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Post-Occupancy Evaluation of Therapeutic Gardens in a
Multi-level Care Facility for the Aged

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Abstract

A post-occupancy evaluation of eight therapeutic gardens at a multi-level care facility was conducted. Staff, volunteers, and families of residents were surveyed, and residents were interviewed. Of the 190 participants, 96.5% either said they strongly liked or liked the gardens. More than 80% believed that four of the five overall design goals of the gardens were achieved. However, participants' evaluations of specific garden features varied, and staff members were more critical than others. About 75% of participants said the money to build the gardens was well-spent. About 20% offered extra comments. Implications for the planning of therapeutic gardens are discussed.

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The belief that a view of nature or experiencing nature enhances well-being is widespread, and there is considerable empirical support for the idea. In his classic study, for example, Ulrich (1984) showed that surgery patients recovered faster when they had a view of nature from their window, compared to patients who had a view of brick buildings. Ulrich advocates a "biophilia approach" (1991, 1993), the notion that humans have, through a long evolution mostly spent in natural surroundings, adapted to the natural environment. Because natural surroundings are genetically familiar, we feel refreshed in them.

Stephen and Rachel Kaplan (1989) believe that nature is restorative and refreshing because it is inherently fascinating; we pay involuntary attention to it, in contrast to the forced (and therefore taxing) attention that we pay to everyday built settings and our tasks within them.

One place to experience nature in urban settings is the garden. Rachel Kaplan (1973) conducted a questionnaire survey to investigate the psychological aspects of gardening, and identified three benefits that participants believed they were obtaining from gardening: the primary gardening experience itself as a nature experience, sustained interest, and tangible outcome (e.g., flowers and vegetables).

Others assert that gardening is helpful for hospital

patients and nursing home residents in particular. For example, Sullivan (1979) pointed out that gardening could motivate patients to develop responsibility in the care of living things, and improve self-esteem, self-confidence, and social skills. Burgess (1990) observed that gardening offers opportunities for people to be of service to others, and provides mental, visual, and auditory stimulation. Gardening activities can be adapted to meet the needs and capabilities of individual residents, so that everyone can benefit from the activities at his or her own level (Catlin et al., 1992; Riordan & Williams, 1988). Facilities for Alzheimer's disease patients have been designed and built utilizing the putative therapeutic effects of garden/gardening (Hoover, 1995; Kromm & Kromm, 1985; Widdes, 1995).

However, few studies have evaluated the effects of gardens in healthcare facilities. Among the few, Cooper Marcus and Barnes (1995) reported four case studies of healthcare facility gardens in California. They used visual analysis of the physical site, systematic non-intrusive behavioral observation, and interviews of garden users. The interview data revealed that, after spending time in the gardens, over 75% reported feeling more relaxed and calmer, and 25% felt refreshed and rejuvenated.

Cooper Marcus and Barnes (1995) also compared two mood shifts, "pleasing drop in energy level" and "spiritual uplift," in garden user groups (staff, patients, and visitors) and found that visitors were most likely to experience a pleasing drop in their energy level and patients were more likely to report a

spiritual uplift. The authors also pointed out the need for more empirical research to evaluate gardens in healthcare facilities to develop appropriate design recommendations.

One technique for evaluating built environments is post-occupancy evaluation (POE), a set of methods for examining the effectiveness of occupied environments for human users (Zimring & Reizenstein, 1980). The purpose of this study is to conduct a POE of therapeutic gardens in a multi-level care facility.

The site we selected opened in 1995 and has eight courtyard gardens. The overall goals of the facility's gardens are to provide residents (a) an opportunity to enjoy nature in a safe outdoor environment and (b) a place of beauty and respite where residents and others can relax with family members and friends. The gardens also include various safety and motivational features, such as wheelchair accessible level pathways, handrails around the garden perimeter, use of non-toxic plants, raised garden beds, and protection from the sun and wind. See Figures 1, 2, and 3.

Figures 1 to 3 about here

However, after the gardens had been in use for a reasonable period, a post-occupancy evaluation was needed to determine whether the therapeutic gardens had been helpful for users.

Thus, this study investigated the reported use of the gardens by volunteers, families of the residents, and residents

who were cognitively able to be interviewed, and users' assessments of the degree to which the goals set for the gardens have been met, the gardens' safety and motivational features, and whether the cost of building the gardens was worthwhile. Our overall hypothesis is that the gardens meet their design goals and were, in the views of the residents, staff, family members, and volunteers, worth the considerable sum they cost to construct.

Method

Setting

The site we selected is The Lodge at Broadmead (TLAB), in Victoria, British Columbia. TLAB replaced an older facility and opened in 1995. TLAB is a multi-level care facility with 225 beds: "A"-level for relatively mildly cognitively-impaired residents, and "B"-level for more severely cognitively-impaired residents. Eight courtyard therapeutic gardens were constructed on-site, each of which has its own design theme and goal.

