The Impact of *Live-in Animals and Plants* on Nursing Home Residents: A Pilot Longitudinal Investigation

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Recently, models such as the Eden Alternative have presented a theoretical basis for attempting to create a therapeutic environment by bringing live-in animals and plants into the nursing home. This article reports on the implementation and assessment of an intervention termed the "Living Habitat," which borrows concepts from the Eden Alternative model. Implemented on a 32-bed unit of a large urban nursing home, the Living Habitat offered numerous plants, a parakeet to any resident who requested one, and two cats and a dog for the unit. A baseline assessment of residents (N = 26) was conducted prior to the introduction of the animals and plants, and follow-up data were obtained 6 months after the intervention began. Results indicate that, following the introduction of the Living Habitat, residents higher in cognitive status became more positively engaged with their environment but reported a decreased sense of control. Residents who had greater affinity for pets also became more positively engaged with their environment. Qualitative impressions and challenges in implementing a systemic intervention are discussed.

Key words: *animals, intervention, nursing home*

Interest in utilizing animals to enhance people's well being is nothing new. For centuries, some people have been convinced of the healing power of animals.[1] However, the rigorous studies necessary to support this conviction have been slow in coming.[2] In addition, most research has examined animal "therapy" programs,[3–12] which are quite different from efforts to change the over-

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all nursing home environment by making animals part of everyday life. Much of the current literature on animals is plagued by small sample sizes, a lack of control groups, and reliance on self-reporting to the exclusion of other forms of data collection, notably observational methods. Even more fundamentally, many studies have not been grounded in an articulated theory of why animals should be of value to nursing home residents. The literature on plants shows the same problems but to an even greater degree.

With his 1994 book, *The Eden Alternative: Nature, Hope, and Nursing Homes,*[13] William Thomas began to redress the gap in theory by proposing a model of optimal nursing home life. Thomas challenged the pre-eminent medical model of nursing home care by asserting that nursing home residents' biggest problems are not disease, disability, and decline but rather feelings of boredom, helplessness, and loneliness. Thomas's view of the problems besetting residents suggests a unique solution, namely, the introduction of animals, plants, and children into nursing homes.

Importantly, these elements are meant to become part of the ongoing fabric of the residents' lives. In their unpredictable, everyday antics, animals and children fight boredom by injecting variety and spontaneity into an environment. According to the Eden Alternative model, they require and thrive on others' care and nurturing and so can counter residents' feelings of helplessness. Plants, too, provide an opportunity for residents to take care of something and to feel useful and of value. Animals and children combat loneliness through their companionship and friendship. As a final strategy, the Eden Alternative model proposes a flat administrative structure intended to foster staff empowerment. Thomas[13] reports positive effects of the Eden Alternative, including reductions in resident infections, medications, and mortality and a decline in staff turnover.

At our facility, we modified the Eden Alternative, developing what we called the "Living Habitat" for one nursing home unit. We included animals and plants but omitted special initiatives involving children and the structural changes Thomas[13] suggested for promoting staff empowerment. We also included very little in the way of staff training, an element that is not explicitly included in the Eden model either but which bears mentioning for its potential impact on the integrity of this intervention. This article describes our program and pilot data regarding the impact of the intervention and offers some qualitative impressions about the implementation process.

INTERVENTION

The Living Habitat intervention began long before the animals and plants entered the nursing home. The process began with meetings of an interdisciplinary group of administrative staff. The meetings were devoted to exploring resident and family issues (eg, fear of animals, allergies, requests for transfer), risk management issues (eg, infection control, fall prevention), staff issues (parallel to the resident and family issues), animal issues (eg, selection, training, care), and research issues. After discussing these issues over the course of nearly 2 years, the Living Habitat was formally launched with letters and meetings for residents, families, and direct care staff. In an effort to involve residents and staff as much as possible in the planning process, additional workgroups consisting of residents and direct care staff were convened. The activities therapist who headed the Living Habitat led the group discussions, which determined the specifics of the program, including, most importantly, the number and type of animals to be brought in.

Upon learning of interventions such as the Living Habitat, many people immediately generate a list of objections to having animals in a nursing home, such as resident and staff allergies, potential property damage, animals' being underfoot and causing falls or other injuries, excessive barking, and fleas. These misgivings were raised regarding the Living Habitat, but, as with other animal interventions,[14] they turned out to be unfounded. Other skeptics speculate that many residents and staff will be afraid of the animals, particularly any dogs, and so will wish to leave the unit. When we launched the Living Habitat, staff and residents were offered the opportunity to relocate to another unit; only one staff member pursued this option.

Of the 26 residents on the selected unit, 12 elected to have parakeets in their bedrooms. Several other parakeets and a cockatiel were placed in common areas on the unit, where they often would sing throughout the day. In actual practice, only 3 or 4 of the residents who had birds interacted with them extensively, primarily because most residents did not spend much time in their bedrooms. Permitting residents to place their birdcages in common areas during the day might have increased their level of interaction with the birds or encouraged conversation with others regarding the birds. The cockatiel attracted a lot of positive attention, mainly due to his outgoing personality and ideal location at the entrance to the unit.

