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Impact of Design Interventions in Nursing Home on Residents with Dementia, Their Families, and the Staff

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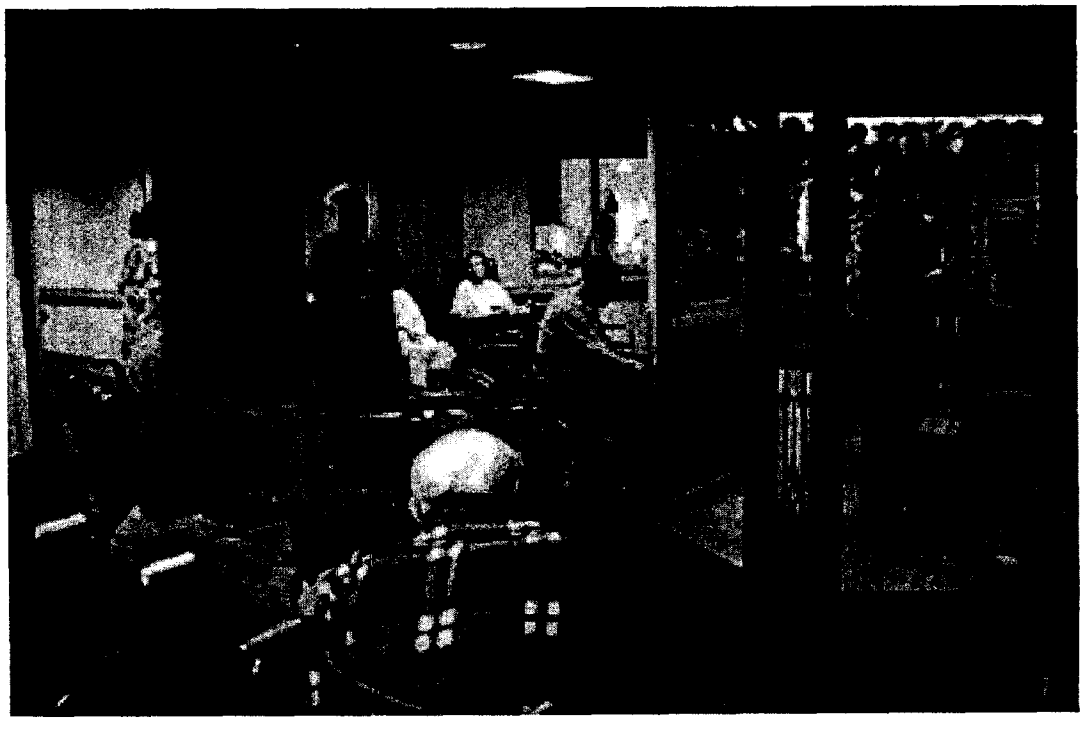

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Abstract

The purpose of this study was to determine whether certain design interventions in a nursing home affect resident with dementia outcomes, family involvement and interaction, and staff perceptions of care delivery.

The study was conducted in Kingswood Manor, a nursing home located in Kansas City, which went through a major reconstruction in 1999-2000. The new setting includes dining and bathing facilities that serve smaller groups of residents and two new wings designed as a cluster of rooms around a common living room. The majority of the rooms in the new units single occupied and equipped with private bathrooms, larger storage space and other residential accommodations. The new design promised to contrast the medical orientation of the existing nursing home with a more residential environment.

A team of researchers, representing the disciplines of environmental design, human development and family studies, and nursing conducted the study. A combination of quantitative and qualitative methods to assess the impact of the environment on its users was used. The study design involved a two-group pretest-posttest comparison in which a sample of residents who eventually were relocated to the newly designed wing of the facility (Treatment Group) was compared with a sample that remained in the existing setting (Control Group). By comparing the two groups before and after the design intervention (controlling for any baseline difference between them) on a number of issues, we were able to draw conclusions about outcomes induced by one environment versus the other. The instruments that were used in the study included the Professional Environmental Assessment Protocol (PEAP), Behavioral Mapping, the Minimum Data Set (MDS 2.0) for resident outcomes, family involvement assessment, family satisfaction survey, personal interviews with families, and focus group interviews with staff members regarding their perception of care delivery and the physical environment.

Findings and implications of this study will provide new knowledge in integrating the diverse professional aspects that contribute to a responsive long-term care setting.

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Table of Contents

Acknowledgements

Over two-thirds of nursing home residents (70.8 percent) suffer from some form of dementia. Almost one third (30.2 percent) exhibit some form of behavior problem, such as verbal or physical abuse, socially inappropriate behavior, wandering or resistance to care. These were the demographics that we kept in mind when in the summer of 1998 we were asked by the executive staff of Kingswood Manor, the nursing home that became the site of this study, to help them to improve their long-term care setting. When the Extandicare Foundation announced in July 1999 the call for the study of nursing homes that established Special Care Units for people with dementia the facility was in the midst of converting the nursing home environment into a more adequate setting for their residents. We were grateful to receive the funding for our study because it allowed us to conduct a post-occupancy evaluation for the design of the facility. We wish to thank the Extendicare Foundation for their funding of our study.

Another source for funding for this project came from the Margaret Mangel award from the College of Human Environmental Sciences in the University of Missouri-Columbia. We are thankful for the seed money we received through this grant.

This study would not have been possible without the support of the executive staff of Kingswood Manor. We wish to thank Ben Thompson who recently retired from his position as the President and Chief Executive Officer of Kingswood after many years. Under Ben's leadership we became involved in design of the renovation project. His vision and enthusiasm for better environments for the frail elderly encouraged us to turn this initial design project into a comprehensive study. Mike Dirlam, the Chief of operation in Kingswood helped us to materialize this study. We thank him for helping us with the coordination of the interviews with the staff and the families of the residents. We are appreciative of the time and efforts he invested in this project despite his busy schedule.

We want to dedicate this study to the residents of Kingswood Manor, their families and the staff of this setting, who helped us in our quest to make interventions in the design of environments be tailored to improve the quality of life of persons with dementia and their caregivers.

Introduction

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Researchers and providers believe that many of the negative behaviors commonly associated with dementia are reactions to inadequate care and treatment in inappropriate environments rather than symptoms integral to the disease[1]. Many of the behaviors attributed to people with dementia are, in part, a consequence of non-therapeutic settings such as nursing home and other institutional long-term care environments[2].

This study has been an attempt to assess the impact of design interventions in an existing nursing home on residents with dementia, their families and the staff of the facility. Funded by Extendicare Foundation at the end of 1999, the study was conducted by an interdisciplinary team of researchers from the University of Missouri-Columbia at Kingswood Manor in Kansas City, Missouri between September 1999 and April 2001.

The following pages contain our final report of this study. We included in the Introduction the background and the significance of the study and the methods that were devised by the team to conduct the research. In the second chapter Habib Chaudhury, Benyamin Schwarz and Ruth Brent discuss the environmental design aspects of the study. Jane E. Bostick examines in the third chapter, the resident outcomes that resulted from the renovation of the facility. In the following chapter, Teresa Cooney and Katie Dunne discuss aspects of family satisfaction with the nursing care and other effects of the renovated setting on the residents and their families. In the fifth chapter we summarize the responses of staff members to the renovations in the facility. The report concludes with conclusions and future implications.

Background and Significance

Despite the enormous diversity in American nursing homes, the ordinary nursing home looks like a host of other long-term care institutions. Hospital-like, double-loaded eight-foot-wide corridors, often jammed with laundry carts characterize its ambience. The easy-to-clean, shiny, vinyl floors reflect the stark lighting of the corridors. Frail elders, dressed in convalescent garb wander the corridors, or line up in their wheelchairs near the strategically placed nursing station[3].

Kingswood Health Center: Pre-renovation view of long double-loaded hallways with institutional finishes

Residents' rooms are typically crowded with two single beds, allowing one resident to be near the only window, and trapping the other on the darker side of the room, near the bathroom. The semi-private rooms can hardly seat two visitors, let alone offer them other kinds of hospitality and the sliding "privacy-curtain" that separates the beds seems to mock the concept of privacy. The toilet, sink, and mirror are shared, and so is the limited closet storage space. The paucity of wall and counter space effectively limits residents from personalizing the room and reflecting their families, lives, or interests. Bathing takes place in a room with tub fixtures designed for staff convenience rather than for residents' dignity. Meals are served three times a day in a bustling dining room, which often doubles as an activity room[4].

Such, now-familiar environmental attributes have been repeatedly criticized by long-term care advocates. The criticism centered on the assertion that nursing homes place their emphasis on "nursing" (efficiency and technical care) and hardly any on "home" (quality of life)[5]. Furthermore, advocates for better care argue that the efficiency of care provision that is arguably achieved in the nursing home environment is accomplished "at real cost to client autonomy. Its institutional base places far more attention on doing the right things to residents than on offering them an opportunity to live out the remainder of their lives pleasantly"[6].

Post-renovation: Hallways with carpeting to reduce glare, enhance acoustics and reduce the institutional character

There is a growing recognition among many scholars, however, that the physical and social care milieu can enhance or diminish the quality of life for people with dementia. Favorable outcomes of intervention in dementia care have been identified in four major domains: functional competence, behavioral symptoms, positive behaviors, and subjective quality of life[7].

Location

Kingswood Manor is a nursing home located on the campus of Kingswood Continuum Care Retirement Community in Kansas City, Missouri. The campus was originally constructed in 1982 with four-story independent living apartments, two-story central commons for program space, and a two-story nursing home. The current capacity of the campus, upon the recent (2000) completion of the nursing home expansion, is 228 Independent Living residents, 86 Skilled Nursing residents, and 12 Assisted Living (Residential Care Facility) residents.

As early as 1988, the Board of Directors started looking at modification plans for the nursing home in an effort to improve the life-quality of residents, their families, and the staff. Following several alternatives, the Board approved the new plans in 1999. The final design version aimed to capitalize on therapeutic goals and design principles of environments for people with dementia in order to create a more responsive physical environment for physically and cognitively impaired elderly. The renovated setting was intended to decentralize dining and bathing facilities in order to serve smaller groups of residents creating a more personal environment. Accordingly, an addition of two new units designed as a cluster of rooms in circumference of a common living/activity room were planned on the north side of the existing building (see floor plans in the appendix). The new units include separate dining and kitchen areas for ten residents. Most rooms in the new addition were designed for single occupancy and each room includes a private bathroom, larger storage space and ample room to encourage family visitations. These arrangements, coupled with other residential accommodations and remodeling of most of the existing nursing home, have promised to contrast the medical orientation of the nursing home with a more residential environment. The design intervention in the physical environment was to be followed by new care policies and programs.

Pre-renovation: Dominant physical presence of the nurses' station at the crossroads of hallways made a strong institutional statement.

Post-renovation: Nurses' station reduced in scale and relocated on the side in the central area

Research design

The interdisciplinary team of researchers was established before the construction started in Fall 1998. The purpose of the team was to assess through a multidisciplinary study the impact of a designed intervention in the nursing home environment on residents with dementia, family members, and the staff.

Although there is some evidence of the positive influence of a responsive physical environment on quality of care in long-term care settings, studies on socio-behavioral outcomes related to specific environmental variables are rare. The study attempted to examine the effect of particular environmental modifications of a nursing home (e.g., size, layout, adjacencies, furnishings, accessibility, etc) on the quality of life of the settings' major users, i.e., residents, staff and families. The main research question of this study was stated as follows:

Do design interventions induce desirable outcomes in residents with dementia, families and staff of a nursing home?

In other words, we wanted to understand whether particular environmental attributes affect the nursing home's major users, and whether specific behaviors and feelings are induced by the complex system of the modified environment. Our objective has been to answer the following questions:

1. Is there any change in the pattern of space usage by residents before and after the design intervention? If yes, how did it change?
2. What are the relationships between design interventions as inspired by advocated therapeutic goals, and residents' outcomes?
3. Is there any change in cognitive, behavioral and affective functioning in residents before and after the design intervention? If yes, how did it change?
4. Which of the environmental attributes in the renovated nursing home are perceived as significant to the residents?
5. What are the relationships between the design interventions and family involvement (e.g. frequency of visits, activities)?
6. What are the relationships between the design interventions and family satisfaction with the physical environment, service and care delivery?
7. How does the renovated setting and the changes in care philosophy affect staff perceptions of the physical setting, service and care delivery?

Existing Knowledge and Gaps

Implicit in the development of purpose-built therapeutic environments for frail elders has been the assumption that physical as well as interpersonal aspects of the environment affect quality of life outcomes[8]. This implies that the relationship between environment and human behavior is based on some form of cause-and-effect linkage and that the environment is a major determinant of behavior[9]. The sub-field of environment and aging has

been concerned, since its inception, with the enhancement of residential environments for older adults that would respond to the physical and mental competence level of aging individuals[10].

Several researchers have developed theoretical models to address the measurable characteristics of person-environment interaction. The most widely recognized and quoted of these models is the competence-press model developed by Lawton and Nahemow[11] which draws on the classic approaches to psychology of Murray and Lewin[12]. The model has helped to clarify the person and environmental characteristics that underlie older persons' optimal living arrangements with the "environmental docility hypothesis" which postulates that "the effect of an environmental press of a given magnitude on outcome is greater as personal competence diminishes"[13].

Attempts to establish elaborate frameworks that dimensionalize the relationships between the environment and the person have been made by many scholars[14]. While these attempts brought about more comprehensive approaches to theoretical models, their utility for designers, policymakers and care providers has been limited[15]. Clearly, there is a gap between broad environment and aging theory and application. Despite the general agreement about the importance of the connection between the physical environment and the quality of lives of the main users of nursing homes, few studies have examined how resident, family and staff actually respond to design interventions[16]. Furthermore, "there is not yet a strong research base on which to predict the effect of interventions on the lives of older persons, the extent to which one intervention will be more important than another one, nor the degree to which particular intervention will interact with another"[17].

To bridge this gap, Cohen and Weisman[18] advocate the use of therapeutic goals for the design of environments for older adults. These therapeutic goals, underline the design of care units for people with dementia, and reflect the transactional relationships among the three types of environments that impact resident behavior in a particular setting. The three domains are the *social* environment, comprised of friends and family; the *organizational* environment, manifested through the program's policies and the staff; and the *physical* environment within which the older residents live.

Pynoos and Regnier[19] identified twelve similar encompassing principles based on common themes in the design and policy application literature[20]. These principles serve both as guidelines for the design and management of residential environments for frail elders, and as a

research framework, sensitive to environmental design concerns and management. Pursuing Pynoos and Regnier's principles, the design program for Kingswood Manor made effort to:

1. Provide opportunities and places in which residents can regulate their desired levels of privacy (e.g., individual sleeping and toilet/bathing areas, adequate privacy space for interacting with family).
2. Create communal spaces that allow opportunities for social exchange and interaction (e.g., cluster arrangements and common living-rooms, and small dining/activity areas to encourage casual encounters in smaller groups, which research has found predictive of enhanced psychological well-being)[21].
3. Promote manifestations of residents' control and autonomy. Assist residents to make choices about their lives (e.g., individually controlled heating and air conditioning devices, personal furnishings and decorations).
4. Design an aesthetically appealing environment with a more residential appearance (e.g., use of elements and features that reinforce the iconography of the residential milieu: interior scale, color, finishes and furnishings that symbolize the home environment. These are likely to contribute to a more positive mood among residents)[22].
5. Consider opportunities for personalization and individualization of the environment (e.g., areas for display of individual mementos, choice of private room color, which are known to predict greater resident satisfaction with the institution)[23].
6. Foster a sense of orientation and way-finding within the setting to reduce confusion and frustration and to support perceived competency and well-being (e.g., variation in the circulation areas, nodes and landmarks to prevent disorientation).
7. Provide a safe and secure environment (e.g., safety features such as grab bars, handrails, non-slip flooring, fixtures and carpeting that absorb the impact of falls).
8. Provide accessibility to all facilities and ease of operation of equipment and appliances to support comfortable functioning (e.g., easy to reach closets, accessible toilets and bathing facilities, short and unconstrained travel distances to major activities of daily living).
9. Create a safe, yet stimulating and challenging environment to keep residents active, alert and aware (e.g., environment rich in texture, color and pattern, outside views to follow the times of the day

and the change of seasons, opportunities to watch living things such as bird cages, pets, and participate in meaningful activities).

10. Design an environment that accommodates age-related losses and changes in sensory stimulation (e.g., avoid glare and provide adequate lighting levels in all areas of the setting, use sound absorbing materials to minimize the disruption of background noise, avoid public announcement system).
11. Consider the adaptability of the environment to fit capabilities of various residents and flexibility for modification for changing needs.
12. Create an environment that affords a familiar frame of reference and a sense of continuity of experiences from former dwellings (e.g., lounges that appear like residential living rooms, furnishings and accessories from residents' homes, activities to support the continuity of the self, all of which contribute to positive well-being of residents[24] and family satisfaction)[25].

The design intervention at Kingswood Manor promised a unique opportunity for a comprehensive, systematic, pretest-post-test study of how design interventions and program changes affect all three major users of a nursing home. The project had several strengths. First, members of the research team served as consultants in the design process. Consequently, their design objectives and concepts served as a set of hypotheses that could be tested in a post-occupancy evaluation to better understand how the various users actually responded to what was designed. Second, despite the relocation of some residents and staff to the new environment, other residents and staff remained in the existing setting, although some residents changed rooms in the existing units. This, we assumed, could provide for a comparison of those residents who do and do not experience the new environmental changes, which would facilitate the identification of the environmental impact. Third, the project focused on both aggregate-level and individual-level outcomes of the environmental intervention, whereas prior studies have not analyzed individual-level change in detail[26]. This was expected to facilitate our understanding of the interplay of environment and human development.

And, finally, employing the new design as hypotheses for testing design attributes and policy directives was expected to assist in a better understanding of which environmental attributes improve quality of life for residents, staff and residents' families. For example, we anticipated that what helps residents to thrive in one

environment, might well differ in another setting. We thought that what affects staff's turn-around might be induced by particular design attributes which improve the ease of care provision; and, what encourages family involvement in care and enhances resident-family relationships might well be influenced by a setting which provides single-occupancy room configurations and a more home-like atmosphere.

Clearly, there is a need for understanding the context of the nursing home environment and which particular environmental attributes "work" and are catalysts for specific outcomes. Collecting and analyzing data with special emphasis on resident care outcomes, staff service and performance, and family involvement, we believed, could generate an empirical basis for improving care for and enhancing the well-being of elderly residents. In addition it could assist in measuring performance of different providers in diverse settings, devise knowledge-based regulations for long-term care settings and permit better prediction for their future design. Furthermore, conducting a study in collaborative, interdisciplinary approach enhances the reliability of the outcomes.

Methods

From the onset of the study we maintained that the complex connections between the physical environment of the nursing home and its users merited an interdisciplinary research approach[27]. Our premise was, and still is, that multidisciplinary investigation and collaboration among scholars, who dare to cross the boundaries of their respective disciplines to conduct joint research, can yield more practical and applicable outcomes for nursing home users. Accordingly, our interdisciplinary team included researchers from the Environmental Design Department, Human Development and Family Studies, and the School of Nursing, all at University of Missouri-Columbia.

The research was designed to employ a pre-test post-test design for data collection, and include a combination of quantitative and qualitative methods. These various methods were to be applied at both the individual and aggregate levels of analyses.

To assess individual resident and family outcomes, two groups of pre-test and post-test design were to be used. The 20 residents assigned to the new wings (Treatment Group) were expected to be compared both pre and post relocation with 20 residents remaining in the existing units (Control Group). Using family visitations and Minimum Data Set (MDS) that were already collected on an on-going basis, the two groups were to be compared to determine if they differed in any systematic way prior to the design

intervention. The pre-construction data were expected to provide a baseline for assessing some of the individual outcomes to be measured for both groups at both pre and post move to the new wing.

Qualitative assessments of individual residents and families was anticipated to compare the treatment and control groups at pre and post-test as well as to examine changes in their views about the nursing home over time.

Aggregate-level analyses were planed to focus on pretest-posttest comparisons of the nursing home units (pre-existing unit and new, re-designed unit) and residents, family, and staff perceptions of these units before and then after construction. The quantitative methods (behavioral mapping and Professional Environmental Assessment Protocol (PEAP) and qualitative approaches to these aggregate level assessments are described below.

The description of the study's methods is organized according to aggregate environmental (unit) assessments, followed by outcome assessments focused on the residents, their families and nursing home staff.

