Aging in Place in Assisted Living: Exploring the Personal and
Environmental Factors Related to Length of Stay

Dissertation

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By

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Abstract

This study examined to what extent personal and environmental factors, as defined by the contemporary ecological model of aging, help us understand aging in place in assisted living (AL). A review of the literature provided background on person-environment perspectives on aging in place as well as highlighted other studies of AL relevant to length of stay. A convenience sample ($N = 218$) of administrative records of AL residents admitted during between the years 2006 and 2011 was collected by the researcher from ALs located in Ohio operated by a single not-for-profit organization. Administrative records included AL residents' demographic and healthcare information as well as dates of admission and discharge.

Cox regression was used to determine which personal (biological, cognitive, affective, and health) and environmental (cultural, social, physical) factors influenced length of stay in three AL programs. Number of medical diagnoses, level of care score, and facility were found to be significant predictors of length of stay. The analyses identified a median survival time of 32 months as well as critical periods for discharge from AL. Using the ecological model of aging to examine length of stay in AL was supported. The results of this study will inform providers, policy makers, researchers, residents and their caregivers about the factors related to aging in place in AL. Study implications and future directions for research are presented.

Acknowledgements

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Fields of Study

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Chapter 1: Introduction

Assisted Living (AL) is one of the fastest growing areas of long-term care services and supports for older adults, with the number of AL facilities surpassing the number of nursing homes nationwide (Assisted Living Federation of America, 2010; Spitzer, Neuman, & Holden, 2004; Stevenson & Grabowski, 2010). Across states, Assisted Living (AL) is broadly defined as a residential facility providing 24 hour supervision and assistance related to personal and health-related services in activities of daily living (National Center for Assisted Living, 2013). Although most states uses the term "assisted living," AL is often known by other names (e.g. residential care, adult care homes, personal care homes) and offers a wide variety of services in a vast array of settings (Mollica, 2008, Zimmerman & Sloane, 2007). AL is designed to provide a safe "homelike" setting with 24-hour staff, meals, social activities, and often health or nursing care services. Residents in AL frequently receive assistance with activities of daily living (e.g. dressing, bathing, eating) and instrumental activities of daily living (e.g. meal preparation, medication administration, shopping). AL also espouses a philosophy of care that promotes dignity, independence, and privacy for residents in these settings (Assisted Living Federation of America, 2013). The early models of assisted living "emerged in reaction to nursing facilities and a vision of a different way of bringing physical environments, care and service capacity, and philosophy together to offer a more

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desirable product to older people" (Wilson, 2007, p. 9).   The most recent national study

of residential care facilities, including AL, defines these settings as facilities that "provide

housing and supportive services to persons who cannot live independently but generally

do not require the skilled level of care provided by nursing homes" (Park-Lee et al., 2011,

p. 1).

Although there have been many on-going efforts of providers, consumers, and

policy makers in expanding AL, the definition and scope of these care settings remains

ambiguous.

AL encompasses a wide range of housing models, including three categories of

state licensing for these settings: institutional, housing and services, and the service

model (Mollica, 2008). The institutional approach offers residents shared bedrooms and

bathrooms while the housing and services model requires apartment-style units that serve

a wide range of resident needs. The service approach licenses the provider or agency of

the AL to regulate the individual facility with existing building codes and requirements.

In additional to licensing categories, multiple typologies for AL include delineations

related to structure, process, population and philosophy (Zimmerman, et al., 2005). AL

experts identify three types of AL: facilities with fewer than 16 beds, traditional board

and care facilities, and new-model facilities. The new model AL definition includes

facilities with at least two different private pay monthly rates dependent upon resident

need, the presence of either an RN or LPN on duty at all times, and facilities with

residents requiring assistance with transfers and/or incontinence. Other research suggests

five types of AL based on the following structural and resident orientations: impairment,

dementia, mental illness, housing, and a mixed model (Park, Zimmerman, Sloane, Gruber-Baldini, & Eckert, 2006).

Facility data from the 2010 National Survey of Residential Care Facilities (NSRCF), conducted by the Centers for Disease Control and Prevention's National Center for Health Statistics, Division of Health Care Statistics, were used for these analyses. To be eligible for the study, RCFs must be licensed, registered, listed, certified, or otherwise regulated by the state; have four or more licensed, certified, or registered beds; have at least one resident currently living in the facility; and provide room and board with at least two meals a day, around-the-clock on-site supervision, and help with personal care such as bathing and dressing or health-related services such as medication management.

Driven by concerns for cost and consumer preferences, long-term care policy has shifted from institutional care to home and community-based care (Fields, Anderson, & Dabelko-Schoeny, 2011; Polivka, Salmon, & Rill, 2013). There are over 36,000 AL facilities across the United States providing residential care and services to almost 1 million older and disabled adults (Park-Lee et al., 2011). Long-term care service provision has expanded to include AL as a result of federal and state initiatives as well as the growing number of older adults in need of health-related supportive services. Federal policy, such as the Olmstead decision of 1999 which prohibits unnecessary institutionalization along with section 1915(c) of the Social Security Act, which established home and community-based (HCBS) waiver programs have resulted in the expansion of alternatives to nursing home placement. The HCBS system supports state

programs such as Medicaid Waivers to provide AL services for individuals who would otherwise live in nursing homes.

AL is a primarily private pay industry with most ALs charging rates far greater than many older adults can afford (Hernandez, 2012). The national average cost of AL is $3,550 per month or $42,600 per year (MetLife, 2013). Although forty-one states have some Medicaid funding for AL, there is often a limit on the number of participants that states may serve each year (Mollica, 2009). One of the challenges with AL Medicaid waivers is that low reimbursements are often a disincentive to participation for AL providers (Hernandez, 2012; Chapin, Hickey, Rachlin, & Higgins, 2008). Currently, federal statues do not allow Medicaid to reimburse ALs for room and board and ALs rely on SSI payments for these expenses (Carlson, Coffey, Fecondo, & Newcomer, 2010). The end result is that ALs are reimbursed at rates that make participation in Medicaid less attractive to providers.

Although the majority of older adults prefer to live at home rather than in institutional care settings, if relocation is needed, AL is considered preferable to a nursing home (Eckert, Carder, Morgan, Frankowski, & Roth, 2009). AL was developed in part to address older adults' interest in avoiding nursing home placement and to offer older adults the ability to "age in place" in a homelike environment (Frank, 2002; Kane, Wilson, & Spector, 2007). Overall, almost 70% of residents move to AL from their own private home or apartment (National Center for Assisted Living, 2010). Healthy and independent older adults may relocate to AL in anticipation of future needs while others

may transition to AL due to functional decline and/or cognitive impairment (Cummings & Cockerham, 2004).

As AL continues to evolve to meet the growing need for long-term care services among older adults, further research is needed to explore the issues associated with transitions to AL and the factors related to aging in place in these settings. While aging in place is often considered a goal in AL, little is known about the factors that influence how long a resident will remain in the AL. Despite a growing need for research in AL, particularly around resident outcomes, there have been only a few recent studies of aging in place in AL settings. The purpose of this research is to explore the extent to which personal and environmental factors influence length of stay among AL residents. This study is an important step in understanding length of stay within the framework of the ecological model of aging. The use of this model will contribute to a better understanding of aging in place in AL and will build a foundation for improving person-environment interactions in these settings. Study findings may contribute to a better understanding of how to maximize length of stay in AL by supporting resident independence and autonomy as well as prevent or delay the use of institutional long-term care services (i.e. nursing homes). Findings from this study may inform future studies in measuring residents' psychosocial needs and may also bolster support for social work in AL. Finally, the combination of personal and environmental measures is expected to provide evidence of the multidimensional factors related to aging in place in AL settings.

Chapter 2: Literature Review

Introduction

The growth in AL as an important alternative to nursing homes (Chapin & Dobbs-Kepper, 2001; Kane, Chan, & Kane, 2007; Polivka et al., 2013; Zimmerman & Sloan, 2007) and the desire of older adults to remain living as independently as possible increases the need to examine the factors related to aging in place in AL. Furthermore, a better understanding of who is best served in AL and under what conditions highlights the importance of a focus on the person and environment in these settings. This chapter begins with an overview of the main theoretical framework used to guide this study followed by a review of studies related to individual and facility level characteristics that are associated with discharge from AL. In order to better understand the factors that relate to length of stay in AL and aging in place, research studies of feeling 'at home' and attachment to home were also examined to help guide the research project.

Theoretical framework

One of the primary goals of home and community based services, including AL, is to allow older adults to age in place in the least restrictive environment (Franks, 2002; Hedrick et al., 2010; Hernandez, 2012; Stone & Reinhard, 2007; Wilson, 2007; Zimmerman et al., 2005). A model that takes into account both the person and the environment was needed to fully examine the factors related to length of stay in AL. Person-environment was first introduced by Lewin (1951) as a theory suggesting that

there is a relationship between the individual, the environment, and behavior. Lewin (1951) represented this relationship with the equation "$B = f(P,E)$, where behavior (B) is a function (f) of the person (P) and the environment (E)" (p. 239). Building on this theory, Lawton and Nahemow (1973) developed an ecological model of aging that considers the adaptation of a person to the environment as a broader process of human adaptation. The ecological model of aging resulted from an examination of how the behavior of older adults is affected by dimensions in the environment in addition to the biological, social, and personal changes associated with aging (Lawton, 1982). Also known as the competence model, the ecological model of aging helps explain the relationship between environmental demands and the ability of an aging individual to cope with these demands. These environmental demands, also identified as "environmental press," refer to physical, social, or psychological conditions that can be positive, negative, or neutral (Lawton, 1982). Lawton proposed that how an individual responds to the environment depends upon his or her level of competence, defined as the theoretical capacity of an individual's functioning in the areas of biological health, sensation, perception, motor behavior, and cognition (Lawton, 1982). In older adulthood, individual competence may decline as a result of losses related to physical functioning, social isolation, and widowhood (Lawton, 1983). According to the model, individuals who have high levels of competence can respond better to greater levels of environmental press while individuals with lower levels of competence are at greater risk to issues posed by the environment. As individuals age, their competencies (e.g. physical and cognitive functions) may decline, resulting in an increased need to cope with environmental press. Furthermore, some older adults may find themselves in an environment that is too

demanding for their state of competence.

However, individual competence may improve when individuals pursue an environment that is most congruent with the fulfillment of individual needs. Kahana's (1982) congruence theory takes into account environmental characteristics and individual needs as a way of understanding the impact of the environment on the well-being of older adults. Kahana's model of person-environment congruence further suggests that individual needs vary in type and strength as do environments which may vary in the extent to which they are capable of satisfying needs (Kahana, 1982). Kahana, Lovegreen, Kahana, and Kahana (2003) proposed that the characteristics of the individual, the environment, and of the person-environment fit are all important predictors of resident satisfaction among community-dwelling adults. Carp and Carp (1982) further elaborated on the person-environment models of Lawton and Nahemow (1973) and Kahana (1982) by examining the objective and subjective aspects of the environment. Carp and Carp (1982) proposed three salient features of the environment including access to services and facilities, relationships with other people, and aesthetics. Their study suggested that the aesthetic qualities of a living environment are relatively important to adults across age groups. When applied to AL settings, these findings suggest that the location of an AL within the greater environment (i.e. neighborhood, community) may play an important role in predicting satisfaction among older adults transitioning to AL.

Aging in place

The term "aging in place" has traditionally referred to older adults living in their own homes with the emphasis on environmental modifications to compensate for decline

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and disability (Pynoos, 1993). However, aging in place is also considered a term that includes the AL environment (Ball, et al., 2004a; Bernard, Zimmerman, Eckert, 2001; Chapin & Dobbs-Kepper, 2001; Marek & Rantz, 2000). Aging in place has been described as a concept that allows older adults to live independently and receive services and supports that increase or decrease with changing needs and functional abilities (Mollica, 2005). Lawton (1990) described aging in place as a "transaction between an aging individual and his or her residential environment that is characterized by changes in both person and environment over time, with the physical location of the person being the only constant" (p. 288). In a recent qualitative study of the meaning of aging in place to older adults, participants ($N = 121$) were asked the question "what is the ideal place to grow older?" Findings suggested that aging in place is tied to a sense of attachment to one's home as well as social connections with the community, feelings of security, and feelings of autonomy (Wiles, Leibing, Guberman, Reeve, & Allen, 2012)

Place attachment occurs when an individual gives emotional meaning to space and a connection binds the individual to that space (Low & Altman, 1992; Rubinstein & Parmalee, 1992). Furthermore, place attachment is related to aspects of physical, social and personal bonding on the behavioral, cognitive, and emotional levels of the individual (Oswald, Hieber,Wahl, & Mollenkopf, 2005). In an ethnographic study of older adults in rural Appalachia, Rowles (1983) explained that individuals attain place attachment over time through the development of physical, social and autobiographical "insideness." Physical insideness is achieved through an individual's familiarity with their home and a "sense of being almost physiologically melded into the environment" (Rowles, 1984, p.

146). Social insideness develops as individuals' social relationships and sense of social identity become integrated with the experience of a place (Rowles, 1983). For example, an individual who knows his or her neighbors and connects to the roles, rules, and expectations of others in relationship to where they live. Autobiographical insideness involves attachments from places in the past that have shaped an individual's self-identity as the "individual engages in the ongoing creation and modification of home as a symbol of the self" (Rowles, 1987, p. 340).

A study by Boschetti (1990) suggested a close integration between the physical/spatial dimensions home and issues of attachment and self-identity in older adults. The concepts of enclosure and openness emerged as important qualities of a home from the perspective of older adults. Enclosure was associated with centers of meaning within the home and served as the focus of the individual-familial world (e.g. fireplace, dining room table). Openness referred to the place where expression of connection with the outside world occurs (e.g. front porch, windows). A related study by Boschetti (1995) examined the role of an individual's personal possessions in attachment to place. Two themes emerged from this research including connection/extension which symbolized the personal self and continuity/discontinuity which symbolized the historical self. Possessions such as photographs, diaries, and paintings were viewed as important in the connections that they made to important people or events in a person's life (Boschetti, 1995). Possessions that were passed down through several generations linked individual's lives across the life span and were seen as objects that served to preserve family continuity and an individual's place within the family structure (Boschetti, 1995). Thus,

the role of possessions as a way to "convey meaning and to transform an anonymous space into a place" (Boschetti, 1995, p. 10) may be important when considering the design of residential settings of older adults.

Rubinstein (1989) proposed a psychosocial process linking person to home environment including the social-centered process, person-centered process, and body-centered process. The social-centered process concerns the way "that individuals utilize public, societal ideals for environmental order" (Rubinstein, 1989, p. 47). Individuals order the way that a home environment is structured based on his or her socio-cultural interpretation of where things go, how a room functions, and the use of decoration in arranging space. Objects in the home environment from the particular to the mundane are significant as environmental features are endowed with meanings related to the "distinctive events, properties, or projections of one's life" (Rubinstein, 1989, p. 49). The body-centered process concerns the on-going relationship of the body to the environment that surrounds it including the notion of "comfort" which is a "bridge between the objective reality of the physical environment and personal feelings and beliefs" (Rubinstein, 1989, p. 51). Rubinstein asserted that implicit in the process of creating a meaningful environment is the idea that changes within the individual may also change the meaning of the environment. Thus, individual dimensions of health such as physical decline or loss may lead to changes within the home environment making it important to understand how meaningful environments evolve in later life.

Research suggests that the past experiences of residents in AL are important in explaining differential residential adjustment outcomes as older adults' past experiences

may impact his or her reference points by which to judge environmental change (e.g. moving to a new home) (Golant, 1998). While looking to the past may be an important consideration, envisioning the future may also be a factor related to residential adjustment. Golant (2003) suggested that how an older resident viewed the future was likely to influence his or her responses to a residential move. For example, a resident anticipating only a short-stay in AL may be more willing to overlook deficiencies in the setting as he or she expects to return to their previously occupied setting (e.g. home). In contrast, an older adult that expects to be living long-term in a new setting may be less tolerant of shortcomings in the environment because he or she does not expect to ever leave this setting. Thus, asking AL residents for their short and long term goals upon admission may be an important aspect of resident assessment in AL.

The use of personal space and personal possession as symbolic markers of "home" may be important considerations for resident adjustment to AL. Researchers have examined the role of household objects during the admission and transition to AL. In a recent study by Nord (2013), qualitative interviews were conducted with AL residents about the meaning of household possessions that they kept when they moved to the AL. Three types of household possessions among the AL residents in the study: a) cherished objects, b) representations of who they were, and c) mundane objects (Nord, 2013, p. 135). The results of the study suggested that the location of these objects was also meaningful to residents as those objects considered to be valuable in everyday life were within the residents' reach. Although study findings revealed low levels of sociability and activity among AL residents, the author argued that they also "lived an

active life in their small, but quality space, evidenced by the many practical objects, both large and small, that they kept with them" (Nord, 2013, p. 141).

