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This study contrasts rates of mortality and of relocation to higher levels of care as well as trajectories of cognitive status, functional ability, depression, and subjective health of residents of an assisted living facility with those of a nursing home. Data were collected from medical records and face-to-face interviews with 158 residents at baseline and 4, 8, and 12 months later. All participants lived on a single long-term care campus. Logistic regression revealed that facility was not a significant predictor of mortality or relocations due to declining health. A repeated measures analysis of variance found that outcomes for people living in the two facilities did not change at different rates. These consistent findings suggest that although the assisted living and nursing home environments claim to have different philosophies of care, health outcome patterns for people living in the two environments were similar.

Key Words: Assisted living, Nursing homes, Mortality, Relocation

The Effect of Long-Term Care Environments on Health Outcomes

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Assisted living facilities have become an increasingly popular form of long-term care. Developed in response to the growing need for an intermediate level of structured care and marketed toward seniors who require more care than is usually provided at home, but less care than is traditionally provided in a nursing home, the number of assisted living facilities in this country has grown exponentially in the past decade. Although assisted living facilities are often promoted as cost-effective environments for older people who need help and cannot live on their own (Fonda, Maddox, Clipp, & Reardon, 1996; Morton, 1995), little is known about how people living in assisted living environments actually fare when compared with those who live in nursing homes. Assisted living facilities are frequently billed as promoting independence and health maintenance, with the implication that their morbidity and mortality rates may be lower than those in nursing homes. Whether assisted living facilities are actually superior to nursing homes in terms of outcomes such as mortality and morbidity remains a matter of debate, however. Nyman (1994), for example, maintains that research has not yet demonstrated that assisted living residents exhibit slower decline in physical and cognitive abilities than nursing home residents. In addition, the shift away from the medical model exemplified by assisted living facilities could result in "deteriorated health conditions and increased morbidity and mortality of residents," (p. 7) because assisted living facilities are not as highly regulated as nursing homes (Kane & Wilson, 1993). In cases in which this results in fewer and less qualified staff, there may be detrimental effects on frail older people. The analyses that follow contrast the mortality rates and need for higher levels of care as well as the trajectories of cognitive status, depression, functional ability, and subjective health of people residing in an assisted living facility with those of people living in a traditional nursing home.

The concept of assisted living facilities is both old and new. Although policy makers and social planners for years accepted the rather simplistic dichotomy between independent living and long-term care institutionalization, in 1963 congregate housing surfaced as a combination of communal living and services for low-income, frail elderly people. The early congregate housing environments were positioned between the more protective environments of skilled and intermediate care facilities and largely independent environments such as retirement communities, private houses, and apartments. They were developed in response to a trend of gradually declining levels of physical, functional, and mental ability of many older people. However, the majority of these facilities did not have the capacity to meet the ever-increasing declines experienced by many of their residents. The new assisted living facilities of the 1990s, providing a combination of housing and services, fall under the umbrella of congregate housing, yet serve a more frail group of people than did congregate living facilities of the past.

Freed from many of the regulations that constrain nursing homes, assisted living facilities are positioned to move away from the "medical model" of care, toward a new paradigm for providing care to frail older persons. Assisted living is a model encompassing housing with services provided differently than in a

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nursing home. Such facilities seek to market themselves as noninstitutional, homelike environments with a philosophy of maximizing autonomy, choice, privacy, well-being, independence, and continuation of normal lifestyles. Yet, some critics fear that the move from the medical model could be accompanied by declining health and increased mortality of residents because of the possibility of less supervision and less qualified staff. Advocates for older disabled people are concerned that this could result in a stripped-down, less well-staffed version of traditional nursing home care without the compensating amenities and benefits.