1. Environmental Assessment

1.1. Professional Environmental Assessment Protocol (PEAP)

The Professional Environmental Assessment Protocol (PEAP)[28] was used to conduct evaluation of the nursing home before and after the environmental modifications. The instrument is designed to evaluate a facility by documenting both *discrete* aspects of the environment (e.g., presence or absence of grab bars in toilets), as well as a *global* assessment of the environment's ability to support functional abilities. The PEAP includes eight indicators of environment: safety and security; environmental awareness and orientation; support of functional abilities; facilitation of social contact; provision of privacy; opportunities for personal control; regulation and quality of stimulation; and, continuity of the self. This assessment of the environment was to be conducted both by investigators of this research team, as well as two professional experts outside the team to obtain reliable assessments of specific environmental features pre and post construction, which could then be linked to user outcomes.

1.2. Behavioral Mapping

Place-centered behavioral mapping[29] was used to observe activity patterns of residents, staff and visitors in different spaces of the nursing home. The observational instrument consists of a floor plan of various rooms in the

facility and a checklist of possible types of activities. The checklist is based upon previous behavioral mapping instrument that was used in other long-term care facilities[30]. Data were to be gathered in random half-hour periods from 7:30 a.m. to 9:00 p.m. on random days of the week including weekends. Behavioral mapping was conducted in four time phases: a) prior to completion of the design modifications, b) immediately after relocation to the renovated setting, c) several weeks after relocation, and d) six months after relocation. Observations were conducted in the shared or common spaces, i.e., dining/activity space, lounge and hallways. For privacy reasons, behavioral mapping was not used within residents' rooms, rest rooms, and tub rooms. However, residents were observed in their rooms as much as the researchers could view the inside of resident rooms from the hallways. Frequency counts were calculated for the number of residents or staff using a room as well as the type of behavior in which they were engaged in. The frequencies were converted to percentages to provide descriptive data on how environmental design influenced the use of the nursing home's space.

A qualitative evaluation of the types of activities, social interaction patterns, etc. occurring in the spaces were also conducted. Three long-term care experts reviewed the behavioral mapping checklist to assess its content validity prior to use. Inter-observer reliability was assessed when two researchers completed the same data gathering route for two hours and compared results.

1.3. Personal Interviews with Residents

Personal interviews with residents were conducted to assess their reactions to environmental attributes in the nursing home and their effect on the quality of their lives. A theoretical sample of 10-15 residents from the existing units and 10-15 residents from the new cluster units were to be interviewed in three phases: a) before the move to the renovated facility; b) right after the move to the completed new setting; and c) six months after the relocation. Each interviewee was given a disposable camera and asked to take 10 pictures of the most significant environmental attributes, which contribute to the quality of life for them. The developed pictures served as triggers for further discussion in the personal interviews.

All the interviews were tape-recorded and transcribed. Data analysis was to be conducted simultaneously with data collection in order to focus and shape the study as it proceeds. The information was to be categorized, searched for patterns, and interpreted. The task of the analysis was to make connections among the field data in order to identify the relevant environmental attributes and outcomes. The personal interviews were supposed to allow

residents to reflect on any change they observed and consider what they saw as the underlying influences on these changes. The personal interviews were expected to supplement the quantitative data that identified changes in functioning, activities and relationships that occurred as a result of the modification of the environment.

1.4. Focus Group Interviews with Resident Families and Staff Members

Focus group interviews were planed with resident families and staff members to gather information in regard to aspects of the physical environment of the nursing home. Advantages of focus group interviews include highly efficient qualitative data collection, checks and balance on the different opinions, and opportunities to explore emergent issues in an interactive process[31]. Three to five focus groups, each consisting of 6-8 participants representing family members and staff were to be interviewed at three phases: a) prior to completion of the design modifications, b) six weeks after relocation, and c) six months after relocation. A semi-structured questionnaire, based on aspects of physical environment, was anticipated to serve as the guide for focus group interviews. The questions were based on salient dimensions (e.g., privacy, social interaction) of the physical environment in regard to quality of life and quality of care in long-term care settings. These environmental aspects have been validated by widely used physical environment assessment instruments used in previous studies, such as Multiphasic Environmental Assessment Procedure[32].

The initial plan was to ask questions such as: How safe and secure is the facility? (Egress problem, hazardous equipment, etc.) How is residents' privacy supported or not by the design of residents' rooms? What is the social interaction like among residents? Is the furniture arrangement conducive for small group interaction? How flexible or rigid is the scheduling of activities throughout the day? Is the room layout confusing for any resident or staff? Is the lighting and color scheme appropriate and does it provide a residential atmosphere? Where do families like to visit while they are with their loved ones? Is the flooring appropriate for normal walking, wheelchairs and walkers? Are there any problems/concerns in delivery of food before and during mealtimes? Any concerns/issues in regards to the housekeeping rooms? How well are the showers and bathing area working? What is the furniture like in residents' room and dining space? Do residents have a choice of roommates? Does facility policy require staff to knock on resident doors before entering? Does the facility require that residents be out of their rooms for a major part of the day? Does staff allow residents to keep the resident

room doors closed? What is the policy regarding bringing in personal furniture?

A content analysis of the focus group data was to be performed in the following manner:

1) Focus group interviews were to be videotaped and transcribed;
2) Central themes from the transcribed data were to be extracted;
3) The themes were to be categorized and organized for broader categories to identify patterns, comparisons, trends and paradoxes;
4) Matrices were to be constructed to check the validity of themes that emerged; and finally,
5) The data were to be reviewed to compare and contrast resident perspectives with those of family and staff of the same phenomena as well as to determine whether the intended design interventions were, in fact, what the users perceived as happening.[33]

2. Resident Outcomes

2.1. Minimum Data Set (MDS 2.0)

The impact of environmental design interventions on resident outcomes was to be assessed quantitatively using the newest version of the nursing home Minimum Data Set (MDS 2.0) instrument. Three sub-scales from the MDS 2.0 were used to compare resident outcomes of the treatment and control groups following the design intervention with pre-construction resident outcomes: (1) the Cognitive Performance Scale (CPS), (2) the behavioral problems sub-scale, and (3) the activities of daily living self-performance sub-scale. The CPS combines 5 selected MDS cognitive items (comatose status, short-term memory, ability to make decisions, making self understood, and eating performance) into a single hierarchical cognitive rating scale, ranging from 0 (no impairment) to 6 (very severe impairment)[34]. The *behavioral problems* sub-scale consists of 5 symptoms (wandering, verbally abusive behavior, physically abusive behavior, socially inappropriate or disruptive behavior, and resisting care). The activities of daily living self-performance sub-scale measures functional status based on the ability to perform 10 activities of daily living: bed mobility, transfer, walk in room, walk in corridor, locomotion on unit, locomotion off unit, dressing, eating, toilet use, and personal hygiene.

It was assumed that using MDS data for quality measurement has several advantages. It involves regular data collection on each resident (every 90 days) using a standardized instrument to measure the complex care

needs of nursing home residents, continuous monitoring of changes in residents and facility performance, and availability of nationwide data for comparison[35]. Validity and reliability testing of the MDS instrument and sub-scales derived from MDS data are the focus of ongoing research[36]. Although testing is ongoing, analyses indicate that reliable judgments based on MDS information are possible concerning the outcomes of specific residents and the quality of care provided in specific nursing homes.

A quasi-experimental one-way analysis of covariance design comparing 20 residents assigned to the cluster unit (Treatment group) and 20 residents remaining in the existing units (Control group) was utilized to analyze the data. The dependent variables were three post-construction MDS scores on the following sub-scales: Cognitive Performance Scale (CPS), behavioral problems, and activities of daily living (ADL).

The independent variable consisted of two levels: residents who were expected to move to the new unit (Treatment group) versus residents who remained in the pre-existing unit (Control group). The three co-variants were to be pre-construction MDS scores on the three sub-scales: CPS, behavioral problems, and ADL. Analysis of covariance (ANOVA) is used to increase the power of the F test by reducing error variance[37]. In addition, ANOVA were designed to save time and money and improve the quality of the data collected because fewer subjects were needed to achieve the same precision[38].

It was hypothesized that after controlling for the effects of pre-construction MDS scores, the post-construction scores would dependent upon the two types of treatment: new environment versus pre-existing environment. The null hypothesis, therefore, was: There is no statistically significant difference between the mean post-construction MDS scores for the two levels of treatment after adjusting for the variance associated with the pre-construction MDS scores.

2.2. Psychological Assessment

To examine the influences of the environment on older individuals' psychological well-being[39], self-reported depression levels was to be assessed using the Geriatric Depression Scale (GDS)[40] at pre and post (6-month) move for both treatment and control groups. This 30-item inventory requires simple "yes-no" answers from residents in reference to their feelings over the past week. The scale's reliability and validity have been established[41], and has been used successfully with the nursing home population by members of the research team. Only residents scoring 2 or less on the Cognitive Performance

Scale of the MDS were to be asked to complete this self-report measure.

2.3. Affective Reaction to Environmental Situations

In addition to examining how design influences older individuals' behavior and use of their environment, it was important to consider their affective reactions to these objective experiences[42]. In conjunction with the Behavioral Mapping (see section 1.2.) we planned to randomly question Treatment and Control group residents about their current affective states as they spend time in various settings (e.g. own room, dining area) at pre and post-construction. A brief scale of eight 7-point semantic differential items tapping affect and activity/arousal level was to be used (e.g. alert-drowsy; excited-bored; sociable-lonely; happy-sad). The scale demonstrated strong internal validity and has been used successfully with adults beyond age seventy-five[43] to assess short-term internal states. Multiple assessments of each participant's internal states in various settings were to be gathered over the weeks of the behavioral mapping so that average score of each resident could be calculated for each environmental setting they experience. This averaging procedure eliminates bias that could result from taking assessments on a single day that may not adequately represent a resident's more typical affective state.

3. Family Outcomes

3.1. Family Visitation

Contrary to social myth, research shows that "placement [of an elderly relative] in a nursing home neither reflects nor causes family breakdown[44]" (p. 361). Instead, family relationships reveal a great deal of continuity after institutionalization as the family continues to visit and provide certain types of care for their resident relatives. Visitation is known to correlate positively with residents' psychosocial well being[45]. Additionally, visits and involvement may relieve negative feelings such as guilt and shame that family members have about placement of their relatives in an institution[46].

The level of interaction between family members and residents in the treatment and control groups were to be compared at pre- and post-move using data from visitor sign-in sheets the facility already uses. Frequency and length of visits for various family members could be determined from these logs. Group comparisons of overall visiting and visits by the primary family member, identified as the family contact person, was to be conducted to determine whether environmental features influence the amount of contact families choose to have with the nursing home.

In addition to how often the primary family members visit, it was important to assess what those experiences are like for them, and how the environment might affect the quality of their contacts with the nursing home. To assess how time was spent on visits to the nursing home and how the visit was experienced by the primary family member, telephone calls were to be made to family members of both groups shortly after (within 1-2 days) their visits during an entire month, both pre and post-construction. To determine the activities of the primary family member during the visit we wanted to use a check-list of activities performed with/for the resident developed from similar measures used by Rubin and Shuttlesworth (1983) and Linsk et al. (1985)[47]. Research indicates that family typically assume tasks centered on personalized, emotionally-sensitive care, doing things such as grooming the relative and monitoring their care[48], because they often view the treatment of nursing staff as more technical and impersonal. In addition, family members spend time observing staff interactions with other residents to see how their own relative may be treated when they are absent. Because the public and private spaces in the nursing facility were expected to change following the new design, such activities, we postulated might also change.

The affective responses of family members to visits to the nursing home were to be assessed using the same 8-item semantic differential scale used to assess residential affect during the behavioral mapping procedure (see section 2.3.). The primary family members were to be asked to recall their most recent visit and report on their loved ones feelings (alert-drowsy; active-passive; energetic-tired; excited-bored) and affect levels (happy-sad; cheerful-irritable; friendly-angry; sociable-lonely) experienced during the visit.

3.2. Family Satisfaction Survey

The quantitative assessment of family outcomes was expected to include family members' general views of satisfaction with the nursing home. Consumer perceptions of nursing home quality have gained increasing attention from marketers and managers recently[49]; the views of family are important as they often are the main decision-makers for elderly residents and their feelings of dissatisfaction can create major problems for staff and administration[50].

Family satisfaction was to be assessed at pre and post-construction (6 months) by surveying *all* families of the nursing home residents. The survey was based on satisfaction surveys used in previous nursing home research[51]. The surveys were mailed to families and followed-up by phone calls to families who did not return

them promptly. Aggregate- level descriptive analyses was to compare responses at pre-move and post-move, determining areas of high and low satisfaction and changes over time. Individual-level data will be compared for families of residents in the Treatment and Control Groups to determine cross-time differences and changes in their levels of satisfaction.

Comparisons of Treatment and Control Group family outcomes was to be made using a 2 (Group) X 2 (Time) repeated measures analysis of variance (ANOVA), with Time as the repeated measure. This was expected to determine cross-time changes in scores on a particular indicator for each group, as well as whether levels of change over time differed for the two groups. An interaction of Time and Group could indicate that cross-time changes for one group were stronger than for the other, which could be attributed to the environmental design differences if pre-existing group differences were minimal.

3.3. Personal Interviews with Families

At both pre- and post-move, open-ended personal interviews were to be conducted with a sub-sample of 10 families from each group to probe deeper into some of the quantitative findings regarding family experiences with the nursing home. Family members were to be asked general questions such as

- Why do family members interact the way they do with their resident relatives? (e.g., frequency of visits, activities performed)
- Why are they either satisfied or dissatisfied with certain aspects of care?
- What are the main factors that determine how often they visit their relative?
- Are there things about the facility that they think interfere with their desired level of involvement with their relative?
- Can they describe any aspects of the nursing home that influence their feelings about visiting their relative?

Families differ widely in what they do when they visit their relatives. Consequently we wanted to ask

- Why do they spend their visiting time the way they do?
- Is there any change in the way they spend the time with their relative as a result of the renovation? If yes, why?

Following transcription, the content of these interviews was to be analyzed to determine central themes in the experience of families.

4. Staff Member Perspectives

4.1. Focus Groups with Staff Members

Three focus groups were planned to identify the impact of the design interventions on nursing home staff's perceptions of resident care. Guidelines for the focus group discussion and subsequent analysis were based on the work of Krueger, who defines a focus group as "a carefully planned discussion designed to obtain perceptions on a defined area of interest in a permissive, non-threatening environment" (p. 18)[52].

A convenience sample of approximately 25 staff members was to be asked to participate on a voluntary basis in one of three focus groups held during each shift: day, evening, and night. Because long-term care is interdisciplinary, each focus group was to be comprised of 7-10 participants that were to include nurses (registered nurses and licensed practical nurses); certified nursing assistants; social workers; therapeutic recreation therapists; and physical, speech, and occupational therapists. Each focus group interview was planned for approximately one hour and was to be led by a trained research assistant and accompanied by a participant observer who was to take written field notes of the group process. The interviews were to be videotaped for later analysis.

Examples of the proposed questions included:

- How do you think the changes in the new environment have impacted the residents?
- How has the new addition affected the way you deliver care to the residents?
- How would you compare the care delivered to residents living in the new addition to care of residents living in the pre-existing units?
- How would you describe your attitude about working on the new addition?
- How would you describe your attitude about working on the pre-existing units?
- Tell me about a situation in which you have noticed a difference in a resident's behavior, cognitive status, or functional ability since moving to this new environment.
- Tell me about a situation in which you have noticed *no* difference in a resident's behavior, cognitive, or functional ability since the move.

A content analysis of the focus group data was to be performed in the manner described in section 1.4.

The various data collection methods and the guiding research questions are summarized in the following matrix:

5. Summary: Research Questions and Methods Table

Research Questions	**Methods**
• Is there any change in the pattern of space usage by residents before and after design interventions? If yes, how did it change? • What are the relationships between design interventions as inspired by advocated therapeutic goals and residents' outcomes?	• Behavioral mapping • Interview with residents
• Is there any change in cognitive, behavioral and affective functioning in residents before and after design interventions? If yes, how did it change? • What are the relationships between design interventions as inspired by advocated therapeutic goals and resident outcomes?	• Behavioral mapping. Resident Affect Assessment during Behavioral Mapping • Interview with residents • MDS (cognitive performance scale, behavioral problems scale and ADL self-performance sub-scale) • GDS (Geriatric Depression Scale)
• Which of the environmental attributes in the renovated nursing home, are perceived as significant to the residents?	• Interview with residents
• What are the relationships between the design interventions and family involvement (e.g., frequency of visits, activities)? • What are the relationships between the design interventions and family satisfaction with the physical environment, service and care delivery?	• Family visitation assessment • Family satisfaction survey • Interview with families • Focus groups with families • Behavioral mapping
• How do the renovated setting and the changes in care philosophy affect staff perception of the physical setting, service and care delivery?	• Focus groups with staff • Behavioral mapping
• What is the global assessment of the facility before and after design interventions?	• PEAP (Professional Environmental Assessment Protocol)

References

[1] Zeisel, J. (1999). Life-Quality Alzheimer's Care in Assisted Living. In Benyamin Schwarz and Ruth Brent Aging Autonomy and Architecture: Advances in Assisted Living. Baltimore, MD: The Johns Hopkins University Press.
[2] Coons, D. (1985). Alive and well at Wesley Hall. *Quarterly: A Journal of Long Term Care*, 21, (2), 10-14. Cohen, U., and Day, K. (1993). Contemporary environments for people with dementia. Baltimore, MD: The Johns Hopkins University Press.
[3] Restinas, J. (1986). *It's OK Mom: The nursing home from Sociological perspective*. New York: Tresis Press.
[4] Schwarz, B. (1996). *Nursing home design: Consequences of employing the Medical Model*. New York: Garland Publishing.
[5] Kane, R. L. (1994). The American nursing home: An institution for all reasons. In J. R. Hollingsworth and E. J. Hollingsworth (Eds.) *Care for the chronically and severely ill: Comparative social policies*. New York: Aldine De Gruyter.
[6] Ibid., 41.
[7] Lawton, M. P., and Rubinstein, R. L. (Eds.) (2000). *Interventions in dementia care: Toward improving quality of life*. New York, NY: Springer Publishing Company.
[8] Carp, F. M. (1987). Environment and aging. In D. Stokols, and I. Altman (Eds.) *Handbook of environmental psychology*. New York: Wiley.
[9] Tiesdel, S., and Oc, T. (1993). Architecture and people. In B. Farmer and H. Louw (Eds.) *Companion to contemporary architectural thought*. New York: Routledge.
[10] Scheidt R. J. and Windley, P. G. (Eds.) (1998). *Environment and Aging Theory: A Focus on Housing*. Westport, CT. Greenwood Press.
[11] Lawton, M. P., and Nahemow, L. (1973). Ecology and the aging process. In C. Eisndorfer and M. P. Lawton (Eds.), *Psychology of adult development and aging*. Washington, D.C.: American Psychological Association.
[12] Murray, H. (1938). *Explorations in personality*. New York: Oxford University Press. Lewin, K. (1951). *Field theory in social science*. New York: Harper and Row.
[13] Lawton, M. P. (1998). Environment and aging: Theory revisited. In R. J. Scheidt, and P. G. Windley (Eds.) *Environment and aging theory: A focus on housing*. Westport, CT: Greenwood Press.
[14] Kahana, E (1982). A Congruence Model of the person-environment interaction. In M. P. Lawton, P. G. Windley, and T. O. Byerts (Eds.) *Aging and environment: Theoretical approach*. New York: Springer. Carp, F. M., and Carp, A. (1984). A complementary Congruence Model of well-being or mental health for the community elderly. In I. Altman, J. Wohlwill, and M. P. Lawton (Eds.) *Elderly people and the environment*. New York: Plenum. Moos, R. H., and Lemke, S. (1985). Specialized living environments for older people. In J. Birren & K. W. Schaie (Eds.) , *Handbook of the psychology of aging*. New York: Van Nostrand Reinhold. See also Moos, R. H., and Lemke, S. (1994). *Group residences for older adults: Physical features, policies, and social climate*. New York: Oxford University Press. Golant, S. M. (1998). Changing an older person's shelter and care setting: A model to explain personal and environmental outcomes. In R. J. Scheidt, and P. G. Windley (Eds.) *Environment and aging theory: A focus on housing*. Westport, CT: Greenwood Press.
[15] Scientists and designers tend to define their goals differently. Social researchers' orientation tends toward explanatory theories and processes, whereas practitioners look for prescriptions for action whose results are hypothesized to lead to desired outcomes . See Lang, J. (1987). *Creating architectural theory: The role of the behavioral sciences in environmental design*. New York: Van Nostrand Reinhold.
[16] See for example Timko, C., & Moos, R. H. (1991) Assessing the quality of residential programs: Methods and applications. *Adult Residential Care Journal*, 5, 113-129. Noell, E. (1995/1996). Design in nursing homes: Environment as a silent partner in caregiving. *Generations*, Winter, 19(4), 14-19.
[17] Pynoos, J. and Regnier, V. (1991). Improving residential environments for frail elderly: Bridging the gap between theory and application. In J. E. Birren, J. E. Lubben, J. C. Rowe, & d. E. Deutchman (Eds.), *The concept and measurement of quality of life in the frail elderly*. New York; Academic Press.
[18] Cohen, U., and Weisman, G. D. (1991). *Holding on to home: Designing environments for people with dementia*. Baltimore, MD: Johns Hopkins University Press.
[19] Ibid.
[20] See for example, Lawton, M. P. (1975). *Planning and managing housing for the elderly*. New York: Wiley and Sons. Lawton, M. P. (1986). Environment and aging. Albany, N. Y.: Center for the Study of Aging. Regnier, V., and Pynoos, J. (Eds.) (1987). *Elderly housing: Design directives and policy considerations*. New York: Elsevier.