Other studies have reported similar findings related to personal household objects during residential relocation. Aminzadeh, Dalziel, Molnar, and Garcia (2010) conducted in-depth interviews with persons with dementia two months prior to their location to a residential care facility ($N = 16$) in order to better understand the transition from home to a congregant setting. The authors highlighted the importance of supporting residents during the transition by "carefully selecting, distributing, and packing their treasured belongings" and stressed that "the significance of this process in facilitating their post-relocation adjustment, should not be underestimated" (Aminzadeh et al., 2010, p. 33).

Making sense of the new AL environment is a challenge, particularly as most residents may not have lived in a group/communal setting since their college days or during past military service. Yamasaki and Sharf (2011) explored how AL residents make sense of and characterize life in AL. The authors found that "linking present situations to past experiences helps residents themselves find meaning in the lived reality of residential long-term care" (Yamasaki & Sharf, 2011, p. 13). The authors also suggested that the "continuity of biographical identity" (p. 20) allows an AL resident to connect with the congregate environment of an AL setting. Similarly, Dobbs (2004) suggested the use of life history information in order to know what residents' preferences in their life at home were prior to moving to AL as well as to establish continuity between home and the new AL environment. Findings indicated that AL residents felt a lack of control regarding certain aspects of their living environment such as mealtimes

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and activities. However, the structure, routine, and socialization in the dining room may be a main way for residents to build relationships and encourage psychological well-being (Kemp, Ball, Hollingsworth, & Perkins, 2012; Park, et al., 2009).

The adjustment to residential care is marked by the feeling that the new setting is now "home." Cutchin, Owens, and Chang (2003) explored the process of how older adults integrate into AL and come to feel "at home" in AL settings. Cross-sectional survey data was collected from a purposive sample of residents ($N = 247$) in AL facilities across four states in order to provide variation by geographic region, urban and rural settings, facility size, and facility funding status (i.e. for profit, not for profit). Findings from a structural equation model indicated that whether an AL resident considered their residence as "home" was influenced most significantly by his or her social engagement with non-family members. Cutchin et al. (2003), further suggested that attachments to place for older adults based on past experiences may require redirection through on-going meaningful activity in order for residents to successfully age in place in AL.

Related research

One of the core values in AL is resident autonomy. Residents in AL report higher level of autonomy and privacy than residents in nursing homes (Robison et al., 2010). Thomas, Guihan, and Mambourg (2011) surveyed 74 AL providers to examine the effect of facility type on AL admission policies (i.e. acuity of residents that ALs will admit) and resident autonomy. The items that were used to measure resident autonomy included: sleeping late and missing breakfast, pet ownership, having overnight guests, individual control over air/heat, alcohol consumption in resident rooms, drinking a glass of

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wine/beer at meals, and smoking. Finding suggested that ALs offered higher resident autonomy than other long term care settings, but were less willing to meet the changing care needs of residents as they grow older. The authors further suggested that "there appears to be a trade-off in which those facilities that were mostly likely to employ policies that promote autonomy were least willing to provide more intensive services that might substantially prolong a resident's capacity to stay in the community" (Thomas, et al., 2011, p. 121).

ALs vary in their ability and/or willingness to provide specialized care such as dementia programming or mental health services. In a qualitative study of AL, administrators described their decisions to discharge residents with dementia from AL to a skilled nursing facility (Aud, 2002). Findings suggested that interactions with the behavior and the environment contributed to the decision to discharge a resident from AL. In particular, safety and elopement (i.e. wandering from the facility) were among the highest factors that influenced resident discharge as well as the match between a resident's needs and the AL's ability to provide care for those needs. In this study, the findings highlighted the "tension between autonomy and security" in AL (Aud, 2002, p. 81).

Dobbs, Hayes, Chapin and Oslund (2006) explored the individual and facility level characteristics related to resident discharge from AL ($N = 366$). More specifically, the authors focused on AL residents with a psychiatric disorder (e.g. depression, anxiety). The outcome variable in this study was aging in place as measured by the length of time in the AL before discharge to a nursing home. Using Cox regression, findings suggested

that residents with a psychiatric disorder were more likely to discharge to a nursing

home. Individual level factors including age, being married and hospitalizations

increased the likelihood of discharge to a nursing home. Of the facility level factors

included in the Cox regression, residents in not-for-profit ALs and freestanding ALs had

a decreased risk of discharge to a nursing home. The authors suggested that providers in

free-standing ALs are more inclined to care for higher risk residents because of concern

for financial losses (i.e. discharges result in lost revenue). The authors also suggested

that providers in ALs that were a part of a Continuing Care Retirement Community

(CCRC) were discharging their residents to another part of the same facility and were

therefore still able to maintain that resident, albeit in a another level of care. However,

these findings are in contrast with the findings of Zimmerman et al. (2005) suggesting

that AL residents that were part of a CCRC/nursing home (versus free-standing AL) were

at increased risk for discharge to a higher level of care. In a related study, Munroe and

Guihan (2005) found that the most common factors related to moving out of AL were

financial (i.e. not paying rent), the need for a two-person transfer, and potential self to

harm or others. The researchers also found that AL providers' "ability and willingness to

manage tenants with increasing need was dependent on at least three factors: a) the

proportion of total tenants with complex service needs, b) how diligently the facility

defined and struggled to adhere to its AL philosophy, and c) whether someone within the

facility was experienced in handling complex or emotionally charged situations" (Munroe

& Guihan, 2005, p. 28).

Recently, qualitative researchers have been exploring the physical environment in AL settings. Kemp et al. (2012) found that facility-level factors including size of the AL as well as physical and social environment influence residents' social relationships in AL. In particular the physical layout of the AL such as back patios and common spaces helped promote resident interaction. The authors noted the importance of designing spaces in AL that encourage socialization among residents (Kemp, et al., 2012).

Campo and Chaudhury (2011) recently conducted an ethnographic study to explore elements of the physical and social environment that influence social interaction among residents living in dementia special care units (SCU). The authors used observation-based instruments including the Therapeutic Environment Screening Scale for Nursing Homes (Sloan et al., 2002) and the Professional Environmental Assessment Protocol (Norris-Baker, Weisman, Lawton, Sloane, & Kaup, 1999) in addition to semi-structured interviews with staff and resident observations. Study findings suggested that environmental features may effect the behavior of the staff and in turn encourage opportunities for social interaction and engagement among residents as well as staff.

Other studies have quantitatively measured features of the physical environment in AL. Cutler, Kane, Degenholtz, Miller and Grant (2006) examined the physical environment in 1,988 resident rooms, 131 nursing units, and 40 facilities in five states. The authors developed and constructed environmental checklists to capture the tangible aspects of the environment. Room level assessments measured the level of privacy in the physical environment, how well the residents' rooms support the needs of individuals with mobility limitations (e.g. wheelchair), the personalization of residents' room (e.g.

personal furnishings), opportunity for environmental control (e.g. adjustable air conditioning), and life enriching items that promote comfort as well as meaningful activities and relationships (e.g. view of the natural environment, telephone, pet).

Nursing unit indices measured the ease of movement within and between units (e.g. handrails, automatic door openers), the presence of corridor clutter, lounge or shared spaces available to all residents, outdoor space accessibility, bathing environment (e.g. multiple tub and/or shower rooms with separate enclosures), and the positive features of dining spaces (e.g. windows).

Facility indices described facility amenities for visitors, residents, and staff (e.g. beauty shop, chapel, coffee bar), outdoor amenities (e.g. secured courtyard), and environmental features such as corridor railings and accessible restrooms. The researchers in this study were able to clearly operationalize environmental variables defined the environment as the "fixed, semifixed, and unfixed components of the physical structure, and the furnishing, fixtures, decor, and equipment" (Cutler, Kane, Degeneholtz, Miller & Grant, 2006, p. 44). However, this definition did not take into account the more subjective, personal features of the environment that may influence length of stay in AL.

Dobbs-Kepper, Chapin, Oslund, Rachlin, and Stover (2001) surveyed AL facility administrators in Kansas ($n = 141$) regarding admission and retention policies, reasons for resident discharge, discharge destinations, and average length of resident stay in AL in order to determine the parameters within which ALs allow residents to age in place. This was one of the first comprehensive studies of aging in place in AL as the authors used longitudinal data collected at three points in time (baseline, 6, and 12 months). The

resident sample in this study was 366 residents from 37 ALs. Data was collected from a

questionnaire, a state required residential function capacity screen, and a resident

outcome form constructed by the research team that included the date of discharge,

discharge destination, and reason for discharge. Findings suggested that nursing facility

placement and hospitalization were the most common outcomes of residents' discharge

from the AL. The individual factors found to be related to discharge from AL to a higher

level of care were: age, marital status, higher ADL average, cognitive impairment,

number of medical conditions, and hospitalizations.

Ball et. al (2004a) examined aging in place through participant observation,

interviewing, review of resident/facility records and marketing materials. The authors

found that the ability of a resident to age in place was influenced by the 'fit' between the

capacity of the AL as well as the resident to manage his or her decline. Multiple factors

including the outside community, the physical and social environment of the facility and

the resident were found to influence aging in place. For example, small size ALs and

small-town and/or rural settings facilitated stronger social relationships while newer

facilities had physical environments that were more accessible.

One of the largest and most cited studies of AL examined the association between

the structure/care in AL with resident outcomes (for an overview, see Zimmerman et al.,

2001). Known as the Collaborative Studies of Long Term Care (CS-LTC), this study

included 2,839 residents and 233 facilities including AL and nursing homes in Florida,

Maryland, New Jersey, and North Carolina.

Bernard, Zimmerman, and Eckert (2001) examined resident characteristics related to discharge from AL using the Collaborative Studies of Long Term Care (CS-LTC) data. The authors found that certain resident characteristics were related to higher risk for discharge from AL, including immobility, limitations with self-feeding, and problematic behaviors such as wandering. Study findings also suggested that the state in which the AL was located, age of the AL, and AL ownership influenced policies related to resident discharge.

Phillips et al. (2003) used data from the CS-LTC to investigate the impact of facility and resident characteristics on discharge from AL. Findings suggested that functional status, cognitive status, and the presence of a full-time RN influenced AL resident moves from ALs to nursing homes. Facility characteristics in the study included prohibition against wheelchair use, discharge policy, size of the AL, occupancy rate, free-standing or CCRC, nursing assistance, whether or not nurses were employed full-time or part time, staff turnover, and the facility case-mix (i.e. level of resident care needs). Of these facility characteristics, only profit status and type of nursing staff were significant. Study findings indicated that residents in for-profit facilities were three times more likely to discharge to another setting and residents in an AL that employed a full-time registered nurse (RN) were less likely to discharge to a nursing home.

In a more recent study of facility level variables, Hedrick et al. (2009), explored the associations between the characteristics of individual ALs and resident discharges in a Department of Veterans Affairs AL pilot program using electronic and administrative records ($N = 393$). The authors examined facility size, occupancy rate, and percentage of

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private rooms as well as whether or not the facility was multilevel (e.g. attached to a skilled nursing facility) and ownership (e.g. part of a chain). The authors also included staffing variables such as resident to staff ratios and nursing care on staff. Study findings indicated that there were no significant differences in mortality or discharge for any of the facility characteristics.

In a seminal study of AL conducted by Zimmerman et al. (2005), the data from the Collaborative Studies of Long Term Care (CS-LTC) was used to compare small ALs, new-model ALs, and traditional ALs ($N = 2,078$) . Longitudinal analyses were used to assess the effects of facility characteristics on AL residents' morality, hospitalization, morbidity (i.e. new or worsening health conditions), functional changes and nursing home transfer over one year. The authors found that differences in facility type were not significant in relation to resident risk of mortality, hospitalization, morbidity or transfer to a nursing home. However, residents in traditional ALs were one third less likely to die over one year than those residents in smaller ALs.

In a similar study, Street, Burge, and Quadango (2009) used state administrative and facility survey data ($N = 463$) from the Florida Study of Assisted Living to compare patterns of admission and discharge by type of facility. The authors specifically wanted to examine whether or not aging in place varied by facility type based on policies related to discharge. ALs were classified according to licensure type: traditional (e.g. standard assistance with ADLs), high-frailty (e.g. additional nursing services provided), and behavioral (e.g. mental health services provided). Findings indicated that most residents were admitted to AL from either their home or from nursing homes while nearly half

were discharged to nursing homes or died. Behavioral ALs discharged residents with declines in physical functioning (e.g. need for wheelchair and/or transfer assistance) more often than traditional and high-frailty ALs. Behavioral ALs were also less likely to admit residents with high care needs and incontinence. High frailty ALs were less likely to discharge residents who wander, have socially inappropriate behavior, or have severe cognitive limitations. High frailty ALs were also more likely to have residents who died and were less likely to be discharged to homes in the community when compared to traditional and behavioral ALs.

Studies suggest that the transition to AL may be particularly challenging for AL residents with dementia. Doyle, de Madeiros, and Saunders (2011) conducted an ethnographic study of AL residents in dementia care ($N = 31$) to examine the formation of social groups within the physical and organizational features of AL. Features of the physical environment, such as the location of locked doors, appeared to restrict not only the mobility of residents but also their social relationships. Findings suggest that locked doors may literally and figuratively become a barrier to social engagement and demonstrates how the environmental features of the AL, particularly for those residents with cognitive limitations, are important to consider.

In a related study, Kelsey, Laditka, and Laditka (2010) conducted a qualitative study using in-depth interviews with 15 caregivers related to the experiences moving their relatives to AL and memory care in AL settings.   Upon admission to AL, most of the caregivers recognized the possibility of a future need for memory/dementia care, however, half of the caregivers expected their relative to remain in AL. The majority of

caregivers in the study indicated that they were not informed upon admission to the AL about the policy for transferring residents with advanced dementia. Findings also suggested that ALs needed to "prepare, support, and educate caregivers" (Kelsey, Laditka, and Laditka, 2010, p. 260) about dementia as a way to improve the transition from AL to the AL memory care unit.

State policies also vary in the regulation of dementia care in AL settings. Kelsey, Laditka, and Laditka (2008) interviewed 10 AL administrators about the process of transitioning from AL to an AL memory care unit. Administrators in this study reported several "triggers" for resident transfer to memory care including leaving the building/elopement, negative behaviors, and the need for multiple staff members to assist with activities of daily living. Free-standing ALs often relied on the administrators' decision alone when considering resident transfer while multidisciplinary input was used for decision making among administrators in a CCRC. Administrators reported that the greater cost of the AL memory care unit was met with family resistance and presented challenges for families during the transition from AL to the memory care unit.

Bicket et al. (2010) examined the relationship of the AL physical environment with resident quality of life and compared residents with and without a diagnosis of dementia ($N = 326$). Measures of the physical environment included the Therapeutic Environmental Screening Scale for Nursing Homes and Residential Care (TESS-NH/RC) which included items such as facility maintenance (e.g. in need of repairs), cleanliness, handrails, call button accessibility, lighting, hallway length, privacy, tactile and visual stimulation, room autonomy, privacy, and homelikeness. The sum of the scores from the

TESS-NH/RC yield an AL Environmental Quality Score (AL-EQS). Overall, higher

ratings of the physical environmental were related with higher quality of life scores for

residents with dementia.

In a longitudinal cohort study of residents with dementia ($N = 1,252$), Sloan et al.

(2005) examined mortality rates, rates of morbidly, ADL changes, cognition, problems

with behavior, depressive symptoms and social functioning. Although the authors found

that there were no differences between nursing home and AL residents, findings indicated

that rates of discharge to a hospital differed. Hospitalization rates were higher for

residents with mild dementia in AL. Furthermore, only approximately one half of the

residents with mild dementia and one third of residents with moderate to severe dementia

remained in AL 1 year after admission.

Lykestos et al. (2007) examined the relationship between dementia and discharge

from AL in a sample of 198 residents from 2 ALs. The authors also explored the factors

associated with shorter length of stay in residents with dementia. Residents with dementia

had shorter length of stays than residents without dementia. Factors related to earlier

discharge among residents with dementia included lack of dementia treatment and more

serious medical comorbidity. In a study of newly admitted residents to dementia-care AL

settings, Kenny et al. (2008) examined time to discharge from AL to a permanent, skilled

nursing facility during a 9 month period ($N = 48$). Nearly half of the AL residents in the

study sample discharged to a higher level of care during the nine month period. Using a

multivariate Cox Regression model, the findings suggested that AL residents in dementia

care discharged at higher rates than those in general AL settings. However, a more recent

study suggests that dementia may not be related to resident discharge to nursing homes (Temple, Andel, & Dobbs, 2010).

Finally, recent studies of AL have started to examine the role of hospice in AL and aging in place. Polivka and colleagues (2013) suggest that "many residents remain in assisted living until they die, which reflects their desire to 'age in place' to the maximum extent possible" (p. 19). Dobbs, Meng, Hyer, and Volicer (2012) examined the influence of hospice enrollment on the likelihood of hospital and nursing home admission among a sample of newly admitted Medicaid wavier AL residents in Florida ($N = 658$). Data were collected from three state administrative sources as well as from the Centers for Medicaid and Medicare Services (CMS). Findings indicated that hospice enrollment was associated with a lower probability of both hospital and nursing home admission. The authors also suggested that enrollment in hospice may prevent hospital admissions because hospice provides additional medical care that reduces potentially avoidable hospitalizations. In addition to preventing hospital admissions, the authors suggested that enrollment in hospice may augment medical care for AL residents with complex medical needs and therefore prevent nursing home transfer. These findings are important, as earlier research by Friedman, Mendelson, Bingham, & McCann (2008) found that patients admitted to the hospital from AL were at higher risk for functional decline and falls than patients from the community. Furthermore, patients admitted to the hospital from AL were also at high risk of nursing home placement after a hospital discharge. As it relates to aging in place, hospice may become an increasingly important service for

residents in AL settings. Rather than discharge to a higher level of care, hospice may extend a residents' ability to age in place in AL.