Literature regarding assisted living facilities is scant, with much of it describing the philosophy of assisted living (Kalymun, 1990; Mollica, Ladd, Dietsche, Wilson, & Ryther, 1992) or the architectural and interior design of such facilities (e.g., Regnier, Hamilton, & Yatabe, 1991). Although to date there have been no studies focusing on adaptation to life in assisted living facilities, several studies have evaluated the effects of earlier forms of congregate housing on residents. Research by Sherwood, Morris, and Ruchlin (1986) concluded that congregate housing had been effective in preventing unnecessary institutionalization and was a cost-effective alternative to institutional care. Several other investigations have confirmed the positive effects of planned housing for elderly adults using a variety of measures, including housing satisfaction, general life satisfaction, involvement in community and on-site activities, and the quality of sociobehavioral relations (Carp, 1976; Hinrichsen, 1985; Lawton, 1982; Lawton & Cohen, 1974; Sherman, 1985; Sherwood, Greer, & Morris, 1979).

The effect of environment is important to examine in light of the relationship between the environment and a person's "competence" in areas such as health and social role performance, as described by the "environmental docility" hypothesis (Lawton & Simon, 1968). According to this hypothesis, as people age and their competence declines, more of their behavior may be attributable to environmental, as opposed to personal, characteristics (Lawton & Nahemow, 1973). This hypothesis and the finding by Kane and Wilson (1993) that some residents of assisted living facilities and some residents of nursing homes may be similar to one another in terms of their physical and mental health, combine to provide a natural laboratory for examining the effects of environment on behavior.

A factor that is often responsible for determining whether an individual who meets the admission criteria for assisted living receives care in a nursing home or in an assisted living facility is the ability to pay for the needed care. Most residents of assisted living facilities pay privately for their accommodations, as Medicaid reimbursement is largely unavailable for assisted living. As such, in many states those frail older people who cannot afford to pay privately for care in an assisted living facility may be forced to reside in a nursing home, even though they do not require 24-hr nursing care and could be cared for appropriately in an assisted living environment.

In the analyses that follow, we focus first on examining patterns of mortality and health declines requiring more intense care for people living in an assisted living facility and those living in a nursing home, controlling for initial differences in the two groups. We then contrast trajectories of cognitive status, functional ability, depression, and subjective health for people living in an assisted living facility with those living in a nursing home.

Methods

Setting and Sample

This study was conducted on the campus of a suburban Cleveland, Ohio, nonprofit organization offering a continuum of care for older adults, including a 350-bed nursing home and a newly opened 66-apartment assisted living residence. The nursing home and assisted living facilities are located within a city block of one another on the same campus, which has one executive director and board of directors. The facilities' staff are separate, staffing patterns are distinct, and each environment has its own managing administrator and maintains a separate waiting list. (The assisted living facility residents are given priority over community residents on the nursing home waiting list, however.) The purpose of the assisted living facility is specifically stated to be providing services ". . . for people who need assistance managing some aspects of daily living but who do not need nursing home care" and the facility is ". . . dedicated to [residents'] independence, their well-being and their dignity." The nursing home's philosophy of care, which does not speak to independence, emphasizes quality of life within a health care context.

Criteria for residence in the assisted living facility and on the nursing pavilion for high-functioning individuals from which participants for this study were drawn were similar. They included independence in mobility with or without the use of assistive devices; bowel and bladder continence; need for minimal assistance with activities of daily living (ADLs); general independence in care needs; a Mini-Mental State Exam (MMSE; Folstein, Folstein, & McHugh, 1975) score of at least 15; and alertness and orientation to person, place, and time. Facility staff used both clinical judgment and standardized assessment measures, such as MMSE scores and ADL abilities, to establish whether residents met these criteria. Those who were eligible for admission to either facility, along with their family members, were able to choose between them, following the opening of the assisted living facility. All participants in the study were long-stay residents; none were admitted for short-term rehabilitation.