Participants

The study included four TLAB user groups: cognitively able residents, one member of each resident's family (including residents who were unable to be interviewed), staff members, and volunteers. The average age of the residents is in the mid-70s for males and in the early 80s for females; 57% of the residents are male. Of the 225 residents, 67 were approached for interviews because they were considered by the staff to be cognitively able to answer the interview questions. The residents were

individually interviewed, because it is often difficult for them to read and complete questionnaires by themselves, even if they are able to understand and answer the questions. One of us (YH) visited the rooms of the residents with a staff member to ask for their participation because the residents are familiar with the staff.

In addition, all 298 TLAB staff, 160 volunteers, and 225 members of residents' families (one per resident) were given questionnaires that closely paralleled the interview.

The Questions

The 25-item questionnaire/interview schedule was based in part on the design goals of the gardens, which were derived from a programming (pre-design) survey. The present study was, in part, a post-occupancy evaluation of whether those pre-construction goals were met in the gardens as built.

Respondents were also asked about their use of the garden (how often, when, length of their visits to the garden, and what they usually do in the garden). Their overall ratings of the gardens were queried on 4-point scales (1 = strong dislike, 2 = dislike, 3 = like, and 4 = strong like). They were asked if they thought the gardens achieved the overall goals on 4-point scales (1 = excellent, 2 = good, 3 = fair, and 4 = poor).

Questions were also asked about each of twelve safety and motivational features--whether these were effective in helping residents as they were intended to, in "yes," "no," and "don't know" response format--and comments were invited. Respondents

were also asked whether any features should be added to or removed from the gardens. They were asked whether they thought the substantial cost of building the gardens (approximately \$700,000 for all 8) was worthwhile, and if they did not, what they thought the money and space should have been used for instead.

TLAB's policy was that staff members were not to use the gardens on their own during their breaks, although they could escort a resident into the gardens as part of their work, so staff members were not asked to complete the portion of the questionnaire concerning their own use and rating of the gardens. (The staff no-use policy is under review subsequent to our study.)

Procedure

Questionnaires were given to all staff in their paychecks. Volunteers and residents' family members received the questionnaire by mail. All potential participants were assured in the cover letter that their anonymity was protected; they were asked to mail the completed questionnaire to the researchers at our university in a pre-stamped, pre-addressed envelope. Residents, as noted earlier, were interviewed individually.

Results

Eighty of 298 staff members (average age, 41.1; 27.9% male), 36 of 160 volunteers (average age, 52.3; 19.4% male), and 57 of 220 family members (average age, 60.3; 23.1% male) returned the questionnaires. The overall average return rate was 25.5%. Among

67 residents who were approached for an interview, 17 agreed to participate in the interview (average age, 77.3; 41.2% male, participation rate 25.4%). The following analyses are based on the 190 interviews and questionnaires obtained.

Use of the gardens

Respondents were asked how often they simply spent time looking into the gardens from elsewhere (e.g., from their rooms, from indoor hallways with windows, from the dining hall, etc.), and 46.7% said they do so "often," 43.4% said "sometimes," and 9.5% said "never".

Among the 110 volunteer, family, and resident respondents, 83.5% said they had visited at least one of the eight gardens. Cross-tabulation revealed that significantly fewer volunteers than family and residents said they had visited the gardens, $\chi^2(2, 110) = 12.02, p < .005$. Table 1 shows the frequency, time, and length of the visits by users.

 Insert Table 1 about here

Exactly one-third visited the gardens weekly, 18.0% did so monthly, and 15.7% did so two to four times a week. Almost 70% of the respondents visited the gardens in the afternoon.

Table 2 shows how users reported spending their time in the gardens.

 Insert Table 2 about here

The three major garden activities reported were sitting, walking, and visiting with others. Although users are permitted to engage in actual gardening, this is fairly uncommon because many residents are unable to do so and because the gardens are fully planted, maintained by a professional gardener, and intended to be experienced rather than worked in. Significantly more family members than volunteers or residents used the gardens to sit, $\chi^2(2, 110) = 19.26, p < .001$, to walk, $\chi^2(2, 110) = 16.16, p < .001$, and to connect with nature, $\chi^2(2, 110) = 14.48, p < .001$. No group differences were found in the use of the gardens to visit with others or to reflect.

User assessments of the gardens

Respondents were asked which features or aspects of the gardens they most liked or disliked. Among the "likes," 52.7% said they liked flowers most, 24.5% said trees, and 12.7% mentioned seating arrangements (see Table 3).

 Insert Table 3 about here

Only 6.4% of the users said there was something they disliked in the garden, and the remainder replied that there was nothing they disliked.

