Physical Environments of Assisted Living: Research Needs and Challenges

Lois J. Cutler, PhD

**Purpose:** This article aims to review research measures and findings related to physical environments of assisted living (AL) according to multiple conceptual perspectives—ecological, cultural, and Maslovian hierarchy. **Design and Methods:** A literature and research review was undertaken with two foci: performance measures for physical environments, and environmental research findings themselves. **Results:** The research review identified a variety of environmental studies with a broad scope of topics, including post-occupancy design multimethod approaches, homeliness, evolution of AL, services, quality of life as an outcome, aging in place, regulatory influences, and environmental design principles. Most studies were descriptive; few dealt with outcomes linked to the environment, and those that did often focused on dementia settings. Some large scale studies with environmental components suggested that physical designs would affect a resident’s ability to age in place within an AL setting. Overall, the environmental research was sparse and often characterized by small samples, lack of longitudinal data, or lack of depth. **Implications:** The field needs research studies that show how resident and environmental characteristics interact to generate both quality-of-life and functioning outcomes, and it also needs work on measures to permit such studies. I suggest eight specific studies in targeted areas and recommend full post-occupancy evaluation studies to develop in-depth understanding about how a setting works for its users. Research on AL environments is most likely to be meaningful if it anchors itself in the study of housing rather than hospitals, nursing homes, and other health settings.

**Key Words:** Apartment, Aging in place, Homelike qualities, Post-occupancy evaluation, Cultural housing norms

Although they give much attention to assisted living (AL) as a service option, commentators less often emphasize that, for those who live there, AL is also their dwelling, their home. It is typically a “rental” home, which, depending on the type of AL, may be more analogous to a rented room and bath in a boarding home, a hotel, a dormitory, or an apartment. The nature of the space available to residents or tenants as their own (including fixtures, options for furnishing and decorating, or the furnishing and décor provided) and the nature of the surrounding space available to the entire AL community can enhance or detract from the functioning, emotional well-being, social involvement, and satisfaction of the resident. Today, the general consensus is that the AL model will continue to evolve, becoming more consumer driven, but that no uniform design will ever be developed and that resistance to government regulation will continue. Service patterns may vary, but the mainstay of the model will continue to be the design of the living environment, because its symbolism connoting home and independence enhances marketability of the product (Carder & Hernandez, 2004).

This article presents a multiperspective research review that focuses on the physical environments of AL settings and includes the conceptual background of that research and the performance measures used in assessing the environments. The Results section includes two subsections: (a) environmental performance measures, including post-occupancy design approaches, available for evaluating the physical environment; and (b) a review of AL studies that covers a broad scope of environmental topics, including homeliness, the evolution of AL, services,
quality of life as an outcome, aging in place, regulatory influences, and design principles.

Design Issues in AL Definitions

Arguably, the essence of AL is housing, a lifelong concern that affects all human beings, no matter what age. A common purpose is to seek “the good life,” which includes the pursuit of safe and comfortable housing, preferably in a form deeply pleasing and reassuring. The evolving needs of elderly housing consumers and their changing discretionary resources, combined with their desire to be independent and age in place, have necessitated that consumers become involved with issues concerning their living arrangements. Continuing sensory and cognitive losses can cause an environment that was previously well matched to the individual to become less supportive, necessitating that changes be made. An important strategy for reducing excess disability is to reduce or eliminate excessive environmental demands through improved design or personal assistance services. When older people relocate to a more physically and socially supportive environment, their independence in daily activities and other behavior and affective domains often improves, even though the underlying disease and impairment may remain the same (Connell, 1996).

Today, AL appears to be the older consumer’s housing of choice when he or she needs to relocate from independent living. A major appeal is that AL conveys an image of receiving care in one’s own home. Increasingly the boundaries separating each AL type have become blurred as new technology, fluctuating regulations and management decisions, and changes in reimbursement and waiver policy support caregiving in an abundant variety of settings. The lack of either consensus on terminology or a systematic approach for classifying different options leads to ambiguity in what consumers can expect from their housing choices when they choose any planned group care setting.

Kane and Wilson (1993) defined AL operationally as any group residential setting not licensed as a nursing home that provides or arranges routine personal care and nursing services; they did not introduce any environmental elements into the definition itself. The Assisted Living Quality Coalition (1998) defined AL as a congregate residential setting that provides or coordinates personal services, 24-hr supervision and assistance (scheduled and unscheduled), activities, and health-related services designed to minimize the need to move; designed to accommodate individual residents’ changing needs and preferences; designed to maximize residents’ dignity, autonomy, privacy, independence, and safety; and designed to encourage family and community involvement. This definition emphasizes services, philosophy, and desired outcomes, again without specifying physical design elements.

More normatively, Regnier (1994), an architect and gerontologist, defined AL as “a long-term care alternative which involves the delivery of professionally managed personal and health care service in a group setting that is residential in character and appearance in ways that optimize the physical and psychological independence of residents” (p. 1). He noted that the size, scale, and configuration of a building define whether a setting is considered residential, not merely the cosmetic features present.

The Assisted Living Workgroup (2003) proposed a three-part definition of AL: (a) services and regulation, (b) private units, and (c) levels of care. Part B proposes that AL units must be privately occupied and shared only by someone of the resident’s choice (e.g., a spouse, partner, or friend). The rationale for the definitional requirement for privacy was the premise that dignity, autonomy, and independence cannot be realized “without personal space controlled by the resident” (p. 13). Notably, this was the most controversial component of the Workgroup report, and a majority of the participating organizations failed to endorse the privacy standard.

In contrast to AL facilities, federal standardization of assessment and quality standards do apply to nursing homes. Code of Federal Regulations for the physical environment specify that it be “safe, clean, functional, comfortable, and homelike, allowing the resident to use personal belongings to the extent possible,” (2005, p. 517) and that a variety of life-safety codes be followed. Overall, federal nursing home rules and the much more voluminous state rules that apply to the physical environment (including fixtures, furnishings, and décor) stress societal values of safety and physical health over a normal lifestyle that emphasizes psychological and social well-being. Some regulation of care is inevitable, but the goal is that the AL industry self-regulate without stifling creativity and innovation (Cinelli, 1999). The nursing home experience suggests that regulation of settings can inhibit each resident’s ability to create a personal home that encompasses past culture and values and provides for flexibility in adapting the environment to become more supportive as care needs increase. However, nursing homes do not require that each individual have private, singly occupied living spaces, and, as pointed out previously, whether AL should have a normative requirement for privacy is a contested topic.

Conceptual Frameworks

As the aging process continues and the gap between the demands of the environment and the older person’s competence widens, a loss of mastery over necessary environmental characteristics can result in older persons living limited lives in their environments or prematurely moving to supportive housing. Existing research supports the contention
that a person’s behavior in his or her environment is directly related to the design of the space, and an optimal environment is designed to meet the specific needs and preferences of a given person (Christenson, 1990; Cutler, 2000; Kahana, 1973). Such research is based on the well-established ecological theory (Lawton & Nahemow, 1973), which holds that behaviors are a function of the interaction of individual factors with the physical, social, psychological, and cultural dimensions of their environment. Behavior and affect are outcomes of a person’s level of competence interacting with an environment’s level of press. Level of press refers to the demands placed on individuals by their environment. To function at the highest level possible, a person’s ability must match demands placed on it by the environment. Too little demand results in lack of stimulation, boredom, and even deconditioning, whereas too much demand can result in stress and inability to negotiate the environment. According to the docility hypothesis, an outcome of the ecological theory, the lower the level of competence, the greater the influence of the environment. The ideal adaptation between persons and their environments is dynamic, adjusting as levels of function change.