[21] Namazi, K H., Eckert, J. K., Kahana, E., and Lyon, S. M. (1989). Psychological well-being of elderly board and care home residents. *The Gerontologist, 29* (4), 511-516.
[22] Cohen-Mansfield, J. and Werner, P. (1998). The effect of an enhanced environment on nursing home residents who pace. *The Gerontologist, 38* (2), 199-208.
[23] Kruzich, J. M., Clinton, J. F., and Kelbert, S. T. (1992). Personal and environmental influences on nursing home satisfaction. *The Gerontologist, 32* (3), 342-350.
[24] Namazi at al, (1989).
[25] Bowers, B. J. (1988). Family perceptions of care in a nursing home. *The Gerontologist, 28(3),* 361-368.
[26] Lemke, S. and Moos, R. H. (1989). Personal and environmental determinants of activity involvement among elderly residents of congregate housing. *Journal of Gerontology: Social Sciences, 44,* S139-148. Timko, C. and Moos, R. H. (1990). Determinants of interpersonal support and self-direction in group residential facilities. *Journal of Gerontology: Social Sciences, 45,* S184-192.
[27] In his discussion of the emergence of Gerontology, Andrew Achenbaum argues that the discipline of gerontology originated as a multidisciplinary endeavor, however little research in this discipline to date truly lives up to the definition of interdisciplinarity . See Achenbaum, A. W. (1995). *Crossing frontiers: Gerontology emerges as a science.* New York: Cambridge University Press.
[28] Weisman, G., Lawton, M. P., Calkins, M., Norris-Baker, L., & Sloane, P. (1996). *Professional Environmental Assessment Protocol.* Unpublished manuscript, University of Wisconsin-Milwaukee, Institute on Aging & Environment, Milwaukee.
[29] Bell, P & Smith, J. (1997). A behavioral mapping method for accessing efficacy of change in special care units. *American Journal of Alzheimer's Disease, 12(*4), 184-189. Cherulink, P. D. (1993). *Applications of environment-behavior research: Case studies and analysis.* Cambridge: Cambridge University Press.
[30] For example, Kovach, C., Weisman, G., Chaudhury, H., & Calkins, M. (1997). Impacts of a therapeutic environment for dementia care. *American Journal of Alzheimer's Disease, 12*(3), 99-110.
[31] Morgan, D. L. (1998). *The focus group guidebook.* Thousand Oaks, CA: Sage Publications. Patton, M. Q. (1990). *Qualitative evaluation and research methods.* Thousand Oaks, CA: Sage Publications.
[32] Moos, R. H., and Lemke, S. (1994). *Group residences for older adults: Physical features, policies, and social climate.* New York: Oxford University Press.
[33] Maxwell, J. A. (1996). *Qualitative research design: An interactive approach.* Thousand Oaks, CA: Sage.
[34] Morris, J., Fries, B. E., Mehr, D. R., Hawes, C., Phillips, C., Mor, V., & Lipsitz, L. A. (1994). MDS cognitive performance scale. *Journal of Gerontology, 49*(4), M174-182.
[35] Rantz, M., Mehr, D., Conn, V., Hicks, L., Porter, R., Madsen, R., Petroski, G., & Maas, M. (1996). Assessing quality of nursing home care: The foundation for improving resident outcomes. *Journal of Nursing Care Quality, 10*(4), 1-9.
[36] Hartmaier, S. L., Sloane, P. D., Guess, H. A., Koch, G. G., Mitchell, C. M., & Phillips, C. D. (1995). Validation of the Minimum Data Set Cognitive Performance Scale: Agreement with the Mini-Mental State Examination. *Journal of Gerontology: Medical Sciences, 50A*(2), M128-M133. Hawes, C., Morris, J., Phillips, D., Mor, V., & Fries, B., Nonemaker. (1995). Reliability estimates for the Minimum Data Set for nursing home assessment and care screening (MDS). *The Gerontologist, 35*(2), 172-178. Morris, J., Hawes, C., Fries, B., Phillips, C., Mor, V., Katz, S., Murphy, K., Drugovich, M., & Freidlob, A. (1990). Designing the national resident assessment instrument for nursing homes. *The Gerontologist, 30*(3), 293-307.
[37] Tabachnick, B. & Fidell. L. (1996). *Using multivariate statistics, 3rd ed.* New York: Harper Collins College Publishers.
[38] Wu, Y. B. & Slakter, M. J. (1989). Analysis of covariance in nursing home research. *Nursing Research, 38* (5), 306-308.
[39] Lawton, M. P. (1983). Environment and other determinants of well-being in older people. *The Gerontologist*, 23, 349-360.
[40] Brink, T., Yesavage, J., Lum, O., Heersema, P., Adey, M., & Rose, T. (1982). Screening tests for geriatric depression. *Clinical Gerontologist, 1,* 37-44.
[41] Yesavage, J., Brink, T., Rose, T., Lum, O., Huang, V., Adey, M. & Leirer, V. (1983). Development and validation of a geriatric depression screening scale: A preliminary report. *Journal of Psychiatric Research, 17,* 37-49.
[42] Lawton, M. P., Devoe, M. R., and Parmelee, P. (1995). Relationship of events and affect in the daily life of an elderly population. *Psychology and Aging 10* (3), 469-477.
[43] Larson, R., Zuzanek, J., and Mannell, R. (1985). Being alone versus living with people: Disengagement in the daily experience of older adults. *Journal of Gerontology, 40,* 375-381. Larson, R., Mannell, R., and Zuzanek, J. (1986). Daily well-being of older adults with friends and family. *Psychology of Aging, 1,* 117-126.
[44] Bowers, B. J. (1988).

[45] Greene, V. L. & Monahan, D. J. (1982). The impact of visitation on patient well-being in nursing homes. *The Gerontologist, 22(4), 418-423.*

[46] Tobin, S. S. (1995). Fostering family involvement in institutional care. Pp. 25-44 in G. C. Smith, S. S. Tobin, e. A. Robertson-Tchabo & P. W. Power (Eds.), *Strengthening aging families: Diversity in practice and policy.* Thousand Oaks, CA: Sage.

[47] Rubin, A. & Shuttlesworth, G. E. (1983). Engaging families as support resources in nursing home care: Ambiguity in the subdivision of tasks. *The Gerontologist, 23(6),* 632-636. Linsk, N. L., Miller, B., Pflaum, R., Ortigara-Vicik, A. (1988). Families, Alzheimer's Disease, and nursing homes. *The Journal of Applied Gerontology, 7(3),* 331-349.

[48] Duncan, M. T. & Morgan, D. L. (1994). Sharing the caring: Family caregivers' views of their relationships with nursing home staff. *The Gerontologist, 34,* 235-244.

[4949] Fottler, M. D., Ford, R. C., & Bach, S. A. (1997). Measuring patient satisfaction in healthcare organizations: Qualitative and quantitative approaches. *Best Practices and Benchmarking in Healthcare, 2(6),* 227-239. Koenig, H. F. & Kleinsorge, I. K. (1994). Perceptual measures of quality: A tool to improve nursing home systems. *Hospital and Health Services Administration, 39(4),* 487-503.

[50] Safford, F. (1989). "If you don't like the care, why don't you take your mother home?": Obstacles to family/staff partnerships in the institutional care of the aged. *Journal of Gerontological Social Work, 13(3/4),* 1-7.

[51] Kane, R. L., Riegler, S., Bell, R., Potter, R., and Koshland, G. (1982). Predicting the course of nursing home patients: A progress report. Santa Monica, CA: Rand.

[52] Krueger, R. A. (1988). Focus groups: A practical guide for applied research. New York: Sage.

Environmental Design Evaluations

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[Add here an introduction to the whole environmental design evaluation process.]

Professional Environmental Assessment Protocol (PEAP)

Professional Environmental Assessment Protocol[1] was used to conduct focused evaluation of the Kingswood facility before and after environmental modifications. This instrument is based on eight attributes of environmental experience that includes

- awareness and orientation,
- safety and security,
- privacy,
- regulation and quality of stimulation,
- functional abilities,
- opportunities of personal control,
- continuity of self, and
- facilitation of social contact.

The primary advantage of PEAP is its documentation of both discrete and global aspects of the environment that supports the eight attributes. Scores across the eight dimensions serve a baseline assessment of the environment before and after renovation at Kingswood. Using this instrument, assessment of the facility was conducted by four members of the research team to ensure reliability.

The newly constructed cluster scored higher in all eight dimensions of the instrument compared with the scores of the facility before renovation. The dimensions of *maximize awareness and orientation, provision of privacy,* and *facilitation of social contact* had the highest variation in the pre- and post-renovation PEAP scores. Score difference in the *privacy* dimension can be explained by the fact that majority of the residents' rooms in the new cluster were single-occupancy, whereas the majority of the residents' rooms in the pre-renovation facility were double occupancy. The score difference in *facilitation of social contact* can be attributed to the cluster floor layout that allowed direct visual and physical access to the activity area from the residents' rooms. This centrality of the living

area and adjacent dining area also impacted the two-point variation in the PEAP dimension of *maximize awareness and orientation*. Residents' rooms surround the new common living/activity space in each cluster. This arrangement increases the potential of utilization by the residents compared with the location of the activity space before the renovation, which was far from the residents' rooms. Pre and post-renovation PEAP scores were as follows:

Environmental Attribute	Pre-Renovation Score	Post-Renovation Score
Maximize Awareness and Orientation	3	5
Maximize Safety and Security	3	4
Provision of Privacy	3	5
Regulation of Stimulation:	3	4
Quality of Stimulation	3	4
Support Functional Abilities	2	3
Opportunities of Personal Control	2	3
Continuity of Self	2	3
Facilitation of Social Contact	3	5

Behavioral Mapping

One of the central questions to be answered in this research was how were the various spaces utilized, how many people used them, and who were these users. The different spaces included the nurses' station area, activity room, dining room, kitchen, and hallways. User groups included residents, staff and administrators. The behavioral mapping study, which involved direct observations of spaces in a systematic way, was the primary method to gather data to answer the research questions that pertained to the physical environment of the facility. More specifically, results of behavioral mapping indicated:

- How often various spaces in the facility were used
- Who were the primary users of those spaces
- What were the patterns of activities in those spaces

These results explain the impact of environmental changes on residents, staff and families. In this study we used place-centered behavioral mapping[2] for observation of activity patterns of residents, staff and visitors in different public spaces. The place-centered approach showed how people placed themselves within particular rooms and the activities in which they engaged. This method is different from the person-centered behavioral mapping, which involves recording actions of particular persons wherever they are located and move around.[3]

Although person-centered observations do not provide any indication of how many people use a room for a particular activity, the data may provide information on the areas that compose each person's home territory. The initial research design for this study included both place-centered and person-centered behavioral mapping; however, the latter was not conducted due to the uncertainty of which residents will move to the new cluster. It was decided that place-centered mapping would be conducted to find aggregate data pre and post-renovation of the facility. Observational instrument consisted of floor plans of the two levels of the facility and a checklist of possible types of activities. The checklist is based upon previous behavioral mapping in long-term care facilities[4].

Data were gathered for randomly assigned half-hour periods from 9:00 am to 6:00 p.m. on various days of the week including weekends. The procedure involved documenting the group, number of users, and activity pattern in a given space for a particular period of time. The specific identity of a user was not observed. Therefore, data evolved in terms of aggregate numbers of residents, staff or visitors without reference to the specific identity of the individuals. Behavioral mapping was conducted in three phases: a) prior to the environmental modifications, b) immediately after relocation in the renovated setting, and c) three months after relocation. The following are the behavioral mapping timeframes:

- Pre-Renovation: 20 hours
- Post Renovation (immediately after renovation): 22 hours
- Post Renovation (three months after renovation): 20 hours

Observations were conducted in the shared or common spaces, i.e., dining/activity space, lounge areas and hallways. Private areas, e.g., residents' rooms, rest rooms and tub-rooms, were excluded for behavioral observations. Frequency counts were calculated for number of residents or staff using the different spaces, as well as the types of behavior they were engaged in. The

Pre-renovation: Single large dining space serving all the residents of the second floor

Post-renovation: Smaller dining space serving a third (10-12) of all residents on the floor

frequencies were converted to percentages and are represented in the charts in Appendix B. The inter-reliability of the observation was assured by the fact that two researchers completed the same data gathering route for two hours in each observation session and compared their results.

Results

The most utilized spaces in the facility were the main activity lounge on the first floor and the nurses' stations on both first and second floors (see floor plans in Appendix A). The majority of the programmed activities for the residents were held on the first floor activity space. This posed certain challenges of access for some residents on the second floor. Residents on the second floor had to take the elevator to go down and find their way to the activity space. For this indirect route of access, some residents on the second floor sought assistance from the staff in order to get to the activity room. Pre-renovation behavioral mapping indicated that activities in the main lounge on the first floor had on average twenty to thirty residents.

Overall, the majority of the residents seemed to be actively engaged in the activities. Only few residents were dozing or set with no engagement. Post renovation data indicated that the number of residents who were using the first floor activity space declined, as they were spending more time in the new common living/activity spaces within the new clusters on both floors. Post-renovation activities were offered in the large activity room as well as the activity spaces in the clusters. Active engagement was slightly increased in the new cluster activity spaces. This can be explained by the smaller group size in the new clusters, i.e., ten to twelve residents, versus twenty to thirty residents in the first floor activity lounge pre-renovation.

However, post-renovation data indicated that during the programmed activities for all the residents, in the main activity room on the first floor, there were some residents who preferred to spend time in the common living/activity areas and not to join the group in the main activity space. This option of easily accessible living areas in the clusters allowed them to choose between staying in their own households and going to the main lounge. Although residents in the new clusters could informally interact with fewer fellow residents in a smaller, residential-scale living area, they could not benefit from programmed activities in these spaces because they were not offered.

This finding demonstrates the importance of organizational decisions regarding staffing and staff training, which need top follow the environmental design in order to take full advantage of an innovative architectural

setting. De-centralized activity spaces require additional activity staff to conduct the range of activities that are suitable for the newly designed common living/activity areas. At the time of data collection for this study, the administration considered hiring additional staff and offer more meaningful activities for residents with dementia. However, the study was completed before the new programs were instigated.

The two aviaries were popular locations for residents on both floors. Although the characteristics of the aviary locations were very different in post-renovation time compared with the nurses' station in the pre-renovation, the nature of the activities had some minor changes. Residents seemed to be congregating around the aviaries passive spectators. The difference in usage of the aviary instead of the nurses' stations, but they continue to be area resulted from the family visitations. Family members tended to use the aviary space more often. In the post-renovation phase, families set with their loved ones in the aviary area in contrast to the pre-renovation phase in which the space was dominated by the nurses' station. Renovation of this area reduced the institutional appearance that is frequently associated with the dominant nurses' station.

The Aviary Area

The nurses' station was reduced in size and was relocated to the side of the general service area. This design allows opportunities for easy visual and physical interaction among staff members and residents. Staff members can engage in various tasks at the new nurses' station, and at the same time they can maintain natural supervision over the residents that are situated around the aviary. However, the popularity of the aviary could be attributed, in part, to the lack of adequate programmed activities in the other common areas. This, of course, was due to organizational aspects in the facility rather than the impact of the physical environment on the residents.

The three dining rooms on each floor that were created during the renovation are smaller in size and less institutional in ambiance, compared to the single large dining space that served the facility before the renovation. Mapping data indicated that there were fewer incidents of disruptive and agitated behaviors in the new dining areas than in the larger dining space that served the residents prior to the renovation. The number of residents that were served in the new dining spaces was 8-10 compared with the 25-30 residents who had their meals in the large dining area before the renovation. Staff seemed to have more sustained conversations with the residents in the new dining spaces than they were having in the old dining space. These positive aspects of the new dining areas could be attributed to the significantly smaller number of residents in one space. Staff members have more time

and control in interacting with fewer residents. Also, in the large dining area, it was observed that one resident's disruptive behavior may have triggered other residents' similar behaviors. The reduction of group size in the new dining areas reduced the possibility of this chain effect of disruptive behaviors.

The overall conclusion of the behavioral mapping study is that the multiple activity spaces on both floors are utilized much more by the residents due to their ease of access compared to the large activity space on the first floor. Although active engagement in planned activities in the new cluster common spaces have slightly increased, the residents spend a significant amount of time in null behavior in these spaces due to lack of adequate planned programs specifically designed for these areas. The aviaries are popular areas for engagement among residents and have provided an option for interactions during family visitations. Decentralized dining areas have fewer disruptive behaviors from the residents and at the same time the spaces seem to encourage greater social interaction among staff and residents.

References

[1] Weisman, G., Lawton, M.P., Calkins, M., Norris-Baker, L., & Sloane, P. (1996). *Professional Environmental Assessment Protocol.* Unpublished manuscript, University of Wisconsin-Milwaukee, Institute on Aging & Environment, Milwaukee.

[2] Cherulink, P.D. (1993). *Applications of environment-behavior research: Case studies and analysis.* Cambridge: Cambridge University Press.

Bell, P & Smith, J. (1997). A behavioral mapping method for accessing efficacy of change in special care units. *American Journal of Alzheimer's Disease, 12(*4), 184-189.

[3] Sommer, R., & Sommer, B. B. (1986). *A practical guide to behavioral research: Tools and techniques.* New York, NY: Oxford.

[4] Kovach, C., Weisman, G., Chaudhury, H., & Calkins, M. (1997). Impacts of a therapeutic environment for dementia care. *American Journal of Alzheimer's Disease, 12(*3), 99-110.

Assessing Resident Outcomes

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The physical design of the nursing home environment has sustained significant criticism for its cold "institutional" ambiance and its detrimental effect on quality of life. Despite years of research regarding the relationship between environment and quality of life, it is still uncertain how best to individualize nursing care environments in a single congregate setting.[2] In recent years, we have seen an increased awareness of the relationship between environmental design and the well being of nursing home residents, particularly in residents with dementia. Environmental design is regarded as a therapeutic resource to promote well being and functionality among people with dementia. Many features of environmental design including smaller size units, fewer resident rooms, more designated private rooms, smaller private dining rooms, separate and larger activity rooms, home-like furnishings, and softer lighting have been hypothesized to support residents' activities of daily living, behavioral patterns, and cognitive performance.

We were presented with a unique opportunity to influence the decisions regarding environmental changes and to evaluate the impact of those changes on the residents, their family, and the staff in Kingswood. The modifications in the physical environment attempted to capitalize on therapeutic goals and design principles for special care units for people with dementia to create a more responsive physical environment for physically and cognitively impaired frail elderly residents.

The newly designed wing provided us with a "living laboratory" in which to contrast the social "home-like" orientation of the new environment with the medical "institutional" orientation of the existing wings.

The nursing component of the study, reported in this chapter, utilized a two-group pre-test/post-test design. A sample of residents who eventually were located in the newly designed wing of the facility (Intervention Group) were compared with a cohort group of residents who remained in the traditional, medically-oriented setting (Control Group). The purpose of this study was to determine if residents living in the newly designed

environment showed significant improvement in cognitive, behavioral, and functional performance as compared to residents who remained in the existing environment.

Methods

Subjects

The total capacity of the facility after renovation and construction of the new wing was 86 beds. A purposive sample of 24 nursing home residents was identified through a review of quarterly resident assessment reports known as the nursing home Minimum Data Set 2.0 (MDS)[3]. The MDS is a federally mandated standardized assessment of each resident's functional medical, psychosocial, and cognitive status and is a part of the resident's permanent record. All Medicare/Medicaid certified nursing homes in the United States are required to perform MDS assessments upon the resident's admission to the nursing home, every 3 months after admission, and on any significant change in the resident's status.