Conclusion

While aging in place is often considered a goal in AL, more research is needed to better understand the factors that influence aging in place and how long a resident will remain in the AL setting (i.e. length of stay). In this study, length of stay is used as a proxy measure for aging in place, which is consistent with several studies that have examined aging in place and the process of how residents grow older in AL settings (Ball et al., 2004a; Bernard, Zimmerman, & Eckert, 2001; Chapin & Dobbs-Kepper, 2001). However, there are gaps in our knowledge about aging in place in AL as these studies were published over a decade ago. Additional studies, particularly ones that consider both personal and individual factors related to length of stay, are critical to better understanding the complexities of aging in place. Further research is warranted as knowing the factors related to aging in place may potentially reduce stressful residential transitions for older adults and their caregivers as well as provide cost-benefits for AL providers and policymakers. The following chapter will discuss the research methods for this study and will integrate the ecological model of aging as the overarching framework to explore the research questions.

Chapter Three: Methods

Introduction

This study explored aging in place in AL settings. As discussed in the literature review of this dissertation, few studies have examined the factors that influence aging in place in AL or how long a resident will remain in the AL setting. This study builds on previous studies to explore the personal and environmental domains involved in aging in place. Although this study is not the final step in our understanding of aging in place in AL, it does provide valuable data as well as insight on length of stay in AL settings.

In the following sections, the study design and justification for the project, sampling procedure, and dependent and independent variables are discussed. Data collection procedures are also reviewed in this chapter. Human Subjects Review Board Approval was received from The Ohio State University and is found in Appendix 1.

Significance and justification of the research

Based on demographic projections and an increased need for long-term care healthcare service delivery, there is a strong likelihood that AL will continue to play an important role in the continuum of housing and services for older adults (Polivka et al., 2013; Kane, Wilson, & Spector, 2007; Stevenson & Grabowski, 2010). Additional research is critically needed to better understand resident outcomes in these settings. Aging in place is one of the philosophical mainstays of AL with the outcome that "residents will have to relocate to a new setting less often" as the AL will "adjust its

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service provision and level of care criteria to meet residents' changing needs and to avoid having to discharge individuals to a higher level of care prematurely" (Chapin & Dobbs-Kepper, 2001, p. 43). The combination of personal and environmental measures provides evidence of the multidimensional factors related to aging in place in AL settings. Furthermore, this study adds knowledge to our understanding of older persons' biopsychosocial needs in AL within the context of this contemporary person-environment framework.

Knowledge of the personal and environmental domains involved in aging in place will give AL providers information to help them develop and improve policies that will support residents' wellness in these settings. This knowledge will also benefit policy makers examining public reimbursement (i.e. Medicaid waivers) of AL services and refining reimbursement strategies to maximize quality of life and minimize costs. Finally, exploring what factors contribute to length of stay and aging in place in AL is the first step in determining what types of interventions will maximize and enhance the overall "goodness of fit" between the person and environment.

Study design

This exploratory study examined the factors related to aging in place in AL settings. Specifically, this study explored the associations between personal and environmental factors and length of stay in AL. Additionally, the study examined the characteristics of short and long stay residents in AL. Research addressing aging in place and length of stay in AL is limited, often focusing on state regulatory requirements for admission and retention (Hawes, Rose, & Phillips,1999; Mollica & Jenkins, 2001) and AL discharge policies (Hawes, Phillips, Rose, Holan & Sherman, 2003). Other recent

studies use surveys of state licensing agencies to examine long-term care systems and

supports at the state level, including AL and other alternatives to nursing homes

(Reinhard, Kassner, Houser, Mollica, 2011). The first nationally representative survey of

residential care facilities occurred in 2010 (which includes AL) and provided a profile of

residential care residents. However, no reports have been published regarding length of

stay from these data (Caffrey et al., 2012). As a result of a lack of standardized

definitions of AL, it has been challenging to access comprehensive data on AL residents.

Therefore, in this study, data were collected at the individual and facility level. State

level data was unavailable and at the time of the study national level data was

unavailable.

Sampling strategy

ALs in Ohio are licensed as "residential care facilities" (Ohio Department of

Health, 2013). Only ALs considered "residential care facilities" were included this study,

thereby eliminating more restrictive long-term care residential settings (e.g. skilled

nursing facilities, nursing homes). The sample for this study consisted of AL residents

($N = 218$) in three ALs located in Ohio. National Church Residences in Ohio (NCR-O)

agreed to assist with this study. NCR is the nation's largest not-for-profit developer and

manager of affordable senior housing and services. NCR is also especially committed to

serving low and moderate-income older adults as demonstrated by participating in the

Ohio Medicaid Assisted Living Waiver program. The ALs in the sample ($n = 3$) were

purposefully selected because these ALs were all affiliated with NCR and were willing to

participate in the study. Furthermore, of the 6 ALs operated by NCR in Ohio, the 3 ALs in the sample had the most accessible administrative records available for review.

By having all of the ALs in the sample affiliated with one provider, this allowed for uniform administrative data collection as these ALs all followed admission and charting procedures outlined by a NCR clinical manual. AL residents living in these NCR affiliated ALs (one suburban, two rural) were the subjects of this study. Although the majority of ALs nationally are located in metropolitan areas, there has been an interest in examining the availability of and access to long-term care services for older adults living in rural areas (Hawes, Phillips, Holan, Sherman, & Hutchison, 2005; Hernadez & Newcomer, 2007). Of the ALs included in the sample, two buildings were considered large (licensed for 50 residents and 100 residents) and one building was considered extra large (licensed for 150 residents). Nationally, large residential care facilities (50 to 100 residents) serve 52 percent of all AL residents and extra large facilities (more than 100 residents) serve 29 percent of all AL residents (Park-Lee et al., 2011).

A convenience sample ($N = 218$) of administrative records of AL residents admitted during a six year period was collected by the researcher. The population for this study consisted of residents admitted to AL between January 1, 2006 (origin date) and August 3, 2011 (end date). The researcher collected the data over the course of eight months (September 2011 to May 2012). Due to the availability and accessibility of resident records, a convenience sample was used in this study. Administrative records included AL residents' demographic and healthcare information as well as dates of admission and discharge. Six years captured both the long and short term length of stays

of AL residents given that the national average length of stay is 28.3 months (National

Center for Assisted Living, 2010). Based on study sites' enrollment rates and the number

of independent variables in the model, six years of data yielded a sufficient sample size

for the number of events per predictor that were needed for Cox regression analysis. The

'rule of thumb' is that " 10 events per variable are necessary in order to get reasonably

stable estimates of the regression coefficient" (van Belle, 2008, p. 126). Although this

study did not have a probability sample, a retrospective power analysis was conducted

using the stpower command in Stata 12.1 software. Using the default probability of

failure set by Stata, the study sample provided sufficient power needed for this

exploratory study.

Data collection

Following the selection of NCR affiliated ALs, administrators at each site were

contacted in writing and in person to discuss the purpose of the study and to obtain

approval for data collection (See Appendix 2 for NCR approval letter). AL

administrators were also notified that the study had received human subject approval. At

this time, the AL administrators identified the staff member/s who oversee medical

records and serve as the point of contact for the study in each building. The researcher

met with medical records' personnel at all three sites to determine a schedule to review

records over the course of the next several months. Records were stored in secure

locations at each site, requiring admittance by AL staff members. It was thus necessary

to review records on-site at each AL to access the data as well as ensure the security of

identifiable protected health information. As recommended by Gearing, Mian, Barber

and Ickowicz (2006), the researcher carefully reviewed several NCR-AL administrative

records in order to ascertain how AL resident data were constructed and documented.

This process allowed the researcher to identify established charting protocols and

standard documentation processes.

The data collection timeframe was from September 2011 to May 2012. Data

collection was reliant upon the schedules of AL staff members, which at times, differed

from the scheduling availability of the researcher. Two of the three AL sites utilized an

off-site storage company for records of residents discharged more than one year from the

AL. Obtaining these off-site records required time to both request and securely deliver

individual resident files to the AL sites. There was also a cost associated with ordering

off-site records which was paid for by the researcher using dissertation grant funding.

Waiting times for off-site record delivery ranged from 48 hours to 7 days, depending on

the AL, and medical records personnel preferred to order one to two boxes at a time due

to the size/weight of the files. Each box may have only contained one administrative

record needed for review as the storage boxes may have contained residents records

outside of the IRB approved years of study (i.e. 2006 – 2011). After reviewing records

contained in the storage boxes, the researcher then had to wait for the off-site company to

pick up the records before requesting any additional files. The waiting period returning

files was usually one week. For ALs that required the researcher to travel, this meant that

multiple trips were taken every 2 to 4 weeks to out of town ALs over the course of

several months. Research suggests that ALs are beginning to utilize electronic health

records, particularly to list residents' medication/s (Holup, Dobbs, Dyer & Temple,

2013). However, the administrative data in this study was not available electronically.

As ALs will likely continue to adopt new technology and electronic filing procedures,

there may be a greater ease of access to administrative data in the future.

A uniform data collection instrument was created to build a case record for all of

the subjects in the study and was used to record information extracted from the

administrative records of AL residents (See Appendix 3). The time to review one

administrative record ranged from 45 minutes to 2 hours, depending on the filing system

used by medical records personnel. Data were collected from the following forms:

resident admitting face sheet, physician's history and physical, nursing assessment, level

of care form, and functional assessment form. As recommended by Gearing, Mian,

Barber, and Ickowicz (2006), a number of steps were taken to extract the data effectively

and systematically: 1) examination of established charting protocols and the nature of

standard documentation, 2) careful inspection of how the charts are

constructed/documented, 3) consultation with site-specific staff to ascertain how patient

information is recorded, and 4) chart re-abstraction of ten percent of the overall sample to

ascertain inter-rater reliability. Twenty-two charts were re-abstracted by the investigator

and doctoral advisor, compared for evidence of agreement on major variables, and

percentage of agreement was computed (95.6% agreement). In the event of disagreement

the two reviewers used information from the original chart as the reference for

discussion.

Conceptual model

   A conceptual model was developed for this study. As illustrated in Figure 1, this study examined the associations between personal and environmental factors and length of stay in AL. The factors considered in this model were selected based upon the ecological model of aging, reviews of past AL research, consultation with experts familiar with AL settings, as well as the clinical experience of the investigator. The following variables were included in the data collection: <u>personal factors</u> (age, gender, depression/anxiety, cognition, health, culture), <u>environmental factors</u> (financial, social resources, physical measures), and <u>length of stay</u>. In order to effectively promote an understanding of the complexities of aging in place in AL, this model should be interpreted within the limitations of this study.
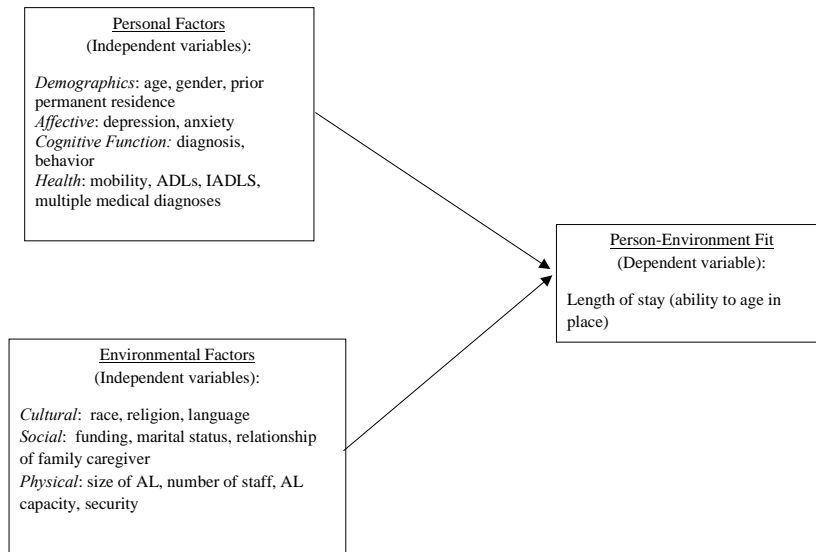
Figure 1. Conceptual Model of Factors Related to Person-Environment Fit and Length of Stay (Aging in Place) in AL!

Personal factors

   Demographic characteristics. Basic demographic characteristics of residents were collected such as age (date of birth), gender (1 = male, 2 = female), and prior residence (1 = private home, 2 = assisted living, 3 = nursing home, 4 = hospital, 5 = MR/DD facility, 6 = hospice). Marital status was measured by the client and/or caregiver's report upon admission (1 = single, never married, 2 = married, 3 = separated, 4 = divorced, 5 = widowed, 6 = other). According to previous research, marital status is a predictor of nursing home admission (Kim, Cho, & June, 2006). Level of education (1 =

less than high school, 2 = high school/equivalent, 3 = college graduate) was measured as the literature suggests that lower levels of education are related to higher levels of disability and shorter life expectancy (Mirowsky & Ross, 2003). Demographic information is collected by the AL admissions office staff and/or administrator upon admission to the AL.

Depression/anxiety. Depression/anxiety was measured as a dichotomous variable in categories of yes or no if a depression, anxiety, or bipolar disorder was recorded as a diagnosis in the medical records. Research suggests that a significant number of AL residents, ranging from 13 to 25 percent, exhibit signs of depression (Cummings & Cockerham, 2004; Gruber-Baldini, Boustani, Sloane, & Zimmerman, 2004). Anxiety is also common among AL residents with and without dementia diagnoses (Smith et al., 2008). Clinical measures such as depression and anxiety are based on the professional judgment of the resident's physician and/or the admitting nurse at the AL. These diagnoses are completed by a number of physicians and/or nurses. It is unknown if standardized assessment tools were used to collect this information, thus reliability and validity of these measures is limited. However, clinical measures are based on professional judgment and are documented at the time of a resident's admission to the AL. The researcher coded these clinical measures in such a way as to note any significant differences between the sources of the diagnoses (e.g. physician history and physical, nursing assessment) and retained for later use, if needed, during data analysis.

Cognitive measures (dementia-related diagnosis and cognitively-impaired behaviors). Cognitive impairment has been associated with discharges or transfers from

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AL settings (Lyketsos et. al, 2007). A dementia-related diagnosis was measured as a

categorical measure of yes or no if diagnosis of Alzheimer's disease or other dementing

illness by a physician is noted on the admitting history and physical form. Cognitively-

impaired behaviors were measured as a categorical measure of yes or no if the resident

exhibits forgetfulness/confusion and/or wandering behaviors upon admission as reported

in the resident's record. Clinical measures of cognitive impairment were based upon

professional judgment of the admitting nurse and not necessarily standardized

assessment, thus reliability and validity of these measures was limited.

Health measures. Health indicators that have been used in other studies of AL

were included (Frytak, Kane, Finch, Kane, & Maude- Griffin, 2001). As a part of the

nursing assessment, the admitting nurse and/or administrator of the AL completes a

standardized form (called a level of care and functional assessment tool) documenting

functional status and activities of daily living. This standardized form is included in the

National Church Residences Clinical Administrative Manual and is utilized by NCR staff

(e.g. nurse or administrator) upon every AL admission. Per activity of daily living, a

score was given for level of assistance: *mobility* (1 = independent, 2 = 1 person assist, 3 =

2 person assist), *eating* (1 = independent, 2 = staff set up, 3 = staff assist, 4 = staff feed),

medication (1 = self-administers, 2 = occasionally requires staff assistance, 3 = staff

administers medications), *bathing* (1 = independent, 2 = staff assistance, 3 = dependent),

hygiene grooming (1 = independent, 2 = staff reminders/prompt, 3 = staff assistance, 4 =

total staff assistance), *dressing* (1 = independent, 2 = staff reminders/prompt, 3 = staff

assistance, 4 = total staff assistance), and *continence* (1 = resident is continent, 2 =

occasional episodes of incontinence and requires staff assistance, 3 = requires staff assistance from staff to change/obtain incontinence products, 4 = total staff assistance).

Number of diagnoses were measured by listing physical health diagnoses as noted by the AL residents' physician in the admitting history and physical form. The data were recoded to reflect the common geriatric diseases, disorders, and health care concerns as outlined by the American Geriatrics Society (AGS). Diagnoses included: cardiovascular diseases, hypertension, hematologic diseases, musculoskeletal diseases, neurologic diseases, respiratory disease, gastrointestinal disease, renal diseases, endocrine/metabolic disorders, dementia/memory, prostate disease, oncology, infectious diseases, pain, insomnia, osteoporosis, incontinence, thrombosis, anticoagulation diseases, eye diseases, and dermatological diseases (Reuben et al., 2010).