The analyses that follow are based on data collected from 158 residents, 76 from the nursing home and 82 from the assisted living residence. All persons participating in the study were White and Jewish. People meeting eligibility requirements for the study were invited to participate, only a minority of whom declined to do so. A group of 13 research assistants

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were trained by senior researchers to administer the study protocol. Face-to-face interviews were conducted with each resident at the start of the study and then 4 (Time 2), 8 (Time 3), and 12 months after the baseline interview (Time 4). Some participants were assessed by different interviewers during the study period because of personnel changes. Over the course of time, 23 residents of the nursing home and 19 residents of the assisted living facility were lost to the study because of either death (57%) or a refusal to continue to participate (43%). Contrasts of these 42 people with the 116 for whom complete longitudinal data were available indicated that the groups were similar in terms of age, gender, pay status (private vs. Medicaid), education, marital status (widowed or not), length of stay, depression at baseline, and subjective health at baseline. People lost to follow-up had significantly lower cognitive ability, $t(120) = -2.91$, $p < .01$, and lower functional ability, $t(128) = -2.12$, $p < .05$, at baseline than people who participated in all four waves of data collection.

Measures

Cognitive status was measured using the MMSE (Folstein et al., 1975). Scores on the scale could range from 0 to 30, with a higher score indicating better cognitive functioning. Internal consistency for the scale as measured by Cronbach's alpha ranged from .73 to .85 over the four points in time.

Functional ability was measured by the Multilevel Assessment Instrument (MAI) developed by Lawton, Moss, Fulcomer, and Kleban (1982). The scale consists of seven ADLs (eating, dressing, grooming, getting around home, getting in and out of bed, bathing, and toileting) and eight instrumental ADLs (housework, laundry, preparing meals, grocery shopping, getting to places out of walking distance, using the telephone, managing money, and taking medication). Residents were asked if they could perform each activity without help, with some help, or if they were completely unable to perform it. Scores at each time could range from 15 to 45, with higher scores indicating better functional ability (i.e., less help needed to perform the activities). Internal consistency for the scale as measured by Cronbach's alpha ranged from .80 to .86.

Depression was measured using the Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977). Higher scores indicate more depressive symptoms. Coefficient alpha for the scale ranged from .86 to .88 over the four points in time.

Subjective health was measured using a 4-item scale developed as part of the MAI (Lawton et al., 1982). These questions asked residents to rate their overall health, compare the state of their health to that of 3 years ago, assess the extent to which health problems prevented them from doing the things they wanted to do, and rate their health in comparison to peers. Higher scores indicate better self-rated health. Cronbach's alpha for the scale ranged from .53 to .70 over the four points in time.

Pay status was coded as either private pay (0), characterizing 75% of the sample, or Medicaid (1), characterizing 25% of the sample. This information was derived from resident records. Slightly more than a quarter of the sample (27%) had not graduated from high school, 42% were high school graduates, and 31% had furthered their education beyond high school. Length of stay ranged from 1 day to 13.3 years. Because the variable was highly skewed, it was dichotomized and treated as a categorical variable with values of 0–14 days (68%) and longer than 2 weeks (32%).

Relocation of participants was tracked by project staff using facility census reports. These permanent room changes were made in both the assisted living facility and the nursing home when a resident's functional and health status declined. Resident deaths were also tracked by project staff using facility census reports. Census reports were reviewed for a period of 15 months, enabling the number of outcome experiences to be maximized in the relatively small sample.

Results

As indicated in Table 1, residents of the two facilities were similar in terms of their age, gender, and marital status (widowed or not, given the prevalence of widowhood among older persons). The participants in the sample ranged in age from 60 to 101 years; 75% were female; 73% were widowed. Residents of the two facilities differed with respect to education, length of stay, and pay status (private vs. Medicaid). Residents of the assisted living facility were more likely to be better educated and privately responsible for paying for their long-term care. The entire assisted living sample consisted of new admissions, compared with 34% of the nursing home residents. There were no differences in the cognitive status of residents of the two facilities at baseline. Residents of the assisted living facility had higher functional ability scores at baseline than did residents of the nursing home, however, and there were also significant differences between residents of the two facilities with respect to depression, with nursing home residents indicating more depressive symptoms. In addition, residents of the assisted living facility rated their overall health as better than residents of the nursing home.