Gerontologists rightly rely heavily on the ecological theory in environmental research, yet used in isolation, it can lead to overemphasis on a specific population at the group level, neglect for taking into account individual housing needs, and underplaying of the role of cultural norms and values in preferences and satisfaction. It may also emphasize how the environment stimulates competence and social activities at the expense of considering how the environment fosters other desirable outcomes such as maintaining a sense of continuity and individuality.

Maslow (1970) provided an influential conceptual framework for understanding individual human needs. The five-level hierarchy includes (a) physiological needs (to eat, sleep, breathe, and be protected from the elements), (b) safety needs (a feeling of control over one’s life and environment, and the security of an environment free from external and internal threats), (c) social needs (love, acceptance, association with other humans, being needed), (d) self-esteem needs (being accepted by others because of competence or mastery of a task, and attention and recognition from others), and (e) self-actualization (realizing one’s full capabilities in terms of achievement and interpersonal relationships). Although not originally designed for use in environmental research, the Maslow stages have become a mainstay of housing curriculum as a framework that outlines basic human needs and the way in which the environment can satisfy those needs both in the workplace and in housing (Denhardt, Denhardt, & Aristigueta, 2002; Lindamood, 1979).

A study of the living environment of a continuing care retirement community used Maslow’s framework. Eshelman and Evans (2002) looked at function and personal meaning as predictors of place attachment (i.e., the bonding of people to place; Low & Altman, 1992) and self-esteem. They operationalized function by using 14 items from the Moos and Lemke (1996) checklist that addressed function and adequacy of environments, defined meaning operationally as satisfaction with interior qualities and supports for personalization, and defined self-esteem using the 10-item standardized Rosenberg (1965) scale. Eshelman and Evans developed a 3-item agree/disagree instrument to measure attachment to place: (a) Your present residence is where you belong, (b) you feel like you are part of the community, and (c) your present residence reflects your personal identity. These three items constituted a reliable attachment scale. Once lower level physiological and safety needs were met, environmental features that had personal meaning elevated the achievement of higher level of belongingness, self-esteem, and self-actualization. Individual environmental competence was the foundation upon which place attachment and self-esteem were built. The results suggest that satisfaction occurs when a person’s living unit is marked with the personality of its resident. Eshelman and Evans explained that these findings offer context for the recent focus on homeliness in the design of congregate care setting, but they went on to warn

Designers working on continuing care retirement communities should not become complacent, thinking they have done their job simply by pursuing expressions of hominess: by designing residences to appear home-like. Instead, they should view the challenge of designing to support the expression of individual preferences, as an enormously untapped area. (p. 7)

Established cultural norms in a country or region or subgroup help explain why particular types of housing fulfill individual needs, influence behavior in a person’s environment, and predict housing satisfaction no matter what the person’s age. Rapoport (1969) contended that cultural norms are basic to the development of supportive design solutions and the satisfaction of consumers and that the prevalent attitude toward planning and design in the United States is influenced by cultural norms most often typified in advertising.

According to Morris and Winter (1991), individuals evaluate their housing conditions in terms of cultural norms and household-specific norms. Values serve as guidelines that assist the individual in determining which norms or goals are most important to them. Privacy is a strong cultural norm that has had great impact on design and ultimately on housing satisfaction. Many norms surround bedrooms in U.S. society. The sharing of sleeping and bathroom spaces tends to be governed by strong norms; though the details may vary with subgroups, there is little reason to think that they change with
age for adults. Sleeping spaces and bathrooms shared with strangers in nursing homes are a contradiction to both the bedroom and privacy norms, as is the transportation to distant bathing and shower rooms down a public corridor. It is no wonder that the medical model nursing home has never found favor as a housing option for elders. The predominant AL model and the one demanded by those with financial means incorporates substantial privacy for sleeping quarters and bathrooms, which in turn allows residents to arrange their possessions, including toilet articles, in the space. The ecological theory, the hierarchy of basic human needs, and cultural norms all contribute to understanding how the environment fosters desirable behavioral outcomes.

Methods

The literature review utilized all AL research from 1989 to 2003 that was abstracted for a working conference sponsored by the Agency for Healthcare Research Quality and cross-referenced for environmental content (Kane, Cutler, & Chan, 2005). In addition, an extensive literature search was conducted on InformeDesign (http://www.informedesign.umn.edu/), a Web-based clearinghouse for design and human behavior research developed by the Department of Design, Housing, and Apparel in the College of Human Ecology at the University of Minnesota. This searchable database of research summaries utilizes research-based design criteria as part of its interpretation of original research articles that pertain to the design of the built environment, going beyond AL. Keywords utilized in the search included physical environments, assisted living, gerontology, performance measures, aging-in-place, home-like, regulating assisted living, and post-occupancy evaluation. An additional search conducted through the University of Minnesota School of Architecture library focused on methods used for assessing the physical environment, including performance measures, sources of data, methodological issues, and studies that utilized those assessment tools.

Results

Environmental Performance Measures

Methodological Issues.—Environmental research has shown an overreliance on interviews; observation at one point in time; or questionnaires, often completed by proxy. As a result, research on physical environments has often resulted in subjective, descriptive, and global data rather than data that are objective, evaluative, and discrete (Cutler, 2000). For some constructs, reliable instruments were unavailable, rendering the obtainment of full multidimensional measures of constructs difficult (Lawton, Weisman, & Calkins, 1997). Too often assessments identified characteristics in the environment but failed to measure how the resident interacted with his or her environment on an individual and continuing basis.

A range of data collection techniques were available, including in-person interviews, self-completed questionnaires, focus groups, checklist ratings, and structured observation at specific points in time and in specific places. Incorporation of behavioral measures of how residents and other users behave in the environment has the potential to result in a more comprehensive understanding of the interaction of residents and their environment. Utilizing floor plans for detailing each room by size, configuration, furnishings, and design features facilitates behavioral mapping. Observing physical traces and documenting them with photographs can be an unobtrusive measuring tool for understanding patterns of use. Observation by trained observers over a sustained period of time provides an objective assessment of staff and resident behaviors. Researchers can also gather data through direct assessment or videotaping followed by uniform coding. Utilizing several methods will increase the reliability of the research.

Data collection took place in a variety of settings but rarely was there an opportunity to conduct research in a residential setting that was also designed as a research setting. Namazi and colleagues (1991) conducted a series of research projects that examined the impact of the physical environment on specific problems of patients with Alzheimer’s disease and related disorders at the Corinne Dolan Alzheimer Center, a residential treatment center that serves as a model for Alzheimer’s disease patient care while focusing on applied research. The building was specifically designed to accommodate the needs of Alzheimer’s disease patients as well as to facilitate a variety of research agendas by allowing for modification and manipulation of various parameters of the physical environment. “The flexibility of the [Corinne Dolan Alzheimer Center] design, in response to both patient care and the specific requirements of the research, makes this center particularly suited to carry out empirical studies on environment influences” (Namazi et al., 1991, p. 5). Namazi and colleagues studied seven areas, including disorientation, incontinence, distractibility, confinement, confusion, food intake, and reinstating familiar tasks, with the goal of identifying features of the environment that could be adapted and used to maximize remaining strengths.