Two cats were brought in, followed by a one-year-old dog who was a retriever mix. The cats took a little while to

adjust to their new home, at first spending much of their time hiding or retreating when people approached them. After a few weeks, they had settled in and were easy to care for and highly visible on the unit, usually spending their nights on a resident's bed. The introduction of the dog, Cass, was probably the most dramatic element of the intervention. She, too, was a much sought-after bedtime companion. Cass's personality was ideally suited to interacting with nursing home residents—she was calm but very responsive and would fall into a rapturous stupor when someone scratched her ears. Residents love to tell the story of when Cass came upon a resident crying in his bathroom, stuck while trying to reach the call bell. Cass returned to the nurses station and barked at the care manager until the care manager followed her back to the resident's room to provide assistance. One worry about having a dog on the unit concerns the dog's well-being: questions arise as to whether a pack animal such as a dog can have its needs met in a communal living arrangement, where there is no core pack to rely on. However, special bonds did develop between the animals and certain residents.

Residents who expressed an interest were enlisted to help in the care of the animals. A half-time animal care technician was on board for the majority of the animal care, but some residents assisted with the hour and a half needed daily to care for the birds or took responsibility for covering the cockatiel's cage or turning on cage lights. Initially, some residents helped with feeding the dog, but theft of dog food (as well as toys and other supplies) required that the dog supplies be locked and made accessible only to certain staff.

As mentioned previously, this intervention did not include formal staff training in how to (1) encourage residents to interact with the animals or plants or (2) use the animals and plants to improve their own interactions with residents. Perhaps because of this omission, the animals tended to limit themselves to the residents who took the initiative in seeking them out. These residents also tended to be those with less cognitive impairment. The Eden Alternative model could benefit from a more thorough discussion of the process issues involved in making the most of the animals and plants, particularly for persons with dementia.

Although plans for a garden fell through because of space limitations, numerous plants were placed in common areas of the unit and in residents' bedrooms. Interested residents assisted the plant caretaker during a weekly horticulture meeting.

EVALUATION

To examine the impact of the dog, cats, birds, and plants, we conducted a pilot longitudinal study. In addition to assessing Thomas's hypothesized mechanisms of boredom, helplessness, and loneliness, we sought to determine the effect of the intervention on residents' satisfaction with care, overall quality of life, and social and emotional functioning. The sequence of events for the evaluation is depicted in the timeline in Figure 1. The initial assessment was conducted in July 1998. The intervention was officially launched, through formal meetings with unit staff, residents, and families and the introduction of the birds, cats, and plants, on December 1, 1998. The intervention was implemented in a stepwise fashion, with events unfolding over the course of several months. For example, the dog did not arrive until April 1999. The follow-up assessment was conducted 6 months after the start of the intervention, during the summer of 1999. It is noteworthy that, midway through this process, in July 1999, the institution was purchased by another nursing home operator.

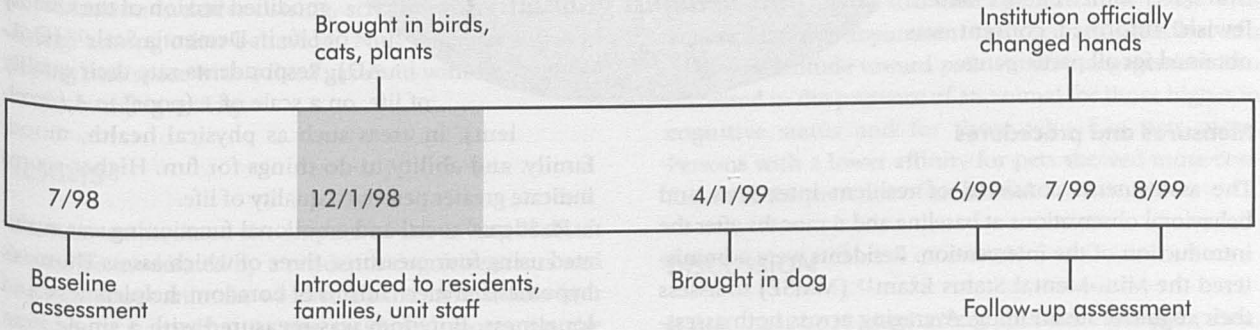


Figure 1. Timeline for the intervention.