The overall rating of the gardens by users on the four-point

evaluation scale was as follows: "strongly like" 54.1%, "like" 42.4%, "dislike" 1.2%, "strongly dislike" 2.4%. Thus, 96.5% of those who responded said they either "strongly like" or "like" the gardens.

Evaluation of the garden goals

Table 4 shows the degree to which users think the gardens achieve their 5 main design goals.

 Insert Table 4 about here

Except for the goal to "provide a place to maintain the hobby of gardening," over 80% of the respondents judged that the gardens have achieved their goals. However, responses were not equally favorable among all groups. Cross-tabulation analyses show that significantly more staff than other groups used the terms "fair" and "poor" (as opposed to "good" or "excellent") to describe how well four of the five goals were met by the gardens: to provide a safe outdoor environment, $\chi^2(3, 168) = 17.84, p < .001$, to provide a place for reflection, $\chi^2(3, 167) = 8.68, p < .05$, to provide a place for relaxation, $\chi^2(3, 170) = 9.64, p < .05$, and to provide a place to maintain the hobby of gardening, $\chi^2(3, 144) = 27.13, p < .001$.

Evaluations of garden features

Table 5 summarizes the respondents' assessments of various garden features' ability to satisfy residents' safety needs and to motivate residents to use the gardens.

 Insert Table 5 about here

About 70% indicated that wheelchair-accessible pathways, chairs, and raised garden beds met residents' safety needs. About 65% judged that handrails, water features, and use of non-toxic plants did so. The three features that respondents were less inclined to approve as meeting residents' safety needs were trees for shade (16.4% non-approval), evening lighting (15.2% non-approval), and water features (9.7% non-approval).

The motivation questions were difficult for the respondents, perhaps understandably so. Many respondents answered "don't know" for all of the features. For example, over 60% said they "didn't know" whether the color of the pavement or the use of non-toxic plants motivated residents to use the gardens. However, about 50% said that the chairs, raised garden beds, and water features do, in their estimation, motivate residents to use the gardens. About 20% responded that the evening lighting, wheelchair-accessible pathways, trees for shade, and handrails do not motivate residents.

Once again, cross-tabulation analyses revealed that staff evaluations were significantly more critical than those of non-staff (volunteers, families, and residents) of most features; see Table 6. [Insert Table 6 about here]

Table 7 describes the frequency of voluntary comments offered by respondents on the gardens' features.

 Insert Table 7 about here

The features that received the most comments were wheelchair-accessible pathways, evening lighting, trees for shade, handrails, and barbecues. Significantly more staff members offered comments about two of these features, evening lighting, $\chi^2(1, 185) = 4.10, p < .05$, and trees for shade, $\chi^2(1, 166) = 13.39, p < .001$. As Table 8 shows, about 40% of those who offered comments on evening lighting described it as insufficient. Comments on trees for shade were almost exclusively (96.2%) about the insufficient shade provided by the existing trees.

Table 8 reports the contents of the other comments about each feature; most tended toward the negative.

 Insert Table 8 about here

Forty percent of the comments on wheelchair accessible pathways concerned the difficult accessibility of the pathways. Most comments about the barbecue (73.7%) asserted that it was not used enough. The garden handrails were said to be not used (34.8%) or to cause accidents (21.7%). Almost 25% of those who offered comments on the raised garden beds said that they were not designed for residents, and 19% of the comments stated that residents cannot work in the gardens. It should be recalled that these are percentages of those who offered comments, not

percentages of all respondents. Typically, less than a fifth of respondents volunteered comments.

Table 9 is a list of features that users wanted either to add or to remove from the gardens. About 28% suggested that

Insert Table 9 about here

something should be added; a little over 11% said there was something that should be removed. The most frequently requested addition was more shade (20.7%), followed by a roof over the garden for rain (15.1%). Other additions varied among participants, reflecting individual tastes.

The most popular specific targets for removal were the barbecue and the smoking area (both 19.0%). Most other features nominated for removal by the respondents were selected mainly because of their potential hazard to residents (e.g., rocks, swing chairs).

Respondents were also asked a more global question about garden features as a whole and 17.6% offered comments. Table 10 lists the contents of the comments.

Insert Table 10 about here

The most frequent statement was that the features were not designed for the residents (23.5%), followed by the comment that the gardens are too busy and too confined (14.7%). Calls for

automatic doors and compliments that the gardens are "pretty and well planned" were each made by 11.7% of the respondents who offered comments.

Are the gardens worth the money?

In response to the question, "Do you think the money was well spent?", 39.9% of those who answered the question said "definitely yes," 34.4% said "yes," 14.2% said "no," and 10.9% said "definitely no." Cross-tabulation showed that significantly fewer staff said "definitely yes," and more staff said "no" than volunteers, families and residents, $\chi^2(3, 182) = 16.20, p < .001$.