Understanding the person–environment fit is not a simple task. Bias is a concern when researching older persons because they generally assess their environments in a more positive light than an expert might. Researchers can label this discrepancy psychological adaptation of the older person, who appraises his or her personal environment highly even though the environment technically fails to support physical functioning. The positive bias can be
attributed to attachment to home, resistance to change, and/or denial of how supportive the housing is for the elder’s specific needs. The timing of the interview of the resident relative to moving in may make a difference, but investigators have yet to study this topic. Furthermore, researchers must also be aware of the ecological fallacy, such that patterns found at a group level will not always translate to an individual level. This is evident when designing with the aim of cueing for expected behavior. For example, the expectation that the absence of a bathroom door will lead to greater use of the toilet by a resident can also have the unexpected consequence of a resident viewing the toilet as a means of flushing articles of clothing away. The absence of the door means that the environment cannot be adapted by closing the door to avoid unwanted behavior. Finally, whether researchers use observation or standardized questionnaires, unless they utilize explicit instructions for coding responses, the results will be project specific and will not lead to a central base on which to build future design solutions.

Available Measures.—There are a variety of measures available for assessing the environment of older adults, but most were designed for measuring dementia special care units and are not specific to AL (although they could be adapted for that use). The most commonly used environment measure is the Multiphasic Environmental Assessment Procedure developed by Moos and Lemke (1996). It is a five-part procedure that includes the following sections: (a) Physical and Architectural, (b) Resident and Staff Information, (c) Policy and Program, (d) Sheltered Care Environment Scale, and (e) Rating Scale. The set of measures is designed to analyze the relationship between the objective characteristics of a program (aggregate resident and staff characteristics, physical and policy factors), personal factors, social climate, resident coping responses, and resident adaptation. Several sections include a measure for assessing individual preferences. The Multiphasic Environmental Assessment Procedure is designed for flexibility, and researchers can administer the scales either individually or in combination.

Several measures for dementia special care units were developed as a direct result of the National Institute on Aging funding that topic. The Professional Environmental Assessment Protocol (Teresi, Lawton, Ory, & Holmes, 1994) and the TESS2+ (P. E. Sloane, Mitchell, Long, & Lynn, 1995) are observational measures designed for nursing homes, but they have the potential to be adapted for AL facilities that specialize in dementia.

Often instruments are designed for a specific project, such as a set of three measures that were specifically developed for a Centers for Medicare & Medicaid Services quality-of-life study (Kane et al., 2003). The environmental team on quality of life in this study concluded that most of the hypothesized quality-of-life outcome domains had hypothetical environmental determinants—not just the obvious domains of privacy, security, and functional competence, but also meaningful activity, enjoyment, relations, and even spiritual well-being. Based on careful review of the published literature, existing instruments, and expert opinion about environmental elements that might affect quality of life, the team constructed three observational tools related to the nursing home as a whole, the unit on which the resident lived, and the resident’s own room (or room space, if shared) and bath. The team further developed indexes to measure environmentally relevant constructs, such as function-enhancing features, life-enriching features, resident environmental controls, and personalization (Cutler, Kane, Degenholtz, Miller, & Grant, 2006). The aim was to characterize the environments experienced by a particular resident rather than to characterize averages for the entire facility; this strategy permitted later nested analyses of resident outcomes controlled for resident characteristics and using hierarchical linear modeling. Descriptive statistics showed great variation in environments across facilities and even within facilities. Researchers could readily adapt this method to AL settings, where the lack of regulatory restrictions and the evolving nature of the field mean the potential for the environment to enhance quality of life while providing reasonable protection is even greater than in the nursing home sector.

Post-Occupancy Evaluation (POE).—A POE is an evaluation tool that utilizes several methods of data collection. It is a process of evaluating buildings in a systematic and rigorous manner after they have been built and occupied for some time (Preiser, Rabinowitz, & White, 1988). The focus of a POE is on environmental features, the users of the building (i.e., those who live there, visit there, work there), and how well the building performs for the users. A POE provides insights into consequences of past design decisions, providing critique and design directives for future buildings. Table 1 presents the conceptual framework for a POE. I next present two examples of structured POE evaluations.

In an edited volume, Schwarz and Brent (1999) presented several POEs relevant to AL. Cinelli’s (1999) study of Heritage Village a year after completion described a facility composed of four major components—home or private zone, household or semiprivate zone, neighborhood or semicommunal zone, and village or communal town center zone. It provided an honest portrayal of how design decisions were made, items that were value-engineered out of the project, and the outcomes of those decisions. Heritage Village was built as a nonlicensed residential environment. Final design decisions were made based on board recommendations, common sense, cost constraints, and consumer input. Designers envisaged that the building would
be fully occupied within 1 year, but it was only 35% occupied by that time. Cinelli noted the need for a dialogue among architects, providers, and residents to determine what the users expected from AL.

Cinelli’s evaluation identified the following problematic design decisions:

- There was a lack of parking spaces for residents (expectation that residents would not drive)
- There were no operable windows in the dining room
- The facility needed a larger roof overhang to reduce glare from the western exposure
- Gutters were value-engineered out of the project due to cost
- There was no individual climate control in apartments
- The bathing and spa room underutilized biaxial symmetry of facility to inhibit way finding
- It was difficult to create a homelike setting in large multiple-use rooms

Fire code regulations greatly increased cost of project and reduced aesthetics

Units needed doors separating the bedroom and living room.

In another example, Hoglund and Ledewitz (1999) described the results of a 3-year study of Woodside Place, an AL dementia setting. Their article explored key environmental design concepts, identified specific findings, and developed recommendations for future projects. The initial goal of the project was to go beyond the typical AL dementia setting of a converted nursing home with special staff and program goals to a setting that offered critical interplay between programs, care goals, and environmental design. Woodside Place was composed of three houses physically connected to a central common area. Each house was home to 12 people. The common area contained a great room with sitting areas, craft room, music room, and entertainment (television) room. Although staff and families favorably received

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Table 1. Conceptual Framework for Post-Occupancy Evaluation

<table>
<thead>
<tr>
<th>Performance Criteria</th>
<th>Performance Measures</th>
<th>Outcomes</th>
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</thead>
<tbody>
<tr>
<td>Building Performance</td>
<td>Based on Criteria Quantitative/Qualitative</td>
<td>Short Term</td>
</tr>
<tr>
<td>Technical</td>
<td>Environmental checklists</td>
<td>Refers to reason of assessment</td>
</tr>
<tr>
<td>Functional</td>
<td>Questionnaires</td>
<td>Mid Term</td>
</tr>
<tr>
<td>Behavioral</td>
<td>Interviews</td>
<td>Feedback for planning, critique, or design directives</td>
</tr>
<tr>
<td>Users/Occupant</td>
<td>Behavioral mapping</td>
<td>Long Term</td>
</tr>
<tr>
<td>Residents</td>
<td>Place-centered time scans</td>
<td>Research database</td>
</tr>
<tr>
<td>Management</td>
<td>Physical cue observation</td>
<td></td>
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<tr>
<td>Staff</td>
<td>Photographs</td>
<td></td>
</tr>
<tr>
<td>Visitors</td>
<td>Analysis of administrative data</td>
<td></td>
</tr>
<tr>
<td>Setting—Assisted Living Facility</td>
<td>Analysis of site and floor plans</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ethnography</td>
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</table>

Technical Elements
Technical elements of the environment involve survival issues such as health, safety, and security aspects of building occupancy. This element plays an important role in the comfort of the resident and supports basic physiological and security/safety needs.

Functional Elements
Functional elements of the environment support organization and activities within the building. Characteristics include prosthetic and therapeutic elements including accessibility, stimulation, challenge, sensory compensation and sensory enhancement, and adaptability of environment to respond to changes in functioning. Functional elements support basic social needs.