Mortality and Relocation

Ten residents of the assisted living facility and 14 residents of the nursing home died over the 15-month period. The mortality rates for the two facilities were not significantly different from one another, χ^2 (1, $N = 158$) = 1.19. In the assisted living facility, 20 people were relocated over the course of 15 months, all to a nursing home. In the sample of nursing home residents, 16 people were relocated, all to units within the nursing home providing significantly greater assistance with resident care than the unit in which they resided when the study began. The two fa-

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Table 1. Baseline Contrasts of Nursing Home and Assisted Living Facility Residents

Variable	Total sample (N = 158)	Nursing home (n = 76)	Assisted living (n = 82)	Difference test
Age (in years)				$t(156) = 1.26$
M	86.82	87.45	86.24	
SD	6.04	6.31	5.75	
Women (%)				$t(156) = 1.02$
M	75	79	72	
SD	43	41	45	
Widowed (%)				$t(156) = 1.52$
M	73	79	68	
SD	44	41	47	
Education (in years)				$t(156) = -3.23$**
M	12.21	11.34	13.01	
SD	3.35	3.02	3.46	
Length of stay (in days)				$t(75) = 6.05$***
M	369.81	764.68	3.83	
SD	848.89	1097.29	3.19	
Private pay (%)				$t(75) = 9.13$***
M	75	47	100	
SD	44	50	0	
MMSE				$t(120) = -0.64$
M	23.30	23.09	23.57	
SD	4.13	4.06	4.25	
Functional ability				$t(128) = -6.94$***
M	37.42	34.89	40.03	
SD	4.93	4.36	4.06	
CES-D				$t(125) = 2.09$*
M	15.94	17.98	13.92	
SD	11.12	11.10	10.85	
Subjective health				$t(131) = -2.22$*
M	8.47	8.07	8.86	
SD	2.08	1.94	2.15	

Notes: MMSE = Mini-Mental State Exam; CES-D = Center for Epidemiological Studies Depression Scale.
*$p < .05$; **$p < .01$; ***$p < .001$.

cilities' rates of relocation also were not significantly different from one another, χ^2 (1, N = 158) = .25.

Logistic regression analysis was used to estimate the effects of facility on relocation to a higher level of care and mortality during the 15-month follow-up period. These analyses took into account the influence of variables on which residents of the assisted living facility and nursing home differed from one another at baseline (education, length of stay, pay status, functional ability, subjective health, and depression) as well as variables that were correlated at the bivariate level with the mortality or relocation outcomes (age and cognitive status). Each logistic regression analysis included two steps. In the first step, all of the variables on which residents of the two facilities differed, as well as the variables having a significant bivariate relationship with the outcome variables, were entered. In the second step, a variable designating facility (assisted living vs. nursing home) was entered. Cases with missing data for any of the variables used in these analyses were excluded.

Results of the logistic regression analyses, presented in Tables 2 and 3, were nearly identical at each step. As indicated, the sole significant predictor of mortality was age. Facility (nursing home vs. assisted living) had no effect on mortality. Relocation resulting from the need for a higher level of care was predicted by education (more), pay status (private pay), functional ability (worse), and cognitive status (worse) at baseline. Facility was not a significant predictor of these relocations.

Outcome Trends

Preliminary trend analyses examined the way in which the four health outcome variables were impacted

Table 2. Logistic Regression Analysis Predicting Mortality (n = 109)

	Step 2	
Variable	B	*SE* B
Education	−0.05	.10
Pay status	−0.96	.82
Length of stay	0.00	.00
Functional ability	0.02	.08
Subjective health	−0.07	.18
Depression	−0.02	.03
Age	0.14*	.06
Cognitive status	−0.14	.08
Facility	−1.50	.88

*$p < .05$.