About a third of those who answered the question added comments; significantly more respondents who answered the "worth" question negatively added comments, $\chi^2(3, 182) = 22.06, p < .001$. The most common theme was that the gardens are not used enough by the residents (35.0%), followed by the comments that the gardens are therapeutic and improve the well-being of the residents (16.7%). About 8% indicated that the "fancy landscaping" was not needed for the residents, and 6.7% said certain garden features could be hazardous for the residents (see Table 11).

 Insert Table 11 about here

About 22% of the 190 respondents suggested how the money and space should have been used, had it not been spent on the gardens. Almost half of those who offered comments said they would rather have a large open area with lawn where residents and

families could sit and have a picnic together. Another 22.5% said they would rather have a similar large space for residents, but indoors so it can be used all year around (see Table 11).

Asked whether they think residents are enjoying the gardens, based on their observations, 29.1% of the respondents said "definitely yes", 50.0% said "yes", 12.8% said "no", 3.5% said "definitely no", and 2.9% said "yes and no." Of the 45 respondents who offered comments on this answer, about 38% said only those who can use the gardens enjoy them, and 17.8% said they rarely see residents in the gardens.

Discussion

Whenever a large expenditure on physical facilities is made, a post-occupancy evaluation (POE) should be conducted. POEs help determine whether the money was well spent, where the facility might be improved through renovation, provide a test of whether the design goals were met, and offer guidelines for future developments of a similar nature. This POE investigated the eight therapeutic gardens in a multi-level care facility. It provided a picture of use patterns and assessments of the gardens by all those concerned: residents, staff, family members, and volunteers.

The largest percentage of users visits the gardens weekly, in the afternoon, and stays less than 30 minutes. They visit the gardens with others, and usually sit or walk around. More than half the users liked flowers in the gardens most, followed by trees. Almost half the respondents spend time looking into the

gardens "often" and about the same percentage of them do so "sometimes." Most respondents (96.5%) either "strongly like" or "like" the gardens.

It is noteworthy that more family members (per capita) report using the gardens to sit, walk and connect with nature than do residents or volunteers. Because volunteers are usually there to work, and generally to carry out a specific job, they may not have much time to visit the gardens. In contrast, family members who visit the facility to see their family member seem to have more time for themselves. Perhaps going into the garden to connect with nature provides them a good opportunity to be relieved from the stress of having ailing family members.

The great majority of users (over 80%) judged that most of the gardens' design goals were well met. However, their evaluation of specific garden features varied widely. The desire for more shade topped the list of things to be added. Considering this study was done in winter, when the need for shade is minimal in this region, the need for shade in the summer must be very strong.

Staff members tended to be more critical when they evaluated garden features. Given that staff members are on-site more than volunteers and family members, and work every day caring for the residents, they may be the most familiar with the advantages and disadvantages of the various garden features. Thus, their views must be given serious consideration. On the other hand, staff members are not allowed to use the gardens, which may limit the

value of their comments and partly explain their more negative evaluations. TLAB is re-considering this policy.

Nevertheless, on the whole, respondents believe the gardens were a good investment: over 70% said the money was well spent. Of those who did not think so, 76.1% offered comments on how the money/space should have been used; about half of those would rather have seen a large grassy space, and some wished to see the gardens covered.

Table 12 lists the questions that received most comments from the users. It therefore indicates which topics users were most interested in communicating about, and possibly, where most perceived problems exist.

Insert Table 12 about here

The question, "Do you think the money was well-spent?" attracted the most comments. As usual, users were not given an opportunity for input before this study was done, and this question seemed to have triggered opinions among the respondents.

Most comments tended to be negative. Perhaps those who have negative opinions about the gardens were more likely to return the questionnaire, and more likely to offer comments. Therefore, the extent to which we can generalize their opinions to all users of the gardens is not clear. Some participants left long comments in their questionnaires.

The lists of comments (Tables 8 to 11) reveal two main

trends. First, some design features that were supposed to help cognitively impaired residents were not seen (by those who bothered to comment) to be working well. Instead, rather ironically, they were seen as hazardous to the residents. For example, the handrails that are supposed to help residents get around the gardens were viewed as dangerous (residents might become wedged in the rail gaps, or fall over it). Water features that residents do enjoy watching also can be a potential hazard for them, because cognitively impaired residents might climb or fall into the water. A couple of such incidents have actually occurred at the facility; this may make staff members more critical of these features. Of course, the number of these comments does not necessarily reflect the frequency of the incidents. TLAB has now extended the handrails so that this is less likely to occur.