Each of the points in the timeline represents a potential confounding factor for our study. The original start date of the intervention, August 1, 1999, was delayed for administrative reasons. The gap between the baseline assessment and the actual start of the intervention in December means that changes might have occurred in the residents that were unrelated to the intervention. The dog was not brought in at the same time as the other animals and plants because it took some time to locate and train the best candidate. In retrospect, we can see a possible advantage to staggering the introduction of the animals: it allows those on the unit to adjust gradually to the changes. However, the delay meant that residents did not have the full 6 months exposure called for by the study design. The sale of the nursing home to another operator also injected a possible confound factor, as many residents, families, and staff were anxious for several months in advance about what the change would bring. In actuality, the changes in staffing and resident care that did occur did not take place until after the follow-up assessment was substantially complete. Even so, the anticipation of negative change might have affected the results of the study. For the most part, the confound factors identified would mask any positive effects of the Living Habitat; therefore, we can be fairly comfortable drawing conclusions about any positive impact detected.

METHOD

Subjects

The sample consisted of 26 residents of a large urban nursing home. The subjects averaged 87 years of age, were mostly female and widowed, and averaged 11.5 years of education (see Table 1). All were Jewish. Informed consent was obtained for all participants.

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Measures and procedures

The assessments consisted of resident interviews and behavioral observations at baseline and 6 months after the introduction of the intervention. Residents were administered the Mini-Mental Status Exam[15] (MMSE) to assess their cognitive functioning. Averaging across both assessments, the mean MMSE score for the total sample was 22.8, indicating a mild level of cognitive impairment.

Table 1.

Demographic Characteristics of the Sample (*N* = 26)

Age (x)	87.1
Gender (% female)	77.0
Marital status	
Single (%)	12.5
Separated/divorced (%)	16.7
Widowed (%)	70.8
Education (years)	11.5
Religion (% Jewish)	100
MMSE (possible range: 0–30) (x)	22.8
Pet Attitude Survey (possible range: 18–126) (x)	93.4

The Pet Attitude Survey[16] (PAS) is an 18-item measure of attitudes toward pets. Items are rated on a Likert-type scale from 1 (strongly agree) to 7 (strongly disagree), with a maximum score of 126. Higher total scores indicate more positive feelings about pets. The mean score for the normative sample was 98.[16]

Satisfaction with care was assessed using a measure designed for this study. It comprised 18 items related to residents' satisfaction with aspects of nursing home life, such as food and activity choices, opportunities for making friends, staff competence, and the physical environment. Items are rated on a scale from 1 (very dissatisfied) to 4 (very satisfied), and higher scores represent greater resident satisfaction (the maximum score is 72).

Residents' overall quality of life was assessed using a modified version of the Quality of Life in Dementia Scale[17] (QoL-AD). Respondents rate their quality of life, on a scale of 1 (poor) to 4 (excellent), in areas such as physical health, mood, family, and ability to do things for fun. Higher scores indicate greater perceived quality of life.

Residents' social and emotional functioning was evaluated using four measures, three of which assess Thomas's hypothesized mechanisms of boredom, helplessness, and loneliness. Boredom was measured with a single item used by Meeks, Gibson, and Walker[18]: "How often do you get bored?" Respondents answer on a 4-point Likert-

type scale from 1 (never) to 4 (always). Helplessness was evaluated using Pearlin and Schooler's Mastery Scale,[19] which consists of seven items that are rated on a scale from 1 (agree a lot) to 5 (disagree a lot). Higher scores indicate greater feelings of helplessness. Loneliness was evaluated using the UCLA Loneliness Scale,[20] which consists of 20 items that are rated from 1 (never) to 4 (always). Higher scores indicate more loneliness.

The fourth measure of social and emotional functioning was observational. Behavioral observation consisted of twelve 5-minute observations per resident over the course of approximately 2 weeks at both baseline and 6-month follow-up. For each resident, six observations took place in the morning and six in the hours between 1 pm and 5 pm. An effort was made to stagger the observations within these time frames so that residents were observed at varying times of day. Research assistants who had received extensive training in the observational coding scheme used a handheld computer called the Psion Organizer[21] to record real-time emotions and behaviors. Scores represent the number of seconds the observed emotion or behavior occurred. Emotions of pleasure, interest, anger, anxiety, and sadness were coded using criteria from Lawton's Apparent Affect Rating Scale.[22] A factor analysis of the coded behaviors resulted in two factors (Positive Engagement and Confusion) and two individual items (Very Negative Verbalization and Null Behavior). Positive Engagement includes any animal- or plant-related activity, psychosocial activity such as socializing or doing crafts, coherent conversation, positive verbalizations such as singing or laughing, and touching of someone warmly. Confusion includes restless behavior such as pacing or other repetitive movement; inappropriate behavior such as making sexual advances, disrobing, spitting, or stuffing food in one's pockets; and negative verbalizations such as incoherent and repetitious statements, arguing, or complaining. Very Negative Verbalization includes cursing, screaming, moaning, or crying, among other behaviors. Null Behavior refers to staring into space with a fixed gaze and with no response to surrounding activity.