Subjects were excluded if they were not residents of the nursing facility from July 1999 through June 2000, so that a 6-month pre and 6-month post comparison could be made. Twelve residents living at the facility in July 1999 were relocated to the newly constructed wing in January of 2001; they comprised the Intervention Group. The other 8 residents of the new wing were "new" admissions to the facility. Of the 66 remaining residents, only 12 were living in the facility between July of 1999 and June 2000, therefore, they comprised the Control Group. No random assignment to the intervention or control groups was possible as the decision to move residents into the new environment was made entirely by the nursing home administrators.

Instruments

The three instruments used in this study were derived from the MDS: the Cognitive Performance Scale (CPS),[4] the Behavioral Problems Scale (BPS), and the Activities of Daily Living-Long Form (ADL-LF)[5]. The Cognitive Performance Scale was modeled after the Mini-Mental State Examination[6] (MMSE) and the Test of Severe Impairment (TSI)[7]. The CPS is based on two direct measures of cognitive items (short-term memory and ability to make decisions) and three indirect measures of cognitive performance (comatose status, making oneself understood, and eating performance)[8]. The CPS is a single, hierarchical cognitive rating scale derived from a complicated set of scoring rules to assign nursing home

residents into 1 of 7 categories of cognitive impairment. The discrete scores of the CPS range from 0, indicating no cognitive impairment, to 6, indicating very severe cognitive impairment. The CPS has shown considerable agreement with the MMSE in the identification of cognitive impairment[9]. Both sensitivity and specificity measures for the CPS compared with the MMSE were .94 with 95% confidence intervals: .90. .98; and .87. .96 respectively.

The Behavioral Problems Scale (BPS) is an additive scale of five behavioral symptoms reported on the MDS: wandering, verbally abusive, physically abusive, socially inappropriate or disruptive, and resists care). Each behavioral item is coded according to the following scale: 0 (behavior not exhibited in last 7 days), 1 (behavior occurred 1 to 3 days in last 7 days), 2 (behavior occurred 4 to 6 days in last 7 days), or 3 (behavior of this type occurred daily). The BPS was found to have fair criterion validity when compared with other research instruments[10]. However, the initial BPS included only the first four behavioral items and no subsequent validity testing has been conducted since adding the item "resists care" to the MDS 2.0 version. It was believed that due to the small sample size in this study, a score of 15 would drastically skew the mean. Therefore, the behavioral symptoms were recoded into two discrete categories: 0 (behavior did not occur in last 7 days) or 1 (behavior did occur in last 7 days) and then summed for all 5 behaviors. The resulting range of BPS scores was 0 (no behavioral problems occurring) to 5 (severe behavioral problems occurring).

The MDS ADL-Long Form is a summary scale of seven selected ADL self-performance items: dressing, personal hygiene, toilet use, locomotion on the unit, transfer, bed mobility, and eating. Each ADL self-performance item is coded according to the following scale: 0 (independent), 1 (supervision), 2 (limited assistance), 3 (extensive assistance), 4 (total dependence), or 8 (activity did not occur). Following the procedure used in the development of the scale, a response of 8 (activity did not occur) was recoded to 4 (total dependence) before adding the seven ADL items[11]. The resulting scale ranged from 0 to 28. Lower ADL scores indicate residents who are more independent in the performance of the selected items, whereas higher ADL scores point to growing dependence upon nursing staff. The alpha (KR 20) measure of item internal consistency for the ADL-LF equals .94; the scale mean is 15.24, the median is 16.0, and the standard deviation is 9.25[12].

Data Collection

Written informed consent from the nursing home administrator was obtained before data were collected. Construction of the new wing began in the fall of 1998 and ended in early January 2000. Residents were gradually moved (over several weeks) into the new environment, while other residents were reassigned to rooms in the older wings. An exact moving date was difficult to determine from the chart review and staff members were unable to indicate when each resident was moved. Data collection was carried out from June 22 to July 18, 2000. A one-year follow up was conducted on February 17, 2001. The nursing home staff, following the guidelines published in the MDS protocol, filled out the MDS quarterly assessments and the author manually collected the data required from each MDS to calculate the three sub-scales. Data was collected at two intervals for all 24 subjects: 3-6 months before the move and 3-6 months after the move. A second post-move data collection 12 months following the move yielded data for only 9 subjects (62% attrition rate). The high attrition rate 12 months post move can be attributed to two factors: death/illness and unavailability of MDS data. Six residents died and one resident was discharged to the hospital between 6- and 12-months following the move. In addition, the administrators chose to suspend MDS quarterly assessments during December 2000 and February 2001due to a staffing shortage and the loss of the director of nursing. Therefore, data for eight subjects were not available 12 months following the move. At one-year following the move, there were only four observations in the Intervention Group and 5 observations in the Control Group. This facility was not required to complete MDS assessments on all residents because they do not receive Medicare/Medicaid reimbursement. Because individual resident data is recorded quarterly following the resident's admission, each resident's assessment was due at different intervals, therefore, the date of the MDS assessment closest to the 6-month pre, 6-month post, and 12-month post data collection time was used.

Some residents in the Control Group were moved out of their old rooms for renovation and then moved into a new room either next door or across the hall on the same wing. Room numbers recorded on the MDS quarterly assessments were used to determine if the assessment took place before the move or after the move. The assessment immediately prior to a room change was identified as the baseline MDS information (from 6/7/99 to 9/28/99) while the most recent assessment available in the summer of 2000 was identified as the 6-month post-move data (from 3/29/00 to 6/17/00). The most recent MDS

assessment available in February 2001 was identified as the 12-months post move data (from 9/28/00 to 2/7/01). As discussed earlier, data was available for only nine subject's 12-months post-move. Demographic information was also collected from the MDS for all 24 subjects including gender, age, race, occupation, education, and payment source.

Data Analysis

All data was entered into an Excel spreadsheet and verified by the author. SAS software (SAS Institute, Cary, North Carolina) was used for all data analyses. The intervention and control groups were compared on demographic variables including age, gender, marital status, and education level using the non-parametric Wilcoxon rank-sum test or a Chi-square test for homogeneity of proportions. In order to compare the groups relative to the CPS, BPS, or ADL scores, it is important to take into account the value of these scores at baseline. Consequently Cochran-Mantel-Haenszel methodology was used to allow an analysis stratifying on the baseline values. In essence this allows an analysis which accounts for possible differences in the scores at baseline.

Results

Of the 24 subjects, 5 were men (21%) and 19 were female (79%) (see Table 1). One hundred per cent of the subjects were white. Four subjects had never married, four were still married, and 16 were widowed (see Table 2). There were no significant differences between the intervention and control groups on gender, marital status, age, education level, pre-CPS, pre-BPS, or pre-ADL scores (see Table 3). The mean age for the Intervention Group was 86.65 and 90.65 for the Control Group (range 76 – 99 years of age). Education level is recorded in 8 categories on the MDS signifying the highest level of education obtained by the resident. Category 1 indicates no schooling; 2, an 8th grade education or less; 3, completion of 9th-11th grades; 4, a high school education; 5, technical or trade school; 6, some college education; 7, the completion of a bachelor's degree; and 8, a graduate degree. The mean (median) education level for Intervention and Control groups was 5.58 (5.0) and 5.41 (5.5), indicating that most had some education post high school.

Table 1: Comparison of Gender

Gender	Intervention Group	Control Group	Total
Male	2	3	5
Female	10	9	19
n	12	12	24

Table 2: Comparison of Marital Status

Marital Status	Intervention Group	Control Group	Total
Never married	1	3	4
Married	2	2	4
Widowed	9	7	16
n	12	12	24

Table 3: Comparison of Age, Education, & Baseline Variables

Baseline Variable	Intervention Group	Control Group	Wilcoxon test statistic	p-value
Age	86.65	90.65	-1.357	0.175 (NS)
Education	5.583	5.417	0.149	0.881 (NS)
Pre-CPS	3.166	3.416	-0.417	0.677 (NS)
Pre-BPS	0.666	0.916	-0.032	0.975 (NS)
Pre-ADL	16.416	16.000	0.435	0.664 (NS)

The main analysis of interest was to determine if residents living in the newly designed environment showed significant improvement in cognitive, behavioral, and functional performance 6-months following the move as compared to residents who remained in the existing environment. This analysis was performed by grouping subjects with similar baseline variables to form strata. We then compared the two groups using a stratified version of the Wilcoxon rank sum test by using the Cochran-Mantel-Haenszel methodology. There were no significant differences found between the two group's CPS (p-value 0.168) and BPS (p-value 0.364) scores 6-months post move, however, there were significant differences found at the .05 level of significance for the 6-months post ADL scores (p-value 0.016) (see Table 4).

Since higher ADL scores indicate increased dependence on staff for the performance of self-care, residents who were relocated to the new wing declined in self-performance whereas residents who remained in the same environment did not. A plot comparing the pre and post ADL scores by group illustrates these results (see Figure 1). The reference line in this graph corresponds to

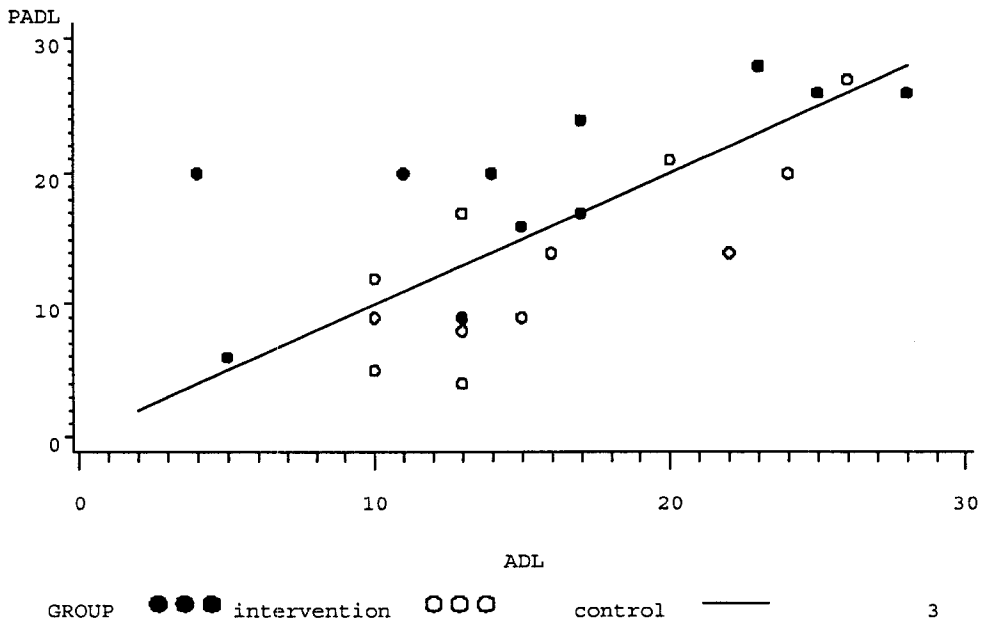
no change from baseline to 6-months score. Points above the line (which are mostly solid dots corresponding to the intervention group) represent subjects with higher (worse) scores at 6-months than at baseline. Similarly, points below the line (which are mostly open circles corresponding to the control group) represent subjects with lower (better) scores at 6-months than at baseline.

Table 4: Comparison of Groups at 6-Months Post-Move Using the CMH Method

Outcome Variable	Cochran Mantel Haenszel Statistic	p-value
6-months Post-CPS	1.898	0.168 (NS)
6-months Post-BPS	0.825	0.364 (NS)
6-months Post-ADL	5.806	0.016 *

- **p < .05**

Figure 1: Plot Comparing Pre and Post ADL Scores by Group



The one-year post move data was analyzed using the same Cochran-Mantel-Haenszel technique. No significant differences between the two groups were found for any of the three variables, when adjusting for the baseline variables. The p-values for 12 months post-move were 0.7655 for CPS scores, 0.1679 for BPS scores, and 0.2516 for ADL scores (see Table 5). As mentioned earlier, the attrition rate from 6-months post-move to 12-months post-move was 62%. In the analysis of the one-year

results, one must note the small number of observations for the Intervention (4 subjects) and Control Groups (5 subjects).

Table 5: Comparison of Groups 12-Months Post Move Using CMH Method

Outcome Variable	Cochran Mantel Haenszel Statistic	p-value
12-months Post-CPS	0.0890	0.7655 (NS)
12-months Post-BPS	1.9014	0.1679 (NS)
12-months Post-ADL	1.3145	0.2516 (NS)

Discussion

Confidence in the results of this study is impaired by the small sample size raising a concern for the validity and generalizability of the findings. The relative smaller power associated with small samples makes it difficult to detect any but relatively large differences in the outcome variables. This is especially true for the 1-year data. Unfortunately, this problem is typical in research regarding design and dementia and reflects the limited populations of residents at a single facility[13]. In a recent review of 71 empirical studies addressing therapeutic design environments for people with dementia, Day and colleagues found more than 30% of the studies used samples of fewer than 30 participants and many had less than 10 participants.

One strong point of this study was the use of a comparison group. The control group had many similarities with the intervention group at baseline and on demographic characteristics, therefore, one can infer that the groups were comparable at the start of the study. Another strength of the analysis was adjusting for any baseline differences between the groups regarding cognitive, behavioral, and functional behaviors. This was especially important considering a random assignment to the intervention and control groups was not possible.

Although an improved relationship between a specially designed environment and the cognitive, behavioral, and functional well being of the residents could not be proved there are several edifying points. First of all, the potential impact from individual design features can be buried by simultaneous changes in other arenas. During this study a new director of nursing was gained and lost. This change created various rippling effects impacting the delivery of nursing care as well as attitudes of nursing staff, residents,

and their families. No specialized training program was implemented along with the newly designed unit for residents with dementia. An inflexible attitude was reflected in one focus group interview with several staff members. In response to a question regarding any changes in care delivery, one staff member said "Just because you have a new person or you change someone's room, you don't change their level of care because they get the very best that we can possibly give them." Another staff member commented "The care shouldn't change at all just because they're in a different room or down the hall."

Secondly, there are intended and unintended consequences associated with renovation and relocation to a new specially designed unit. The intended consequences of improving cognitive orientation and memory, decreasing wandering and disruptive behavior, and supporting independent activities of daily living can be thwarted by the unintended consequences of mass confusion, noise, and over stimulation found during construction and moving. Residents with dementia need time to become acclimated to new surroundings and their functional abilities often decline during prolonged periods of stress and change.

Thirdly, the ability to measure resident outcomes responsive to change in the environment is difficult. Quality of life measurements are difficult to obtain. Behavioral problems, cognitive performance, and activities of daily living were used in this study as proxy measures for quality of life. The use of MDS data also poses some concern regarding the consistency and reliability of staff-reported data from the quarterly assessments. The information used in the calculation of CPS, BPS, and ADL scores must be interpreted with caution. These items may not be sensitive to environmental change or they may be responsive to other confounding factors. Reportedly, the ADL-LF is more sensitive in identifying residents whose ADL status is beginning to change because it can identify more minor, incremental changes than its hierarchical counterpart[14].

Finally, any positive changes associated with the environment can be obscured by the steady rate of decline seen with stages of dementia. High mortality rates are prevalent among studies that include residents with dementia[15]. Inferences about cause and effect cannot be drawn from a quasi-experimental study such as this. It is difficult to know whether the functional decline seen six months following relocation could be attributed to the newly designed environment or to the various other changes (i.e. short staffing or the disease process associated with dementia).

In conclusion, future research should address the complex nature of global environmental interventions by

attempting to clarify the particular characteristics of an effective design intervention. Additionally, changes in environmental design should be accompanied by programmatic changes that educate and empower staff members to provide for special needs of residents with dementia. More research is needed to confirm findings from existing research and explicate the therapeutic impact of design in dementia care settings.

References

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[2] Day, K., Carreon, D., & Stump, C. (2000). The therapeutic design of environments for people with dementia: A review of the empirical research. *The Gerontologist, 40*(4), 397-416.

[3] Frederiksen, K., Tariot, P., & DeJonghe, E. (1996). Minimum Data Set Plus (MDS+) scores compared with scores from five rating scales. *Journal of the American Geriatrics Society, 44*, 305-309.

[4] Morris, J., Fries, B., Mehr, D., Hawes, C., Phillips, C., Mor, V., & Lipsitz, L. (1994). MDS Cognitive Performance Scale. *Journal of Gerontology: Medical Sciences, 49*(4), M174-M182.

[5] Morris, J., Fries, B., & Morris, S. (1999). Scaling ADLs within the MDS. *Journal of Gerontology: Medical Sciences, 54A*(2), M546-M553.

[6] Folstein, M., Folstein, S., & McHugh, P. (1975. "Mini-mental state": A practical method for grading the cognitive state of patients for the clinician. *Journal of Psychiatric Research, 12*, 189-198.

[7] Albert, M. & Cohen, C. (1992). The test for severe impairment: An instrument for the assessment of patients with severe cognitive dysfunction. *Journal of the American Geriatrics Society, 40*, 449-453.

[8] Morris, J., Fries, B., Mehr, D., Hawes, C., Phillips, C., Mor, V., & Lipsitz, L. (1994). MDS Cognitive Performance Scale. *Journal of Gerontology: Medical Sciences, 49*(4), M174-M182.

[9] Hartmaier, S., Sloane, P., Guess, H., Koch, G., Mitchell, M. & Phillips, C. (1995). Validation of the Minimum Data Set Cognitive Performance Scale: Agreement with the Mini-Mental State Examination. *Journal of Gerontology: Medical Sciences, 50A*(2), M128-M133.

Hartmaier, S., Sloane, P., Guess, H., & Koch, G. (1994). The MDS Cognition Scale: A valid instrument for identifying and staging nursing home residents with dementia using the Minimum Data Set. *Journal of the American Geriatrics Society, 42*, 1173-1179.

Sloane, P., Mitchell, M., Preisser, J., Phillips, C., commander, C., & Burker, E. (1998). Environmental correlates of resident agitation in Alzheimer's Disease special care units. *Journal of the American Geriatrics Society, 46*, 862-869.

[10] Snowden, M., McCormack, W., Russo, J., Srebnik, D., Comtois, K., Bowen, J., Teri, L., & Larson, E. (1999). Validity and responsiveness of the Minimum Data Set. *Journal of the American Geriatrics Society, 47*, 1000-1004.

[11] Morris, J., Fries, B., & Morris, S. (1999). Scaling ADLs within the MDS. *Journal of Gerontology: Medical Sciences, 54A*(2), M546-M553.

[12] Morris, J., Fries, B., & Morris, S. (1999). Scaling ADLs within the MDS. *Journal of Gerontology: Medical Sciences*, *54A*(2), M546-M553.

[13] Day, K., Carreon, D., & Stump, C. (2000). The therapeutic design of environments for people with dementia: A review of the empirical research. *The Gerontologist*, *40*(4), 397-416.

[14] Morris, J., Fries, B., & Morris, S. (1999). Scaling ADLs within the MDS. *Journal of Gerontology: Medical Sciences*, *54A*(2), M546-M553.

[15] Day, K., Carreon, D., & Stump, C. (2000). The therapeutic design of environments for people with dementia: A review of the empirical research. *The Gerontologist*, *40*(4), 397-416.

Teresi, J., Holmes, D., Ory, M. (2000). Commentary: The therapeutic design of environments for people with dementia: Further reflections and recent findings from the National Institute on Aging collaborative studies of dementia special care units. *The Gerontologist*, *40*(4), 417-421.

Family Satisfaction

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There were three main goals for the family component of the Kingswood project: (1) to examine what family members consider important in the environmental design of nursing homes, (2) to assess family members' satisfaction with the Kingswood Health Center where their relatives lived, prior to versus after the design renovation, and (3) to explore the impact design interventions had on family members' feelings about and experiences with the Health Center.

Three types of data were collected to meet these goals. First, a mail survey was sent to persons who had a family member residing in the Health Center. The pre-renovation survey was done during March-April 1999, with the post-survey being completed in September 2000. The purpose of the survey was to gather family members' feelings of satisfaction with various dimensions of care and the environment at the Health Center, prior to versus after the design renovation. The survey used a validated tool from the field of nursing home research (The Family Perceptions of Care Tool) and obtained a highly acceptable response rates at both pre- (49 of 68= 72%) and post-renovation (49 of 81=60%). A subgroup of family members also was selected to complete personal interviews with the researchers at both pre and post-renovation. Of the 14 family members originally interviewed, approximately half had a resident family member with dementia, and the rest had relatively high-functioning resident family members. Post-renovation interviews were only repeated with 12 of these family members, as two were no longer available after the renovation.