A second theme was that the gardens and some of the features were not utilized enough by residents. This was the most common comment by those respondents who thought the money was not well spent. Apparently, based on the comments, this is the case partly because not enough staff or volunteers are available to take residents into the gardens. For example, one respondent pointed out that most residents are not self-mobile, and that they would not be able to utilize the wheelchair-accessible pathways unless staff or volunteers help them. Also, some respondents said that cognitively impaired residents were not able to enjoy the barbecue in the garden by themselves. Probably this is the reason

that the barbecue topped the list of features that should be removed.

Another reason for poor utilization seems to be poor accessibility to the gardens, such as the lack of automatic doors (the facility is gradually installing them now), a lack of signs orienting the way to the gardens, and a lack of awareness and encouragement to use the gardens. One family member said in her comment, "I would love to use the gardens if I knew how to get there!" Perhaps a well-designed signage system would increase use of the gardens (cf. Levine, 1982).

Finally, accessibility complaints may reflect a perception that the gardens are too decorative and insufficiently participatory. Some residents are not able to garden, and others have plants in their rooms. However, it may be that more garden space could be set aside for self-initiated gardening, as opposed to appreciative viewing or gardening that is guided by the horticultural therapist.

Comments about how the money should have been used reflect what users thought about the features and what they would prefer. Almost 70% of those who offered comments wished to have a large, open space without any features, either outside or inside, just to sit and relax.

Some limitations of this study should be mentioned. First, its timing was not ideal for generalizing the results across the seasons. Because it was conducted in winter, there were fewer users of the gardens than in other seasons, and responses to the

usage questions probably were affected by that. For example, when asked, "Do you think the residents are enjoying the gardens, based on your observation?", 77.5% of participants answered either that gardens were not used enough, or that they rarely saw residents in the gardens. During the summer, the answers might have been different.

Second, had naturalistic observation been added to the questionnaire survey, more accurate information on the use of the gardens would have been provided. However, it was difficult to arrange for naturalistic observation for this study due to lack of resources. TLAB was also concerned about conducting naturalistic observations in a non-public space (i.e., the facility is "home" for residents and observers in the gardens might be considered an intrusion in their private space).

Third, the number of the residents who were able to participate was smaller than we hoped (7.7% of all residents). Because the gardens were designed mainly for the residents, evaluation of the gardens should, ideally, involve more residents. However, when most residents are cognitively impaired, collecting their opinions is difficult. Among those who did not participate in an interview, 71.6% declined because they said they did not use the gardens. It is not clear whether they never use the gardens or they were not using the gardens when the study was conducted (in winter).

On the positive side, the study did manage to collect the opinions of 190 users about the gardens. Given that there has not

yet been much evaluation of therapeutic gardens for the aged, this study may be seen as a first step toward more sophisticated evaluation studies. Also, the study was able to identify various problems that may need attention in planned or existing gardens. Finally, as some respondents pointed out in their comments, the survey helped to increase users' awareness about the gardens, and to encourage them to become more involved in the improvement of the gardens.

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Author Notes

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Table 1

Garden Visits: Frequency, Time of Day, and Length

| Frequency: | | Time of day: | | Length (minutes): | |
|------------|------|--------------|------|-------------------|------|
| | % | | % | | % |
| Weekly | 33.7 | Afternoon | 65.6 | < 15 | 46.6 |
| Monthly | 18.0 | Morning | 13.3 | 15-30 | 34.1 |
| 2-4/week | 15.7 | Morning and | | 30-60 | 10.2 |
| Daily | 6.7 | afternoon | 13.3 | > 60 | 2.3 |
| 3-4 Months | 5.7 | Other | 7.8 | Other | 6.8 |
| Annually | 3.4 | | | | |
| Other | 16.8 | | | | |
| Total | 100 | | 100 | | 100 |

Table 2

Use of the Gardens by Different Groups

| Activity | Volunteers | Family | Residents | All groups | p< |
|---------------------|------------|--------|-----------|------------|------|
| | % | % | % | % | |
| Sit | 16.7 | 59.6 | 23.5 | 40.0 | .001 |
| Visit | 33.3 | 43.9 | 17.6 | 36.4 | n.s. |
| Walk | 19.4 | 53.6 | 11.8 | 35.8 | .001 |
| Connect with nature | 2.8 | 28.1 | 0 | 15.5 | .001 |
| Reflect | 8.3 | 15.8 | 11.8 | 12.7 | n.s. |

Note. The p values are based on chi-square analyses. Family column totals more than 100% because respondents reported engaging in multiple activities.