Cultural measures. Previous studies of AL have not focused on cultural measures per se, but rather have focused on the distribution of race in AL (Howard et al., 2002) and the relationship between race and the decision to move to AL (Ball et al., 2009a). In this study, several variables will be used to examine cultural factors. Data relevant to cultural measures were collected by the admitting nurse upon admission and were recorded in a resident's chart. Race/ethnicity was defined as categories of African American, Asian, American Indian, Caucasian, Hispanic or other as reported by the resident and/or caregiver upon admission. Language was defined as the primary language spoken at home as defined by the resident and/or caregiver upon admission. Religious preference was defined as religious identification as reported by the resident and/or caregiver upon admission.

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Environmental Factors

Financial resources. In this study, payor source was operationalized as the primary payor of resident care. Financial resources were measured by the primary source of payment upon admission to AL. Payor source was coded as either private pay or Medicaid AL waiver. Payer status has been used in related research on health declines in AL settings (Prucho & Rose, 2000). Additionally, the design of admission criteria and discharge policies has been found to be unfavorable to residents funded by public payment programs (Bernard, Zimmerman, & Eckert, 2001).

Social resources. Although there are a myriad of ways to define "family support," this study utilized a broader definition that included whether or not a resident listed a family member as the next of kin and emergency contact on the admitting face sheet. Family support was measured by the relationship of primary caregiver to the resident as reported upon admission (e.g. spouse, daughter) as well as the presence or absence of family involvement in the admissions process (i.e. yes or no). From the perspective of an AL provider, the next of kin listed on the face sheet (recorded by name and relationship to resident) was the primary family contact in case family support was needed and/or emergencies occurred.

Physical measures of the AL. Physical measures of the AL were collected from records maintained by the AL administrator. Size of AL staff was measured as the average resident to staff ratio during each year of study. AL capacity was measured as the maximum number of residents that an AL can serve. Number of shared spaces (e.g. lounges, lobbies, activity rooms) was measured in each AL. Finally, security was

measured by whether or not a resident lives in a "memory care unit" (i.e. all entrances
and exits are locked).

Length of stay

Length of stay has been used as a measure of aging in place by other researchers
studying AL (Chapin & Dobbs-Kepper, 2001) and has also been used as an outcome
variable related to personal and environmental factors associated with discharge from AL
settings (Phillips et al., 2003). In this study, length of stay was operationalized as the
number of weeks/months/years a resident lived at the AL beginning with the date of
admission and ending with the discharge date. Discharge from AL was operationalized
as resident no longer paying to hold or to live in their unit. Temporary discharges to
hospitals or nursing homes when the intention is to return and the room is held were not
included. Hospital stays and skilled nursing facility stays did not count as discharge from
the AL. Residents who had not discharged or died by the end of the study were assigned
a discharge date of May 13, 2012, the date on which the data collection was completed.
Residents without a discharge date were considered "censored cases" and could therefore
be included in the planned analyses (e.g. survival analysis, cox regression) to calculate an
estimated length of stay. Discharges from the facility were measured as either discharge
or death. Discharge locations were measured as: acute hospital stay (other than short
stay), nursing home (other than skilled nursing), independent living residence, another
AL residence, back to existing home, to relative's home, and hospice in another setting
(e.g. nursing home).

Data analysis

Data was entered directly into SPSS 19.0 via laptop computer when the researcher was on-site at the ALs. Proof reading was conducted by the researcher by comparing the original data in the administrative record against the computerized database. Eder, Fullerton, Benroth and Lindsay (2005) suggest that on-going assessment of the data during medical records review is a pragmatic strategy to enhance the reliability of data. Thus, when discrepancies were found, the original records from which the data were extracted were examined and corrections were made. This on-going data screening process helped minimize errors during data entry and resulted in a data set that accurately reflected the data extracted from the administrative records of each AL resident in the sample.

Based on the theoretical model as a guiding framework and the variables needed for the analyses, the database was paired down to contain only the variables relevant to the study. The data were then exported into a STATA 12.1 file format because more extensive survival analysis options are available in STATA than in SPSS. SPSS was utilized for univariate descriptive statistics to check for accuracy in data entry, to identify outliers, to examine normality and linearity, as well as to evaluate and address missing data.

The Cox proportional hazard regression model was used as the multivariate statistical analysis to investigate the factors that influence the length of stay in AL. Survival analysis was the most appropriate statistical test for this research study because it permits the examination of the time interval between a starting event and a terminal event while making use of data from all cases, including those for which the terminal

event has not yet occurred (Hosmer, Lemeshow, & May, 2008). The administrative data collected in this study included cases that were "censored" or truncated because the resident had not discharged by the time the data collection was completed. Survival time was estimated as the time between admission to the AL and discharge from the AL (terminal event). If discharge from the AL for a particular resident had not occurred by the end of the study, the survival time was the interval between the time of entry into the study (i.e. admission to the AL) and the time that the study ended (i.e. the date of the last collection point). As a result of this analysis, the researcher was able to identify personal and environmental factors related to length of stay in AL.

Conclusion

The methods detailed in this section were based upon both conceptual and empirical criteria. The ecological model of aging provided the framework for examining variables that represent personal and environmental domains of aging in place. The study utilized survival analysis, specifically Cox regression, to explore length of stay in AL using administrative data with both censored and uncensored cases. The next chapter will discuss the results from the analyses. The results of the descriptive statistics for the sample are provided and highlight the demographic profile of AL residents in this study. Included in these results are whether or not the resident has a diagnosis of dementia, number of medical diagnoses, and level of care score. The results of the bivariate correlations are provided in order to examine relationships between the predictor variables and the dependent variable. The findings from the Cox regression analyses are reported as well as the tests of the proportional hazards assumption.

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Chapter 4: Analysis and Findings

Data analysis

Quantitative data were analyzed using SPSS 19.0 and STATA 12.1 software.

Initially, descriptive statistics including frequency, measures of central tendency and

standard deviations were used to describe the study population. Survival analysis was

selected as the method of analysis as it allows the researcher to study the timing of events

(i.e. AL discharge) and because the outcome variable of interest is time until an event

occurs (Kleinbaum & Klein, 2012). Survival in the context of the present study means

that the AL resident has not been discharged from the AL. The Cox proportional hazards

model is considered one of the most well-known methods to explore whether variation in

the risk of an event occurrence systematically differs with predictors (Singer and Willet,

2003). Cox regression uses a hazard function to estimate the effect of covariates on

survival time and estimates the relative risk (ratio) of failure (Hosmer, Lemeshow, &

May, 2008).

In this study, Cox regression was used to examine the influence of predictor

variables on length of stay in AL and to what extent personal and environmental factors

can be used to predict discharge from AL settings. The time variable was the length of

stay in AL, the status variable was initial admission, and personal and environmental

variables were used as covariates. Discharge from AL was operationalized as resident no

longer paying to hold or to live in their unit. Temporary discharges to hospitals or

nursing homes when the intention is to return and the room is held were not included. If

discharge from the AL had not occurred by the end of the study, the survival time was the

interval between the time of entry into the study (i.e. admission to the AL) and the date of

the last data collection point.

Cox regression allows a researcher to model event occurrence even when some of

the data are "censored." The most common type of censoring, "right-censoring" occurs

when an event time is unknown because the target event is not observed (Singer &

Willet, 2003). Linear and logistic regression cannot handle censored data because there

are incomplete observations of the target event. Cox regression can handle cases in

which the observation ends before an individual experiences the target event (Allison,

2010). In the present study, some of the AL residents will not have discharged by the end

of the study period. In these cases, the end date is the end date of the study, not the date

of discharge from the AL. The use of Cox regression allows for a plausible estimate of

length of stay by including the censored cases in the AL administrative data set.

Cox regression is based on the proportional hazards model that assumes that the hazard

ratio is constant across time and that predictor variables have the same effect over time

(Allison, 2010). Tests of the proportional hazards assumption are presented later in this

chapter.

Descriptive statistics were used to provide characteristics of the study sample.

Histograms were constructed to identify any cases with extreme values and no univariate

outliers were found among the variables of interest. Survival analysis does not require

assumptions of multivariate normality, linearity, and homoscedasticity; however,

extremely high correlations among covariates can create statistical problems (Tabachnick

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& Fidell, 2007). Cox regression also assumes that relationships among covariates are independent; therefore, bivariate correlations of the predictor variables and the dependent variable were examined (See Table 1). Bivariate correlations in the data set ranged from -.006 to .543. As recommended by Tabachnick & Fidell (2007), bivariate correlations of .70 indicated the presence of multicollinearity. No variables were found to have correlations that exceeded .70, thus multicollinearity was not detected.

Table 1

Correlation matrix

Variable	Age	Marital	Gender	Memory care	Facility	Depression	Anxiety	No. Diagnoses	Level of care
Age									
Marital	-.229*								
Gender	-.037	.158*							
Memory care	-.239*	.401*	-.026						
Facility	-.039	-.037	.092	-.060					
Depression	.217*	.058	.100	-.071	-.046				
Anxiety	.071	.0173*	.004	.163*	.022	.351*			
No. diagnoses	.073	-.003	.030	-.115	-.110	-.008	-.008		
Level of care	-.084	-.235*	'-.091	.518*	-.134	-.019	.103	.038	
* $p < 0.05$									

Missing data were identified through an examination of descriptive statistics as well as frequency tables. The proportion of cases lost to missing data in the categorical variables of interest was small (less than 10%), thus listwise deletion was used for these cases (Allison, 2010). Missing data were also analyzed using the expectation

maximization (EM) method in SPSS 19, which "assumes a distribution for the partially missing data and bases inferences on the likelihood under that distribution" (IBM, 2011, p. 7). Little's chi-square statistic for testing whether the missing values are missing completely at random was included in the EM matrices (Little, 1988). Non-significant findings ($p = .103$) suggest that the data were missing completely at random.

Data recoding

Prior to running the survival analysis and Cox regression, several variables were recoded. Marital status was recoded into a dichotomous variable with married = 1 and unmarried = 0. Facility was recoded as facility 1, facility 2, and facility 3.   The variable facility was included in the Cox regression by creating a dummy variable using facility 1 as the reference group. Facility 1 was a part of a Continuing Care Retirement Community (CCRC) located in a rural area with a capacity of 55 residents as well as a memory care unit in the AL. Facility 2 was part of a CCRC located in a rural area with a capacity of 100 residents (no memory care unit). Facility 3 was a freestanding facility located in a suburban area with a capacity of 150 residents as well as a memory care unit. A medical diagnosis index was created by adding separate variables including: cardiovascular disease, cognitive disorder, musculoskeletal disease, endocrine disorder, neurological disease, gastrointestinal disease, respiratory disease, osteoporosis, infectious disease, vision disorder, kidney disorder, hematologic disorder, cancer/s and other. The medical diagnosis index was created in order to allow the researcher to examine whether or not multiple diagnoses may play a role in discharge from AL. Previous studies have

used indices to classify the number of medical diagnoses and patient comorbidity

(Charlson, Pompei, Ales, & MacKenzie, 1987).

The variable, level of care index, was created by the researcher and added the

items per activity (e.g. 1 = independent, 2 = assistance, etc.) for level of assistance in the

following variables: mobility, eating, medication administration, bathing, hygiene

grooming, dressing, and continence. Level of assistance per activity was assessed by the

nurse upon resident admission using a form from the NCR clinical manual. Index scores

ranged from 7 (independent with level of care needs) to 25 (dependent on staff for level

of care needs). Lower index scores indicated a lower level of care needed with assistance

of activities of daily living while a higher level of care index scores indicated higher level

of care needs with activities of daily living.

Survival analysis

Survival analysis allows the examination of the time to an event of interest even

when there are incomplete observations. In other words, it is a method for analyzing the

length of time to an event regardless of whether or not all cases experience the event

before the end of the study. Regression modeling is commonly used to examine the

relationship between an outcome variable and predictor variable/s. However, incomplete

event occurrences challenge the ability of traditional regression models to measure time.

Furthermore, when the time to an event is the outcome variable of interest, the challenge

becomes how to formulate regression models that can account for the fact that time is a

dynamic process (Hosmer, Lemeshow, & May 2008).

A key component of survival analysis is its ability to "describe, explain, or predict the occurrence and timing of events" even when some event times are unknown (Allison, 2010, p. 413). These events are known as "censored observations" and occur either because some individuals in the study will never experience the event of interest or individuals will experience the event, but not during the time frame of a study's data collection period (Singer & Willett, 2003). When examining length of time to the occurrence of an event, data from both censored and uncensored cases (i.e. cases with event times) should be incorporated into the analysis in order to capture important information regarding the probability of event occurrences.

The Kaplan-Meier estimator uses both censored and uncensored cases to "estimate the conditional probability of confirmed survival at each observed survival time and then multiply them to obtain an estimate of the overall survival function" (Hosmer, Lemeshow, & May, 2008, p. 17). The Kaplan-Meier estimator provides helpful information as to the rates of events occurring as well as not occurring and how these rates change over time (Allison, 2010). Using both censored and uncensored cases, the Kaplan-Meier estimator computes the probabilities of event occurrence at particular points of time and then multiplies them to obtain an estimate of the overall survival function (Hosmer, Lemeshow, & May, 2008). In this study of length of stay in assisted living, this is an estimate of the probability of being a resident in AL at time t, given that discharge from the AL has not yet taken place.

Table 2 illustrates the Kaplan-Meier estimator as the estimated probability of being enrolled in AL by years. At each interval, the researcher assessed how many

residents discharged from AL and determined how many residents were at risk for discharge. The columns in Table 2 present the time interval, the number at risk for discharge (enter), the number of discharges (discharge), the number of subjects censored (censored), and the probability of enrollment through time t (cumulative survival).

Table 2

Survivorship function (N =218)

Time (years)		Enter	Discharge	Censored	Cumulative Survival Beyond t
0	1	218	34	0	0.84
1	2	184	37	28	0.66
2	3	119	20	30	0.53
3	4	69	13	14	0.42
4	5	42	6	19	0.34
5	6	17	1	10	0.32
6	7	6	0	6	0.32

The survivorship function provides insight into the study question related to long and short stay residents in AL. Figures 2 and 3 present the graph of the Kaplan-Meier estimator where the follow up time is shown in years and months. Graphing the cumulative survival function in months indicated a steady and somewhat sharper discharge risk until about 10 months in the ALs. The risk of discharge after 10 months began to level off more gradually until reaching the minimum value of .32. The last observed time corresponds to a censored observation, thus the estimate of the survival function does not go to zero because it is the smallest value that is estimated at the last observed survival time (Hosmer, Lemeshow, & May, 2008).