Behavioral Elements
Behavioral elements have an effect on quality of life by how the resident uses the environment; and the influence of management decisions, programs, and policies. Management programs and policies have an impact on expressions of territoriality, personalization, familiarity, activities, satisfaction, and so on. Behavioral elements fulfill the basic needs of self-esteem and self-actualization.

Users
The primary users of an assisted living facility are the residents. Family members, staff, management, and visitors all use the same environment, but for a different purpose.

Setting
The overall setting is an assisted living facility. Categories of environmental characteristics include physical, social, psychological, and cultural.

Source: Preiser and colleagues (1988).
the building, the evaluation produced a number of lessons about what not to do. Hoglund and Ledewitz addressed nine design issues specific to people with dementia but that are relevant to the nondemented population as well. The evaluation showed that rooms designated for a single purpose, such as the music room or activity room, were underutilized. This was also true for lounges at the end of the corridor. Residents spent less than 10% of their time in their rooms, which suggested to the authors that smaller room size was acceptable if more square footage were to be given to shared spaces. The study also noted that color cueing and way-finding techniques were not successful. Instead, the presence of a person or staff member was much more successful at orienting a person. A design directive would be to locate staff workspaces at critical junctions throughout a building.

I based Table 2 on a summary of selected issues and design recommendations from the Woodside Place evaluation.

### Table 2. Design Recommendations From the Evaluation of Woodside Place

<table>
<thead>
<tr>
<th>Design Issue</th>
<th>Selected Design Recommendations</th>
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<tbody>
<tr>
<td>Acknowledging privacy and community</td>
<td>Provide private bedrooms with private baths</td>
</tr>
<tr>
<td>Residents spend less than 10% of day in bedroom</td>
<td>Provide hierarchy of public and private spaces</td>
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<tr>
<td>Most socializing occurs in main corridor</td>
<td>Design so obtrusive visual observation is limited</td>
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<tr>
<td>Flexible rhythms and patterns</td>
<td>Provide kitchen that supports flexible meal times</td>
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<tr>
<td>Building supportive of variety of activities not forced interaction</td>
<td>Separate activity areas from resident rooms</td>
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<tr>
<td></td>
<td>Create a variety of settings</td>
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<tr>
<td></td>
<td>Reinforce seasonal and daily rhythms with views to outside</td>
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<td></td>
<td>Integrate space for informal activities into structure</td>
</tr>
<tr>
<td>Small group size</td>
<td>Provide small group spaces</td>
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<tr>
<td></td>
<td>Avoid multipurpose rooms</td>
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<tr>
<td></td>
<td>Do not design space specific to one activity, such as library or music room—make adaptable to other use</td>
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<td></td>
<td>Select furnishing to accommodate 3 to 8 persons in separate seating areas</td>
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<tr>
<td>Caregiver and family relationships</td>
<td>Design work station as a social seating area</td>
</tr>
<tr>
<td>Long corridors discourage frequent contact</td>
<td>Locate storage areas in close proximity to resident rooms</td>
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<tr>
<td>Lack of private space can lead to conflict</td>
<td>Provide visitors with an unobtrusive way out of facility</td>
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<tr>
<td>Inappropriate seating arrangements make casual conversation difficult</td>
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<tr>
<td>Engaged wandering</td>
<td>Avoid dead ends</td>
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<tr>
<td>Channel behaviors into appropriate activities</td>
<td>Create multiple and intersecting loops of circulation</td>
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<td></td>
<td>Use of consistent color and material can keep people in a continuous path</td>
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<tr>
<td></td>
<td>Keep scale of circulation path small, with room for seating</td>
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<td></td>
<td>Minimize use of security systems as a means to limit access</td>
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<tr>
<td>Alternative wayfinding systems</td>
<td>Reinforce visual connection between corridor and destination</td>
</tr>
<tr>
<td>Residents respond better to people as orienting cues than to built environment</td>
<td>Provide flexibility so visual connections can be controlled</td>
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<tr>
<td></td>
<td>Arrange shared spaces in continuous progress</td>
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<tr>
<td>Independence with security</td>
<td>Create hierarchy of spaces at varying levels of risk</td>
</tr>
<tr>
<td>Safety seems to be antithesis of independence</td>
<td>Secure only doors leading to high-risk areas</td>
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<tr>
<td>Residents’ safe use of kitchen exceeded expectations</td>
<td>Provide secure outdoor area with six-foot-tall fences</td>
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<td></td>
<td>Use carpet when possible to reduce falls</td>
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<tr>
<td>Focused and appropriate stimulation</td>
<td>Room to accommodate small groups of 6 to 8 people</td>
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<tr>
<td>Goal to balance interest and curiosity without distraction or stress</td>
<td>Rooms with auditory privacy</td>
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<tr>
<td>Front door unexpectedly has become gathering place</td>
<td>Staff exit/entrance separate from public front door</td>
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<td></td>
<td>Screen front entrance from residents’ view</td>
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<tr>
<td>Residential qualities</td>
<td>Subdivide building volume into smaller elements</td>
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<tr>
<td></td>
<td>Organize space like prototype of house (do not walk past bedroom to get to living room)</td>
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<tr>
<td></td>
<td>Conceptualize rooms as they are in a house</td>
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<tr>
<td></td>
<td>Avoid specially designed geriatric furniture that, although meeting hygienic and physical comfort, is often ugly</td>
</tr>
</tbody>
</table>

The predominant model of AL has evolved over two decades. Today, the general consensus is that the model will continue to evolve, becoming more consumer driven, but that no uniform design will ever be developed and that resistance to government regulation will continue. Service patterns may vary, but the mainstay of the model will continue to be the design of the living space, because its symbolism connoting home and independence enhances marketability of the product (Carder & Hernandez, 2004). This section looks at efforts to describe the property of homeliness, research on the evolution of the AL environment, services, aging in place, quality of life in AL as an outcome, regulatory influences, and design principles that enhance quality of life.

**Homeliness.**—A major contributor to the success of AL is its reputed identity as being home like. But what does home like, homeliness, homininess, or residential quality really mean? Is it an attribute of physical design, a function of the kind of activity and norms governing behavior there, or both? Is it measurable without information about the preferences and history of the person who will be making a home in the location?

Marsden (2001) created a framework for understanding homelike character in the context of the exterior appearance of AL facilities that focused on three themes: (a) supportive protection that encompasses three concepts, namely familiarity, enclosure, and care; (b) human scale; and (c) naturalness. Arguing that “in order to determine whether an environment is familiar, we relate current stimulation to memories of past experiences with environment” (p. 85), Marsden contended that the perception of home is a series of cultural housing norms that we as individuals have become accustomed to and cannot let go.

Rubinstein (1989) identified three factors that contribute to the meaning of home for residents in a long-term-care setting: (a) the socially centered process, which is tied to the notion of order and the proper place of things; (b) the person-centered process, which is tied to the life course and which consists of varying degrees of a person’s identification with environmental features; and (c) the body-centered process or person–environment fit. Building on this work, Dobbs (2004) looked at the socially constructed meaning of home for residents in an AL setting. Using Groger’s (1995) construct of home as being both concrete and abstract—wherein concrete refers to similarities in a living environment between past and present and abstract refers to symbolism such as roles, relationships, choices, and experiences—Dobbs suggested that residents are able to establish a sense of home when there is some continuity between both the concrete and abstract meaning of one’s former home. She further contended that AL facilities have been successful at maintaining the concrete meaning of home but that the abstract meanings are largely missing. This discussion suggests that it is easier to claim hominess than to measure it or demonstrate its presence. Several conceptual models contribute components that underlie the concept of AL as a form of housing different from other long-term-care settings.