The interviews focused on care and environment issues, giving family members a relatively unstructured format in which to share, in depth, their views about the facility. These interviews were designed to permit family members to raise the issues they considered most salient, rather than to assume that the environment would be important to them and therefore focus them on that issue. They were prompted for their views about the environment (e.g., *things they liked, things they did not like*) at the end of the interview if they had not already raised such issues earlier in the interview. Interviews lasted approximately

45-60 minutes at pre-renovation and about 30 minutes at post-renovation. They have been transcribed from tape and are currently being thematically coded. Finally, to consider whether design innovation altered the frequency of family visitation visitor sign-in data were collected from the visitor logs for approximately 6-7 weeks at both pre- and post-renovation. We consider the multiple sources of data we collected as valuable in strengthening the validity of our findings, as they include self-report as well as observational data, and data assessed both objectively through quantitative methods, as well as more subjectively through qualitative assessments of personal interviews.

To assess Goal 1 stated above, we used both the pre-renovation mail surveys and in-person interviews to explore what family members value and expect in a nursing home environment. Interestingly, the mail survey conducted prior to the Health Center renovation revealed that of four dimensions *(Total care, Nursing care, Relationships of staff, residents & family*, and *Environment*) assessed on the satisfaction tool, family members rated the environment the lowest (3.51 on a 5-point scale). To gain deeper understanding of their relative dissatisfaction with the pre-renovation environment, we combed through the qualitative data from the personal interviews and the main concerns that emerged were:

- **institutional feeling of the health center** (e.g., neutral colors, unattractive draperies & furnishings, hospital-like food). Some of those interviewed, however, expressed doubt that a nursing home can really feel "homelike."

- **lack of aesthetic appeal in the resident rooms** (in contrast to beautiful parlor and other parts of the CCRC)

- **privacy issues** (lack of privacy for visiting in rooms, problems keeping other residents out of one's room and things)

- **poorly matched roommate and dining assignments** (centered on mixing of residents with and without dementia)

While some of these issues can be addressed through physical renovation (e.g., the set-up of double rooms in a way to promote privacy, selection of wall-coverings, floorings), others require modifications in the social environment that may depend on policy and procedural changes initiated by administrative and nursing staff. For example, factors considered when pairing roommates for the double rooms, or policies involving privacy (keeping

doors open or shut) are not directly linked to physical environment changes. [A paper based on these findings was presented at the 1999 annual meeting of the Environmental Design Research Association, San Francisco.]

Once post-renovation survey data were in, we conducted analyses of the mail survey data to test for pre to post-renovation changes in family satisfaction. Surprisingly, significant changes were found on only 8 of 63 items on the Family Perceptions of Care tool, and nearly all of these changes were in the negative direction, with family being *more* satisfied at pre than post renovation. The only item pertaining to the environment that showed a significant change was that concerning "attractiveness of the décor" and this item did, however, change in the positive direction. When the four dimensions of the scale (noted above) were summed, only that related to Relationships between staff, residents, and family revealed significant pre- to post-renovation change, again in the negative direction.

Additional analyses showed no differences in ratings of the environment by family based on dementia status of their resident member. When we compared satisfaction ratings for families whose resident member moved to a newly constructed wing versus those who did not, more differences were revealed. Family members whose resident was residing on one of the new wings were *less* satisfied with activities provided for the resident, and their family member's use of self-care abilities. These families also reported more problems with odors than the other family members, but they had become more satisfied with their resident family members' ability to control the temperature in their own rooms. Relationships with staff, residents & family and physical care were less satisfying at post-renovation for families whose members had moved onto one of the newly built wings.

Our interpretation of these surprising findings is that there were possibly other changes occurring in the Health Center, at about the same time that the building was renovated, that may have altered care and staff-resident-family relationships. One change we are aware of involved a new director of nursing, who, according to comments from families, was less open and communicative with the resident families, and less responsive. Such a shift in personnel could have confounded our pre to post renovation comparisons. Another possibility, however, is that physical changes in the environment are not enough to provoke positive changes in care; that is, changes in the care situation may require accompanying modifications in policies and procedures aimed at altering the *social environment.* Finally, the fact that family with members on

the new wings felt less satisfied than other family members could be a response to adjusting to a new setting, or to the fact that many of the placements on the new wing were residents with more severe cognitive and functional impairments, which could create differences in the responses that families gave to these survey items. [These findings were reported at the annual meetings of the Gerontological Society of American, in Washington, D.C., in November, 2000.]

Currently, we are beginning the qualitative analyses of the post-renovation personal interviews that were conducted with 12 family members, all of whom had also been interviewed prior to renovation. Our focus in these analyses is the changes in the environment and delivery of care from pre-to-post renovation that family members identify and discuss. Please note that observations here are preliminary as the systematic coding of the interviews is not complete. For the most part, family members recognize the enhanced aesthetics of the facility and appreciate the more home-like, up-to-date, and cheerful physical environment. Such comments as:

> *"It's just more attractive. It's brighter, it's more colorful, it's newer. . . I just think it's more uplifting. . . I try to point those things out to my sister, who may not be as tuned in to that kind of thing. . ."* [#40]

Yet, several still felt that it is impossible for the facility to feel home-like. As one family member said:

> *"I don't know if any place like this can really be homelike. Unless a person is able to take care of themselves and move themselves around, and really keep their room the way they want to, I think it becomes institutionalized."* #41]

When asked what their resident family members have said or thought about these changes, however, nearly all said that it means very little to them. According to one family member, her very alert sister doesn't have much reaction to the changes:

> *"when you're in a facility like this, and you're not able to get up and walk around, and you're old. What difference does it make?"* [#35]

Not surprisingly, similar comments were more often given by those families whose resident member suffers from dementia. From the point of view of family members, they attribute essentially no effects of the environmental

changes on their experience with visiting (including frequency, how they spend their time, where they spend their time, or feelings about visiting). Several noted that the place doesn't have bad odors anymore and is more pleasant looking, but they still find the most discomfort and displeasure with visiting to be centered on seeing older persons who are physically challenged and cognitively disoriented.

Some of the concerns family had with the renovations focused on increased costs for the rooms and their perceptions that physical appearance of the facility may have taken priority over the quality of care delivered to residents. The Health Center, like many facilities, deals almost constantly with high staff turnover and understaffing due to currently low unemployment rates. Some family members see this as the major challenge to their resident member getting consistent, high quality care:

> *"the people who actually give the care--there's just not quite enough of them, ever. Nor are they as well trained as they ought to be. . . you're paying minimum wage, and for most of them. . . that leaves a little to be desired." [#10]*

With high turnover they worry that staff don't know the unique needs of their family members or have time to develop a real concern for their personal well-being. More than one family member who was interviewed expressed the desire that some of the money used for renovation could have alternatively been used to increase staff salaries and staffing in general, thereby hopefully reducing turnover:

> "(it's) *fine to have a fabulous facility, but there needs to be a balance with staff salaries and upgrading positions."* [#26]

The belief is that this will have a greater impact on care than changes in the physical environment.

Finally, a few family members discussed the idea of changing the social environment. They discussed how the administration had planned for these physical renovations to be accompanied by an Edenization approach that emphasizes a more personal, social approach to resident care. This social part of the plan had not yet been implemented to the degree that family members desired, which led some to conclude that any goals that had been set had not yet materialized:

*"when the remodeling was finished we were supposed to transition to a new plan for dementia patients--Edenizing. . .(*but) *they weren't ready to go into it because staff wasn't ready. . . I was expecting a greater number of hours per patient ratio and therefore more attention. . . and a better trained staff in dementia treatment and that just wasn't pushed!"* [#5].

Later in the interview this same family member added that the resident can come first in any environment--you don't need to change the setting for that!

We still have to analyze visitation data, but at least from the perspective of these twelve family members, we don't anticipate significant changes in the level of visiting in response to the environmental renovation. [These current analyses will become part of a paper submitted for presentation at the 2001 Gerontological Society of America meetings to be held in Chicago in November.]

In sum, our exploration of how family members view the physical environment of nursing home facilities and respond to changes in the environment reveals mixed findings. Although family members appreciate efforts to enhance the physical features and design of nursing home facilities, they do not appear to consider physical environment as the top priority in their rating a facility's quality or in what they look for in a facility. Not surprisingly, family members concentrate first and foremost on staffing and care issues that are going to impinge more directly on the treatment of their resident relative. When family members perceive environmental upgrades as a trade-off to maintaining or obtaining quality care, they seem less positive about effort to enhance physical space. As more than one family member noted, while a beautiful facility may sell more beds initially, that is not what will keep families satisfied with the facility over the long-term. Finally, these results suggest that environmental renovation has to include modification to the social setting, as well as the physical setting, if care is to be positively affected and nursing home settings are to become less institutional and more home-like and personalized.

Staff Response

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In the process of soliciting staff response to the design interventions in Kingswood we conducted Focus Group Interviews with the staff, personal interviews with the executive staff and observations of the interactions of the staff with residents and families in the renovated settings. This report includes quotes from the focus group interviews with the staff and the interviews with the executive staff.

Focus Group with Staff

Focus group interviews are widely used in qualitative research methods. Advantages of focus group interviews include efficient qualitative data collection, checks and balances on the different opinions, and opportunities to explore emergent issues in an interactive process[1].

Two interviews were conducted with the staff of Kingswood Manor to gather information in regard to aspects of the physical environment of the renovated environment. The first interviews were conducted right after the completion of the construction of the new wings on the north side of the building. The second set of interviews was conducted six months after the relocation. Images of various spaces before and after the modifications were projected in a slide presentation during the interviews in order to draw attention of the focus group to specific environmental aspects of the nursing home.

Staff reaction was elicited on salient dimensions of quality of life of the residents (e.g., privacy, social interaction) as well as care-giving issues (e.g., ease/difficulty in showering a resident). These environmental aspects have been validated by widely used physical environment assessment instruments used in previous studies, such as the Multiphasic Environmental Assessment Procedure[2], and the Professional Environmental Assessment Protocol[3]. The focus group interviews were tape-recorded and transcribed. Content analysis of the transcribed data was done to extract themes. Some of the major issues are reviewed in this chapter. The themes are organized here according to the various spaces.

The Nurse Station before the renovation

Nurses' Work Area

Before the renovation, the nurses' station was located at the intersection of major circulation routes in the health center (see floor plans in the Appendix). The central location of the nurse station and its physical presence was a powerful symbol of the institution.

Staff members had mixed feelings about the relocation of the nurses' station. They thought that the relocation had reduced the staff-resident hierarchy, had made the work more organized, and had given easier access to the medication room. Some staff members commented that the reduced visual access to the hallways from the nurses' area is not a drawback as long as there were other monitoring devices.

They thought that the counter height of the nurses' area could have been reduced to provide residents in wheelchairs better access and communication with the staff behind the counter.

The Nurse Station after the renovation

"To me, the way the nurses' station was before it was too big, too cluttered, unprofessional looking in the back because they stuck things all over the place and all. It was spread out. The way the new nurses station is, it is a brighter, more professional appearance".

"[before] the med (medication) room ... was on the left hand side, and now everything is right there with them. So I think that's a big change for them. You know, the med room's right next to you. There's a flow that goes with how, your charts, your medications, everything, in a smaller area".

"...With this area being in the center of everything it's like the nurses station was the center focus and the residents were secondary".

"I don't think it's important to have that much visual control as long as you have another adequate monitoring system so that they can hear when the call lights go off and things like this. If you have the right P.A. system, the visual is not all that important".

"I think that would open it up more. Then the residents' wheelchairs would be more approachable. As it is, some of them have to kind of go like this when they're trying to see the nurse".

Aviary Area

The general reaction was that replacing the prominent nurses' station with the aviary has reduced the institutional ambiance in the health center. The perception was that an aviary is less institutional than a nurses station, and replacing the large nurses' station in that central location of the health center has resulted in less institutional feel. The birds and their activities seem to be attracting residents to sit around the aviary. Some residents became fond of the birds. Staff felt that having the residents sitting around the aviary gives opportunity for easier surveillance because the nurses' station is close by.

The Aviary Area

However, some staff members were concerned that the residents' interaction with the aviary constituted a passive behavior. They claimed that there is a need for more programmed or structured activity in association with the aviary in order to improve residents' engagement. This latter aspect identifies the gap between environmental modifications and expected corresponding activities for residents with dementia. The design principles that guided the environmental changes were based on a social model of care in which a homelike environmental setting would provide residential context and aid in small group activities, social interaction and enhance residents' choice and control. At the time of the interviews the facility was going through a transitional phase. New staff members were hired and went through training to engage residents with dementia in meaningful activities. It is hoped that the architectural setting will be better utilized by the trained staff to realize it's intended potential.

> *"We have some residents that sit there the greater part of the day and they talk about the different little birds. But then we're still failing to the effect that it's staff convenience for them to still sit them in those locations rather than get them involved in another activity. We're still working on the fact that just sitting in front of the bird cage is not ample activity. There's other things that we need to do....Sometimes to just sit the residents there, it's easier to keep track of them so to speak".*

> *"...it gives the residents more space. There are more things for them to do. It's really not an inconvenience having it where it is. I think it's better to give them more space because we're kind of out of the way.... It makes it more like it's their territory instead of ours".*

Dining Area

The general feeling was that the new, smaller dining rooms were more homelike in contrast to the central, large dining area before the renovation. The staff expressed satisfaction with the smaller dining areas stressing the less "disruptive" behaviors of some residents, and the more manageable group size during mealtime. In addition, staff members felt that due to smaller group size and reduced behavioral problems; there was less noise, which in turn reduced agitated expressions. Quality of lighting was perceived as a major improvement. Also, staff members made comments on the ease of food handling and serving process due to the close proximity of dining and pantry/kitchen areas.

The dining room in the new wing

"It was like a big mess hall...And now since they've been broken up into smaller dining rooms, I've noticed that now they're eating better and the hot food right there with them. The food is hot when we take it out to them and I think this is much better for them because it's smaller groups. And I noticed that they are eating better".

".... the noise level is different because it's like a chain reaction. When one behavior starts then it sets off another person and another person. And the smaller areas have kind of eliminated those reactions.

"I think that's a big change. I think it's a lot brighter. A lot brighter.... It looks much nicer than this picture. The window treatments are better. I think they appreciate it. I think they noticed the new change".

"The cook would serve up and I'd be on the other side to pass the trays to the residents as he served it up....And I dish the food up now. The aides are in there to help me just take the food from the steam table and the hot plate and carry it right out to the table".

Service window in one of the kitchens after the renovation

Resident's Room

In general, staff was positive about the new residents' rooms and their residential appeal. Specifically, they appreciated the carpet in the rooms, layout of the semi-private rooms and the option of showering in the "bathrooms." The staff felt very positively about the privacy provided to both residents in a shared room. They had

Resident room in the new wing

observed that families are using the resident rooms more freely during their visits with the increased sense of privacy. Also, there were positive comments about the bay windows that have provided opportunities for displaying meaningful personal possessions like photographs, dolls, vases, and various artifacts. The residents are able to personalize their space to maintain the sense of control and autonomy in their rooms and in turn preserve their sense of selves.

"I think they're great....they have more room for the resident...They're prettier. One thing, I mean the carpet is beautiful, it's nice, it's harder for the residents that are able to wheel themselves on the carpet. Also, the bathrooms are real nice. It's nice that they have their own shower. But the problem with the showers is the seats when they put them in there, there's like a hole in the bottom".

"I like the new design because the fact that, like she said, it does give them more privacy. It kind of defines their space a little bit better. It is a much more home like environment than the rooms were as they existed prior to the remodeling".

"When family comes in and things, they feel like they don't have the sense that they can carry on a conversation with their loved one without the other party being involved in that conversation. So the new design does give them that aspect that they feel like, oh I can go in and have a conversation with mom or dad and I'm not interfering with another".

"There was one resident I spoke with. She absolutely loved it. She's got all her little dolls set up there and up on top. She's just happy being able to sit in her chair and relax and look out the window to see what's going on".

"I've heard a lot of positive comments also about the windows and the way they're arranged".

Pre-renovation: Typical double-occupancy resident's room.

Shower space in residents' restroom

Although the availability of a shower area in the residents' bathrooms was very much appreciated by the staff, there were few problematic aspects in the construction and finishes of the showers. Staff commented on the difficulty they had to face in washing the bottoms of the residents because the shower seats were not designed

appropriately. The residents were sometimes taken to the central showering area, defeating the intended function of the private shower room in the residents' own bathrooms.

Also, due to inappropriate floor slope the water from the shower drains sometimes into the main bathroom space, making the area difficult to use. There were also comments in regard to the need for additional storage space for residents' toiletries in the bathrooms. The shelf space was adequate for one resident but not enough for two residents. Staff also pointed out the inappropriate location of the call light in the bathrooms. However, it was recognized that some of these problematic aspects can be remedied to take full advantage of maintaining dignity and privacy of the residents by showering them in their own rooms.

> *"It's much easier to take them down the hall, put them in the shower chair. It's easier on us and safer for them. Cut a whole in the seat and have a bar that goes on the side of it that you can swing out and just lock into place when they're sitting".*

> *"It would work out better. I mean, if you can bathe them in their room it is much better because then it lets up on the congestion in the shower area because everybody's trying to get your showers in and we have 6-8 showers a day, we wait in line to get yours in. So it would be easier to do it in their room. And I'm sure the residents like that better. It's more of a home feeling. They don't have to take their clothes and everything down the hall. I mean, it would be better for them".*

> *"I think it's a lot better. Just so the residents are able to have their privacy. You know, some of them get roommates that they don't really like or they end up talking all night. I know some of the double rooms have partitions that they can pull. You know, they have family over and they're not interrupting the other resident.*

> *"The only thing in the new area, there are shelves on the bathroom wall. Well, with some of our residents with the two residents in a room, the shelf is only big enough for like one person. And if they added another shelf, that would kind of make it ideal for them. And sometimes they fight over the space of that one little shelf to put the denture cups and things like that.*

"...There's much more room so it's easier to get in and out of when it takes more than one person to transfer people...If you have a bigger person, a bigger man, it's very difficult when they require a 2 or 3 person to assist them to the toilet. With both of these bars on the side, it's very, very difficult to get in and out, especially if we have to use the lift. It's a virtual impossibility. But in the newer bathrooms, there's more space and you can accomplish that".

Tub Area

The tub area was a major improvement over the traditional tub before the remodeling. Staff observations pointed out that many residents prefer a bath over shower and they are taking advantage of the new tub. The new tub provided easy access and egress. Other positive aspects of the new tub included the opportunity of soaking the lower body in the hot water instead of getting cold in the shower, and the flexibility of tilting the tub for comfort.

The Bathtub after the renovation

"The new tub is great. I mean, you can move it this way and that way. It's pretty easy for them to get into it. You know, they get into it and you can tilt it up and they can lean back and it has little jets. So it helps out a lot".

"Some like to have bubble baths. They can be able to sit in there and soak cause in the shower, even though the water's hot, they get cold so quick and just sitting there in that warm water is very relaxing for them".

Hallways

The renovated hallways in the existing wings had addition of carpets, residential lighting and warmer colors. The staff felt that the renovated hallways were giving homelike appearance as opposed to the institutional hallways before the renovation. They commented on the warm ambiance created by the carpet and lighting. They also observed the improved acoustics in the hallways due to carpeting and the reduced congestion of carts and other items. They pointed out that the handrails are better than the previous ones.

One of the hallways after the renovation

"The lighting is better. It brightens up. When you come through the double doors downstairs on the first floor from the assisted living site... people

comment on how much brighter it was with the change in the lighting and ceiling tiles and things. And the warmth of how the colors in the carpet make it feel. It just seems that that carpet they have down now is a lot easier to maintain than the tile was. It just seems a lot more cleaner than what the rooms used to be".

"I would think to prefer to see a design like the new wing has. This is the residents' home that gives them a more home like appearance. This [hallway before the renovation] looks like a straight hospital. Very sterile, never-ending corridor and things like this. And actually with the new design, with the rooms...you have the central area and then your rooms around it. You have the capabilities for much better interaction with the residents and activities and etc. that you can carry on. Where the long corridors, you don't have that. I mean, you're just walking up and down. There's not space to do anything, really, other than just travel".

"I would like to see more color... I would like to see more plants and more brighter colors and more busy. I little more busy. Like a game room. The aviary is nice, but again we went from the sitting around the nurse's station to sitting around the aviary area".

New Cluster

The new cluster was designed based on residential and social model of care. The focus group staff observed that the central living/activity area with the surrounding rooms provided opportunities for natural social interaction. They contrasted the cluster design with the old part of the health center -- with long hallways not conducive for social activities. During the time of the focus group interviews the facility was in the process of reorganization in staffing pattern with the goal that appropriate staff groups for the new cluster would be better able to conduct more programmed activities in the central activity space taking advantage of the design.