RESULTS

Because we assumed the impact of the Living Habitat would be moderated by a resident's cognitive status and feelings about animals, we divided the sample into four subgroups according to the residents' scores on the MMSE and the PAS. Using the standard cutoff (23 and below) for mild cognitive impairment on the MMSE,[23,24] we divided residents lower in cognitive status from those higher in cognitive status. A median split of scores on the PAS gave us a group of residents with a relatively low affinity toward pets and a group with a relatively high affinity. Unfortunately, the sample size was too small to examine combinations of subgroups, such as persons with lower cognitive status and higher pet affinity or persons with higher cognitive status and lower pet affinity. For comparative purposes, results from analyses of the full sample also will be presented.

To explore changes in the variables across the 6 months of the intervention, we conducted repeated measures general linear modeling analyses. As shown in Table 2, these analyses revealed that those higher in cognitive status reported a significant decrease in their sense of control following the introduction of the animals and plants. Subjects higher in cognitive status also were more positively engaged with their environment following the implementation of the intervention. For those scoring above the median on the PAS (indicating greater affinity for pets), repeated measures analysis revealed an increase in positive engagement with the environment following the introduction of the animals and plants (see Table 2). No significant differences occurred over time in the remaining interview and observational variables. When the entire sample was examined, repeated measures analysis indicated a reduction in resident observed anxiety.

Multivariate analysis of variance (MANOVA) was used to examine differences in residents' observed emotion and behavior during observation occasions when an animal was present versus occasions when all animals were absent. Animals were present for only 3.8% of resident observations. As Table 3 illustrates, however, their presence was associated almost uniformly with positive outcomes. For the sample as a whole, pleasure was greater when a dog, cat, or bird was present. Looking at the subgroups of residents, this effect persisted for those with greater cognitive impairment and occurred regardless of a resident's attitude toward pets. Positive engagement also increased in the presence of an animal for those higher in cognitive status and for those who like pets more. Persons with a lower affinity for pets showed more confusion in the presence of an animal.

DISCUSSION

It first must be re-emphasized that these are pilot data. The number of subjects is small, even more so when we divide the sample according to cognitive status and prefer-

Table 2.

Repeated Measures General Linear Modeling for all Variables

	Total sample (*N* = 26)			Lower cognitive status[a] (*N* = 12)			Higher cognitive status[b] (*N* = 11)			Lower pet affinity[c] (*N* =11)			Higher pet affinity[d] (*N* = 10)		
	Pre	Post	*F*	Pre	Post	*F*	Pre	Post	*F*	Pre	Post	*F*	Pre	Post	*F*
Satisfaction with care	54.49	53.80	.19	53.76	55.09	.27	55.27	55.16	.01	57.84	56.31	.54	51.11	54.10	1.71
Boredom	2.58	2.42	.68	2.40	2.10	.80	2.78	2.78	.00	2.22	2.22	.00	3.00	2.67	.80
Control	21.58	23.83	1.72	22.40	21.20	.16	21.00	25.71	9.03*	20.43	21.00	.05	23.20	27.80	4.97
Loneliness	46.35	45.49	.10	42.41	38.16	.98	51.17	54.45	1.85	40.79	38.82	1.39	53.14	52.08	.03
Quality of life	33.88	36.52	2.17	34.83	36.56	.66	35.05	36.90	.38	35.07	37.62	1.63	34.96	35.16	.00
Pleasure	14.89	13.69	.18	21.00	18.31	.23	11.33	12.26	.10	22.21	15.01	2.71	11.61	13.54	.25
Interest	205.73	191.43	1.48	232.98	211.03	1.54	196.30	176.89	1.11	226.77	217.45	.41	200.20	170.15	1.60
Anger	.30	.63	.56	.03	.21	1.05	.00	1.26	3.12	.00	.85	1.83	.00	.70	2.04
Anxiety	5.90	2.57	5.46*	3.55	2.72	.45	3.96	.74	3.21	3.07	2.36	.28	4.06	.81	2.72
Sadness	1.06	3.31	.81	.00	5.12	1.03	2.11	2.25	.00	1.06	5.58	.63	1.16	2.47	.46
Positive engagement	186.75	200.16	1.10	186.30	192.95	10	206.19	243.28	7.84*	216.92	214.12	.022	169.23	212.41	5.63*
Confusion	1.22	2.09	.95	2.26	4.42	1.29	.12	.12	.00	.70	1.22	.43	2.07	4.09	.87
Very negative verbalization	.25	.42	.46	.37	.64	.30	.00	.30	1.73	.40	.64	.70	.51	.18	.54
Null behavior	1.36	1.46	.03	.31	1.29	1.00	.62	.17	1.15	227.41	228.71	.02	224.72	226.00	.01

[a]MMSE ≤ 23; [b]MMSE >23; [c]PAS ≤ 98; [d]PAS > 98; [e]$p < .05$.

ences for pets, and the time period is relatively short. Further, the study was undertaken as a pilot study because only limited resources were available, prohibiting the inclusion of a control group. The findings, therefore, must be interpreted in light of the possibility that the differences could have occurred by chance. In addition, a control group would have revealed areas in which residents' psychosocial functioning tends to decline over time. Residents need not show improvement in those areas for an intervention to be considered a success; simple maintenance of initial levels on those variables would represent a gain over usual care. Without a control group, we cannot determine whether maintained levels on particular variables actually indicate an improvement over usual care.