**Evolution of the AL Model.**—A 1988 study looked at early models of AL by comparing 10 AL facilities in southeastern Florida. This study sought to describe AL settings and discern the decision-making patterns in the environment (Kalymun, 1990). Although none of the facilities were more than 4 years old at the time, they varied in their appearance, with the older ones most resembling an institutional setting:

> Long hallways, double loaded corridors, fluorescent lighting, public address system, painted walls, large shared space, and furniture with vinyl upholstery were the norm. Private spaces project the visual image of an institutional setting, however a hint of residential living trickled in with furniture and accessories brought from a former home. (Kalymun, 1990, p. 111)

Some of the facilities were more residential in style, resembling motel-like structures. The apartments were studio in size, with private patios and no variation in floor plans. Residents showed a preference for a refrigerator versus a stove if they were required to choose between the two. A succeeding structural design of a 1986 setting provided a choice between studio and one-bedroom apartments. The interior design aspect of shared spaces took on a homelike appearance, suggesting that residents were invited to extend their perception of home into the living, dining, and television areas. Shared spaces diminished in square footage, becoming more closely associated with a “size akin to a private home” (p. 114). Kalymun further observed that the overall design of the facility seemed to follow the original business orientation of the owner. Owners historically involved in the nursing home industry introduced AL arrangements that were architecturally conducive to the medical model of care, and owners initially affiliated with retirement communities tended to present AL facilities that conformed to the residential model. As consumers embraced the residential model of care, their desire to age in place soon became an expectation. But for those owners whose backgrounds were rooted in the nursing home industry, the continuum of care with movement between AL and the nursing home remained an economic necessity.

**Relationship Between Environment and Services.**—Hawes, Phillips, and Rose (2000) conducted a study with a specific objective of examining the effect of key AL service and environmental characteristics on price and the ability of residents to age in place. The
authors drew a national probability sample of more than 900 AL facilities from those serving mainly older people and having capacity for 10 or more residents. The study identified a resident unit consisting of a bedroom as the most common type (57%); it found apartment-style units in 43% of the sample. Room types based on level of privacy varied. Most AL facilities included both private and shared accommodations. Only 27% were composed of individually occupied units (shared only by choice), 47% had a mix of private and shared units, and 28% reported at least one bedroom shared by three or more residents. Looking at the data another way, 73% of all resident units were private, 25% were semiprivate, and 2% were in rooms that housed three or more unrelated persons. Bathrooms offered less privacy. Private full bathrooms were located in 65% of the rooms or units, 6% had a private half bath, and 33% required residents to share a full bathroom. Finally, 55% of AL settings were freestanding rather than being part of a larger multilevel housing campus; residents of AL facilities in campus settings were more likely to have private units and apartments.

The study examined environmental characteristics and the philosophy of AL using a series of performance indicators that included privacy, environmental autonomy, unmet personal care needs, affordability for low-income elders, retention policies, and ability to meet scheduled and unscheduled needs. High-privacy/high-service AL facilities were significantly more willing than high-privacy/low-service facilities to meet needs in locomotion and transfer. They also offered more private accommodations and more environmental features associated with autonomy, such as the ability to control temperature in unit, the ability to cook in unit, and the ability to lock the door to unit.

Greene, Hawes, Wood, and Woodsong (1998) looked at how family members defined quality in AL facilities. They conducted six focus groups of family members of people with dementia who were living in or had recently been discharged from an AL facility to gain insights into participants’ experiences, perceptions, and attitudes about quality. The authors grouped comments into four major areas: facility staffing, services, environmental features, and facility operational policies and practices. Environmental features found to be indicative of quality included a safe environment; access to a pleasant and safe outside area; sufficient space for a range of activities; single-story buildings; a design that did not isolate residents; and personal space that was homelike, was clean, and allowed for personal belongings.

Kane and colleagues (2005) conducted a six-state study of apartment-style AL settings with a large environmental component. They assessed the physical environments in each of the private spaces (i.e., 600 apartments in 60 AL settings) and shared spaces using a 200-item checklist that was developed after consultation with environmental experts, who coded environmental characteristics as they related to homelike properties or functionality properties. In addition, the investigators took photographs of the items on the checklist to illustrate good and not-so-good examples of homelike features and items that either supported or detracted from functional competence. For example, the authors noted a microwave for its presence and took a photograph to illustrate the accessibility of that microwave for ease of use and safety. By definition, eligible settings offered kitchenettes and full bathrooms, but in practice enormous variation existed in the physical attributes of these rooms, especially the kitchens. To reduce the data for analysis purposes, the environmental team grouped items to develop summary measures of environmental constructs for both the homelike properties and the function properties. Overall, these apartment-type AL settings rated positively in homelike properties in both the shared and the private spaces, but the variation in the functional ratings was much greater. The environments of the apartment-style AL facilities studied in this project provided settings that could be viewed as extensions of a former home. Some residents continued to bake cookies, a 38-year-old turtle continued to be cared for by its master, favorite recipes for frying catfish were tried and evaluated, and overall a sense of pride and companionship was evident. The resident’s role appeared to involve much more continuation of pre-move-in activity than is likely for most nursing home residents. Although the greater frailty of nursing home residents may contribute to inactivity and discontinuity, environmental supports and opportunities can render residents more functional and increase quality of life in either a nursing home or assisting living environment, as the ecological theory suggests. Table 3 illustrates the kind of insights that emerged from incorporating environment into the design of this study.

Quality of Life as an Outcome of Environment.—Recent studies comparing nursing home and AL residents’ quality of life as an outcome have produced conflicting findings. P. D. Sloane, Zimmerman, and Walsh (2001) used an amended version of the TESS2+ instrument (P. E. Sloane et al., 1995) to look at seven dimensions of quality of life: safety and security, resident orientation, stimulation without stress, privacy and personal control, facilitation of social interaction, continuity with the resident’s past, and cleanliness and maintenance. The TESS-RC instrument, created for that study, added items from the Board and Care Walk-Through Observation instrument (Moos, 1992). Also, the authors included additional items to capture amenities attributed to AL facilities and a count of individual bedrooms and bathrooms belonging to respondents. The TESS instrument provides a comprehensive index for quantitatively assessing the environment through observation but does not measure the interaction

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Eleven (18%) of the facilities were built from 1978 to 1990 (the majority being renovated motels or apartment complexes), 10 (17%) from 1991 to 1995, and 39 (65%) from 1996 to 1999. The number of apartments in a facility ranged from 24 to 287. The apartments varied in size and configuration: 343 (57%) were studio type, 218 (36%) were one bedrooms, and 39 (7%) were two or more bedrooms.

Although dramatic exceptions illustrated possibilities, personalization was generally lacking. Only 4% of the residents modified the décor, 9% maintained a hobby or craft, and 4% had a pet.

The individual apartments built before 1990 had fewer function-enhancing characteristics. Though 28% of the residents used a wheelchair, only 14.5% of the apartments had wheelchair-accessible kitchen sinks and 32% had roll-in-showers.

The correlation between the presence of functional characteristics in the bedroom and bathroom and resident outcomes was examined. Adjusting for environmental and resident characteristics, preliminary analysis of the environmental data found a significant effect between lower levels of function-enhancing features in the bedroom and difficulty with dressing, unmet dressing needs, and instrumental activity of daily living needs. Lower levels of function-enhancing features in the bathroom had a significant effect on difficulty with transferring and unmet needs in ambulation, bathing, transferring, and activities of daily living.

Assistance with medication, a common service provided by ALFs, was enhanced or undermined by the physical plant. Most of the ALFs utilized a small medication storage room that often required the resident to wait in line for their meds—at times lines extended down very long corridors with no place to sit.