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Table 3. Logistic Regression Analysis Predicting Relocation ($n = 109$)

Variable	Step 2	
	B	*SE* B
Education	0.17*	.08
Pay status	−1.73*	.87
Length of stay	0.00	.00
Functional ability	−0.16*	.07
Subjective health	0.15	.14
Depression	−0.03	.03
Age	0.00	.05
Cognitive status	−0.18*	.07
Facility	0.39	.74

*$p < .05$.

by the demographic variables on which residents of the assisted living facility and the nursing home differed at baseline (education, length of stay, and pay status). For example, in one such analysis, education—categorized as less than 12 years, high school diploma, or beyond high school—was the between-subjects factor, and cognitive status scores at the four points in time were the within-subjects factors and dependent variables. In this case, whether the interaction of Time × Education was significant was noted.

These repeated analyses of variance (ANOVA) indicated no interaction effects over time between education and cognitive status, $F(3,6) = .22$, $p = .97$, functional ability, $F(3,6) = 2.07$, $p = .06$, depression, $F(3,6) = .08$, $p = .99$, and subjective health, $F(3,6) = .98$, $p = .44$. Length of stay was not found to be related over time to cognitive status, $F(3,3) = .04$, $p = .99$, depression, $F(3,3) = 1.46$, $p = .23$, or subjective health, $F(3,3) = 2.46$, $p = .06$. There was a significant interaction, however, between length of stay and functional ability measured over time $F(3,3) = 3.76$, $p < .05$, such that new admissions experienced a decline in functional ability, whereas veteran residents did not. Pay status had no interactive effects over time with cognitive status, $F(3,3) = 1.52$, $p = .21$, functional ability, $F(3,3) = 2.60$, $p = .053$), depression, $F(3,3) = .44$, $p = .72$, or subjective health, $F(3,3) = 1.79$, $p = .15$. Results from these analyses suggested the importance of including length of stay, but not education or pay status, as a covariate in the subsequent trend analyses.

To examine the way in which people living in the nursing home and in the assisted living facility changed over time and to address directly the question of how these living environments impacted cognitive status, functional ability, depression, and subjective health, a separate repeated ANOVA was conducted for each outcome measure. These analyses examined the main effect of time as well as the interaction of Time × Facility for each outcome variable. Significant findings for the interaction terms would suggest different trends for residents of the nursing home and those of the assisted living facility.

Information regarding the distribution of scores on cognitive status, functional ability, depression, and subjective health at each time period may be found in Table 4. Results from the repeated ANOVAs are presented in Table 5. These analyses suggest that there were no time, Time × Facility, or facility effects for cognitive status and depression. For functional ability, there was a significant main effect for facility, with residents of the assisted living facility having higher (better) mean scores across time than residents of the nursing home. For subjective health, there was a significant linear main effect of time, with residents of both the nursing home and the assisted living facility reporting that they perceived their health to be better over time. There were no significant interaction effects involving facility and any of the outcome variables.

Discussion

Taken together, these data suggest very similar outcomes over time for these nursing home and assisted living facility residents, all of whom met similar eligibility criteria for admission. Facility did not influence patterns of mortality or relocation due to declining health, or trends in cognitive ability, functional ability, depression, and subjective health.

Although these findings are compelling in their consistency, their generalizability is limited and their statistical power is restricted for a number of reasons. First, data for this study derive from a small, homogeneous sample (all were White and Jewish). Second, with both facilities being part of a larger parent organization, it is possible that the assisted living and nursing home environments were not actually as dis-

Table 4. Outcome Measure Scores for Nursing Home and Assisted Living Residents ($n = 116$)

	Nursing home ($n = 53$)		Assisted living ($n = 63$)	
	M	*SD*	*M*	*SD*
Cognitive status				
Baseline	23.13	3.68	24.12	4.06
Time 2	23.33	4.16	24.40	5.32
Time 3	22.53	4.64	23.88	4.33
Time 4	22.60	4.52	23.64	5.40
Functional ability				
Baseline	34.65	4.59	40.72	3.62
Time 2	35.65	4.35	39.63	3.71
Time 3	35.22	4.22	39.18	3.98
Time 4	35.59	3.79	39.23	3.77
Depression				
Baseline	16.38	11.63	13.69	10.58
Time 2	15.91	11.76	12.05	8.07
Time 3	14.15	10.96	12.77	8.17
Time 4	13.74	10.70	13.08	10.28
Subjective health				
Baseline	8.03	1.90	8.63	2.17
Time 2	8.50	2.00	9.24	1.43
Time 3	9.18	2.24	9.37	1.79
Time 4	8.53	2.43	9.46	1.69