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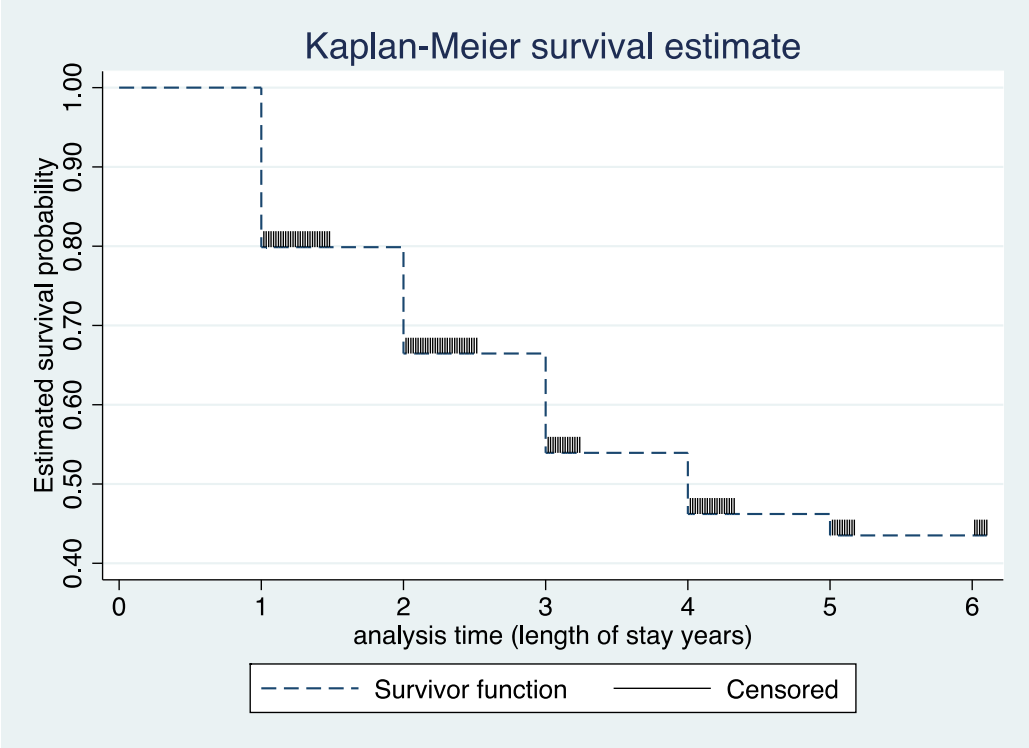
Figure 2. Cumulative survival function (years)
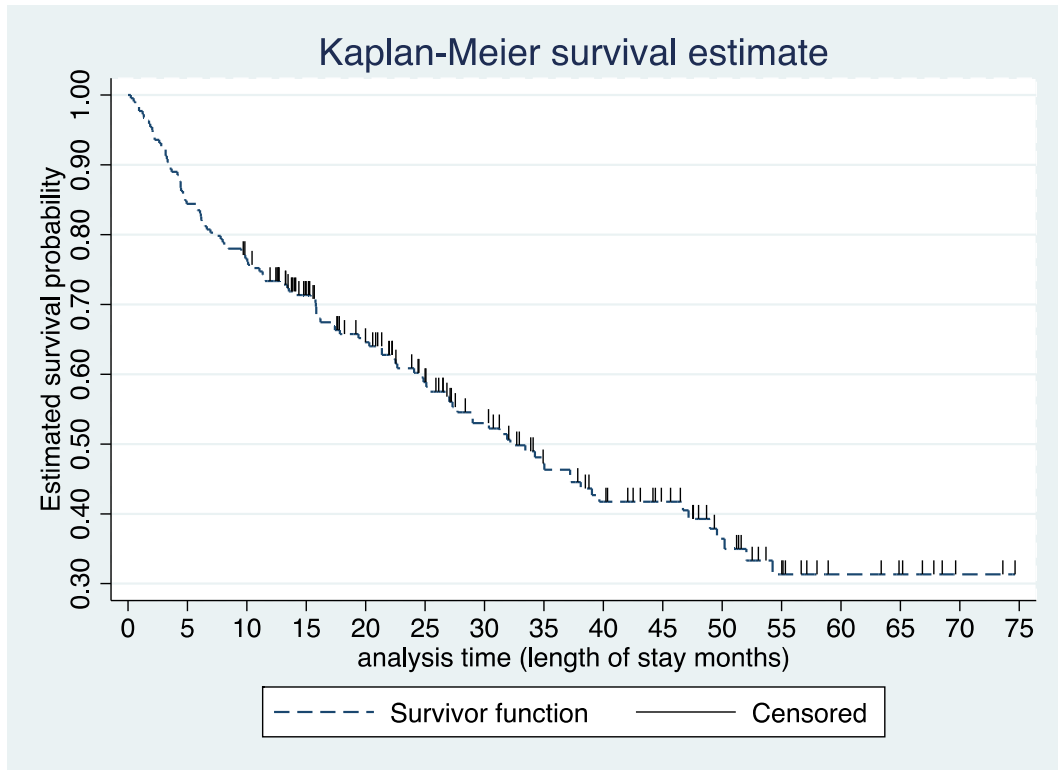
Figure 3. Cumulative survival function (months)

Cox regression

The Cox Proportional Hazards model was used to examine the effect of predictor variables on length of stay in AL (i.e. survival). The Cox regression model uses a hazard function to estimate the probability that an individual will experience an event (e.g. discharge from AL) at a particular time t given that the individual is still at risk of "failure" or discharge from AL. The Cox regression model incorporates both censored and uncensored data to assess discharge from AL as a log-linear function of covariates. The dependent variable, length of stay, is transformed into a hazard function that represents the probability and timing of discharge occurring. The Cox regression model

evaluates the effects of covariates on survival (i.e. remaining enrolled at the AL) or

discharge from AL.

Selection of covariates

For this exploratory study, consideration was given to both conceptual importance

as well as empirical evidence for inclusion in the model. Covariates included as a part of

the person-environment model were considered: age, marital status, gender, facility,

dementia diagnosis, memory care unit admission, depression diagnosis, anxiety

diagnosis, number of medical diagnoses, social support, and level of care score. Race

and payor source, were not included as these variables lacked variation.

As suggested by Hosmer, Lameshow, and May (2008), multivariable model

building should be approached using a "purposeful selection of covariates" (p. 133)

through a series of several steps. First, bivariate analysis was conducted with each

covariate in relation to survival time (in months) following admission to AL. For all of

the categorical variables, the log-rank test of equality for survival function was used to

explore whether or not to include the covariates in the multivariable model. For

continuous variables, a univariate Cox proportional hazard regression was used to

determine inclusion in the model. Variables with significance at the 20-25% level were

considered for inclusion in the model (see Table 3 and 4). The use of this modest level of

significance was based on the recommendations of Hosmer, Lameshow, & May (2008).

Gender, memory care unit admission, and facility were significant at the 20% level. Age,

number of diagnoses, and level of care were also significant at the 20% level.

Table 3

Log-rank test for categorical covariates

Variable	Log-rank test *p*-value
Gender	.119*
Marital	.419
Memorycare	.178*
Facility	.002*
Dementia	.567
Depression	.500
Anxiety	.531

*p < .25

Table 4

Wald test for continuous covariates

Variable	Wald test *p*-value
Age	<.001
No. of diagnoses	<.001
Level of care	<.001

Following the bivariate analyses and the fit of the initial multivariable model (see Table 5), each covariate was removed one at a time and the *p*-value of the partial likelihood tests was examined to confirm that the deleted variable was not significant. Hosmer, Lemeshow, & May (2008) recommend an assessment as to whether the removal of the covariate has produced a 20% change in value in the coefficients of the variables remaining in the model. If there was an important change in the remaining coefficients, then the variable was added back into the model. Finally, variables excluded from the

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initial multivariable model were added to the model one at a time to confirm that the

variable was not statistically significant or an important confounder (Hosmer, Lemeshow,

& May, 2008). The process resulted in a preliminary main effect model (see Table 6)

including facility (B = .813, SE = .279, $p < .05$), number of diagnoses (B = .157, SE =

.073, $p < .05$), and level of care score (B =. 041, SE = .021, $p < .05$).

Table 5

Covariates considered for the initial Cox regression model

Variable	Coefficient	Std. Err.	z	P>|z|	95% Conf.	Interval
Facility						
2	-0.0254	0.368	-0.07	0.945	-0.747	0.697
3	0.7973	0.279	2.85	0.004	0.249	1.345
Age	0.017	0.0172	1.34	1.34	-0.008	0.042
Gender	0.283	0.283	1.3	1.3	-0.144	0.71
No. of diagnoses	0.145	0.145	1.97	1.97	0.001	0.288
Memory care	0.051	0.516	0.2	0.2	-0.457	0.56
Level of care	0.042	0.0419	1.66	1.66	-0.008	0.091

Table 6

Covariates considered for preliminary Cox regression model

Variable	Coefficient	Std. Err.	z	P>|z|	95% Conf.	Interval
Facility						
2	-.018	0.356	-.050	0.958	-0.718	.680
3	0.813	0.279	2.92	.004	2.66	1.359
No. of diagnoses	0.157	0.073	2.15	0.031	0.0142	0.300
Level of care	0.041	0.021	1.93	0.054	-0.001	0.083

Linearity of covariates

The preliminary main effect model includes two variables that are continuous: number of medical diagnoses and level of care score. Hosmer, Lameshow and May (2008) recommend examining the scale of all continuous covariates to determine whether the data support the assumption of linearity in the log hazard. One approach is to use fractional polynomials through a closed test procedure that compares the linear model to the best two-term model. If this test is not significant at the 5% level then the assumption is that the log hazard is linear in x. In the current study, the linear model is not significant for either number of medical diagnoses or level of care score indicating that they are linear (See Table 7).

Table 7

Fractional polynominal model comparisons

No. of diagnoses	Deviance	Deviance dif.	Sig	Powers
Linear	1062.494	1.975	0.578	1
Model 1 (m = 1)	1060.972	0.452	0.798	3
Model 2 (m = 2)	1060.52	–	–	2 2

Level of care score	Deviance	Deviance dif.	Sig	Powers
Linear	1061.15	0.746	0.862	1
Model 1 (m = 1)	1060.516	0.113	0.945	-1
Model 2 (m = 2)	1060.403	–	–	1 2

Interaction terms

One of the final steps in the variable selection process is to consider whether interactions (i.e. product of two covariates) are needed in the model and to form a set of plausible interaction terms from the main effects in the model (Hosmer, Lemeshow, & May, 2008). The interaction terms are evaluated by comparing the model with the interaction term to the main effects model through the partial likelihood ratio test and are added to the main model separately. Interactions that are significant at the 5% level are then added to the main effects model (Hosmer, Lemeshow, & May, 2008). Three conceptually plausible interaction effects were considered, however, none of these interactions proved to be significant when added to the model: number of diagnoses and level of care score (.648), number of diagnoses and facility (.934), and level of care score and facility (-.179).

Adherence to key assumptions

Cox regression is based on the proportional hazards model and assumes that predictor variables have the same effects regardless of the point of time (Allison, 2010; Hosmer, Lemeshow, & May, 2008). In other words, the model assumes that the hazard function is constant over time and that the predictor variables are not time dependent (i.e. there are no interactions with time) (Tabachnick & Fidell, 2007). Hosmer, Lemeshow, and May (2008) recommend assessing the proportional hazards assumption by calculating covariate specific tests as well as by plotting the scaled and smoothed scaled Schoenfeld residuals against time. Schoenfeld residuals compare observed and expected covariate values and are considered a powerful tool for exploring the proportionality

assumption (Singer & Willett, 2003). The tests of proportionality for each covariate were

not significant and the overall (global) test was not significant ($p = .669$), indicating that

there is not a violation of the assumption (See Table 8). A visual assessment of the

graphs of the scaled Schoenfeld residuals should illustrate a horizontal line if the

proportional hazard assumption holds (See Figures 4 through 6).

Table 8

Test of proportionality

Variable	rho	chi2	df	Pro>chi2
Facility				
2	.063	.43	1	.512
3	.002	.00	1	.985
No. of diagnoses	-.054	.42	1	.519
Level of care	-.160	2.39	1	.122
global test		3.63	4	.459
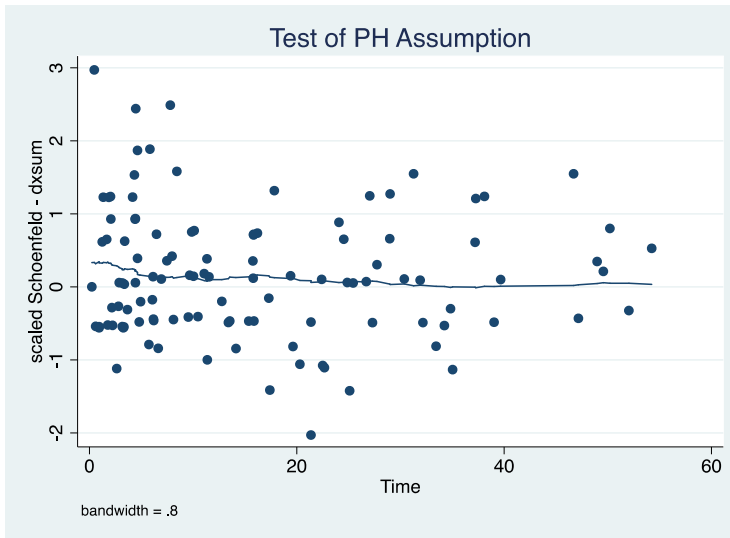
Figure 4. Partial residual for number of diagnoses
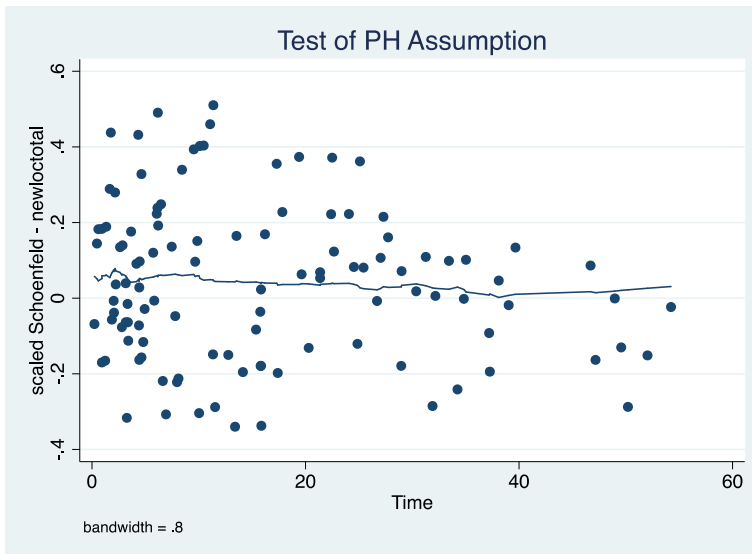
Figure 5. Partial residual for level of care score
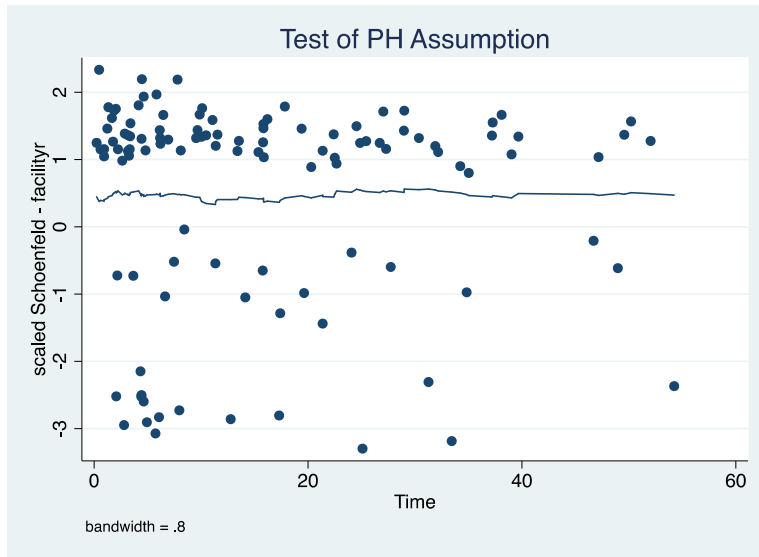
Figure 6. Partial residual for facility

In evaluating the Cox regression model, it is important to identify if any
observations have disproportionate influence on the regression coefficient estimates
(Cleves, Gould, Gutierrez, & Marchenko, 2010). DfBeta values measure the influence
that each observation has and indicates the difference between each regression coefficient
when an observation is included and excluded in the model (Acock, 2010). A DfBeta
value greater than two divided by the square root of n warrants a closer examination of
the data (Chen, Ender, Mitchell, & Wells, 2003). In this study, the critical value of
2/sqrt(218) or .14 was used to determine potential problems with influential observations.
All of the DfBeta values for the covariates facility, number of diagnoses, and level of
care score were less than .14 (see Figures 7 through 9).
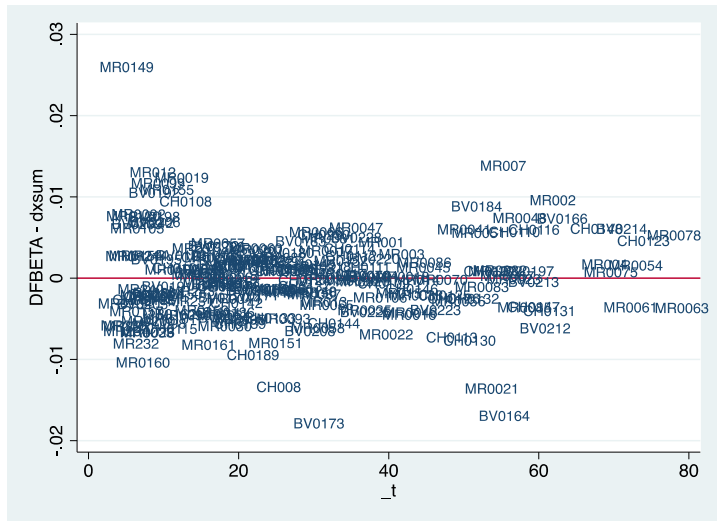
Figure 7. DfBeta values for number of diagnoses
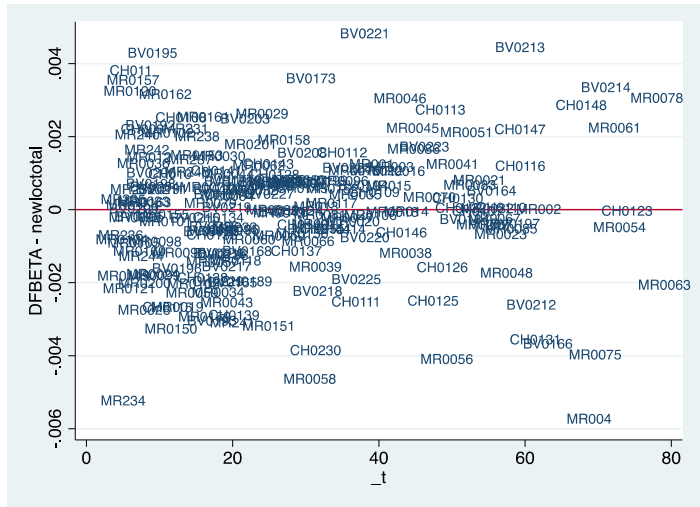
Figure 8. DfBeta values for level of care score

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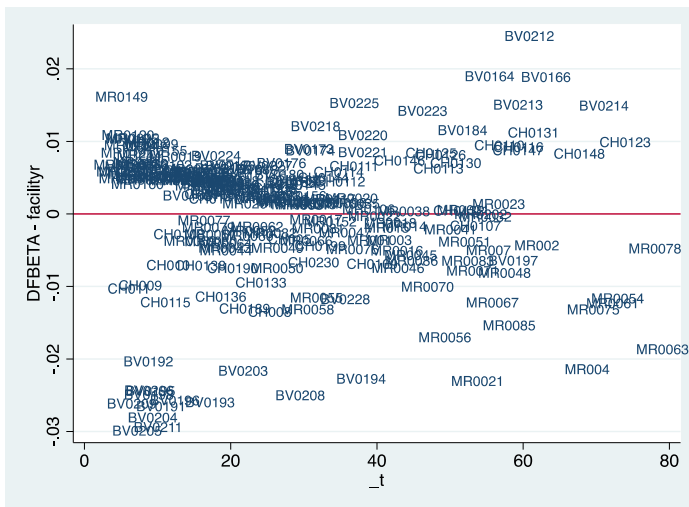
Figure 9. DfBeta values for facility

The types of survival analysis methods presented in this section are commonly
used in research to examine time to event occurrences. First, the Kaplan-Meier method
provided an illustration of the overall survival curve to account for the probability of
surviving (i.e. remaining enrolled at the AL). Second, the life table analysis was used to
describe the data by grouping the results in time intervals of months and years. Next, the
Cox Proportional Hazards Model was used as the primary method to examine the effects
of covariates on survival or discharge in AL. Finally, the examination of the test of
proportionality, Schoenfeld residuals, and DfBeta values supported the inclusion of the
covariates facility, number of diagnoses, and level of care score in the final model. The
study findings will be presented in the remaining sections of this chapter and the
interpretation as well as implications of these findings will be discussed in detail in
Chapter Five.