The decrease over time in anxiety that emerges when the entire sample is examined seems to be driven primarily by subjects higher in cognitive status and higher in their affinity for pets; analyses of the subgroups apparently lacked sufficient power to detect the effect that emerged once the sample size was increased. The decrease in anxiety may reflect the comfort brought by interacting with animals and by being around them. Some residents said that they could only sleep when one of the cats was in their room, suggesting that the cats had a soothing effect, consistent with reports that a sleeping animal may signal that the situation is secure.[25] Similarly, petting a dog has been shown to lower blood pressure.[26] Some residents would absent-mindedly stroke Cass's head while standing at the nurses station; one had the impression that Cass helped them to remain calm while seeking help from staff. In contrast, those who show little affinity toward animals or who have less exposure to them on the unit (ie, those

Table 3.

MANOVA of Observed Resident Behavior and Affect by Presence versus Absence of an Animal

	Observations of the total sample			Observations of those with lower cognitive status[a]			Observations of those with higher cognitive status[b]			Observations of those with lower pet affinity[c]			Observations of those with higher pet affinity[d]		
	Present (n = 26)	Absent (n = 650)	F	Present (n = 15)	Absent (n = 241)	F	Present (n = 6)	Absent (n = 255)	F	Present (n = 14)	Absent (n = 398)	F	Present (n = 12)	Absent (n=252)	F
Pleasure	43.87	13.14	22.03**	53.04	20.87	8.05**	24.50	11.52	1.49	50.56	14.38	13.46***	36.07	11.18	10.32**
Interest	222.33	198.60	1.06	216.70	227.67	.20	217.83	189.33	.33	246.30	217.01	1.64	194.36	185.32	.07
Anger	.19	.45	.09	.33	.47	.01	.00	.33	.04	.36	.52	.02	.00	.33	.09
Anxiety	1.08	4.33	.45	1.87	2.63	.04	.00	3.00	.16	2.00	5.37	.20	.00	2.69	.28
Sadness	3.96	2.10	.32	2.33	3.02	.01	.00	1.62	.09	.00	2.39	.24	8.57	1.64	2.77
Positive engagement	246.55	191.80	2.63	230.16	218.67	.06	346.33	214.91	3.76†	212.44	195.78	.13	286.35	185.52	4.15*
Confusion	2.96	1.50	.31	5.13	2.63	.26	.00	.26	.04	5.50	.58	9.54**	.00	2.95	.26
Very negative verbalization	.00	.34	.24	.00	.47	.15	.00	.11	.02	.00	.44	.15	.00	.19	.09
Null behavior	.00	1.43	.30	.00	1.01	.10	.00	.56	.06	.00	2.04	.22	.00	.48	.09

[a]MMSE ≤ 23; [b]MMSE >23; [c]PAS ≤ 98; [d]PAS >98; †p = .053; *p <. 05; **p < .01; ***p < .001.

with greater cognitive impairment) would be less likely to find comfort in their presence. Fortunately, even those who were not partial to pets did not show an increase in anxiety as a result of the intervention.

In the presence of a bird, cat, or dog, most residents demonstrated a significant increase in pleasure. Clearly, the animals helped to bring joy to the residents, perhaps through their playfulness, unabashed affection, tactile stimulation, and prompting of pleasant reminiscence. The single exception was the group of residents with the least cognitive impairment, although the reasons for this are not apparent. Surprisingly, even those low on pet affinity showed more pleasure when an animal was nearby. It may be that these residents disliked the responsibilities of pet ownership more than they disliked actually being with animals. The increase in confusion that also emerged for those low on pet affinity suggests that these residents may have been highly reactive to animals. One can envision people who are both drawn to and repelled by animals, whose expressions of pleasure and excitement are peppered with complaints and statements of mild alarm, and whose effort to maintain an optimal distance from the animals interferes with their ability to focus clearly on other tasks.

Our data demonstrate that residents higher in cognitive status and pet affinity were more positively engaged with their environment when an animal was present, consistent with studies that report an increase in socialization in the presence of an animal.[4,5,7,8,12] Beyond this proximal effect, residents' positive engagement also increased longitudinally in a sampling of observations made at various times of day. This increase in positive engagement over time may reflect the impact of the overall therapeutic environment or it may suggest a carryover effect of earlier interactions with the animals, in contrast to several studies that have noted the difficulty of demonstrating a lasting impact from brief interactions with animals.[12,27] Perhaps welcoming animals into the institution as cohabitants and integrating them into the fabric of residents' daily lives helps to extend the short-lived positive results reported by others.