Table 3

User Preferences for Garden Features

| Feature: | <u>Like</u> | | |
|---------------------|-------------|--------|-------|
| | Most | Second | Third |
| | % | % | % |
| Flowers | 52.7 | 11.8 | 2.7 |
| Trees | 24.5 | 17.3 | 4.5 |
| Seating arrangement | 12.7 | 2.7 | 9.1 |
| Streams | 10.9 | 8.2 | 8.2 |
| Birds/fish | 6.4 | 2.7 | 8.2 |
| Barbecue | 4.5 | 2.7 | 4.5 |
| Garden ornaments | 4.5 | 1.8 | 2.7 |

Table 4

User Perception of Overall Goals of the Gardens

| Goals: | Excellent % | Good % | Fair % | Poor % | p < |
|--|----------------|-----------|-----------|-----------|------|
| Provide a safe outdoor environment | | | | | |
| Staff | 37.5 | 35.0 | 17.5 | 10.0 | |
| Non-staff | 56.8 | 38.6 | 2.3 | 2.3 | |
| Total | 47.6 | 36.1 | 9.5 | 6.0 | .001 |
| Provide a place for reflection | | | | | |
| Staff | 35.0 | 38.8 | 21.3 | 5.0 | |
| Non-staff | 46.0 | 44.8 | 6.9 | 2.3 | |
| Total | 40.7 | 41.9 | 13.8 | 3.6 | .05 |
| Provide a place for relaxation | | | | | |
| Staff | 40.0 | 37.5 | 15.0 | 7.5 | |
| Non-staff | 53.3 | 40.0 | 5.6 | 1.1 | |
| Total | 47.1 | 38.8 | 10.0 | 4.1 | .05 |
| Provide a place for socialization | | | | | |
| Staff | 35.0 | 43.8 | 15.0 | 6.3 | |
| Non-staff | 50.6 | 36.0 | 10.1 | 3.4 | |
| Total | 43.2 | 39.6 | 12.4 | 4.7 | n.s. |
| Provide a place to maintain the hobby of gardening | | | | | |
| Staff | 15.0 | 30.0 | 35.0 | 20.0 | |
| Non-staff | 39.2 | 32.4 | 5.4 | 9.5 | |
| Total | 26.6 | 31.2 | 20.8 | 14.9 | .001 |

Table 5

User Evaluation of Garden Features for Resident Safety and as Motivational Agents to Use the Gardens

| Feature: | <u>Meets Safety Needs</u> | | | <u>Motivates to Use</u> | | |
|---------------------------------|---------------------------|------|------------|-------------------------|------|------------|
| | Yes | No | Don't know | Yes | No | Don't know |
| | % | % | % | % | % | % |
| Wheelchair-accessible pathways | 79.3 | 4.9 | 15.8 | 44.9 | 23.4 | 31.7 |
| Chairs | 71.8 | 7.1 | 21.2 | 53.1 | 15.9 | 31.0 |
| Raised garden beds | 69.5 | 6.1 | 24.4 | 49.0 | 16.3 | 34.6 |
| Handrails to guide Residents | 65.7 | 7.9 | 26.4 | 39.0 | 20.8 | 40.3 |
| Water features to attract birds | 64.2 | 9.7 | 26.1 | 52.3 | 13.4 | 34.2 |
| Use of non-toxic plants | 63.8 | 1.2 | 35.0 | 20.3 | 18.9 | 60.8 |
| Trees for shade | 58.2 | 16.4 | 25.5 | 41.5 | 22.4 | 36.1 |
| Garden ornament for orientation | 52.8 | 8.7 | 38.5 | 30.5 | 18.5 | 51.0 |
| Color of the paving | 47.5 | 5.6 | 46.9 | 23.2 | 15.9 | 61.0 |
| Barbecue | 34.2 | 8.6 | 45.8 | 27.0 | 14.2 | 58.9 |
| Evening lighting | 28.1 | 15.2 | 56.7 | 19.5 | 24.0 | 56.5 |

Table 6

Comparison of Responses About Garden Features: Staff versus Non-staff

| Feature: | <u>Yes</u> | | <u>No</u> | | χ^2 | p < |
|-------------------------------|------------|-----------|-----------|-----------|----------|------|
| | Staff | Non-staff | Staff | Non-staff | | |
| | % | % | % | % | | |
| Wheelchair accessible pathway | | | | | | |
| safety | 73.4 | 83.8 | 10.1 | 1.0 | 8.41 | .05 |
| motivation | 30.7 | 56.5 | 38.7 | 10.9 | 19.87 | .001 |
| Handrails | | | | | | |
| safety | 64.6 | 66.7 | 15.2 | 2.0 | 11.75 | .005 |
| motivation | 29.2 | 47.1 | 34.7 | 9.2 | 16.19 | .001 |
| Lighting for the evening | | | | | | |
| safety | 26.3 | 29.7 | 26.3 | 5.5 | 14.49 | .001 |
| motivation | 10.7 | 27.8 | 40.0 | 8.9 | 22.68 | .001 |
| Color of the paving | | | | | | |
| safety | 46.3 | 48.5 | 8.8 | 3.1 | 2.64 | n.s. |
| motivation | 19.2 | 26.7 | 24.4 | 8.1 | 8.29 | .05 |
| Raised garden beds | | | | | | |
| safety | 73.4 | 67.0 | 10.9 | 3.0 | 7.57 | .05 |
| motivation | 40.6 | 55.1 | 28.1 | 7.9 | 11.29 | .005 |
| Use of non-toxic plants | | | | | | |
| safety | 75.0 | 56.6 | 1.6 | 1.0 | 6.17 | .005 |
| motivation | 10.0 | 27.3 | 35.0 | 8.0 | 19.60 | .001 |

