007). Insufficient lighting in nursing homes. *Journal of the American Medical Directors' Association*, 8(5).
- Design Council. (n.d.). The interior design process Retrieved April 16, 2012, from <http://www.designcouncil.org.uk/about-design/types-of-design/interior-design/the-process/>
- Drageset, J. (2004). The importance of activities of daily living and social contact for loneliness: a survey among residents in nursing homes. *Scandinavian Journal of Caring Sciences*, 18(1), 65-71. doi: 10.1111/j.0283-9318.2003.00251.x
- Edelson, D. C. (2002). Design research: What we learn when we engage in design. *The Journal of the Learning Sciences*, 11(1), 105-121.

- Facility Guidelines Institute. (2012). About the FGI Guidelines for Design and CONstruction of Health Care Facilities Retrieved August 15, 2012, from <http://www.fgiguideelines.org/>
- Full Circle of Care (2010). Home safety and safety issues. Retrieved March 27, 2014 from <http://www.fullcirclecare.org/caregiverissues/general/safety.html#vision>
- Gaugler, J. E. (2006). Family involvement and resident psychosocial status in long-term care. *Clinical Gerontologist*, 29(4), 79-98.
- Gott, M., Seymour, J., Bellamy, G., Clark, D., & Ahmedzai, S. (2004). Older people's views about home as a place of care at the end of life. *Palliative Medicine*, 18, 460-467. doi: 10.1191/0269216304pm889oa
- Heath, Y., & Gifford, R. (2001). Post-occupancy evaluation of therapeutic gardens. *Activities, Adaptation and Ageing*, 25(2), 21-43.
- Hunter, C. (2002). Bright ideas. *Health Facilities Management*, July 2002, 26-30.
- Imamoglu, C. (2007). Assisted living as a new place schema: a comparison with homes and nursing homes. [Journal Article]. *Environment and Behavior*, 39(2), 246-268.
- Iwarsson, S. (2005). A long-term perspective on person-environment fit and ADL dependence among older Swedish adults. *The Gerontologist*, 45(3), 327-336.
- Kahana, E., Lovegreen, L., Kahana, B., & Kahana, M. (2003). Person, environment, and person-environment fit as influences on residential satisfaction of elders. *Environment & Behavior*, 35(3), 434-453.
- Karakaya, M. G., Bilgin, S. C., Ekici, G., Kose, N., & Otman, A. S. (2009). Functional mobility, depressive symptoms, level of independence, and quality of life of the elderly living at home and in the nursing home. *Journal of the American Medical Directors Association*, 10(9), 662-666.

- Knoefel, F., Patrick, L., Taylor, J., Goubran, R. (2013). Dual-stiffness flooring: Can it reduce fracture rates associated with falls? *Journal of the American Medical Directors Association, 14*, 303-305.
- Kochera, A., & Bright, K. (2005). Livable communities for older people. *Generations, 29*(4), 32-36.
- Krueger, R., & Casey, M. (2008). *Focus groups: A practical guide for applied research*. Thousand Oaks, California: Sage Publications.
- Kvale, S., & Brinkmann, S. (2008). *InterViews: Learning the craft of qualitative research interviewing*. Thousand Oaks, California: Sage Publications.
- La Gory, M., & Fitzpatrick, K. (1992). The effects of environmental context on elderly depression. *Journal of Aging and Health, 4*(4), 459-479.
- Lee, S., Dilani, A., Morelli, A., & Buyn, H. (2007). Health supportive design in elderly care homes: Swedish examples and their implication to Korean counterparts. *Architectural Research, 9*(1), 9-18.
- Leibrock, C. A., & Harris, D. (2011). *Design details for health: Making the most of design's healing potential*. Hoboken, New Jersey: John Wiley & Sons.
- Leonova, A. B. (2009). Basic issues in occupational stress research. In D. Wedding & M. J. Stevens (Eds.), *Psychology: OUPsyS Global Resource*. London: Psychology Press.
- Liebig, P. (2001). International perspectives on housing frail elders. *Journal of Architectural and Planning Research, 18*(3), 208-222.
- Medicare.gov. (2010). Who can get Medicare-covered home health care, and what services does Medicare cover?, from