A Common living room in the new cluster

"This is the residents' home that gives them a more home like appearance. ..with the new design, with the rooms...you have the central area and then your rooms around it.

"Well, when we're broken up into smaller groups they will have less residents and we will have more staff. So it will balance out in the end so it is not like an added burden or anything like that but it will give them the opportunity to get more into the social roles and out of the medical model".

Interviews with the Executive Staff

Interviews with the executive staff took place after the renovation and the relocation of the residents. The followings are exerts from the interviews with the Chief of operation and the CEO of Kingswood.

We asked the Chief of Operations to describe to what degree the renovations met his expectations.

A*: "I think that at this point it's meeting the expectations. I certainly never had expectations of a brand new facility and all of the pod design that I would have loved to have in a new facility. But as far as expectations for a remodeled facility, I think that at least from a physical plan standpoint, we pretty much got what we were after. I am pleasantly surprised with the way that the halls now feel. They feel a little more open with the windows to the dining rooms. You can look into the dining rooms and it kind of takes out the feeling of a long, continuous hall.*

I think that with the pods' physical plan, we are, pretty much getting to where we wanted to be. The carpeting of the rooms, the lightening up of the color of the walls, the change in the lighting, the pantries for each unit, I think that all these have helped to make it a better setting.

I know that our food-service staff is a little bit more impressed. They certainly didn't like the way we were trying to create simultaneous dining. They fought us through a bunch of meetings, but now that it's finished, I think some of them are starting to perceive this as not such a bad thing after all.

Certainly the new area, the north wing, is what we were really trying to achieve.

I think that from a staff perspective and from a resident and family perspective, what we've already achieved is a better feeling of a homelike setting. Certainly it's an institution that was converted, but we've already come a long way from where we

were before, which was an institutional environment.

We had no real commons areas for the residents to congregate. The addition of the aviary in the central area has already enhanced the homelike feeling. We find that the families are sitting around with the residents. They're watching the birds and they talk with the residents at the same time. We've created a lot of nooks where people can go. Before we only had the dining room and/or the front parlor. Because of the creation of the new dining area, the aviary areas, the little activities area in the new addition, and the common area back in the new addition, we've created a lot of little places where people can go to get away. So, I think we're getting very close to what we were trying to do.

The other piece that we wanted to do was to "Eadenize" the facility. The plants, the animals and the birds and also the change in our employee attitudes and the way they serve people are improved. It has not been an easy process of education. It seems like everyday we have meetings trying to get the staff to understand that "No, it's not on your schedule anymore, it's more on a resident's schedule, and what they want." It is not simple.

I think that's the next big piece for this facility. We're in a three month training program now. We're moving towards our first neighborhood. The neighborhood is like a small community within this larger community of health care. And the staff is being trained specifically for that neighborhood. They will staff their own neighborhood. Those residents would be theirs from now until they leave Kingswood. And we're starting to put that first neighborhood together and throughout the remainder of this year we'll probably try to accomplish at least another two neighborhoods. Behind each and every neighborhood is this concept of creating common space and a feeling of a home. Creating a sense of a family with our staff and the residents and their families, and creating an environment that feels good not only for the resident but also for the employees."

Q: Do you think the new environment meets the needs of people with dementia?

A: "Um, I have mixed emotions on that

particular question. And the reason is that Kingswood, because it is a CCRC, tends to get the residents who come into our health center a little older than in other facilities. Mainly because we are able to maintain them in their home environments, their apartments or wherever they're living, a lot longer because we do supply an awful lot of support systems and services. By the time they come to the health center they are older, they are frail and with dementia. As a rule, 60 percent of our residents suffer from some kind of dementia.

The challenge is already present, and has been for some time. Our old policy was to take care of people wherever they were at. That worked fairly well for us, but we do have a lot of families today who do not like it. They are not excited by the fact that those people are in the same wing as their mother or their father. As recently as last week, we had a family move out to another facility because there was a person who wandered into their mother's room and did this quite frequently. That upset them enough that they moved out last week. My response to them was that the person with dementia has as much right to the room as their mother. While we offered to do some things, that wasn't good enough. They did not want to be in the same section as this other person who wanders.

They did not like the fact that this person wanders during the day and also comes in sometimes at night. It scared their mother. And they could not accept the fact that a lot of people with dementia are harmless. They just did not want to accept that, and they wanted separate accommodations, separated from people with dementia or Alzheimer's.

So, that is still a concern for me. I don't think we could ever create enough beds for that type of people. But, we are creating a whole different programming mechanism for people with dementia in each individual neighborhood within the facility. So, to answer part of your question, yes the units that we've developed and the programming for people with Alzheimer's will benefit those people greatly.

We are currently reviewing plans to create whole new walking gardens for the residents with dementia that will be located near the lower floor unit. That certainly will enhance the quality of life for those residents along with the programming that we will do as part of that. For those residents with

some form of dementia who are in other parts of the facility, they will be receiving programming but certainly not at the same level as those people within that unit. So I have some mixed emotions about how well it will work, but I think it's kind of like the trial and error. You put the programs in and then you see what you can do to adjust."

Q: Did you have any comments from the families regarding the environment?

A: *"The families' comments have been certainly positive. Number one is the carpeting under your feet as opposed to the cold tiles. This makes you feel like it's more of a home and it feels warmer. The other thing that we've noticed is the noise level change. The carpeting has absorbed the noise, or just because we put carpeting we've actually created some sound deadening as part of that process. That's noticeable.*

The other thing, we had a fall, I think it was either last week or the week before, and I actually was probably a hundred feet from where this fall occurred. The resident fell straight over onto the floor. Well, the carpeting we've put in is not just a jute deck but it actually has a minimal amount of rubber backed padding underneath it. The resident basically ended up with a skin abrasion as opposed to a split head which is exactly what they would have had had they hit it in the old days in that same area.

The other thing that the families have commented on was that there is more of a feeling of warmth because of the colors that were used. It's kind of a peachy/beige on the wall plus a light base on the bottom. The chair rails are light. The baseboards are light. The lighting was changed in all of our ceilings and it's a much warmer light than the old florescent light that we had in there. And that's all been noticed. The families have noticed it.

The other thing that's been noticed is room configuration in the new addition. We created a bay window effect in those rooms with an area where people can set pictures or knick-knacks or whatever. And we created that same effect over the window. And as you go into these rooms you'll see that effect. And that makes it feel a lot homier in a heartbeat. And most of the people who see that really love that setting. They are kind of

attracted to the window before they're attracted to a lot of other things.

So I think residents, overall, and also families have responded favorably to the choice of color. We are going to extend those colors back into our administrative areas and through our existing area. Partly, as we're able to afford it, we're going to change all of the colors to those lighter colors and bring that same feel back into that area."

Q: How do you, personally feel about the changes?

A: *"I think that as I walk through there I feel a change, personally, and I've been trying to note my own reaction for this as I go. I personally feel that change of being able to see to a certain degree down that hallway out to the outside. Before the modifications, it was just a long corridor. Those dining rooms, even with the glass windows that the fire marshal made us put in, still give us a sense of being able to look out and break up that hall.*

Certainly, the north addition where we've added the private rooms, is probably the ultimate design we would have all preferred to have all over the facility. But I think we've come a long way. We certainly are indebted to you for the help that we received from you. Not only from the architectural standpoint, but also from the interior design standpoint. I would not have envisioned the dining rooms to look as nice as they do with the vaulted ceilings and the recessed lighting. It makes it feel much homier and much more conducive to dining as opposed to the past feeding. People who are not in our industry probably don't understand that. But there is a big difference between dining and just feeding like livestock; going in and just eating whatever there is in front of them. That's what we were trying to change in those dining areas.

We've also changed the way we provide medications. We no longer provide medications with meals at all. We do it after meals, or before if it's something that has to be given with a meal. We've now fixed it so the dining is actually dining. We've changed that process as a result of all these smaller dining areas. That's kind of an added benefit, I guess."

We asked the CEO of Kingswood whether he thinks the Board accomplished their objectives?

A: *" Yes, I think we did. The facility has certainly made a dramatic change. The corridors now look lighter than they were before. Because of the color selection and the wood trims that were used, and the carpets that were suggested the place opened up... it is brighter, it appears to be whiter. So, that part is a tremendous improvement.*

The relocation of the central nurses' station to the side and replacing it with aviaries has made a big difference in the appearance. It creates a welcoming kind of environment. The addition to the north, where we were able to create everything that we wanted; the private rooms, the innovative designed semi-private rooms, and the parlor; the type of dining room that we wanted just made the whole area exceptional. I think that all those factors contributed to the point that we were able to market both floors of that wing very easily, very quickly, and at the upper end of the price range."

Q: Did you change the care provision as a result of the new setting?

A: *"We still have to make the adjustment. We have not been able to implement the neighborhoods as far as staffing is concerned for several reasons. One, we had originally planned to create different neighborhoods based around specific needs for care. But by the time we finished building the new wings and remodeling the health center, the demand was so great that we were in full occupancy, and we weren't able to move people around to the different neighborhoods, because families did not want that loved one to be moved. And the loved one did not want to be moved. And then there are some State requirements as far as the movement could go.*

The third thing was that we had a lot of new staff that were hired. They didn't understand the neighborhood concept, either because they had never seen it before, or because we did a poor job of explaining it. And it's probably a combination of both. So we got bogged down in not making that move.

We also had a staff turnover, which was a big issue. We had a new Director of Nursing come on board, so that represented one kind of change. For a period of time, our wages were not competitive in the area, so we were losing staff and the kind of staff we were attracting was not a good staff. So we got to a point where we could increase the wages and be competitive, and then we began attracting better staff. But they were not aware of what we were trying to accomplish because they were new enough and we hadn't had time to tell them. So, I think all of that slowed us down."

Q: How do you think the families reacted to the changes?

A: *"I think the families appreciate what was done. Unfortunately, during this period of time, our level of care fell. I think that the drop in the level of care influenced part of the reaction of the families to the remodeling. They were saying: "Well, if it had to be either or, I wish they would have put the money in the care." Essentially, raising staff wages to attract better people. What we wanted to do was accomplish both. We are now in a process of responding to the situation. The administrator of the health center has implemented several new ways with work force by engaging teams to look at how we can make the transition to neighborhoods and how we can improve the level of care. We've also made a change in the leadership in the nursing staff. We haven't found a replacement. We have terminated the former director.*

We have a lot of training to do here because staff has been trained over the years, actually over the history of the industry in the way "I get the patient up, I give the patient a bath, I make the bed, I clean the bedpans. I take them down to an activity room. But I don't sit down and have a cup of coffee with them. I don't sit down and play checkers with them. I don't sit down and read a book with them. I don't sit down and talk to them. I'll get fired! The boss will think I'm lazy!" So, I think what we've discovered is that there's a lot more to this new wing. You have to change the care provision and you cannot do all the same work that you've always done."

Q: Is there anything else you want to discuss?

A: *" I'm pleased with the way it turned out. The only problems that we face are that we have a long*

ways to go to make the transition from the old medical model of design and the medical model of care to the social model of design and social model of care. That's going to take even more time than we thought it was going to take. And it's going to take some changing in the attitudes of everybody from administrative staff clear down to the person who is actually delivering the service. It's not just one department. It's every department. You know, food services and even housekeeping."

References

[1] Morgan, D.L. (1998). *The focus group guidebook.* Thousand Oaks, CA: Sage Publications.
Patton, M. Q. (1990). *Qualitative evaluation and research methods.* Thousand Oaks, CA: Sage Publications.

[2] Moos, R.H., & Lemke, S. (1994). *Group residences for older adults.* New York: Oxford University Press.

[3] Weisman, G., Lawton, M.P., Calkins, M., Norris-Baker, L., & Sloane, P. (1996).. *Professional Environmental Assessment Protocol.* Unpublished manuscript, University of Wisconsin-Milwaukee, Institute on Aging & Environment, Milwaukee.

Conclusions and Implications

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In conclusion we want to return to the main research question of this study: *Do design interventions induce desirable outcomes in residents with dementia, their families and the staff of a nursing home?* Answering this question, as one might expect, is not a simple task even when the answer is broken up according to the original research questions. Due to the nature of the subject matter, the characteristics of the setting are intertwined with issues of policy, lack of special programs, problems with balancing staff workload, and the overall task of maintaining residents throughout the progression of the disease.

Clearly, the new residential setting with its homelike attributes helped to change the patterns of space usage by the residents. Evidence of the changes may be found in the findings of the Behavioral Mapping and the Professional Environmental Assessment Protocol (PEAP). Other indications for the change in resident interaction with the environment are found in quotations from the staff focus group. In most cases, the changes have been positive and seemed to justify the investment in the modification of the environment.

Physical and spatial elements are critical components in people's relationships to settings. The configuration of the space and its attributes can provide residents with opportunities for independent action, control, privacy, and socialization. However, because of the policies in this particular facility, many residents move to the health center when they are too frail to benefit from the special features that are offered there for people with dementia. Furthermore, the health center houses residents with dementing illnesses as well as residents who suffer from combinations of other chronic diseases.

The interviews we attempted to conduct with the residents are, perhaps, indicative to this situation. Prior to the renovation we provided disposable cameras to several residents of the facility. We asked them to take pictures of the most significant attributes of their environment. The pictures were expected to serve as stimulants for the interviews regarding the physical attributes of the setting. However, when we tried to interview the residents, we

were unsuccessful in our communication attempts with the majority of them. Some of them could not remember why they took the pictures. Others could not or did not want to talk, and many were too frail to discuss their environments and provide us with meaningful insights. As a result, we discontinued the interview process and focused, instead, on the observational data gathering.

The results of the behavioral mapping indicated that some of the environmental interventions had positive outcomes. The special programs could not be followed to the same degree because the facility went through some difficulties in staffing and programming at the time when the research was conducted. Some of the adjustment problems were discussed in the interviews with the CEO and the Chief of operation. These difficulties influenced our ability to detect significant changes in resident outcomes; we could not identify changes in processes of care that lessen aggressive behavior or increased levels of activity participation by residents with dementia. And unfortunately our investigations could not link the environmental features in the new setting to outcomes, such as cognitive or functional performance of the residents or reduced levels of agitation. But, based on the interviews with families, staff and the executive staff, it looks like the overall safety and the residents' quality of life were improved as a result of the environmental modifications.

The interdisciplinary approach that guided this research proved to be fruitful, despite the challenges that are associated with this kind of cooperation. The team plans to expand the research in more nursing homes and Special Care Units for people with dementia. The outcomes of this study were presented in several locations. Most notably in the annual meeting of the Environmental Design Research Association (EDRA) in San Francisco in 2000 and in the Gerontological Society of America (GSA) in Washington D.C. in 2000. Another presentation is scheduled for the GSA in Chicago on November 2001 and a paper to the Interior Design Educators Council (IDEC) in Santa-Fe 2002 was submitted. The team plans to submit papers to the *Journal of Housing for the Elderly* and other journals associated with Alzheimer's research.

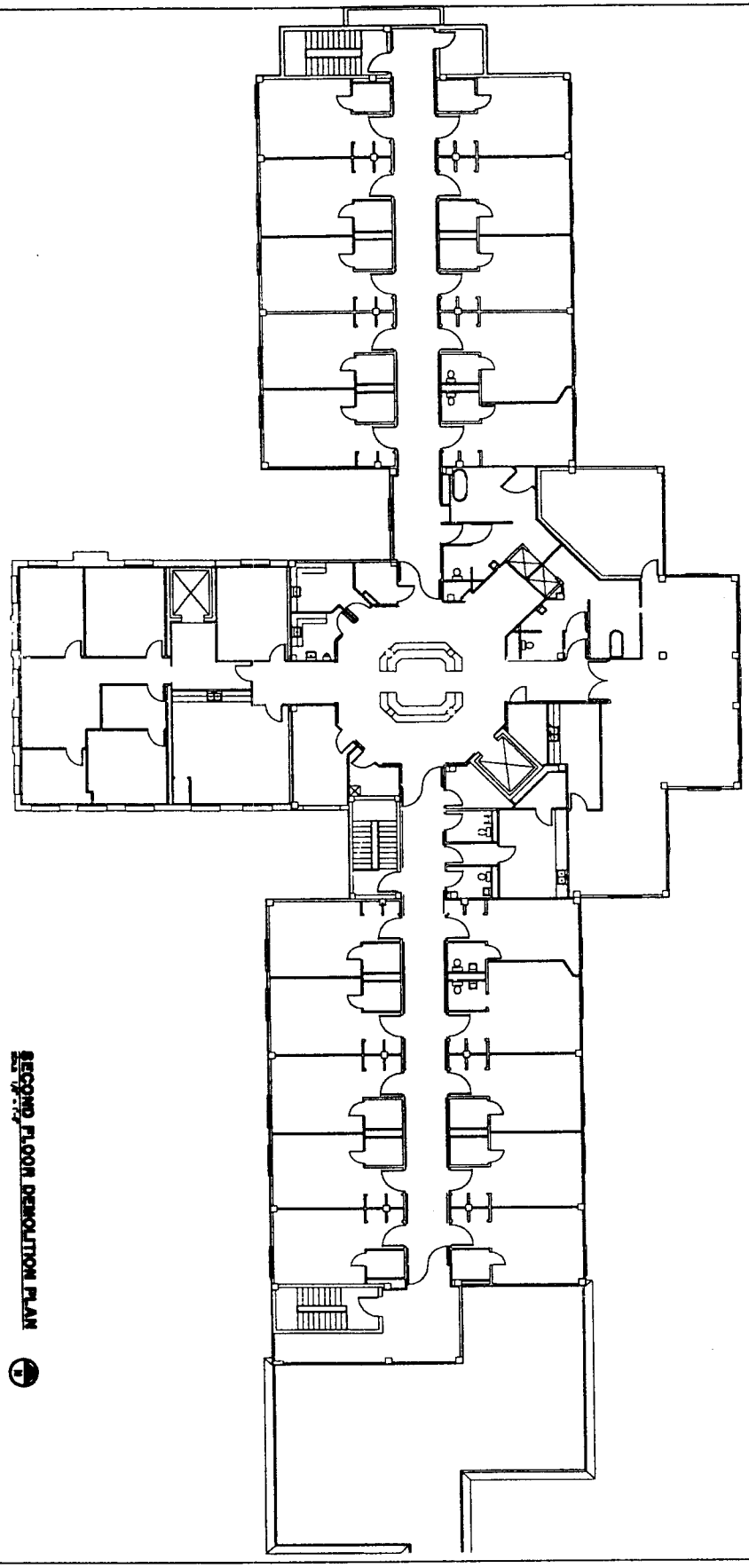
The need to establish state policies regarding standards for SCUs motivated the State of Missouri to enact in 1999 a provision for its Division of Aging to establish and implement demonstration projects which will provide state-of-the-art care facilities for individuals with Alzheimer's disease. Sixteen care facilities throughout the state were selected in August 2000 to become pilot projects. The chosen facilities were instructed to use the *social model* rather than the institutional, *medical model* and to design and implement a residential environment,

which promotes the maintenance of residents' social abilities through daily and frequent opportunities for socialization and appropriate activities. The residential environment shall be designed and utilized in such a way as to reflect the individual preferences of residents and to provide as much independence and opportunities for choices throughout a day as possible.

Our team has proposed to conduct an interdisciplinary study in which all sixteen new facilities in Missouri will be evaluated for three years to examine the impact of a complex group of organizational, programmatic, and environmental factors on resident health and social experience, staff performance, and family caregiver satisfaction. These demonstration projects provide a unique opportunity to conduct an action research that will help to gain knowledge from the early stages of the development through the occupancy stage and finally the post-occupancy evaluation. Funding for the project is still pending.

With the increased interest and awareness of the special needs in the growing population of people with dementia, and the particular requirements for Special Care Units, we believe in the need to study these facilities to inform practitioners and policy makers about how better to organize specialized dementia care.