One large ALF, a transformed three-story motel, utilized med carts that traveled to resident rooms from a central storage area. A newly constructed ALF facility built a locked drawer in the kitchen of each resident apartment for storage of that resident’s medications. Medications requiring refrigeration were placed in a secured container in the resident’s refrigerator. Staff members raved about the efficiency, safety, and socialization merits of this system. This ALF also installed a central vacuum system in each apartment that staff deemed as providing an efficient way of accomplishing a housekeeping task, and residents who were able to vacuum expressed pride in their continuing ability to maintain their own apartment.

All ALFs provided some degree of outdoor space, with the most common layout being an inner courtyard. For the most part, these spaces were underutilized, except for the designated smoking areas and organized activities such as a facility barbeque. Outdoor areas that were utilized the most were those with a covered seating area and a view of the world beyond the AL boundaries. However, this study could not illuminate whether the areas were underutilized because of lack of resident interest or because staff practices and facility policies discouraged use.

Staff members of ALFs in continuing care communities commonly described resistance of residents living in independent settings to sharing their common spaces with residents living in the AL setting, even their gardens and paths.

In smaller ALFs, residents typically used one main dining room. Routinely in larger ALFs, residents were delegated to eat in a certain dining room according to their health status. In one facility, the difference in amenities and service between the two dining rooms was alarming. In the “nice” dining room the chairs were upholstered, a salad bar was available, and the food was served cafeteria style with an attendant carrying the plates of food to the table for the residents. In the “not-so-nice” dining room, tray service was provided, the chairs were covered in plastic, and the salad came with the tray. Even though each setting provided the same service of dining and utilized dining tables and chairs and common eating utensils, photographs were able to capture and illustrate the difference in amenities beyond the basics and ambience.

Notes: AL = assisted living; ALF = assisted living facility.
Source: Kane and colleagues (2005).

Table 3. Environmental Insights From 600 AL Apartments in 60 AL Settings

<table>
<thead>
<tr>
<th>Description</th>
<th>New-Model Facilities</th>
<th>Traditional Facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common features in bedrooms</td>
<td>85%</td>
<td>41%</td>
</tr>
<tr>
<td>(a) Architectural layout</td>
<td>100%</td>
<td>91%</td>
</tr>
<tr>
<td>(b) Lighting</td>
<td>91%</td>
<td>50%</td>
</tr>
<tr>
<td>(c) Privacy</td>
<td>100%</td>
<td>88%</td>
</tr>
<tr>
<td>(d) Temperature</td>
<td>100%</td>
<td>89%</td>
</tr>
<tr>
<td>(e) Bathroom design</td>
<td>100%</td>
<td>78%</td>
</tr>
<tr>
<td>Common features in bathrooms</td>
<td>84%</td>
<td>41%</td>
</tr>
<tr>
<td>(a) Architectural layout</td>
<td>100%</td>
<td>92%</td>
</tr>
<tr>
<td>(b) Lighting</td>
<td>93%</td>
<td>46%</td>
</tr>
<tr>
<td>(c) Privacy</td>
<td>100%</td>
<td>86%</td>
</tr>
<tr>
<td>(d) Temperature</td>
<td>100%</td>
<td>87%</td>
</tr>
<tr>
<td>(e) Bathroom design</td>
<td>100%</td>
<td>76%</td>
</tr>
</tbody>
</table>

The data came from the sample of 193 residential care/AL (RC/AL) facilities and 40 nursing homes participating in the Collaborative Studies of Long-Term Care funded by the National Institutes of Health. P. D. Sloane and colleagues (2001) compared on seven dimensions nursing homes from three strata of the RC/AL sample: (a) facilities with fewer than 16 beds; (b) facilities with 16 or more beds, constructed since 1987, and containing one or more features associated with new purpose-built models (termed new-model facilities); and (c) other facilities with 16 or more beds (termed traditional facilities). Results on safety and security showed that nursing homes consistently achieved the highest ratings when compared with the three RC/AL strata. Findings on resident orientation showed that smaller homes avoided long, disorienting corridors and tended to rely on direct visual cues to orient residents. Larger homes utilized personal objects and photographs for orientation, whereas nursing homes tended to use room numbers. Findings for stimulation without stress showed that new-model homes scored more favorably in all aspects of lighting and provided more tactile and visual stimulation. Distracting noise was most prevalent in nursing homes and least frequent in small RC/AL facilities, with the exception of television and radio, which were common in all four strata. Feces odors were least prevalent in small homes and most noticeable in nursing homes. Privacy and control findings showed private rooms to be more prevalent in the RC/AL strata as compared to in nursing homes, but private baths were more common in new-model and traditional facilities than in small RC/AL facilities and nursing homes. A
higher prevalence of autonomy and personal control items was found in new-model homes. Findings on facilitation of social interaction suggested that small RC/AL facilities provided the greatest ease of having an intimate conversation, whereas nursing homes provided little opportunity for small-group gatherings. All three strata of RC/AL facilities scored higher than nursing homes on continuity with the resident’s past, indicators that measured degree of homeliness, percentage of rooms with pictures or mementos, and percentage of rooms with noninstitutional furnishings. New model RC/AL facilities consistently rated highest on cleanliness and maintenance measures.

Given that this is one of the few efforts to link resident outcome data to environmental tenets, it is important to underscore that the TESS measures were identified for nursing homes and that TESS-RC measures of these constructs have significant limitations. In an essay reviewing the book in which the findings were published, Kane (2003) noted:

For the items used to measure safety, orientation cues, and maintenance, nursing homes achieved better scores than any type of AL, and even the rating for items reflecting “stimulation without stress” and “environmental characteristics that facilitate social interaction” showed nursing home environments as preferable to even the new model [AL facilities]. This finding defies common sense, because new model [AL facilities] with apartment environments permit, encourage, and provide much more opportunity for stimulation than do most nursing homes, and they provide a vehicle for social interaction in person and on the phone that goes deeper than planned social activities. Unfortunately, many of the TESS-RC items used to construct these categories referred to the public space rather than the private apartment space. As the authors point out, new environmental measures are needed to tap AL more specifically, objectively, and in a way validated by resident preference. For example, in the scale on stimulation, points are lost if the residents’ door are closed, even though the ability to close or even lock one’s door is a highly valued attribute for many residents. (pp. 99–100)

**Aging in Place.** — An environment has the potential to foster increased quality of life, but is that enough? Should it also foster aging in place? Aging in place could mean residing in the same AL unit, despite increased disability, until the end of life, or it could refer to moving through the levels of graduated care in a continuing care community. One study of more than 600 AL facilities found that only 48% had resident contracts that specified discharge criteria (Frank, 2001). A study that sampled 141 AL and care facilities in Kansas found that AL settings served as intermediates in the long-term-care continuum, with admission and retention policies that deterred aging in place. Moreover, the policies of the settings tended to be more restrictive than state regulations required (Chapin & Dobbs-Kepper, 2001).

Residents also struggle with aging in place. They may want the ability to remain until they die or choose to leave, yet they may not want to live among visibly impaired elderly people, which implies that others would need to leave (Frank, 2001). Residents are known to mask their own health problems for fear of being asked to move. Hawes and colleagues (2000) found that even though less than one third of the residents in their study reported being informed about discharge and retention policies, the vast majority of residents expected to be able to stay in facility as long as they wished.