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Population description

The majority of the study population was female (76%), single/widowed (78%), and Caucasian (97%). Over half of the residents were admitted from a private home (55%) followed by a nursing home (33%), other assisted living (9%), hospital (2%), and other (1%). The average age upon admission was 84.5 years ($SD = 8.17$). There was insufficient data to report religion, language, and level of education. See Table 9.

Table 9

Sample description

	%	N
Gender		218
Female	76	
Male	24	
Race		209
Caucasian	97	
African American	2	
Asian	1	
Marital status		206
Married	21	
Widowed	64	
Divorced	6	
Single	9	
Admitted from		212
Private home	55	
Assisted living	9	
Nursing home	33	
Hospital	2	
Other	1	

	M	*SD*	Range	*N*
Age	84.5	8.17	52-104	218

Affect, cognition, and physical health (personal factors)

        Approximately 22% of the sample had a psychological diagnosis of depression and 11% a diagnosis of anxiety (11%) by the admitting physician. Measures of cognitive functioning indicated that over half of the sample had a dementia diagnoses by the admitting physician. Activities of daily living as recorded in the initial nursing assessment indicated that 63% were independent with mobility, 42% were independent with eating, 22% were independent with bathing, 26% were independent with dressing, 18% were independent with self-administering medication, and 50% were continent. The average level of care score total indicated a moderate level of care need with ADLs ($M =$ 14.4, $SD = 4.5$). Residents in the sample averaged about two medical diagnoses. Cardiovascular disease (70%), cognitive disorder (48%), musculoskeletal disease (31%), endocrine disorder (31%), neurological disease (20%), and gastrointestinal disease (20%) were the most common medical diagnoses. See Table 10.

Table 10

Affect, cognition, and physical health

	%	N
Affect		218
Depression	22	
Anxiety	11	
Cognitive functioning		214
Dementia	52	
Activities of daily living (independent)		218
Mobility	63	
Eating	42	
Bathing	22	
Dressing	26	
Medications	18	
Continence	50	
Physical health		218
Cardiovascular disease	70	
Cognitive disorder	48	
Musculoskeletal disease	31	
Endocrine disorder	31	
Neurological disease	20	
Gastrointestinal disease	20	
Respiratory disease	11	
Osteoporosis	9	
Infectious disease	9	
Vision disorder	9	
Kidney disorder	8	
Hematologic disorder	7	
Cancer/s	5	

	M	*SD*	Range	*N*
No. of diagnoses	3.15	1.41	1-8	216
Level of care	14.4	4.48	7-25	218

Financial and social resources (environmental factors)

The majority of the sample paid privately for AL. However, 6% of the sample

relied on Medicaid AL waivers as the primary payer for services. The relationship of the

primary caregiver was most frequently a daughter (41%) or son (31%). Spousal

caregivers made up 9% of the sample. See Table 11.

Table 11

Financial and social resources

	%	N
Primary payer		218
Private	94	
Medicaid Waiver	6	
Primary caregiver		218
Daughter	41	
Son	31	
Spouse	9	
Daughter-in-law	3	
Niece	2	
Nephew	1	
Granddaughter	1	
Other	12	

Physical measures (environmental factors)

The average staff to resident ratio was 1:8 (facility 1), 1:15 (facility 2), 1:18

(facility 3). The average staff to resident ratio for memory care units was 1:4 (facility 1)

and 1:7 (facility 3). Facility 2 did not have a memory care unit. Resident capacity for

each facility was: 55 residents (facility 1), 100 residents (facility 2), and 150 residents

(facility 3). Number of shared indoor spaces for each facility was: 5 (facility 1), 8

(facility 2), and 9 (facility 3). Number of shared outdoor spaces for each was: 7 (facility

1), 5 (facility 2), and 4 (facility 3). See Table 12.

Table 12

Physical measures

	Ratio	*n*
Staff to resident ratio		
Facility 1	1:8	
Memory care*	1:4	
Facility 2 –AL only	1:15	
Facility 3	1:18	
Memory care*	1:7	
Resident capacity		
Facility 1		55 residents
Facility 2		100 residents
Facility 3		150 residents
Number of shared spaces (indoor)		
Facility 1		5
Facility 2		8
Facility 3		9
Number of shared spaces (outdoor)		
Facility 1		7
Facility 2		5
Facility 3		4

* locked unit

Length of stay

About half of the residents were still residing in AL at the end of the study period. Of those residents who discharged, 32% died. The remainder of the discharges were due to moving to a nursing home, moving to a private home in the community, moving to another AL setting, hospital admission, and other reasons not specified in the administrative record. However, due to inconsistencies in the administrative records related to discharge location (with the exception of death), this data was unreliable. The median length of stay for residents with an AL discharge date ($N = 111$) was 20.3 months. The median length of stay for residents with an AL discharge date (i.e. uncensored cases only) was: 5.9 months (facility 1), 16.5 months (facility 2), and 11.06 months (facility 3). The median survival time for both censored and uncensored cases was ($N = 218$) was 32.2 months. In other words, the time beyond which 50% of residents in the study were expected to survive was 2.66 years (32 months).

Among residents who discharged from AL during the first 10 months ($n = 54$), the majority were female, single, private pay, and White. Approximately 28% of these residents had a diagnosis of depression, 7% had a diagnosis of anxiety, and 35% were admitted to a memory care unit. The median age was 85 years old. The average number of medical diagnoses was 3.5 and the average level of care score was 15.7.

Cox regression model

The final Cox regression model and overall cumulative survival function provides insights into the following study questions:

1) What personal and environmental factors, as defined by the contemporary

   ecological model of aging, predict the length of stay, i.e., aging in place in

   AL settings?

2) What factors promote or hinder resident length of stay in AL settings?

3) In what ways and to what extent do personal and environmental factors differ

   between long and short stay AL residents?

The application of the ecological model of aging to the covariates of interest suggests that number of diagnoses, level of care score, and facility influence the length of stay in AL. (See Figure 10). The cumulative survival function indicates a steady and slightly sharper risk of discharge until about 10 months in AL and suggests that there are critical periods for risk among residents with shorter stays in AL.
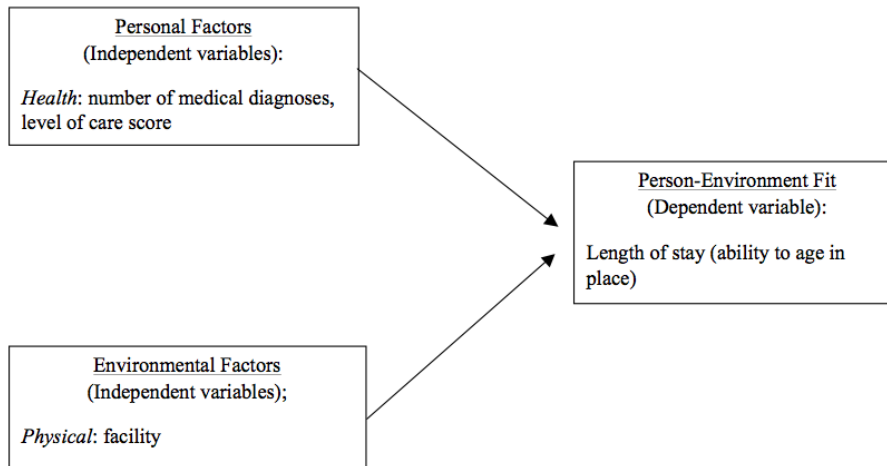
Figure 10. Application of the ecological model of aging to covariates

The final main effect model is reported in Table 13. The hazard ratios in the model indicate that holding all other variables in the modeling constant, there appears to be a facility effect for facility 3 (free-standing AL) as residents in this AL had two times the risk of discharge when compared to the other ALs. For each increase in number of diagnoses, there is an increased risk of discharge by 17%. Residents who score one point more on the level of care score discharge at a rate that is 4% higher than those with lower scores. The log likelihood for the final model is -521.566 compared to -532.231 with the baseline model in which all beta values are set to 0. The chi-square test of 21.33 is significant ($p = .003$).

Table 13

Final Cox regression model

Variable	Haz. ratio	Std. Err.	z	P>|z|	95% Conf.	Interval
Facility						
2	.981	0.356	-.050	0.958	.487	1.974
3	2.25	0.628	2.92	.004	1.305	3.892
No. of diagnoses	1.17	0.085	2.15	0.031	1.014	1.350
Level of care	1.041	0.222	1.93	0.054	.999	1.086

Log likelihood -521.566

Overall goodness-of-fit

Hosmer, Lemeshow, and May (2008) indicate that a measure comparable to R^2 for

the proportional hazards regression model is difficult to calculate and interpret because of

censored values. They further suggest that a "perfectly adequate model may have what,

at face value, seems a low R^2 due to a high percentage of censored data" (Hosmer,

Lemeshow, & May, 2008, p. 194). They suggest the following formula if "one must

compute such a measure."

$$R^2_p = 1 - \{\exp[2/n \ (L_0 - L_p)]\}$$

L_0 = the log partial likelihood for model zero, the model with no covariates

L_p = the log partial likelihood for the fitted model with covariates

The value of .09 was calculated from the log partial likelihood values in the model. An

R-square for this proportional hazards model of .09 suggests that facility, number of

diagnoses, and level of care score together explain 9% of the variance in the length of

stay in AL.

Summary

The results from the data analyses highlight several important aspects of aging in place in AL and the influence of personal and environmental factors related to length of stay in these settings. The analyses identified a median survival time of 32 months as well as critical periods for discharge from AL. The analyses also identified both personal and environmental factors that may contribute to length of stay in AL including number of diagnoses, level of care score, and facility. The results provide insight into the application of the ecological model of aging to length of stay in AL settings and for the future development of conceptual models related to aging in place. Discussion and implications of these results will be provided in Chapter 5.

Chapter 5: Discussion and Implications

Summary

This study examined to what extent personal and environmental factors, as defined by the contemporary ecological model of aging, help us understand aging in place in AL. A review of the literature provided background on person-environment perspectives on aging in place as well as highlighted other studies of AL relevant to length of stay. A convenience sample ($N = 218$) of administrative records of AL residents admitted during between the years 2006 and 2011 was collected by the researcher from three ALs in Ohio. Using Cox regression, number of medical diagnoses, level of care score, and facility were found to be significant predictors of length of stay. As seen in the results of this study, aging in place in AL appears to be influenced by both personal and environmental factors. Study findings may inform policy makers, providers, practitioners, as well as residents and family caregivers about the role of AL in the continuum of long-term care and the capacity of AL settings to promote aging in place. The conclusion of this chapter includes a discussion of the limitations of the study and highlights the complexities of researching AL settings. The final section offers direction for future research and suggests ways in which to expand and build upon the dissertation findings in subsequent studies of AL.

Discussion

  The preliminary findings of this study support the use of the ecological model of aging as a framework for examining the personal and environmental factors that influence length of stay in AL. Within the context of the person-environment fit in AL, length of stay was influenced by number of medical diagnoses, level of care score, and facility. These preliminary findings warrant further investigation of the influence of both the person and the environment on aging in place in AL. Although the ALs in this sample lacked variability in several aspects of the personal (e.g. race, socioeconomic status) and environmental (e.g. size of rooms, layout) factors of interest, the findings suggest that future research may potentially strengthen the application of the ecological model of aging as a framework for understanding length of stay in AL.

  This research is important because better understanding outcomes in AL settings has been highlighted as a priority for researchers (Zimmerman & Sloane, 2007; Kane et al., 2007; Polivka et al., 2013; Street et al., 2009; Thomas et al., 2011). This study addresses a gap in the more recent studies of AL that have primarily focused on regulation (Mor, Miller, & Clark, 2012), residents' social engagement (Ball, Lepore, Perking, Hollingsworth, & Sweatman, 2009; Park, et al., 2009; Teri et al., 2009; Yang & Stark, 2009) and staff-resident relationships (Burge & Street, 2010; Kemp et al., 2009). Although previous research has examined length of stay in AL settings (Ball et al., 2004a; Chapin & Dobbs-Kepper, 2001; Dobbs et al., 2006), these studies have not considered to what extent the ecological model of aging applies to aging in place. Knowledge of the personal and environmental domains involved in aging in place will give AL providers information to help them develop and improve policies that will

support residents' overall wellness in these settings. Given that AL was developed to provide older adults the opportunity to age in place, more is needed to know about how and to what extent AL residents do so. Furthermore, a focus on the person and environment in these settings provides us a better understanding of who is best served in AL and under what conditions. The findings may also guide practice related to resident assessment and care planning in AL that supports aging in place.

Demographic projections suggest that one in five persons will be age 65 or older by the year 2050 (Shrestha & Heisler, 2011). In Ohio, the number of adults age 85 and older is projected to reach 322,497 by 2030, an increase by 82 percent since the year 2000 (Ohio Department of Aging, 2011). As a result of growing numbers of older adults both nationally and statewide, there is a strong likelihood that there will be a continued need for long term care services and supports, including AL. Furthermore, as states shift to increased use of home and community-based services in an effort to manage cost and meet consumer demands for less institutional care, ALs may play an even greater role in long-term care service provision.

Personal factors

The Cox regression model suggests that as level of care and number of medical diagnoses increases, there is a higher risk for discharge from AL. These findings are consistent with previous research that has documented that residents with greater healthcare needs are at greater risk of being discharged to a higher level of care (e.g. nursing home) and that residents' health and function upon admission influences their ability to age in place (Ball et al., 2004a; Dobbs & Chapin, 2001). The findings shed

light on the extent to which ALs are admitting and caring for residents with complex

medical needs. Furthermore, the findings suggest that AL residents who are admitted

with higher level of care needs may need more supports to age in place in AL. Research

suggests that medically complex residents in AL require additional staff monitoring,

particularly in regard to medication management, and may be at higher risk for

hospitalization (McNabey, et al., 2008). Some residents in AL may have physical and

cognitive limitations that meet the criteria for a nursing home's level of care. Although

the defining philosophy of AL is to provide a less restrictive/less institutional model of

care, the study findings suggest that a greater emphasis may need to be placed on

addressing the health care needs of AL residents. Residents with high level of care needs

and multiple diagnoses may require more comprehensive assessment upon admission as

well as more services and supports. Furthermore, more specific policies around

admission and discharge in AL may be needed to establish thresholds of quality care in

AL.

The capacity of ALs to meet the care needs of these residents may vary,

particularly because ALs vary from state to state in their regulations as well as policies

related to admission and discharge. The current findings of this study also highlight the

potential challenges of providing long-term care supports and services for residents with

nursing home level of care needs in an environment that was originally designed to be a

more social rather than medical model of care. There may be tension between the overall

guiding philosophy of AL (e.g. independence, autonomy) and the need to provide

appropriate and quality care to medically complex AL residents. Researchers have

suggested that in the future, ALs may adopt a "hybrid model with some of the health care features of a nursing home and new funding and regulatory strategies" (Polivka et al., 2013, p. 2). The current findings lend support to the possibility that a hybrid model of AL may be key to aging in place in these settings.