Appendix A



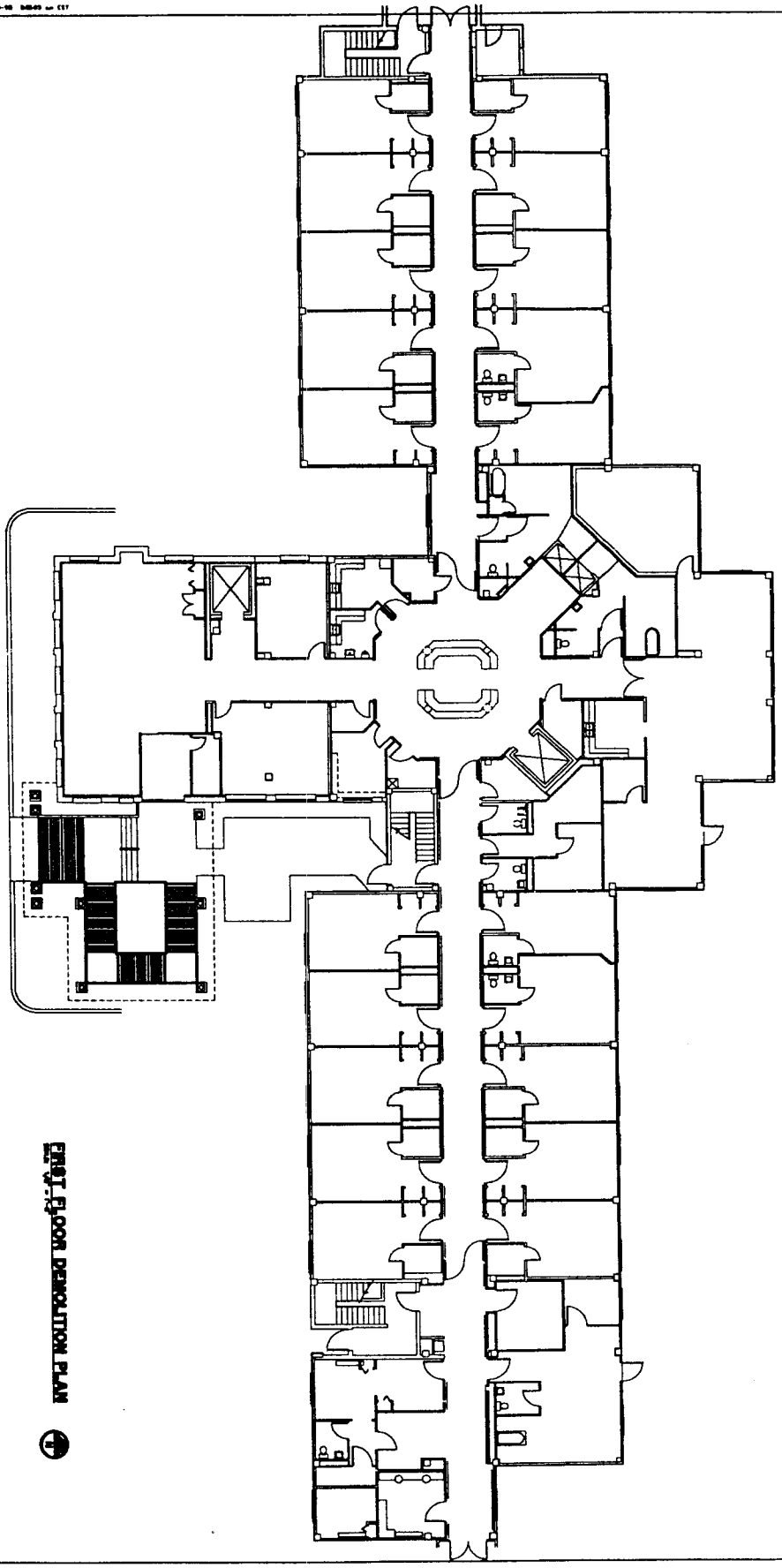
SECOND FLOOR DEMOLITION PLAN

KINGSWOOD ELEMENT #2

HEALTH CENTER ADDITION
AND RENOVATION

10000 WORNALL ROAD, KANSAS CITY, MISSOURI

GBA GEORGE BUTLER ASSOCIATES, INC.
Engineers • Architects
Kansas • Missouri • Illinois



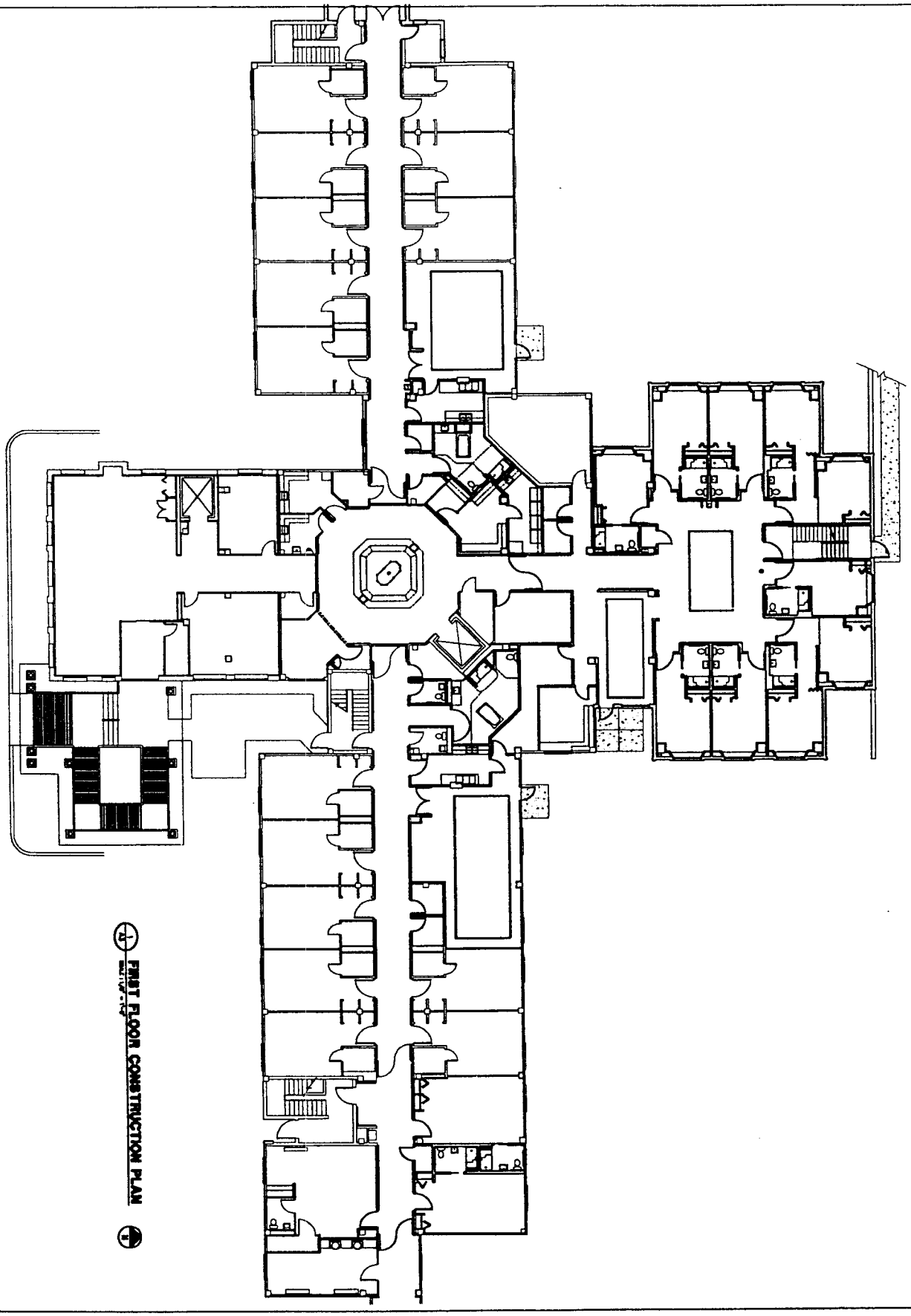
FIRST FLOOR DEMOLITION PLAN

KINGSWOOD ELEMENT #2

HEALTH CENTER ADDITION
AND RENOVATION

10000 WORNALL ROAD, KANSAS CITY, MISSOURI

GBA



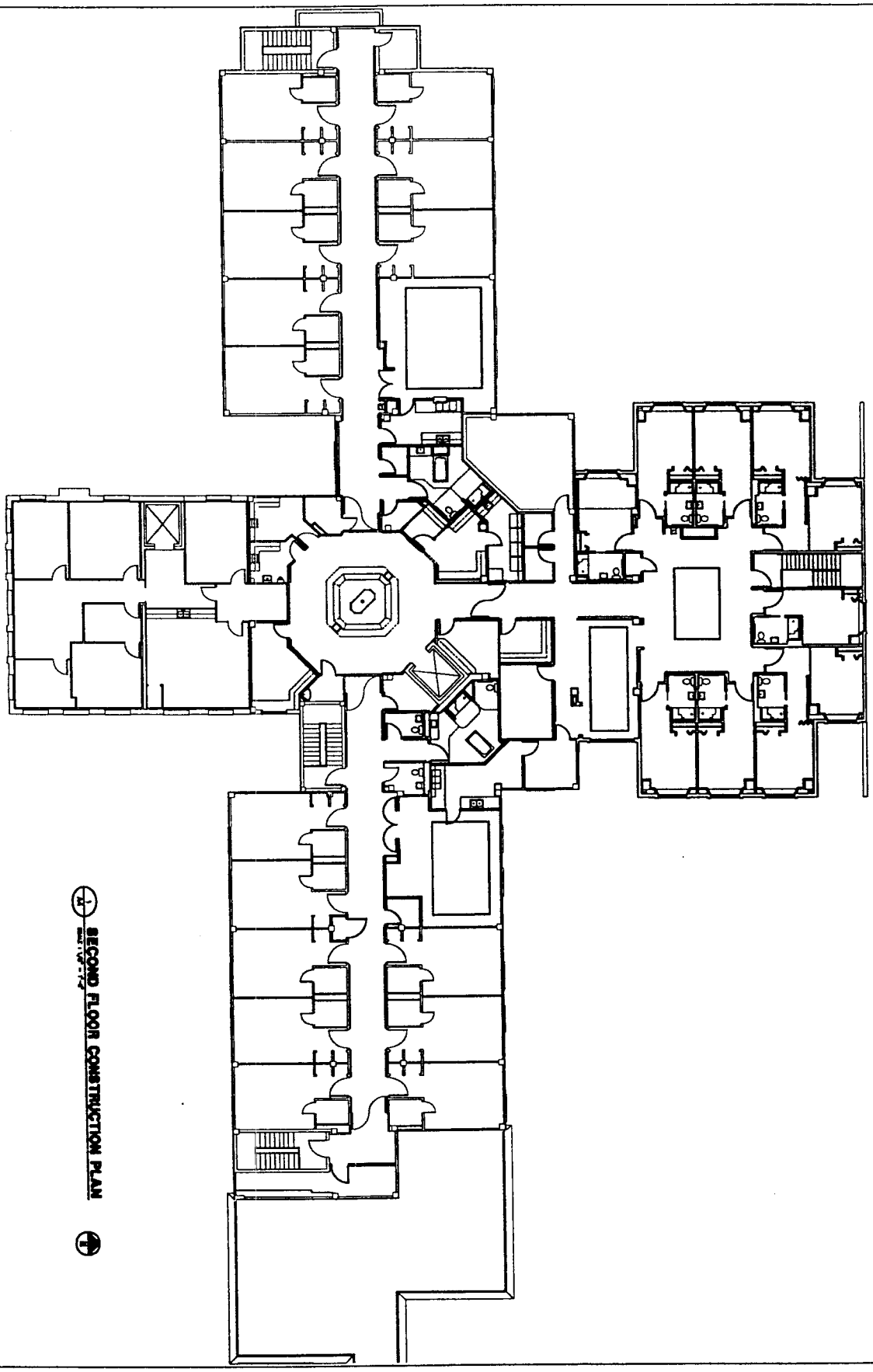
FIRST FLOOR CONSTRUCTION PLAN

KINGSWOOD ELEMENT #2

HEALTH CENTER ADDITION
AND RENOVATION

10000 WORNALL ROAD, KANSAS CITY, MISSOURI

GBA



SECOND FLOOR CONSTRUCTION PLAN

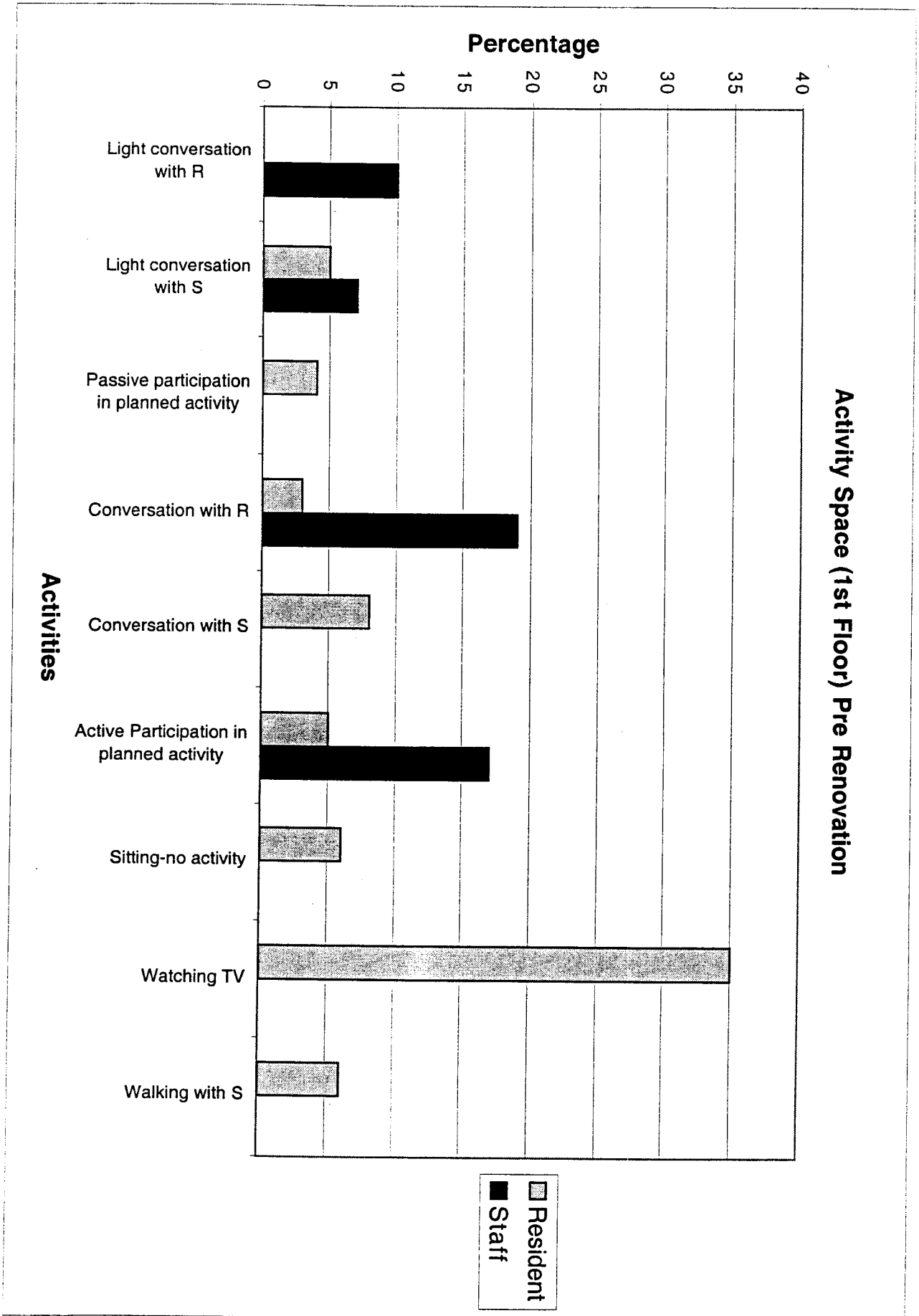
KINGSWOOD ELEMENT #2

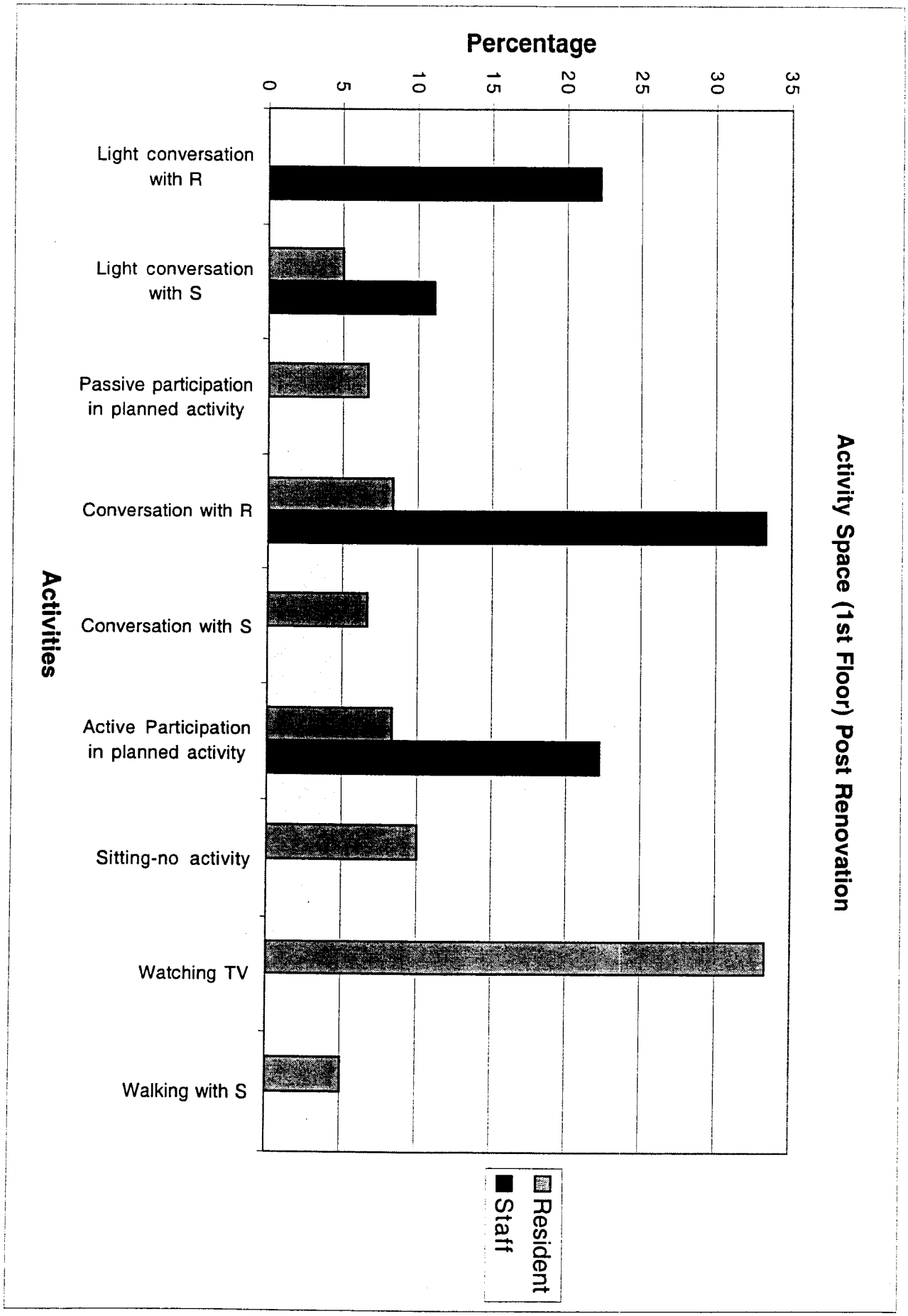
HEALTH CENTER ADDITION
AND RENOVATION

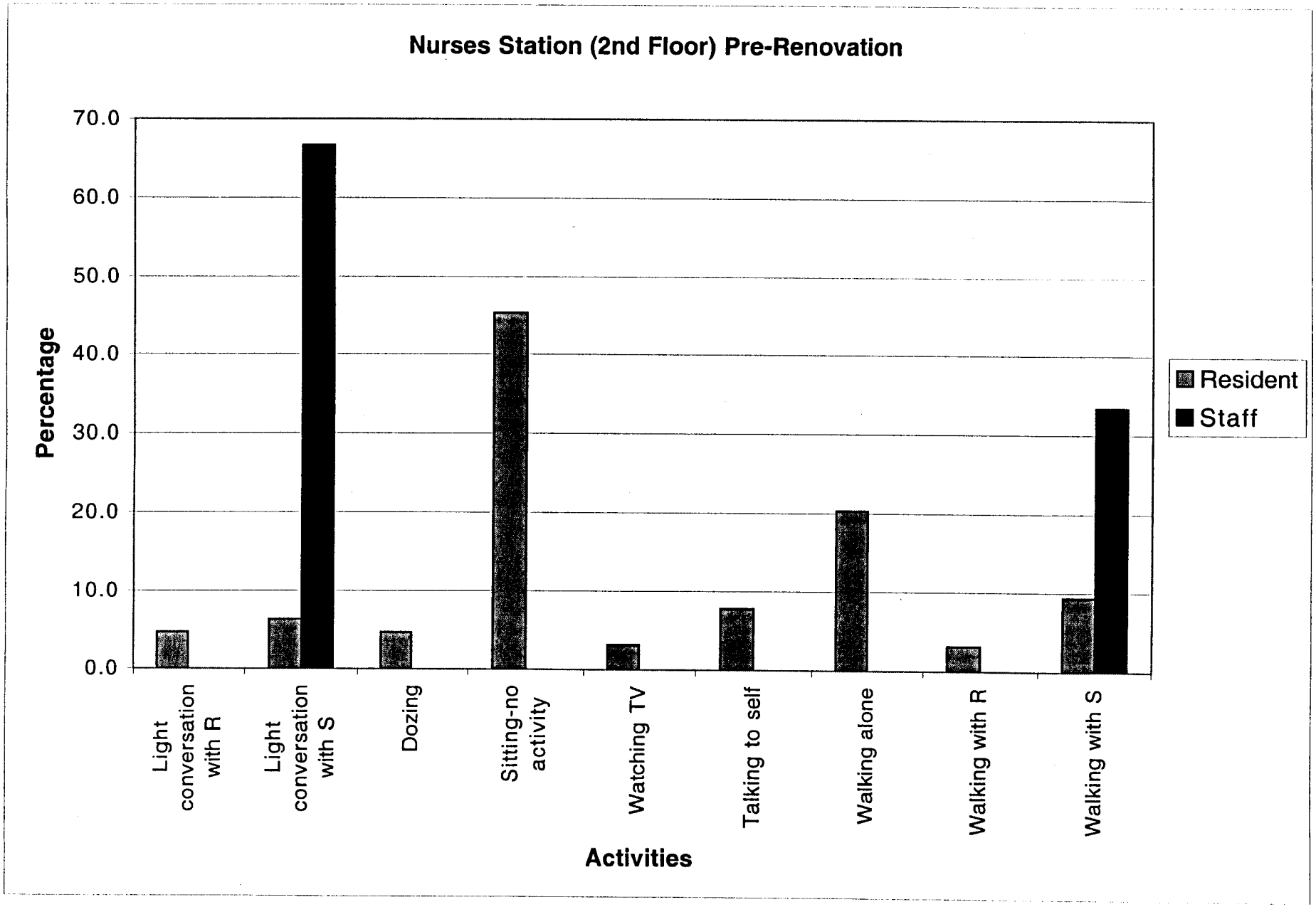
10000 WORNALL ROAD, KANSAS CITY, MISSOURI