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Table 5. Repeated Analysis of Variance for Cognitive Status, Functional Ability, Depression, and Subjective Health ($n = 116$)

	Cognitive status		Functional ability		Depression		Subjective Health	
Source	*df*	*F*	*df*	*F*	*df*	*F*	*df*	*F*
				Within subjects				
Time	3	1.33	3	2.01	3	1.04	3	5.45**
Time × Length of Stay	3	0.14	3	1.46	3	0.94	3	2.13
Time × Facility	3	0.18	3	2.43	3	0.25	3	0.89
Error (time)	156	(4.18)	222	(5.04)	210	(48.37)	216	(1.52)
				Between subjects				
Length of stay	1	0.26	1	0.01	1	0.84	1	0.14
Facility	1	1.12	1	14.91***	1	0.02	1	0.61
Error	52	(70.41)	74	(49.70)	70	(278.76)	72	(10.85)

Note: Values in parentheses represent mean square errors.
**$p < .01$; ***$p < .001$.

similar from one another as their stated philosophies of care might lead one to believe. Even more serious is the fact that the parent institution is one of the premier long-term care facilities in the United States. Third, results from this study are generalizable only to that subset of older persons who would qualify for both assisted living care and nursing home care. Persons at this intersection are the highest functioning nursing home residents and the lowest functioning residents of assisted living facilities.

Another potential difficulty with these analyses is the effect due to length of stay. Although new admissions constituted the entire assisted living sample, they represented only about a third of the nursing home sample. Even though length of stay had a significant interaction with the functional ability outcome over time, it was not a significant predictor in any of the analyses. It may be argued that length of stay and facility are hopelessly confounded, yet the fact that neither variable predicted any of the outcomes adds credence to the lack of findings of facility differences.

It may also be argued that relocation could have been influenced by the availability of a continuum of care on the parent organization's campus. Some believe that an assisted living facility affiliated with an organization offering multiple levels of care would be more likely to relocate residents whose health declined, compared with a freestanding facility trying to maintain full occupancy. In a national study of assisted living, however, administrators of facilities on multilevel campuses reported a resident case mix similar to those of freestanding facilities (Hawes, Rose, & Phillips, 1999). In addition, because the two study facilities had substantial waiting lists, which for the nursing home consisted of both community residents and current residents of the assisted living facility, and because the facilities both maintained full occupancy, it was unlikely that the management of the assisted living facility felt compelled to keep residents after their health declined markedly. At the same time, because the assisted living residents were almost all paying privately for their care, there does not seem to have been a financial incentive for them to be relocated. All of the relocated assisted living residents moved to a nursing home, where the care is more expensive and private resources would be exhausted more quickly.

Nonetheless, results from this unique opportunity to contrast the nursing home and assisted living experiences in a controlled environment set the stage for similar studies. Future research of this nature involving larger numbers of residents in multiple facilities has the potential to add to our understanding of the fit between older people and different long-term care environments and its effect on outcomes. If similar in their findings, such studies might also provide a compelling rationale for altering existing funding mechanisms for long-term care. With similar morbidity and mortality trajectories characterizing residents of assisted living and nursing home facilities, shifting Medicaid funding from nursing homes to assisted living facilities could be a promising strategy for reining in runaway long-term care costs. Less intensely regulated than nursing homes, assisted living facilities are considerably less expensive to operate and seem to have similar effects on their residents. Kingsley and Struyk (1991) suggested that the 1990s would be an important time in the evolution of U.S. housing policy. Central to the policy goals is enabling the frail elderly to remain in the community for as long as possible. If, as these data suggest, people living in assisted living facilities and nursing homes have similar trajectories of morbidity and mortality, care in assisted living facilities would seem to be a viable alternative to nursing homes for some individuals.

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