The increase in positive engagement over time may be due to a number of mechanisms. Perhaps the animals and plants provided a topic for conversation, encouraging otherwise timid residents to initiate contact with others. Maybe they enticed residents to spend more time in common areas so as to be near the pleasant foliage or to observe the animals, and the extra time in these areas

would make engagement with others more likely. Or perhaps the animals and plants helped the residents feel reconnected to a more vibrant, dynamic environment and feel more enlivened as a result.

That positive engagement increased only for subjects with minimal cognitive impairment suggests that *active* involvement with the intervention—by initiating contact or assuming some responsibility for care—may be necessary for positive engagement to occur. However, the obstacle of cognitive impairment certainly may be overcome. As has been pointed out by numerous researchers,[28–31] interactions and tasks can be structured to engage residents with moderate dementia in activities such as the care and enjoyment of animals and plants. Perhaps with additional training, direct care staff could learn to facilitate the interaction of residents with the animals and plants or with each other in relation to the animals and plants. Facilitating such interaction might draw out even the more impaired residents and improve their engagement with the environment. For example, Hellen[28] describes how to frame an invitation so that residents are more likely to join an interaction and notes the value of acknowledging all successes, no matter how small (eg, "Look, Mrs. Jones, Cass loves it when you scratch her like that"). Others have noted the importance of being patient, empathic, nonjudgmental, and vigilant for the first sign of distress[28–31] to encourage maximal engagement and functioning in persons with dementia.

In light of Thomas'[13] contention that the Eden Alternative combats feelings of helplessness, it is surprising that residents with more intact cognitive abilities demonstrated an increase in feelings of helplessness following the introduction of the Living Habitat. This finding may be interpreted as a negative effect of the intervention, reflecting, for example, a situation in which residents were bothered by an unwanted animal whom they felt unable to avoid. Or perhaps residents felt more helpless because they perceived staff to be occupied with the animals and so less available to respond to their own needs. Then again, maybe the Living Habitat omitted those components of the Eden Alternative model (eg, children, staff empowerment) that are most critical to reducing residents' feelings of helplessness. Of course, an increase in feelings of helplessness is just the reaction one would expect from residents whose home was being sold without their consent, at least from those whose cognitive abilities permitted them to fully grasp the situation. The impending transfer of ownership of the nursing home may well have been the critical factor in diminishing the residents' sense of control.

The sale of the nursing home illustrates a scenario familiar to anyone who conducts intervention research: despite careful planning, complete control is not possible, and the institutional system does not always cooperate with the research agenda. Some further considerations for conducting research on psychosocial interventions include the following (a more complete discussion of these research challenges can be found in reference 32):

- *Obtain buy-in from administrators, staff, and residents.* Buy-in begins with sharing information. If possible, provide detailed implementation plans prior to beginning the intervention and solicit input from administrators, staff, and residents regarding its content. Administrators also might be won over by an offer of consultation or training services.
- *Consider training supervisory staff to monitor the integrity of the intervention.* This may help to ensure that the intervention will continue beyond the duration of the research project. Unfortunately, highly effective psychosocial interventions may fade away once the research presence is gone. Planning for this eventuality by training existing clinical staff can help to extend the life of a successful intervention.
- *Expect delays, obstacles, modifications.* Not only was our research team unable to exert control over a significant system-level event (ie, the timing of the sale of the nursing home), we faced additional difficulties in evaluating a program that we did not have the authority to implement. Without this authority, researchers must rely upon administrators to keep to the implementation schedule and maintain the integrity of the intervention. At the same time, it is important for researchers to remain flexible regarding their goals. We were able to view this study not only as a source of data but also as an examination of feasibility, which made the implementation dynamics interesting in their own right.

One example of our lack of authority was our inability to convince the Living Habitat organizers to build staff training into the intervention. Although the research team felt that training would be critical to the success of the intervention, those charged with implementing the intervention believed that animals and plants could have a positive impact without any deliberate training of or effort by staff. However, even if they are familiar with and enjoy animals, staff members might benefit from training in how to encourage residents to pet, groom, play with, or walk the animals. The potential tactile comfort of touch-

ing an animal's fur[33] may be missed if staff are not taught to encourage petting. Staff members may need to model how to groom or play with the animals, as these activities do not come naturally to many. Staff also could be taught tips for getting residents to reminisce about their recent or childhood pets or for getting them to converse about the animals. One nurse was often heard lamenting to the dog, Cass, "Why don't you go over there, with the residents?" For all her positive qualities, Cass could not be expected to pursue a therapeutic agenda without help from the staff. The residents, in turn, often complained that staff members treated the animals better than they treated the residents. Staff training could sensitize staff as to how their attention to the animals might be perceived as taking away from their attention to the residents. To move beyond this level of speculation, a future study might explicitly evaluate the benefits of staff training.