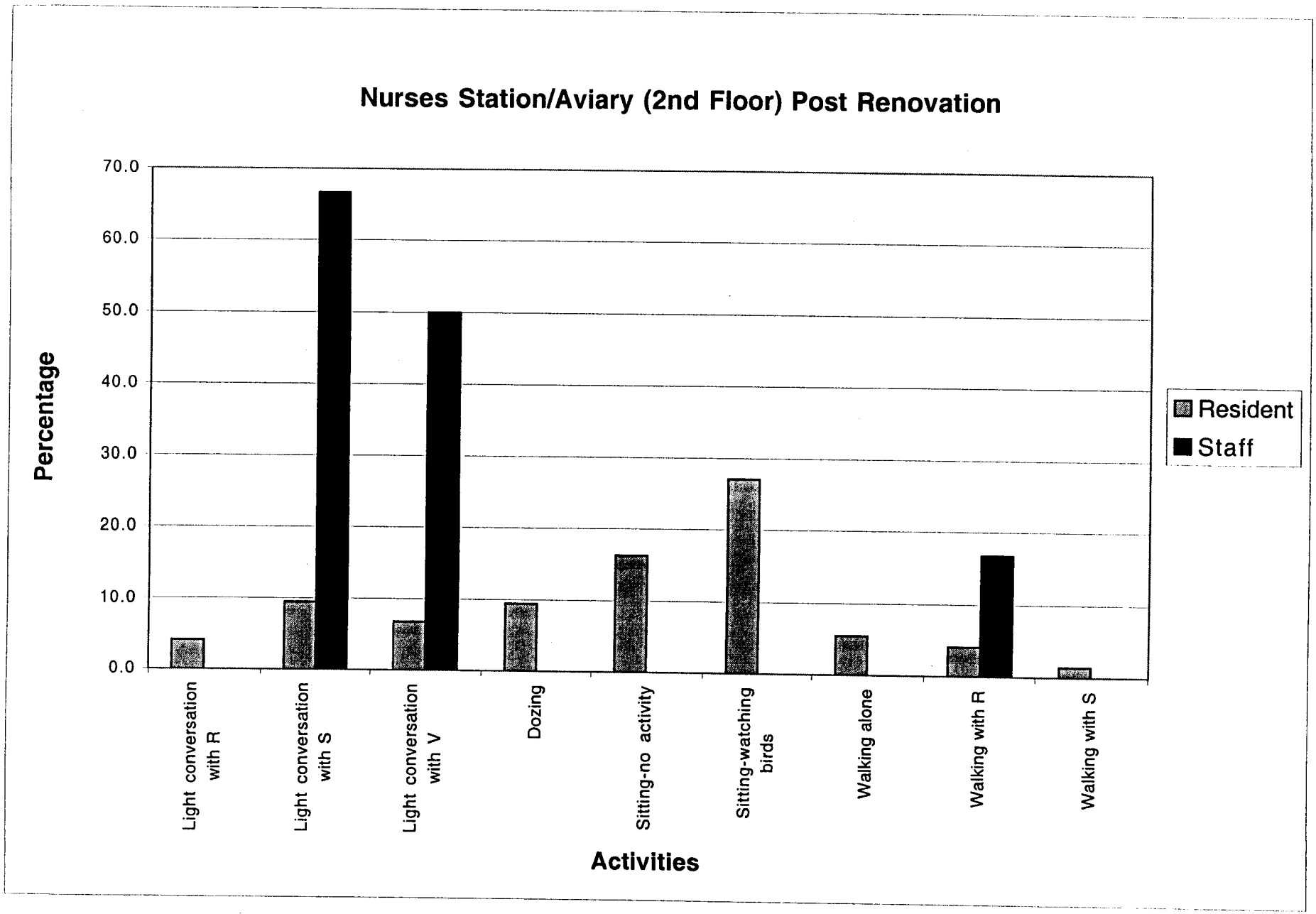
GBA

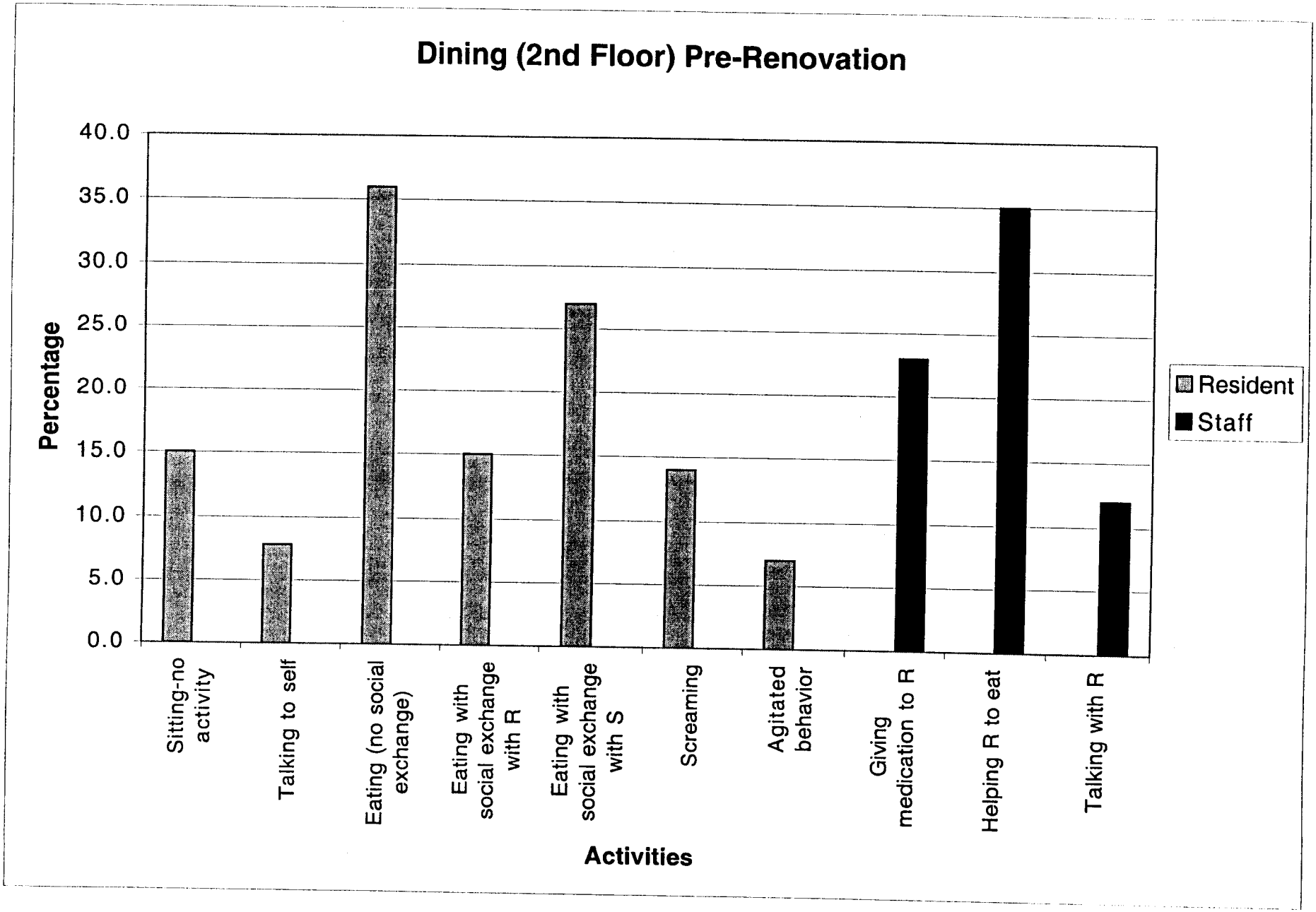
Appendix B

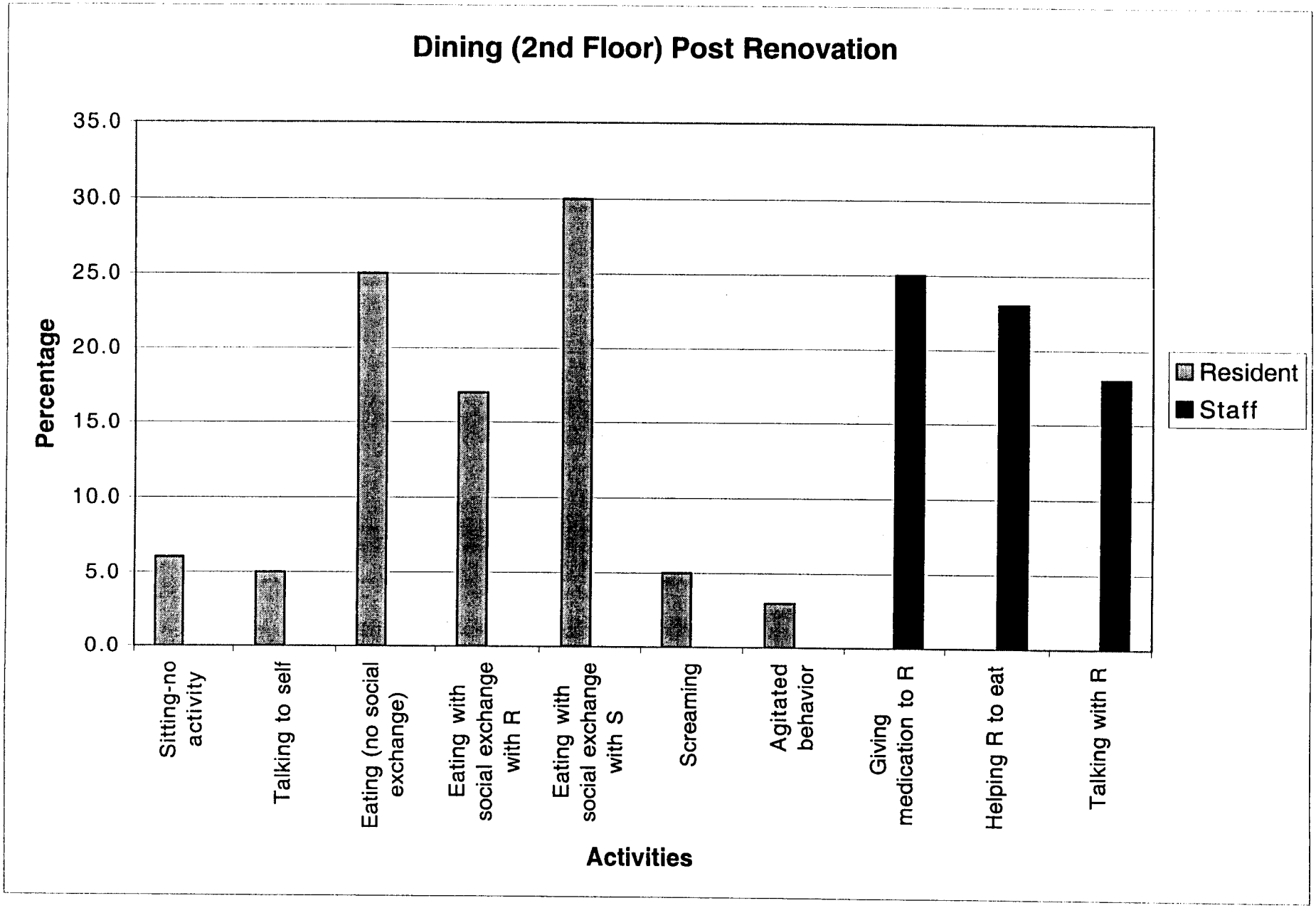

Activity Space (1st Floor) Pre Renovation
Percentage
0
5
10
15
20
25
30
35
40
Activities
Light conversation with R
Light conversation with S
Passive participation in planned activity
Conversation with R
Conversation with S
Active Participation in planned activity
Sitting-no activity
Watching TV
Walking with S
Resident
Staff


Activity Space (1st Floor) Post Renovation
Percentage
0
5
10
15
20
25
30
35
Activities
Light conversation with R
Light conversation with S
Passive participation in planned activity
Conversation with R
Conversation with S
Active Participation in planned activity
Sitting-no activity
Watching TV
Walking with S
Resident
Staff


Nurses Station (2nd Floor) Pre-Renovation
Percentage
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
Light conversation with R
Light conversation with S
Dozing
Sitting-no activity
Watching TV
Talking to self
Walking alone
Walking with R
Walking with S
Activities
Resident
Staff


Nurses Station/Aviary (2nd Floor) Post Renovation
Percentage
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
Light conversation with R
Light conversation with S
Light conversation with V
Dozing
Sitting-no activity
Sitting-watching birds
Walking alone
Walking with R
Walking with S
Activities
Resident
Staff

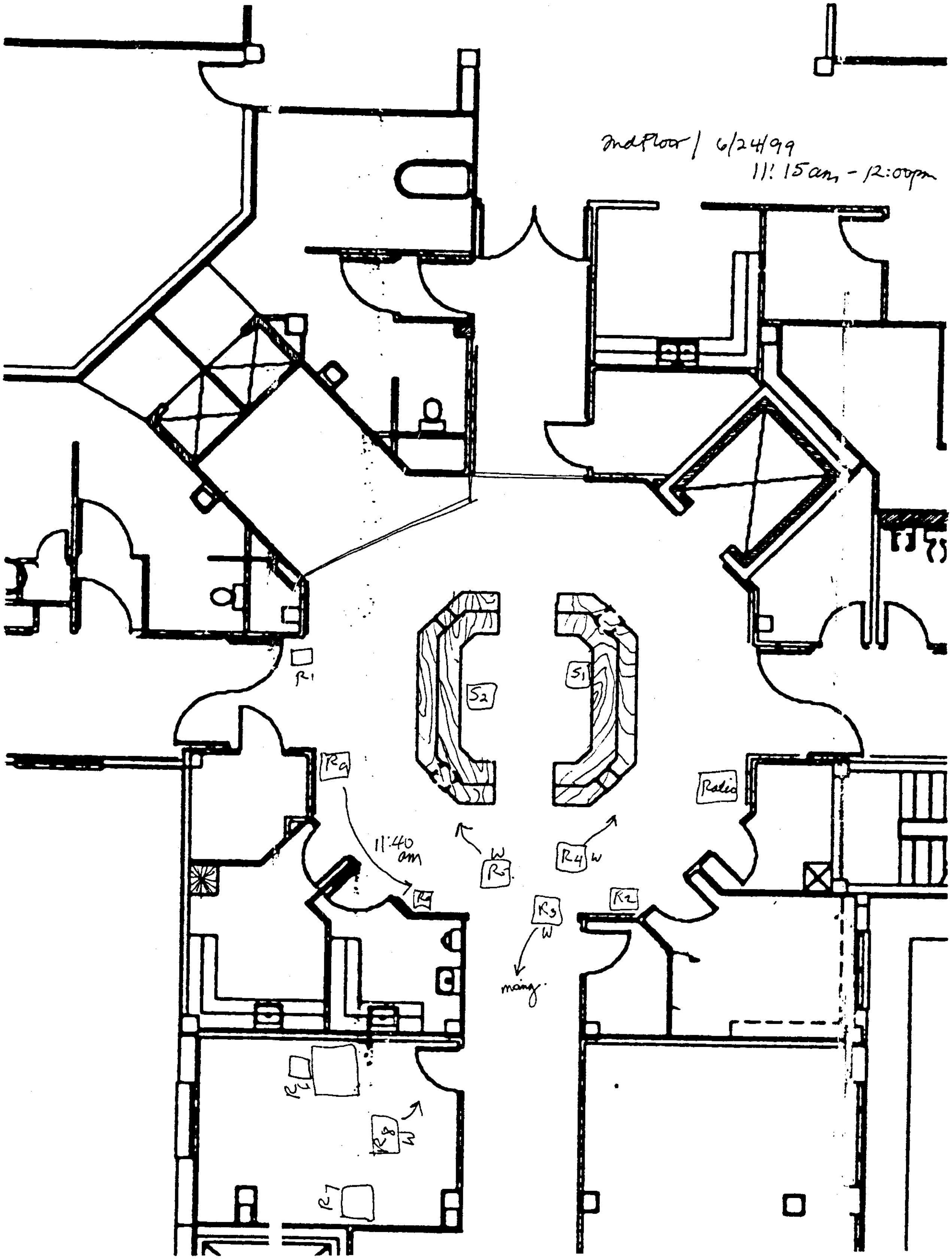

Dining (2nd Floor) Pre-Renovation
Percentage
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Sitting-no activity
Talking to self
Eating (no social exchange)
Eating with social exchange with R
Eating with social exchange with S
Screaming
Agitated behavior
Giving medication to R
Helping R to eat
Talking with R
Activities
Resident
Staff


Dining (2nd Floor) Post Renovation
Percentage
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Sitting-no activity
Talking to self
Eating (no social exchange)
Eating with social exchange with R
Eating with social exchange with S
Screaming
Agitated behavior
Giving medication to R
Helping R to eat
Talking with R
Activities
Resident
Staff

Activities	Residents															Staff				
	1	2	3	4	5	6	7	8	10	11	12	13	14	15	16	S1	S2	S3	S4	S5
Low Level Social Interaction (conversation upto 3 minutes)																				
Acknowledging																				
Light conversation w/R																				
Light conversation w/S																				
Light conversation w/V																				
Passive participation in planned activity																				
High Level Social Interaction (conversation sustained over 3 minutes)																				
Conversation w/ R																				
Conversation w/ S																				
Conversation w/ V																				
Active participation in planned activity																				
Other Activities																				
Sleeping																				
Dozing																				
Sitting-no activity																				
Standing-no activity																				
Sitting-solo activity																				
Standing-solo activity																				
Watching TV																				
Talking to self																				
Walking alone																				
Walking w/ R																				
Walking w/ S																				
Walking w/ V																				
Eating (no social exchange)																				
Eating with social exchange w/R																				
Eating with social exchange w/S																				
Eating with social exchange w/V																				
Screaming																				
Agitated behavior																				

Location: _____ Date: _____ Time: _____

Comments: _____


2nd Floor / 6/24/99
11:15am - 12:00pm
R1
S2
S1
R9
11:40 am
W
R5
R4 W
R3
W
R2
R6
R8
W
R7