Table continues

| Feature: | <u>Yes</u> | | <u>No</u> | | χ^2 | p< |
|------------------|------------|-----------|-----------|-----------|----------|------|
| | Staff | Non-staff | Staff | Non-staff | | |
| | % | % | % | % | | |
| Trees for shade | | | | | | |
| safety | 50.0 | 63.1 | 27.4 | 9.7 | 8.88 | .05 |
| motivation | 24.1 | 52.8 | 41.4 | 10.1 | 22.31 | .001 |
| Water features | | | | | | |
| safety | 62.9 | 65.0 | 17.7 | 4.9 | 8.37 | .05 |
| motivation | 42.4 | 58.9 | 23.7 | 6.7 | 9.58 | .005 |
| Garden ornaments | | | | | | |
| safety | 40.3 | 60.6 | 19.4 | 2.0 | 16.23 | .001 |
| motivation | 24.2 | 34.8 | 27.4 | 12.4 | 5.96 | n.s. |
| Chairs | | | | | | |
| safety | 63.5 | 77.4 | 11.1 | 4.3 | 4.38 | n.s. |
| motivation | 50.8 | 54.8 | 19.7 | 13.1 | 1.14 | n.s. |
| Barbecue | | | | | | |
| safety | 40.0 | 30.4 | 15.0 | 4.3 | 8.38 | .05 |
| motivation | 24.1 | 28.9 | 20.7 | 9.6 | 3.45 | n.s. |

Table 7

Percent of Participants Who Offered Comments About Various Garden Features

| | Staff | Non-staff | Total | p < |
|-------------------------|-------|-----------|-------------|------|
| | % | % | % | |
| Wheelchair accessible | | | | |
| pathways | 25.0 | 14.2 | 18.8 | n.s. |
| Lighting | 23.8 | 12.4 | 17.3 (59.4) | .05 |
| Trees for shade | 29.0 | 7.7 | 15.7 (69.2) | .001 |
| Handrails | 12.5 | 9.6 | 12.1 | n.s. |
| Barbecue | 15.9 | 8.7 | 11.4 | n.s. |
| Raised garden beds | 12.5 | 8.6 | 11.1 | n.s. |
| Chairs | 15.9 | 7.8 | 10.8 | n.s. |
| Garden ornaments | 11.1 | 8.6 | 9.5 | n.s. |
| Water features | 12.6 | 5.8 | 8.4 | n.s. |
| Use of non-toxic plants | 9.4 | 4.8 | 6.5 | n.s. |
| Color of the paving | 1.3 | 2.9 | 2.2 | n.s. |
| <u>Other comments</u> | | | | |
| Features to be added | 41.3 | 26.2 | 31.9 (49.1) | .05 |
| How should be spent? | 34.6 | 12.4 | 21.9 (67.5) | .001 |
| Features to be removed | 19.0 | 8.7 | 12.7 | n.s. |

Notes. Numbers in parentheses indicate the percentage of comments offered by staff, where the group difference was significant; non-staff includes volunteers, family, and residents.

Table 8

Comments About Each Feature of the Gardens, Based on a Content Analysis

| Feature | Number of comments | Percent within comment |
|---------------------------------|--------------------|------------------------|
| Wheelchair accessible pathway | 35 | |
| difficult accessibility | | 40 |
| design problem | | 22.8 |
| residents can't use them | | |
| without being supervised | | 17.1 |
| not used enough | | 8.6 |
| other | | 8.6 |
| Lighting in the evening | 32 | |
| not enough | | 40.6 |
| gardens not used in the evening | | 40.6 |
| lights not on in the evening | | 12.5 |
| lights add a lot | | 6.3 |
| Trees for shade | 26 | |
| not enough shade | | 96.2 |
| have soothing effect | | 3.8 |

Table continues

| Feature | Number of comments | Percent within comment |
|--|--------------------|------------------------|
| Handrail | 23 | |
| is not used | | 34.8 |
| residents stuck in the handrail gap, fell over, etc. | | 21.7 |
| design problem | | 17.4 |
| other | | 26.1 |
| Raised garden beds | 21 | |
| design problem | | 23.8 |
| residents can't work in the garden | | 19.0 |
| cause resident's behavioral problems | | 19.0 |
| good for those who do gardening | | 14.3 |
| helpful only on A level | | 14.3 |
| other | | 9.5 |
| Barbecue | 19 | |
| not used enough | | 73.7 |
| residents enjoy the occasion | | 21.0 |
| other | | 5.2 |