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Perhaps the most valuable message from this pilot study is its reinforcement of the importance of individualized care. Different patterns of results emerge when we examine the total sample or subgroups defined by preference for animals or cognitive status. We might have divided our subjects further by exploring not just their generalized attitudes toward pets but their specific attachment to the animals brought onto their unit, as this factor has been shown to influence reactions to animal interventions.[34,35] An assessment of the amount of actual contact with the animals and plants, through both care provision and simple companionship, also would have helped us to differentiate the individuals in our sample and might have revealed distinct patterns of responses. Clearly, psychosocial interventions are not one size fits all,[28] and it cannot be expected that any program will have a universally positive impact. In fact, there is no reason to expect that an intervention involving animals and plants would have a greater effect across the board than any other well-conceived psychosocial intervention.[27,35,36] The results of this pilot study should remind us once again how critical it is to assess residents' preferences and try to accommodate them if we are serious about improving residents' quality of life.

In summary, to optimize the therapeutic value of pets and plants, consider following these guidelines:

- *Recognize the importance of staff training.* Pets and plants are inherently appealing to many people; however, their optimum value may not be realized if staff are not trained to utilize them therapeutically. Animals are unlikely to follow a therapeutic agenda without guidance from staff, and staff may not be aware of how to employ animals and plants to elicit reminiscence, facilitate sensory stimulation, foster conversation, or encourage residents to take on small care responsibilities.
- *Match the intervention to the residents.* Like any intervention, pets and plants will not solve all problems for all people. Our data suggest that residents with positive attitudes toward pets and fairly intact cognitive abilities (ie, MMSE greater than 23) will respond well to pets and plants, even with only minimal staff guidance. Those with impaired cognitive abilities (ie, MMSE of 23 or lower) may well benefit from pet and plant interventions but are likely to require additional support and assistance from caregivers.
- *Accommodate the special needs of persons with dementia.* Because of problems with initiative, judgment, attention, memory, and even variability in mood, persons with dementia will require more intensive facilitation by staff in order to maximally benefit from pet and plant programs. Although these residents may not be able to independently provide care to the animals and plants, they may be enlivened and comforted by regular interactions with pets, in particular. Integrating animals and plants into the daily routine of the unit can help to provide the familiarity and consistency to which persons with dementia respond well.[31] Staff can arrange for the animals to remain near the residents to provide entertainment and reassurance and to foster a homelike atmosphere. They can use cueing, modeling, and simple instructions and break activities down into small components[28,30,31] to encourage residents with dementia to pet, play with, or simply observe the animals. Staff can stimulate reminiscence about childhood or recent pets by knowing the resident's life story and posing questions that do not require the retrieval of facts.[29]

Future research should continue to explore the role of preferences and individual differences in residents' responses to animals, plants, and other Eden Alternative elements. In particular, it will be important to identify particular cognitive and functional impairments and affective or personality qualities that may limit the posi-

tive impact of these programs and to match residents to programs accordingly. It also will be useful to conduct studies that link Thomas's proposed mechanisms to outcomes. For example, researchers could measure the actual level of spontaneity and variety in the environment, the actual amount of nurturing or care provided by residents, and the actual companionship perceived by residents to determine whether these mechanisms are related to resident outcomes.

In conclusion, the implementation of a therapeutic intervention for persons with dementia poses numerous challenges, from organizational obstacles to difficulties in determining which interventions work for whom. There are many ways in which animals and plants may be therapeutic; we have described one format, the Living Habitat. Our pilot data demonstrate that the introduction of plants and live-in animals into a nursing home unit that is home to residents with mild dementia can have a positive effect on the level of engagement of some of those residents. These data highlight the importance of matching interventions to residents' individual preferences to improve their quality of life.