In discussions on aging in place, people often ignore the ability of the physical environment to compensate for a decrease in functional competence. Accessibility issues loom large. If a resident becomes dependent on a wheelchair for mobility and that wheelchair does not fit through the door to his or her unit, or if the bathroom walls cannot structurally support grab bars, or if the only bathing option is a bathtub, then that resident will be forced to move to a more supportive environment—not necessarily a nursing home, but some environment that is supportive of his or her needs, even another AL setting.

Aud (2002) studied the interaction between behaviors of residents with dementia and their environment as predictors of discharge from Missouri AL facilities. She found that the ability of a resident to follow the state regulation “path to safety” was the most important factor in the decision to discharge residents with dementia. Missouri regulations require the resident to recognize the need to exit the facility, identify an appropriate exit, proceed to the exit, and leave the facility. Missouri regulations allow the use of assistive devises such as canes or walkers, but a wheelchair user must be able to transfer independently into the wheelchair, propel the chair to the exit, open the exit door, and maneuver the wheelchair though the door. Other residents and staff may not provide assistance by pushing the wheelchair or opening the exit door. Clearly, environments can facilitate or impede the resident’s ability to meet these hurdles. For instance, units on a first floor with multiple well-marked egress points will help. Unfortunately, an elopement attempt by a resident is also a predictor of discharge, and environments that promote easy emergency exit also promote elopement. Needless to say, no such requirements exist in a person’s own home or apartment. The AL field is at a crossroads between becoming merely a homelike nursing home or a transformed model of residential long-term care, albeit with increased regulations.

**Regulatory Effects on Environment.** — Some states have developed regulations that affect the physical environments (sometimes linked to zoning). Accord-
ing to a review by Regnier and Scott (2001), these tend to be “over-prescriptive, rigid, overlapping contradictory and counter-intuitive.” Furthermore, Regnier and Scott suggested that the one-size-fits-all attitude, which is often reinforced by rigid ADA (Americans with Disabilities Act) requirements, has interfered with developing bathroom and other designs that work well for older people and has kept U.S. projects from “emulating some of the most successful qualities of European developments” (p. 76).

Manard and Cameron (1997) conducted detailed interviews with 29 selected developers, architects, builders, and consultants directly involved in implementing AL projects. The interviewees summarized the barriers to development as follows: lack of definition of AL; ignorance of the sector among local government officials and the general public; regulatory constraints on the use, design, and construction of AL facilities; zoning ordinances; building codes; the ADA; and the Fair Housing Amendment Act (FHAA). Zoning ordinances typically regulate (a) the type of activities to occur on given piece of land, (b) how much land can be covered by building, (c) setback requirements, (d) the height of the structure, and (e) the total floor area. A zoning ordinance may also contain requirements for fences, decks, facades, balconies, and roof overhangs. The developers identified the zoning approval process as one of the biggest challenges to the development of AL. AL often fails to fit into any existing zoning classification, resulting in a discretionary approval process by a planning committee that may or may not be familiar with the model.

A building fire code establishes the relationship between the type of construction, building use groups, fire resistance rating, allowable height and floor areas, and separation from neighboring structures. Determination of user group (institutional vs residential) has major implications for fire resistance requirements and ultimately development costs. Often a local fire official makes these decisions. An additional challenge is that current fire code provisions in residential housing do not address dementia-specific AL facilities.

ADA requirements signed into law in 1990 require that public accommodations and commercial facilities be built to accessibility specifications. These strict requirements apply to the structure of areas such as the corridors, kitchens, bathrooms, and living rooms. Several developers noted that ADA requirements were a good first step, but that their one-size-fits-all attitude was the wrong way to provide the best fit for elderly residents who are often very short in height, have a limited range of motion, and have limited arm strength. But variances to the law are being given, although not always for the benefit of the resident. The State of New Jersey approved a variance to the requirement that showers be wheelchair accessible with no raised lip. The state approved the lip because it would serve as a guard against water spillage and thus prevent a resident from falling. In this situation, the decision for a variance did not take into consideration the eventual need for wheelchair accessibility. In many ways, design decisions and regulatory considerations discourage aging in place.

The FHAA applies to the right of a person to require management to make adaptations to an existing environment that will provide a fit between the specific needs of the resident and the characteristics currently available. Although there is ambiguity in interpreting FHAA guidelines as they apply to AL facilities, design professionals have agreed on design principles that should be applied when developing AL.

**Design Principles.**—Experts have proposed many design principles, goals, and themes for creating successful physical environments for older adults. The Society for the Advancement of Gerontological Environments has identified eight values related to gerontological environments. These include physical safety and psychological security, environment as a therapeutic resource, holism and well-being, individual rights and personal autonomy, communities and relationships, support of caregivers, function-enhancing technology, and creating and evaluating.

A review of the literature identified additional sets of design principles for AL facilities. Table 4 presents six separate sets of design principles developed by leading experts in the development of AL. The challenge is measuring how effective they are in supporting a higher level of functioning for the residents.

**Discussion**

In this article, I have reported on a variety of environmental studies using different research methods. Most are descriptive, and few deal with outcomes linked to the environment. Researchers often generalize the unit of analysis to the physical environment as a whole rather than specifically identify it as an outcome of behavior in a specific location such as the dining room or a resident’s room. Studies conducted in settings such as the Corinne Dolan Alzheimer Center, which serves as a model for Alzheimer’s patient care while focusing on applied research, are rare. Experts often determine environmental preferences by convening a focus group and asking this small group of people to choose a favorable image of a certain environmental characteristic, or investigators base conclusions on observation of users or characteristics at a single point in time. Researchers do not assess interaction effects sufficiently. What the AL field needs is an environmental assessment to be a process, not a single procedure. The process must take into account the goals of the setting, the management, the demographics of the occupants
Data must come from several sources, including observation, behavioral mapping, traces, satisfaction with various types of living environments that could be used to compare across environments; and detailed observational tools that are as objective as possible to capture detail about the built environment where the older person lives. (Cutler, 2000, p. 378)

The AL field is at a crossroads between becoming merely a homelike nursing home or a transformed model of residential long-term care. Oddly, the nursing home industry is also at somewhat of a crossroads regarding environmental standards, with some movement toward neighborhood and household models, full bathrooms adjoining resident rooms, and even toward small-house nursing homes, such as the Green House. Increased regulations in AL, particularly if they are enacted before a more residential norm is established for nursing homes, would drive the field toward more institutional models in AL. However, consumer preferences and the tendency toward developing AL capacity in ordinary low-income housing (where apartments already exist) are moving the field toward a transformed model of residential long-term care. Privacy has been a gold standard of the model, but the debate over the design of dual-occupancy resident rooms as a source of cost savings and affordability is heating up. If there is to be a distinction between nursing homes and AL, then the discussion must squarely address the issue of shared occupancy. The market wants single occupancy unless by choice (e.g., for spouses). Whether a shared-occupancy model is more attractive for public financing is unclear. Furthermore, it is unknown whether the AL model will continue to be consumer driven and predominantly private pay, or whether the potential of increased reimbursements will determine the future design of the model.