The association of medical diagnoses and level of care with length of stay in this study underscores the importance of resident assessment and care planning upon admission. These findings are particularly applicable for nursing staff as they are most likely to be assessing residents' clinical needs upon admission. Comprehensive admission assessments are not only important for quality of care but may also impact the possibility of targeting services to the most "at-risk" residents moving to AL. Although nearly all states require that residents be formally assessed before admission to AL, many states do not have standardized forms (Yee-Melichar, Boyle, & Flores, 2010). Minimum assessment standards may be needed to better address the health and wellness of residents as well as improve the overall fit between the resident and the AL. Including family caregivers in a standardized admission assessment might also better inform AL providers about resident care needs as well as address the expectations and goals for residents and families transitioning to AL settings.

Although the results of the current study did not indicate that dementia was a significant predictor of risk for discharge, over half of the AL residents in the sample had a diagnosis of dementia and 27 percent were admitted to a locked memory care unit. Nationally, Alzheimer's disease and other dementias are among the most common chronic health conditions in AL residents (Caffrey, et al., 2012). Sloane et al. (2005)

found that approximately half of the residents with mild dementia and one third of residents with moderate to severe dementia died or discharged from AL within one year. Recent studies show that residents with dementia may experience more difficulties when transitioning to AL settings (Doyle, de Madeiros, & Saunders, 2011). Residents with dementia may also have shorter lengths of stay in AL when compared to residents without dementia (Lykestos, et al., 2007). Unlike the research of Lykestos (2007), this study did not include a detailed, comprehensive assessment for dementia, which may have impacted the current findings. The number of Americans with Alzheimer's disease as well as other dementias is expected to increase (Alzheimer's Association, 2013) and there will presumably be a greater need for settings and services that will assist older adults with memory loss. Furthermore, ALs may increasingly provide memory care services as the current study findings suggest that dementia is prevalent among AL residents.

The study results also highlight the prevalence of mental health needs in the sample of AL residents. Twenty-two percent of residents had a diagnosis of depression and 11% had a diagnosis of anxiety. These findings are consistent with other research as estimates of depression among AL resident range from nearly 13% to 27% (Dakin, Quijano, McAlister, 2010; Park, Jang, Lee, Schonfeld, & Molinari, 2012; Watson et al., 2006) and as many as 18% of AL residents have symptoms of anxiety (Neville & Teri, 2011). Relocation to AL may be a source of depression and anxiety for residents both during and after the move. Although the study findings do not suggest any association between diagnoses of depression and/or anxiety with length of stay, no standardized

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instruments such as the Center for Epidemiological Studies- Depression (CES-D) scale

revised (Irwin, Artin, & Oxman, 1999) or the Patient Health Questionnaire (PHQ-9)

(Kroenke, Spitzer, & Williams, 2001) were a part of the nursing assessment or the

physician's history and physical upon admission. This may possibly explain these

findings. The lack of formal mental health assessment in the current study confirms other

research that suggests that in spite of the frequency of residents admitted to AL with

mental health disorders, there is limited mental health training for AL staff (Cummings &

Cockerham, 2004).

Environmental factors

   The results of this study indicated that there was a facility effect on length of stay

in AL that provides additional support for the importance of person-environment fit in

AL. Residents living in the free-standing AL with a locked memory care unit located in a

suburban location had a higher risk for discharge than those residents living in either of

the other two ALs. The other two ALs were both part of a CCRC and were located in

smaller, more rural areas. The facility effect may be partially explained by several

differences between the free-standing AL and the ALs that were a part of a CCRC.

   First, if residents in the free-standing AL needed skilled nursing care, these

residents must be admitted to a separate intermediate or skilled nursing facility (SNF).

For example, a resident who is hospitalized and who then requires short-term

rehabilitation will not be discharged directly from the hospital to the free-standing AL,

but instead must be admitted to a different SNF until he or she is ready and/or safe to

return to the free-standing AL. The temporary move from the free-standing AL to a

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separate SNF may lead some residents and family caregivers who anticipate a long SNF

stay and/or are uncertain about the possible need for long-term nursing home care to elect

to "give up" their apartment in a free-standing AL.

Secondly, there is also the possibility that a resident with increased healthcare

needs and/or functional limitations may be at risk for transitioning back and forth from

the hospital to SNF. For ALs that are a part of a CCRC, residents are able to directly

transition back and forth from a SNF that is connected and affiliated with the AL. For

residents in a free-standing AL, SNF admission may require multiple relocations to and

from a separate facility. The multiple levels of care in a CRCC "implies that transitions

will take place" (Shippee, 2009, p. 418), thus residents transitioning to and from AL in a

CCRC may be expected (e.g. from SNF to AL, from AL to SNF).   In addition to being

physically and/or emotionally taxing on the AL resident, family caregivers may find it

less of a burden for the residents in a free-standing AL to transfer to a CCRC if future

transitions are anticipated requiring a SNF admission. Research also suggests that multi-

level ALs (e.g. CCRC) are more likely to care for impaired older residents who need

nursing care than freestanding ALs (Hawes et al., 1999). The findings in this study

suggest that residents in the free-standing AL may have reached a level of care greater

than the AL was willing/able to provide.

Third, the free-standing AL in the sample was located in a more suburban, well-

populated area with many options for long-term care. The other two facilities in the

study were smaller than the free-standing AL and were located in more rural areas. AL

residents in smaller, more rural areas may have limited access to long-term care services

as supports than ALs located in in suburban and/or metropolitan areas. Hernandez and Newcomer (2007) reported that many rural communities face challenges in the access and availability of health care and long-term care services (including AL).

Finally, the size of the facility may also explain the facility effect on length of stay. The free-standing AL in the sample was also the largest of the ALs (150 residents). Research suggests that residents living in smaller ALs reported higher life satisfaction than those in medium to large ALs perhaps due to the more 'homelike' environment of smaller settings (Street & Burge, 2012). Thus, a larger facility might make it more difficult for a resident find his or her "place" in AL. Research also suggests that small size ALs and small-town and/or rural settings facilitate stronger social relationships among AL residents (Ball et al., 2004a). Furthermore, differences in staff to resident ratios among the facilities may influence the facility effect on length of stay as the free-standing AL had the highest resident to staff ratio. Research suggests that staffing characteristics influence the social relationships of residents in AL (Kemp et al., 2012) and that "facilities must strive to maintain staff-to-resident ratios that accommodate both emotional and physical care (Ball et al., 2009, p. 46). Therefore, staffing patterns may be an additional factor for consideration in supporting aging in place in AL settings.

Implications

The study findings have several implications for policymakers as well as AL providers. AL is a generally a less expensive option than a nursing home. According to Metlife, the average monthly cost of AL was $42,600 annually while national rates for a nursing home ranged from $81,030 to $90,520 annually (MetLife, 2013). It's important

to point out that the majority of the sample in the currently study were private pay

residents compared to 6% Medicaid. This finding suggests that low income older adults

in Ohio may not be able to access and/or afford AL as readily as those residents with

more financial resources. Studies report that AL providers are less inclined to accept

Medicaid due to lower reimbursement rates (Hernandez, 2012; Chapin, Hickey, Rachlin,

& Higgins, 2008). In Ohio, fewer dollars are spent on home and community-based

services, and 63% of Medicaid expenditures for long-term care supports and services

were spent on institutional care, including nursing facilities (Mehdizadeh & Applebaum,

2012). Additional policy development and research should be explored to compare

publicly and privately funded residents, particularly as research suggests that variability

in admission and discharge policies in AL may lead Medicaid-eligible residents to feel

hesitant about moving to AL settings (Carlson et al., 2010). Differences in length of stay

among publicly versus privately funded residents should be examined to develop

improved services and supports for preventing costly institutional care.

Nationally, the median length of stay is approximately 22 months (Caffey et al.,

2012). For AL residents who discharged in the study, the median length of stay was 20.3

months, suggesting that AL residents in the sample are remaining in AL approximately

the same as national rates. However, the study findings also revealed that there is a

sharper risk of discharge until about 10 months among AL residents. These results

suggest that the time during the first year after admission to AL may be a critical period

for whether or not a resident will remain in AL. AL providers might consider adding

greater levels and/or frequency of care to residents during their first year in AL.

The profession of social work has long been committed to supporting the autonomy, independence, and dignity of individuals. These values are at the heart of the AL philosophy of care. This study adds to our understanding of older persons' biopsychosocial needs in AL and supports the potential value of employing social workers in these settings. Exploring what factors contribute to length of stay and aging in place in AL was the first step in determining what types of interventions will maximize and enhance the overall "goodness of fit" between the person and environment. Greater attention should be given to social work as ALs increasingly become long-term healthcare providers. According to the National Association of Social Workers (2005),

> healthcare settings are practice areas in which assessment, care, and treatment address the physical, mental, emotional, and social well-being of the person; address prevention, detection, and treatment of physical and mental disorders with the goal of enhancing the persons' biopsychosocial and spiritual well-being. (p. 12)

Future research related to social work in AL may substantiate the need for social workers in these settings, particularly in the provision of medically related social services that may enhance and/or maintain the psychosocial well-being of AL residents.

Furthermore, AL administrators have identified the importance of social workers in assisting residents in the decision to move to AL as well as during the move and transition to these settings (Koenig, Lee, Fields, & Macmillan, 2011). Research also suggests that social workers may be valuable to ALs in providing pre-admission education to residents and their family member (Fields, Koenig, Dabelko-Schoeny, 2012; Koenig et al., 2013). However, full-time social workers are on average, not employed in most ALs (National Center for Assisted Living, 2010). Future research may build upon

this data to develop interventions designed to assist older adults adjusting to the AL and to further examine the role of social workers in providing services in AL settings.

Limitations

This study has several limitations that warrant closer examination. As administrative data were gathered from resident records, the information was reliant upon what the resident self-reported, what the caregiver reported and/or what the AL staff assessed upon admission. The data may have been inaccurate or missing. There were three different AL settings in the sample that may have threatened the reliability of the records. In addition, using more standardized admission tools with sound psychometric properties is important as data in this study may also lack validity and reliability.

Utilizing an administrative data set limited the type of information that could be collected by the researcher. Ideally, the researcher might collect data in the future that is not currently included in the resident records such as psychosocial variables related to the strength of family relationships, family caregiver involvement, resident friendships both within/outside the AL, and participation in social activities. In this study, there was limited information related to social support as the admission assessment only includes information related residents' emergency contact/next of kin. Future studies may better operationalize social support and additional data collection is needed to more broadly capture the social domains of person-environment fit. Furthermore, collecting data related to resident and family expectations as well as the short and long-term goals of residents and families may better capture variables related to adjustment and transition in AL settings.

The data collected did not incorporate time-varying measurements that could have provided more information about the dynamic aspects of aging in place. Collecting data at only one point in time did not capture the changes that may have taken place over the course of a resident's stay in AL. There is a need for multiple assessments to account for changes over time (e.g. longitudinal study). Another limitation is that discharge destination (e.g. nursing home, private home) was unknown. It's difficult to ascertain whether or not the residents discharged to a higher level of care and what the reason was for resident discharge. Furthermore, there is a need to better understand the nature of discharges from AL, as in some cases, a discharge may overall be in the best interest of the resident (e.g. safety, increased medical oversight). In the future, a longitudinal study design involving multiple points of time may provide a more accurate picture of the factors related to aging in place in AL.

Finally, as a result of using a convenience sample of residents in three ALs in one state, the generalizability of the findings to other ALs is limited. The three ALs in the sample were a part of a single, nation-wide organization that may allow for more services and supports to AL residents than smaller, independently owned and operated ALs. The majority of subjects in this study were White, thereby limiting comparisons to other minority and ethnic groups. The lower number of residents participating in the Medicaid Waiver program may also limit comparisons to low income older adults.

Issues related to statistical power may have also been a problem in this study as the sample size may not have provided optimal power to detect the relationship between length of stay and the covariates of interest. Future studies should include larger sample

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sizes. Moreover, other factors that contribute to aging in place not addressed in this study (e.g. strength of familial relationships, role of family caregiver) may also explain discharge from AL.

Future Research

There are a number of opportunities for future research studies of length of stay and aging in place in AL. Additional research might provide more clarity around how to operationalize the environmental context of AL, including measures of the social environment. More empirical studies of person-environment fit in AL may allow for the revision of the ecological model of aging that addresses the changing needs of older adults within the context of home and community based care, including in AL. Improved assessment tools may be useful in identifying gaps in the services and supports provided in AL. Capturing the more in-depth aspects of a resident's personal experience in moving to AL might also be beneficial for future research. Furthermore, a longitudinal study beginning with pre-admission through the admission to AL may better capture the transition experience to these settings.

A pilot project using a mixed methods exploratory design (Creswell & Clark, 2011) to identify the psychosocial needs of AL residents transitioning to these settings would be appropriate as there are few studies using both inductive and deductive analysis. The pilot project would first qualitatively explore residents' experiences upon admission to AL and then quantitatively examine psychosocial needs and supports among AL residents. A two-phase, mixed methods approach might also better address the gaps in the knowledge about psychosocial care in AL as well as help identify resident

psychosocial supports including family relationships, cultural views, and social resources that might promote more successful transitions to these settings.

Findings from this future pilot project could lead to the development of a more comprehensive tool to better capture indicators of psychosocial wellness upon AL admission as well as build upon existing screening tools in long-term care such as the Minimum Data Set 3.0 in nursing homes which uses standardized measures obtained from residents related to cognition (the Brief Interview for Mental Status; Chodosh et al., 2008), mood (the Patient Health Questionnaire [PHQ-9]; Kroenke, Spitzer, & Williams, 2001) as well as daily preferences, daily routines, pain, behavioral symptoms, and discharge planning. Zimmerman, Connolly, Zlotnik, Bern-Klug, & Cohen, 2012) suggest that the MDS 3.0 is a "promising tool to promote better psychosocial care and outcomes in nursing homes" (p. 454). Although the MDS 3.0 was not designed specifically for AL use, it is a tool worth examining further given the growing similarities between residents in ALs and nursing homes. In addition to the MDS 3.0, the Preference for Everyday Living Inventory (PELI) measures psychosocial domains of older adults such as social contact, growth activity, leisure activities, self-dominion, support aids, caregivers, and care (Van Haitsma et al., 2012). Although the PELI has not been tested in ALs, it might also be used as a part of the quantitative phase of a future pilot study.

There is also a need to more closely examine the reasons for discharge from AL in order to better understand aging in place. A discharge to a nursing home may be a result of an AL no longer being able to provide the level of care needed for a resident to age in place in AL. However, a discharge to an AL may also be related to the type of AL

setting (e.g. free-standing, CCRC) and have implications for staffing patterns such as higher numbers of full-time nursing staff as well as direct care staff. The extent to which a resident can age in place in AL is important to providers as well as policy makers as the cost of AL is significantly lower than nursing home care. Future studies should examine the profile of an AL resident who is most appropriate for an AL level of care. This is particularly critical for residents with memory care needs that may require a more secure environment.

Furthermore, future research might explore whether and to what extent AL residents with little to no memory impairment feel "at home" in a setting that also provides memory care. Similarly, it would be compelling to learn whether or not residents with memory impairment are "at home" in an AL environment that was not purposefully designed for memory care and may have design features that cause greater confusion (e.g. layout of the hallways). A closer examination of dementia care and memory units in AL might offer additional insight into the clinical as well as organizational factors that influence length of stay, particularly for residents more "at risk" for discharge to a higher level of care. Additionally, future research that examines the 'micro' environment in AL (e.g. residents' apartments) may shed light on the fit between the person and environment in these settings.

The concept of aging in place may evolve with increased use of hospice in AL. As the demand for home and community-based services are projected to grow, it is expected that there will be an increased need to provide services and care to residents who are dying in settings such as AL (Cartwright, Miller, & Volpin, 2009). Research suggests

that enrollment in hospice while remaining in the AL community has been shown to lower the likelihood of hospitalization as well as nursing home admissions (Dobbs et al., 2012). More research is needed to examine the influence of hospice and length of stay in AL settings. Furthermore, research is needed to explore the risks and benefits of "dying in place" within the context of aging in place in AL.

Finally, the findings from this dissertation research underscore the challenges of studying AL because of variations between these settings, even among ALs within the same organization. Resident outcomes in AL have been difficult to empirically examine for several methodological reasons including a lack of a uniform, standardized definition of AL. Variability in what services AL provides results in variability among resident experiences in these settings. Less is known about the impact of AL on family caregivers. Future studies that examine more specific interventions in AL, such as dementia care programming in memory care units, may provide a clearer picture of what impact AL has on quality of life for both residents and family caregivers.

Conclusion

This study is timely as there is continued interest in using home and community-based services to delay or prevent admission to nursing homes. The research is also valuable as a foundation for future studies of AL and provides preliminary data demonstrating the need for further examination of personal and environmental factors related to length of stay. Investigating factors related to adjustment and transition to outcomes in AL, including length of stay, may help providers and practitioners to find ways to better serve older adults and their families in these settings. The results of this

study also suggest that in many ways, knowing *what does not* influence length of stay may be just as important as knowing *what does.* In other words, are there other factors that have not been measured in AL or that have been missing from current research in aging in place? Further work on outcomes in AL is extremely crucial. Considering that growing numbers of Americans are aging and will likely prefer home and community based services to nursing home care, there is clear evidence for future research in AL. Finally, considering the fiscal challenges of providing long-term care services for an aging population, researchers and policymakers must continue to examine the capacity of AL to delay or prevent more costly institutional care.