Table continues

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| Feature | Number of comments for the feature | Percent within comment |
|--|--|------------------------------|
| Chairs | 18 | |
| not enough | | 33.3 |
| are good | | 22.2 |
| are too hard | | 16.7 |
| swing chairs are dangerous | | 11.1 |
| other | | 16.6 |
| Garden ornaments | 16 | |
| are not selected for residents | | 25.0 |
| are never noticed | | 25.0 |
| are good for orientation | | 12.5 |
| other | | 31.3 |
| Water features | 14 | |
| residents climb into the water | | 35.7 |
| residents like watching pond, stream, and gold fish | | 28.5 |
| not many birds attracted | | 14.3 |
| other | | 21.4 |
| Use of non-toxic plants | 11 | |
| Good as residents might eat them | | 45.5 |
| Make no difference as residents do not know it | | 54.5 |

Note. Comments for the color of the paving is omitted as there were only 4.

Table 9

Features that Participants Wished to Add To or Remove From the Gardens

| Add (<u>n</u> = 53) | % | Remove (<u>n</u> = 21) | % |
|---|------|-------------------------|------|
| More shade | 20.7 | Barbecue | 19.0 |
| Roof or cover for the garden | 15.1 | Smoking area | 19.0 |
| Animals | 9.4 | Swing chair | 9.5 |
| Bird feeder, bird bath | 5.6 | All the rocks | 9.5 |
| Softer environment, like lawn | 5.6 | Anything from pathway | 9.5 |
| Better accessibility | 5.6 | Weeds | 9.5 |
| more vegetable garden | 5.6 | Others | 19.2 |
| Sign for way-finding, identification tag | 5.6 | | |
| Others | 26.4 | | |

Table 10

Content of Comments About Features of the Garden as a Whole

| Comments (<u>n</u> = 34) | % |
|---|------|
| Features are not designed for residents | 23.5 |
| Gardens are too busy, too confined | 14.7 |
| Need automatic door | 11.7 |
| They are pretty and well planned | 11.7 |
| Others | 39.4 |

Table 11

Comments About the Cost of Building the Gardens and How the Money/space Should Have Been Used If Not for Gardens

| <u>Cost of building the gardens (n = 60)</u> | | | |
|--|------|---------------------|------|
| Not well-spent: | % | Well-spent: | % |
| Not used enough | | Helps well-being | |
| by residents | 35.0 | of residents | 16.7 |
| Too much spent on | | If enough staff and | |
| fancy landscaping | 8.3 | volunteers help | |
| | | residents go out | 3.3 |
| B-level gardens are hazardous | 6.7 | Other reasons | 11.7 |
| Let staff use gardens | 5.0 | | |
| Smokers dominate the garden | 3.3 | | |
| Other reasons | 10.0 | | |

How should the money/space have been used? (n = 40)

| Content of comments: | % |
|---|------|
| Grassy, and open large area to sit, have a picnic, etc. | 45.0 |
| Large living space inside for residents to watch TV, etc. | 22.5 |
| Extra nursing staff, equipment | 10.0 |
| Other comments | 20.0 |

Table 12

"Do You Think the Residents Are Enjoying the Gardens?"

| Content of comments (<u>n</u> = 45): | % |
|---|------|
| Those who can use the gardens enjoy them | 37.8 |
| Rarely see residents in the gardens | 17.8 |
| Not enough residents use the gardens | 17.8 |
| Those who are seen in the gardens are smokers | 6.7 |
| Many residents are not aware of the gardens | 4.4 |
| Others | 13.3 |

Table 13

Questions That Received the Most Comments

| Question: | <u>N</u> |
|--|----------|
| Do you think the money was well-spent? | 61 |
| Is there anything you wish to add to the gardens? | 53 |
| Do you think the residents are enjoying the gardens? | 45 |
| How the money/space should have been used? | 40 |
| Wheelchair accessible pathways | 35 |
| Any comment on features? | 34 |
| Lighting for the evening | 32 |
| Trees for shade | 26 |
| Is there anything you wish to remove from the gardens? | 21 |

Figure Captions

Figure 1. This courtyard garden is called "Healing Center". It is in the "B" level stabilization wing (special intake unit) where most confused residents stay. This garden is intended to provide a calm and comforting place for the residents.

Figure 2. This courtyard garden is called "Nature Room". It is a place where a stream meanders and birds gather. It is designed to give residents an opportunity to connect with nature.

Figure 3. This courtyard is called "Meditative Garden". It is intended to create a soothing environment for the residents. Wide pathways allow two wheelchairs to pass. This picture shows the still-immature trees which are so far unable to provide enough shade.