Some critics tend to consider private occupancy, kitchens, and other niceties as amenities that should not become a basic standard in publicly subsidized care settings. Proponents for privacy counter that

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### Table 4. Design Principles for Assisted Living Facilities Identified in Literature

| Design Principles (Regnier, 1994, p. 43–44) |
| Creating a Therapeutic Environment: Lessons From Northern European Models (Regnier, 1994) |
| 1. Appear residential |
| 2. Be perceived as small in size by residents |
| 3. Provide privacy and completeness in residential units |
| 4. Recognize each resident’s uniqueness |
| 5. Foster independence, interdependence, and individuality |
| 6. Focus on health maintenance, physical movement, and mental stimulation |
| 7. Support family involvement |
| 8. Maintain connections with the surrounding community |
| 9. Serve frail persons |

### Housing the Aged: Design Directives and Policy Considerations (Regnier & Pynoos, 1987)

- Resident satisfaction
- Social interaction
- Management
- Sensory aspects
- Physiological constraints
- Wayfinding

### Improving Residential Environments for Frail Elderly (Pynoos & Regnier, 1991)

- Privacy
- Social interaction
- Control/choice/autonomy
- Aesthetics/appearance
- Personalization
- Orientation/wayfinding
- Safety/security
- Accessibility and functioning
- Stimulation/challenge
- Sensory aspects
- Adaptability
- Familiarity

### Therapeutic Goals for Dementia Facilities (Cohen & Weisman, 1991)

- Ensure safety and security
- Support functional ability through meaningful activity
- Increase awareness and orientation
- Provide appropriate environmental stimulation and challenge
- Develop a positive social milieu
- Maximize autonomy and control
- Adapt to changing needs
- Establish links to the healthy and familiar
- Protect the need for privacy

### Assisted Living: Needs, Practices, and Policies in Residential Care for the Elderly (Zimmerman et al., 2001)

- Safety and security
- Resident orientation
- Stimulation without stress
- Privacy and personal control
- Facilitation of social interaction
- Continuity with the resident’s past
- Cleanliness and maintenance

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**Table 4. (Continued)**

1. Safety and security
2. Resident orientation
3. Stimulation without stress
4. Privacy and personal control
5. Facilitation of social interaction
6. Continuity with the resident’s past
7. Cleanliness and maintenance

The AL field is at a crossroads between becoming merely a homelike nursing home or a transformed model of residential long-term care. Oddly, the nursing home industry is also at somewhat of a crossroads regarding environmental standards, with some movement toward neighborhood and household models, full bathrooms adjoining resident rooms, and even toward small-house nursing homes, such as the Green House. Increased regulations in AL, particularly if they are enacted before a more residential norm is established for nursing homes, would drive the field toward more institutional models in AL. However, consumer preferences and the tendency toward developing AL capacity in ordinary low-income housing (where apartments already exist) are moving the field toward a transformed model of residential long-term care. Privacy has been a gold standard of the model, but the debate over the design of dual-occupancy resident rooms as a source of cost savings and affordability is heating up. If there is to be a distinction between nursing homes and AL, then the discussion must squarely address the issue of shared occupancy. The market wants single occupancy unless by choice (e.g., for spouses). Whether a shared-occupancy model is more attractive for public financing is unclear. Furthermore, it is unknown whether the AL model will continue to be consumer driven and predominantly private pay, or whether the potential of increased reimbursements will determine the future design of the model.
During the initial design and development phase of construction, many decisions are made based on the cost of an amenity. Facilities are often found on continuing care community campuses. Are residents who reside on a continuing care community campus more likely to be moved to the nursing home facility when their health declines as opposed to remaining in the AL setting?

There is an abundance of U.S. Department of Housing and Urban Development senior high-rise apartments throughout the country that provide affordable housing to the residents. What would be the costs and effects of renovating a number of floors within those buildings to support services?

AL facilities are often found on continuing care community campuses. Are residents who reside on a continuing care community campus more likely to be moved to the nursing home facility when their health declines as opposed to remaining in the AL setting?

During the initial design and development phase of construction, many decisions are made based on the cost of an amenity without adequate research-based information on the benefit of that amenity for the users of the facility. For example, how often is an enclosed patio used versus a front porch that serves as a window to the world? How often is a library or music room used for the designated purpose? How often are shared spaces used in an AL setting, who uses the space, and what are the most popular gathering places within an AL setting?

Note: AL = assisted living.

Table 5. Potential Research Topics on AL Environments

How do people with dementia use selected environmental programmatic AL features compared to people without dementia? The results might suggest whether less space should be dedicated to individual units and more to communal spaces for different populations.

One of the hypothesized advantages of the AL model is the smaller residential scale and the resulting shorter distances to shared spaces from resident rooms. Research could examine whether residents utilize communal spaces more because of the shorter distance, or whether they respond to inducements such as happy hours before meals in spaces near the dining room. Is a long walk along a corridor a good exercise or a deterrent to using space?

Kitchenettes are found in many AL settings. How often are the appliances used, what are they primarily used for, and which appliances are used most often?

Family caregiving in AL facilities is receiving some attention as a potential cost saver. Does the physical environment of the individual apartment and the facility as a whole support a family member providing some care that would normally be provided by staff members? What kinds of spaces would be conducive to family members staying overnight?

Hospice services have come into an AL setting to provide end-of-life assistance to a resident. What environmental features are desirable to support end-of-life care?

There is an abundance of U.S. Department of Housing and Urban Development senior high-rise apartments throughout the country that provide affordable housing to the residents. What would be the costs and effects of renovating a number of floors within those buildings to support services?

AL facilities are often found on continuing care community campuses. Are residents who reside on a continuing care community campus more likely to be moved to the nursing home facility when their health declines as opposed to remaining in the AL setting?

During the initial design and development phase of construction, many decisions are made based on the cost of an amenity without adequate research-based information on the benefit of that amenity for the users of the facility. For example, how often is an enclosed patio used versus a front porch that serves as a window to the world? How often is a library or music room used for the designated purpose? How often are shared spaces used in an AL setting, who uses the space, and what are the most popular gathering places within an AL setting?

Note: AL = assisted living.

private occupancy is only slightly more expensive in new construction and easily amortized across the life of the loan, and that private space is cheaper to operate in terms of decreased vacancies, cleaning, dispute resolution, and so on. Even the kitchens are a slight expense in a new construction process. Yet when a pervasive belief remains that public payment should not be posh or full of amenities, then the issue becomes differentiating between what is basic and what is an amenity. Wilson introduced the term independence-enhancing features rather than amenities to achieve greater acceptability of normal residential features in AL (Kane & Wilson, 1993).

Design decisions are made for a multitude of reasons and by an assortment of people, and they do not always focus on the primary needs of the residents. Often design decisions are made as a team approach involving architects, board members, and administrative staff, although outside influences such as a donor or regulator can necessitate a change in an original design. Unfortunately, a good design can be altered drastically when the cost of adhering to local regulations exceeds the construction budget and amenities need to be cut. Sometimes design decisions are made on the basis of expected behavior rather than documented behavior, or they are created on a group level without regard for individual preferences and needs. In other words, they are one size fits all. Yes, the microwave located on top of the refrigerator may save space and be cost effective, but that location ignores the fact that elders are usually short in height and shaky of hand and that removing something hot from a microwave to a lower counter is potentially dangerous. The footprint of the residents’ unit that locates the only window in the space designated for the bedroom was probably designed with the assumption that the residents would be spending the majority of their day in shared spaces. Expectations in designing a space are not always the reality of how a space is used.

There is a need for a research agenda that looks at how the older person uses his or her environment, what features are available in that environment, and the outcome of the interaction between the older person and the environment. Simply, does the environment facilitate higher functioning, or does it create an obstacle? In addition, research is needed to better understand how other users of the environment utilize the space, acknowledging that residents, staff, and family members all use the same space but for very different reasons. Any research agenda must be multidisciplinary in its approach and utilize a combination of research methods. Table 5 presents
a sample of research questions that have immediate implications for particular building designs.

Returning full circle, an AL apartment or room in an AL complex is someone’s home, and environmental research in AL is most likely to be meaningful if it anchors itself in the study of housing rather than of hospitals, nursing homes, and other health settings.

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