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Gerontology Series B: Psychological Sciences and Social Sciences, 60(4), S195-S204.

Appendix A: Human Subjects Review Board approval

July 31, 2012

Protocol Number:	**2011B0282**
Protocol Title:	**AGING IN PLACE IN ASSISTED LIVING: UNDERSTANDING THE PERSONAL AND ENVIRONMENTAL FACTORS THAT INFLUENCE LENGTH OF STAY,** **Virginia E. Richardson, Noelle L. Fields, Social Work**
Type of Review:	Continuing Review with Amendment—Expedited
Approval Date:	July 19, 2012
IRB Staff Contact:	Carolyn Hagopian Phone: 614-292-0569 Email: hagopian.5@rf.ohio-state.edu

Dear Dr. Richardson,

The Behavioral and Social Sciences IRB **APPROVED** the Continuing Review of the above referenced research.

Date of IRB Approval:	**July 19, 2012**
Date of IRB Approval Expiration:	**July 19, 2013**
Expedited Review Category:	**7**

In addition; the research has been reapproved for a waiver of the consent process and for a waiver of HIPAA Research Authorization (entire research study).

In addition, the IRB **APPROVED** the request to amend the protocol dated 05/24/12--Add funding from the John A. Hartford Doctoral Fellows program on July 19, 2012.

If applicable, informed consent (and HIPAA research authorization) must be obtained from subjects or their legally authorized representatives and documented prior to research involvement. The IRB-approved consent form and process must be used. Changes in the research (e.g., recruitment procedures, advertisements, enrollment numbers, etc.) or informed consent process must be approved by the IRB before they are implemented (except where necessary to eliminate apparent immediate hazards to subjects).

This approval is valid for **one year** from the date of IRB review when approval is granted or modifications are required. The approval will no longer be in effect on the date listed above as the IRB expiration date. A Continuing Review application must be approved within this interval to avoid expiration of IRB approval and cessation of all research activities. A final report must be provided to the IRB and all records relating to the research (including signed consent forms) must be retained and available for audit for at least 3 years after the research has ended.

It is the responsibility of all investigators and research staff to promptly report to the IRB any serious, unexpected and related adverse events and potential unanticipated problems involving risks to subjects or others.

This approval is issued under The Ohio State University's OHRP Federalwide Assurance #00006378. All forms and procedures can be found on the ORRP website -- www.orrp.osu.edu. Please feel free to contact the IRB staff contact listed above with any questions or concerns.

Steven Beck, PhD, Vice Chair
Behavioral and Social Sciences Institutional Review Board

hs-017-07 Exp Approval CR/AM
Version 01/06/09
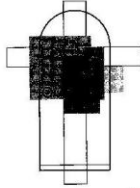
National Church Residences

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January 25, 2011

The Gerontological Society of America
Hartford Doctoral Fellows Program
1220 L St., NW, Suite 901
Washington, DC 20005-4018
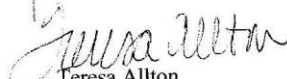
Dear Selection Committee:

I am writing to encourage you to support Noelle Fields in her effort to examine factors related to transitioning to assisted living environments by selecting her to become a John A. Hartford Doctoral Fellow. As the nation's largest not-for-profit developer and manager of affordable senior housing and services, National Church Residences (NCR), is committed to providing high quality services in assisted living. Noelle's research will provide important insights in meeting the needs of those served in assisted living environments, an area in dire need of further research.

The State of Ohio has committed over the last few years to fund assisted living services for poor and disabled individuals who qualify for Medicaid, and NCR has been a partner in this effort. NCR, other assisted living providers and consumers will benefit from Ms. Fields' work. Family members are desperate to understand how to best support their loved ones in their move to assisted living.

NCR has had a long standing relationship with the Ohio State University College of Social Work, and we look forward to expanding our work together through Noelle's research. It is with pleasure that write this letter of support.

Sincerely,

Teresa Allton
Vice President of InCare

Bristol Village

HERITAGE
Day Health Centers

InCare

TRADITIONS
Skilled Nursing, Assisted Living,
and Alzheimer's Facility-based Care

"Since 1961 combining compassion with professionalism in our ministry of housing and supportive services to families and older adults."

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Appendix C: Data abstraction form

Data Abstraction Form

Date Form Completed:	_____
Name of Coder:	_____
Study ID#:	_____
Time Started: _____ Time Completed: _____ Total Time: _____	

DEMOGRAPHIC INFORMATION

1. Age   _____

2. Gender

     1 = Male

     2 = Female

3. Marital status

     1 = Single, never married

     2 = Married

     3 = Separated

     4 = Divorced

     5 = Widowed

     6 = other (specify)

     99 = unknown

4. Race

     1 = Caucasian

     2 = African American

     3 = Hispanic

     4 = Asian

     5 = American Indian

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6 = Other

5. Religion

    1 = Protestant

    2 = Catholic

    3 = Jewish

    4 = Muslim

    5 = None

    88 = other: _____

    99 = unknown

6. Primary language

    1 = English

    2 = Spanish

    88 = other: _____

    99 = unknown

7. Highest level of education

    1 = Less than high school

    2 = High school/equivalent

    3 = College graduate

    99 = unknown

8. Funding/payor source (1 = yes, 2 = no, 99 = unknown)

Self pay	_____
Family	_____
Long term care insurance	_____
Veteran's Administration	_____
SSI/State Supplement	_____
Medicaid waiver	_____

9. Prior residence

    1 = Private home/apartment

    2 = Other Assisted living

    3 = Nursing home

    4 = MR/DD facility

    88 = Other _____

10. Prior residence household

    1 = Lived alone

    2 = Lived with family member

    88 = Other _____

11. Relationship of primary caregiver

    1 = Spouse

    2 = Daughter

    3 = Son

    4 = Niece

    5 = Nephew

    6 = Daughter-in-law

    7 = Son-in-law

    8 = Granddaughter

    9 = Grandson

    88 = Other _____

12. Next of kin to be notified in case of emergency, relationship

    1 = Spouse

    2 = Daughter

    3 = Son

4 = Niece

5 = Nephew

6 = Daughter-in-law

7 = Son-in-law

8 = Granddaughter

9 = Grandson

88 = Other _____

ADMISSION/DISCHARGE INFORMATION

13. Admission date (month, day, year):   ___ / ___ / ___

14. Admitted from

     1 = Private home/apartment

     2 = Assisted living

     3 = Nursing home

     4 = Acute care hospital

     5 = Psychiatric hospital

     6 = MR/DD facility

     7 = Hospice

     88 = Other _____

15. Discharge date (month, day, year):   ___ / ___ / ___

16. Discharge status

     1 = Death

     2 = Moved to nursing home

     3 = Moved to the community

     4 = Moved to other assisted living

5 = hospital

88 = other: _____

17. Reason for discharge

    1 = Required transfer to a higher level of care (i.e. nursing home or hospital then nursing home)

    2 = Required Alzheimer's or dementia care

    3 = Required behavioral management

    4 = Health status improved and resident could move to community

    5 = Resident/family wanted resident to live with/closer to family/spouse

    6 = Financial

    88 = other: _____

18. Length of stay (days)   _____

19. Resident involvement during the admission process

    1 = Yes

    2 = No

20. Family involvement during the admissions process

    1 = Yes

    2 = No

21. Referral from

    1 = self

    2 = family member

    3 = acute care hospital

    4 = nursing home

    5 = physician

    6 = attorney

88 = other: _____

22. Admission agreement signed

    1 = Yes

    2 = No

23. Bill of rights signed

    1 = Yes

    2 = No

24. Type of accommodation upon admission

    1 = studio apartment

    2 = one bedroom apartment

    3 = two bedroom apartment

25. Memory care unit upon admission

    1 = Yes

    2 = No

26. Advanced directives

    1 = Living Will

    2 = Power of attorney

    3 = Both

    4 = None

27. Authorization for mental health services?

    1 = Yes

    2 = No

MENTAL HEALTH AND COGNITION

28. Mental health diagnoses (1 = yes, 2 = no, 99 = unknown)

Depression	_____
Anxiety	_____
Bipolar Disorder	_____
Other:	_____

29. Source of mental health diagnosis

    1 = physician assessment

    2 = nursing assessment

30. Dementia related diagnosis

    1 = Yes

    2 = No

31. Cognitive status

    1 = Oriented in person, place and time but may have some occasional forgetfulness

    2 = Requires cuing and reminders on occasion

    3 = Mild impairment

    4 = Moderate impairment

    5 = Heavy impairment

32. Cognitive skills for daily decision making

    1= independent

    2 = modified independence

    3 = moderately impaired

    4 = severely impaired

33. Cognitive impaired behaviors

    1 = Yes

    2 = No

34. Wandering

    1 = individual does not demonstrate wandering behavior

    2 – individual wanders throughout the facility unsupervised; able to locate apartment with minimal direction

    3 = Needs occasional direction/supervision due to inability to locate apartment; may occasionally wander into other resident apartments throughout the facility; can be redirected

    4= prone to wandering, unable to locate apartment at times without supervision

    5 = attempts to wander inside and outside the buildings; may be unable to redirect

35. Code Alert Device

    1 = Yes

    2 = No

36. Source of dementia/cognitive behaviors diagnosis

    1 = physician assessment

    2 = nursing assessment

37. Elopement risk

    1 = Yes

    2 = No

HEALTH MEASURES

38. Number of recent hospitalizations

   _____

39. Prior skilled nursing facility/nursing home stays

   1 = Yes

   2 = No

40. Medical diagnoses (1 = Yes, 2 = No, 99 = unknown)

Cardiovascular disease	_____
Hypertension	_____
Musculoskeletal disease	_____
Neurological disease	_____
Respiratory disease	_____
Gastrointestinal disease	_____
Renal disease	_____
Endocrine/metabolic disorders	_____
Prostate disease	_____
Oncology and hematologic diseases	_____
Other	_____

41. Terminal diagnosis

   1 = Yes

   2 = No

42. Medications

    1 = Able to self-administer all medications

    2 = Resident may self-administer certain medications as per physician order; nursing staff administer all other medications

    3 = Resident requires complete supervision and administration of all medications by staff

43. Total number of medications upon admission   _____

44. Psychotropic medications

Medication(s)	Dosage
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

45. Pain present

    1 = Yes

    2 = No

46. Continence

    1 = Resident is continent of bowel and bladder

    2 = Resident has occasional episodes of incontinence and requires staff assistance

    3 = Resident requires assistance from staff to change/obtain incontinence products

    4 = Resident requires total assistance from staff

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47. Mobility

     1 = Self

     2 = Assisted

     3 = Chair bound

     4 = Bed bound

48. Ability to ambulate

     1 = Independent

     2 = 1 person assist

     3 = 2 person assistance

49. Ambulation devices

     1 = independent

     2 = wheelchair only

     3 = walker only

     4 = cane only

50. Functional status

     1 = Independent

     2 = 1 person assist

     3 = 2 person assist

     4 = total assist

51. Falls risk

     1 = Yes

     2 = No

52. Activities of daily living (0 = independent, 1 = staff assistance, 2 = dependent)

Eating	_____
Dressing	_____
Shaving	_____
Grooming	_____
Bathing/shower	_____
Needs help with shopping	_____
Needs help with housework	_____

53. Instrumental activities of daily living (0 = independent, 1 = staff assistance, 2 = dependent)

Using telephone	_____
Traveling by car/bus	_____
Shopping	_____
Preparing meals	_____
Doing housework	_____
Handling own money	_____
Laundry	_____

54. Skilled nursing service use upon admission (1 = yes, 2 = no, 99 = unknown)

Physical therapy	_____
Occupational therapy	_____
Speech therapy	_____
Nursing	_____
Other	_____

55. Communication

    1= Clear

    2 = Unclear speech

    3 = No speech

56. Vision

    1 = Adequate

    2 = Adequate with glasses

    3 = poor

    4 = blind

57. Hearing

    1= Adequate

    2 = Adequate with hearing aides

    3 = poor

    4 = deaf

58. Therapeutic diet

    1 = Yes

    2 = No

59. Sleep patterns (1 = yes, 2 = no, 99 = unknown)

Usual bed time	_____
Usual arising time	_____
Usual nap time	_____

60. Resident level of care (0 to 5) _____

61. Short term goals _____

62. Long term goals _____

63. Discharge plan _____

PSYCHOSOCIAL FUNCTIONING

64. Which words best describe the resident (1 = yes, 2 = no, 99 = unknown)

Alert	_____
Angry	_____
Fearful	_____
Noisy	_____
Friendly	_____
Cooperative	_____
Lethargic	_____
Non-questioning	_____
Combative	_____
Other:	_____

65. Resident answers questions (1 = yes, 2 = no, 99 = unknown)

Readily	_____
Reluctantly	_____
Inappropriately	_____
Other:	_____

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66. Resident's mood (1= yes, 2 = no, 99 = unknown)

Passive	_____
Anxious	_____
Depressed	_____
Quiet	_____
Calm	_____
Questioning	_____
Talkative	_____
Hyperactive	_____

LEVEL OF CARE ASSESSMENT

67. Mobility

    1 = Independent

    2 = 1 person assist

    3 = 2 person assistance

68. Eating

    1 = Independent

    2 = Staff set up

    3 = Staff assistance

    4 = Staff feed

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69. Medication administration

    1 = Resident self-administers own medication

    2 = Occasionally requires staff assistance

    3 = Total staff assistance

70. Bathing

    1 = Independent

    2 = Some assistance

    3 = Dependant

71. Hygiene/Grooming

    1 = Independent

    2 = Staff reminders/prompts

    3 = Staff assistance

    4 = Total staff assistance

72. Dressing

    1 = Independent

    2 = Staff reminders/prompts

    3 = Staff assistance

    4 = Total staff assistance

73. Continence

    1 = Resident is continent of bowel and bladder

    2 = Resident has occasional episodes of incontinence and requires staff assistance

    3 = Resident requires assistance from staff to change/obtain incontinence products

    4 = Resident requires total assistance from staff

74. Terminal diagnosis

    1 = Yes

    2 = No

75. Falls risk

    1 = Yes

    2 = No

76. Resident lacks family support

    1 = Yes

    2 = No

77. Mental status

    1 = Intact for orientation, memory, and decision making

    2 = Mild impairment

    3 = Moderate impairment

    4 = Severe impairment

78. Behaviors

    1 = None

    2 = Resident requires staff intervention and/or monitoring due to displays of disruptive behaviors, wandering, and/or other anxiety levels

79. Resident level of care (0 to 5)   _____

80. Wandering

    1 = Individual does not demonstrate wandering behavior

    2 = individual wanders throughout the facility unsupervised. Able to locate apartment with minimal direction.

    3 = Needs occasional direction/supervision due to inability to locate apartment.

    4 = Prone to wandering

    5 = Attempts or wanders inside and outside of building.

81. Shopping

    1 = Individual takes care of own needs

    2 = minor assistance may be needed with transportation and/or carrying bundles

    3= must be reminded to make deposits, write checks, pay bills

    4 = needs assistance in every transaction

    5= totally dependent- unable to shop for self

    6= family/friends do all shopping

82. Food preparation

    1= takes care of all areas of food preparation and clean up

    2= heats and serves prepared meals/foods without prompting

    3= can prepare and heat meals but needs prompting, needs assistance with use of kitchen equipment

    4= Will eat continental breakfast and go down for lunch and dinner

    5= meals/snacks must be completely prepared and served to individual

83. Housekeeping

    1= Keeps apartment clean but needs help with heavy work

    2= can perform light housekeeping tasks

    3= staff will make bed daily. Housekeeping will clean weekly

    4= cannot maintain orderliness of personal items, clothing, or foodstuffs which may cause a safety or health problem

    5=staff must perform all tasks

84. Laundry

    1= sends out or does own

    2- minimal assistance carrying clothes to laundry room

    3= family will do laundry

    4= housekeeping will do laundry

    5= other

85. Transportation

    1= Uses public transportation system or drives car

    2= uses taxi or other means of transportation; makes own arrangements; does not drive

    3= depends on someone else for travel, unable to make arrangements

    4= requires customized handicapped vehicle for transportation or requires supportive person to stay with him/her

    5= No travel at any time

86. Telephone use

    1= no assistance needed to make outgoing call or receive calls

    2= assistance needed to initiate some calls, able to receive calls

    3= only able to dial a few numbers committed to memory

    4= only able to answer telephone. Does not initiate calls or remember number sequences.

    5= staff must make and receive calls or unable to use telephone

87. Financial management

    1= handles all finances and banking functions independently

    2= is capable of conducting standard transaction

    3= assistance is required in deciding and procuring

    4= family handles financial affairs

    5= requires a trustee or family-appointed guardian to handle all financial arrangements and is not responsible for financial obligations

88. Well-being

    1= in good general overall health with no serious difficulties preventing independent living

    2= stable chronic conditions

    3= unstable chronic conditions

    4= acute or life threatening conditions with some hope for recovery

    5= terminal illness

89. Pain present

    1 = Yes

    2 = No