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REFERENCES

1. Serpell JA. Animal companions and human well being: an historical exploration of the value of human-animal relationships. In: Fine AH, ed. *Handbook on Animal-Assisted Therapy: Theoretical Foundations and Guidelines for Practice*. San Diego: Academic Press; 2000:3–19.
2. Wilson CC, Netting FE. New directions: challenges for human-animal bond research and the elderly. *J Appl Gerontol*. 1987;6:189–196.
3. Batson K, McCabe B, Baun MM, Wilson C. The effect of a therapy dog on socialization and physiological indicators of stress in persons diagnosed with Alzheimer's disease. In: Wilson CC, Turner DC, eds. *Companion Animals in Human Health*. Thousand Oaks: Sage Publications; 1998:203–215.
4. Bernstein PL, Friedmann E, Malaspina A. Animal-assisted therapy enhances resident social interaction and initiation in long-term care facilities. *Anthrozoos*. 2000;13:213–224.
5. Corson SA, Corson EO. Companion animals as bonding catalysts in geriatric institutions. In Fogle B, ed. *Interrelations Between People and Pets*. Springfield, IL: Charles C Thomas; 1981:146–174.
6. Crowley-Robinson P, Fenwick DC, Blackshaw JK. A long-term study of elderly people in nursing homes with visiting and resident dogs. *Appl Anim Behav Sci*. 1996;47:137–148.
7. Fick KM. The influence of an animal on the social interactions of nursing home residents in a group setting. *Am J Occup Ther*. 1993;47:529–534.
8. Haughie E, Mine D, Elliott V. An evaluation of companion pets with elderly psychiatric patients. *Behav Psychother*. 1992;20:367–372.
9. Holcomb R, Jendro C, Weber B, Nahan U. Use of an aviary to relieve depression in elderly males. *Anthrozoos*. 1997;10:32–36.
10. Katsinas RP. The use and implications of a canine companion in a therapeutic day program for nursing home residents with dementia. *Activities, Adaptation, Aging*. 2000;25:13–30.
11. Savishinsky J. Pets and family relationships among nursing home residents. *Marriage Fam Rev*. 1985; 8:109–134.
12. Winkler A, Fairnie H, Gericevich F, Long M. The impact of a resident dog on an institution for the elderly: effects on perceptions and social interactions. *Gerontology*. 1989;29:216–223.
13. Thomas W. The Eden Alternative: nature, hope, and nursing homes. Sherbourne, NY: Eden Alternative Foundation; 1994.
14. Yates J. Project Pup: The perceived benefits to nursing home residents. *Anthrozoos*. 1987;1:188–192.
15. Folstein MF, Folstein SE, McHugh PR. "Mini-Mental State": a practical method for grading the cognitive

state of patients for the clinician. *J Psychiatr Res.* 1975;12:189–198.
16. Templer DI, Salter CA, Dickey S, Baldwin R, Veleber DM. The construction of a pet attitude scale. *Psychiatr Rec.* 1981;31:343–348.
17. Logsdon RG, Gibbons LE, McCurry SM, Teri L. Quality of life in Alzheimer's disease: patient and caregiver reports. *J Ment Health Aging.* 1999;5:21–32.
18. Meeks S, Gibson LL, Walker KP. "Negative symptoms," health, depression, and level of functioning among nursing home residents. *Int J Geriatr Psychiatry.* 1992;7:203–209.
19. Pearlin LI, Schooler C. The structure of coping. *J Health Soc Behav.* 1978;19:2–21.
20. Russell DW. UCLA Loneliness Scale (version 3): reliability, validity, and factor structure. *J Pers Assess.* 1996;66:20–40.
21. Noldus LP. The Observer: a software system for collection and analysis of observational data. *Behav Res Methods Instrum Comput.* 1991;23:415–429.
22. Lawton MP, Van Haitsma K, Klapper J. Observed affect in nursing home residents with Alzheimer's disease. *J Gerontol B Psychol Sci Soc Sci.* 1996;51B:P3–P14.
23. Folstein M, Anthony JC, Parhad I, Duffy B, Gruenberg EM. The meaning of cognitive impairment in the elderly. *J Am Geriatr Soc.* 1993;33:228–235.
24. Uhlmann RF, Larson EB. Effect of education on the Mini-Mental State Examination as a screening test for dementia. *J Am Geriatr Soc.* 1991;39:876–880.
25. Woloy EM. *The Symbol of the Dog in the Human Psyche.* Wilmette, IL: Chiron Publications; 1990.
26. Friedmann E, Katcher AH, Thomas SA, Lynch JJ, Messent PR. Social interaction and blood pressure: influence of animal companions. *J Nerv Ment Dis.* 1983;171:461–465.
27. Beck AM, Katcher AH. A new look at pet-facilitated therapy. *J Am Vet Med Assoc.* 1984;184:414–421.
28. Hellen CR. *Alzheimer's Disease: Activity-Focused Care.* Boston: Butterworth Heinemann; 1998.
29. Bell V, Troxel D. "Knack" of Alzheimer's care. *Caring.* 1997;16:26–39.
30. Bowlby C. *Therapeutic Activities with Persons Disabled by Alzheimer's Disease and Related Disorders.* Gaithersburg, MD: Aspen Publishers; 1993.
31. Zgola JM. *Care That Works: A Relationship Approach to Persons with Dementia.* Baltimore: Johns Hopkins University Press; 1999.
32. Ruckdeschel K, Van Haitsma K. Research with nursing home staff: challenges and solutions. *J Ment Health Aging.* 1997;3:209–219.
33. Vormbrock JK, Grossberg JM. Cardiovascular effects of human–pet dog interactions. *J Behav Med.* 1988;11:509–517.
34. Baun MM, Bergstrom N, Langston NF, Thoma L. Physiological effects of human/companion animal bonding. *Nurs Res.* 1984;33:126–130.
35. Boldt MA, Dellmann-Jenkins M. The impact of companion animals in later life and considerations for practice. *J Appl Gerontol.* 1992;11:228–239.
36. Hendy HM. Effects of pet and/or people visits on nursing home residents. *Int J Aging Hum Dev.* 1987; 25:279–291.