- https://questions.medicare.gov/app/answers/detail/a_id/1347/~who-can-get-medicare-covered-home-health-care,-and-what-services-does-medicare
- Medicare.gov. (2012). Medicare benefits Retrieved April 12, 2012, from <http://www.medicare.gov/navigation/medicare-basics/medicare-benefits/medicare-benefits-overview.aspx>
- Mezey, M., Dubler, N. N., Mitty, E., & Brody, A. A. (2002). What impact to setting and transitions have on the quality of life at the end of life and the quality of the dying process? *The Gerontologist*, 24(Special Issue 3), 54-67.
- Morgan, D. (1996). *Focus groups as qualitative research*. Thousand Oaks, CA: SAGE Publications.
- Morgan, L. A., Eckert, J. K., Piggee, T., & Frankowski, A. C. (2006). Two lives in transition: Agency and context for assisted living residents. *Journal of Aging Studies*, 20, 123-132.
- National Institute on Aging. (2014). Caregiver guide: Tips for caregivers of people with Alzheimer's Disease. Retrieved March 27, 2014 from <http://www.nia.nih.gov/alzheimers/publication/caregiver-guide>
- NCIDQ. (2004). Definition of interior design Retrieved April 16, 2012, from <http://www.ncidq.org/AboutUs/AboutInteriorDesign/DefinitionofInteriorDesign.aspx>
- NIH: National Institute on Aging. (2012). Nursing homes, from <http://www.nlm.nih.gov/medlineplus/nursinghomes.html>
- North Carolina State University Center for Universal Design. (1997). *Universal Design Principles*. Retrieved from http://www.ncsu.edu/ncsu/design/cud/about_ud/udprinciples.htm

- Pynoos, J., & Regnier, V. (Eds.). (1991). *Improving residential environments for the frail elderly: Bridging the gap between theory and application*. New York: Academic Press.
- Rabig, J. A., Thomas, W., Kane, R., Cutler, L., & McAlilly, S. (2006). Radical redesign of nursing homes: applying the Green House concept in Tupelo, Mississippi. *The Gerontologist*, 46(4), 533-539.
- Reed, R., Leigh, K., & Tremblay, K. (2007). Designing assisted living facilities to foster a sense of home. *Housing and Society*, 34(213-240).
- Regnier, V. (2002). *Design for assisted living: guidelines for housing the physically and mentally frail*. New York: John Wiley and Sons.
- Regnier, V., & Denton, A. (2009). Ten new and emerging trends in residential group living environments. *NeuroRehabilitation*, 25(3), 169-188. doi: 10.3233/nre-2009-0514
- Rogers, S., & Komisar, H. (2003). Who needs long-term care? *Long-Term Care Financing Project*: Georgetown University.
- Saunders, J. C., & Heliker, D. (2008). Lessons learned from 5 women as they transition into assisted living. *Geriatric Nursing*, 29(6), 369-375.
- Scher, R. (2011). Massachusetts' 2nd Green House Project focused on Alzheimer's care
Retrieved December 7, 2011, from <http://thegreenhouseproject.org/massachusetts-2nd-green-house-project-focused-on-alzheimers-care/>
- Shippee, T. P. (2009). "But I am not moving": Residents' perspectives on transitions within a continuing care retirement community. *The Gerontologist*, 49(3), 418-427. doi: 10.1093/geront/gnp030
- Social Security Online. (2011). Retirement benefits by year of birth. *Retirement Planner*
Retrieved April 12, 2012, from <http://www.socialsecurity.gov/retire2/agereduction.htm>

- Spillman, B. C., & Long, S. K. (2007). Does high caregiver stress lead to nursing home entry? : U.S. Department of Health and Human Services.
- Stewart, R. (2009). Case study - Humanitas: SAGE Tours.
- The Benevolent Society. (2009). Apartments for life in Australia: Lessons for Australia from Humanitas in the Netherlands: The Benevolent Society
- U.S. Census Bureau. (2006). Selected characteristics of baby boomers 42 to 60 years old in 2006. In U. S. C. B. Age and Special Populations Branch (Ed.): U.S. Census Bureau.
- U.S. Department of Health and Human Services. (2000). *Healthy people 2010: understanding and improving health*. Washington, DC: Author.
- United States Census Bureau. (2011). *Age and sex composition: 2010*.
- Van Hoof, J., & Kort, H. (2009). Supportive living environments: a first concept of a dwelling designed for older adults with dementia. *Dementia* 8(2), 293-316.
- Vincent, G., & Velkoff, V (2010). The next four decades: The older population in the United States: 2010-2050. *Current Population Reports*: U.S. Census Bureau.
- Whitemyer. (2012). The future of evidence-based design Retrieved April 17, 2012, from <http://www.iida.org/content.cfm/the-future-of-evidence-based-design>
- Whole Building Design Guide. (2012). Nursing Home Building Attributes Retrieved September 13, 2012, from http://www.wbdg.org/design/nursing_home.php
- Wilson, K. B. (2007). Historical evolution of assisted living in the United States, 1979 to the present. *The Gerontologist*, 47(Special Issue 3), 8-22.
- Wimo, A., Olov Wallin, J., Lundgren, K., Rönnbäck, E., Asplund, K., Mattsson, B., & Krakau, I. (1991). GROUP LIVING, AN ALTERNATIVE FOR DEMENTIA PATIENTS. A COST ANALYSIS. [Article]. *International Journal of Geriatric Psychiatry*, 6(1), 21-29.

World Health Organization. (2012). Definition of an older or elderly person. Retrieved April 12, 2012, from <http://www.who.int/healthinfo/survey/ageingdefnolder/en/index.html>