

EVALUATING A CHILDREN'S HOSPITAL GARDEN ENVIRONMENT: UTILIZATION AND CONSUMER SATISFACTION

SANDRA WHITEHOUSE¹, JAMES W. VARNI^{1,2}, MICHAEL SEID¹, CLARE COOPER-MARCUS³, MARY JANE ENSBERG,⁴
JENIFER R. JACOBS¹ AND ROBYN S. MEHLENBECK¹

¹*Center for Child Health Outcomes, Children's Hospital and Health Center, San Diego, U.S.A.*

²*Department of Psychiatry, University of California, San Diego, School of Medicine, U.S.A.*

³*College of Environmental Design, University of California, Berkeley, U.S.A.*

⁴*Patient and Family Services, Children's Hospital and Health Center, San Diego, U.S.A.*

Abstract

The Leichtag Family Healing Garden at Children's Hospital and Health Center, San Diego was planned and built as a healing environment space for patients, families, and staff. A Post-Occupancy Evaluation (POE) was conducted to determine whether the garden was meeting the goals of reducing stress, restoring hope and energy, and increasing consumer satisfaction. Results from behavioral observations, surveys, and interviews indicated a number of benefits of the garden. The garden was perceived as a place of restoration and healing, and use was accompanied by increased consumer satisfaction. However, the garden was not utilized as often or as effectively as intended. Children, parents and many staff members recommended changes for the garden, such as the inclusion of more trees and greenery, and more interactive 'things for kids to do'. In addition, the majority of family members surveyed throughout the hospital did not know about the garden. Based on the findings, recommendations for changes were developed to promote better use of the garden. These research findings can be used to guide the future planning, design, building, and subsequent evaluation of garden environments in children's hospitals and pediatric settings.

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Introduction

The benefits that individuals can derive from plants and contact with nature have been discussed for thousands of years. Historical accounts suggest that this belief was an organizing principle for the exemplary hospitals of the past, where a primary goal was making patients more comfortable (Stein, 1990). As early as the Middle Ages, hospitals within monasteries utilized the garden cloister as a place of healing (Warner, 1995). Patients' rooms typically bordered courtyards that offered sunlight, a lawn, seasonal plants and places to sit or walk. A significant change in the treatment of illness occurred in the 19th century, when biologists Louis Pasteur and Claude Bernard developed the germ theory of disease. This theory—that disease is caused by pathogenic agents and that the host's resistance and the germ's virulence determine the disease's severity—gave medicine a systematic, organized, and much

more successful way to treat and research disease (Lindheim & Syme, 1983). This also caused a change in the way hospitals were designed, from a focus on patient comfort to a focus on disease treatment. In addition, engineering advances of the late 19th century, such as the elevator and the steel skeleton building, made the high-rise hospital possible. Layouts of new hospitals were determined by the new discoveries in medical technology, and any lack of attention to patient comfort seemed unimportant compared to the dramatically improved patient recovery rates in the new, technologically driven hospitals.

In the United States, new hospitals or substantially remodeled structures are being built primarily to replace outdated facilities and to serve areas of population growth, as the healthcare marketplace has become increasingly competitive (Horsburgh, 1995). There is the hope that pleasant, user-friendly facilities will attract patients and improve their

healthcare satisfaction (Hutton & Richardson, 1995). In addition, healthcare specialists, architects, and landscape designers, among others, have come to believe that the hospital environment can affect the mood, stress level, and well-being of patients and their families. With increased focus on the overall hospital healing environment, a renewed interest in using the restorative aspects of nature to aid in the healing process has emerged.

Cooper-Marcus and Barnes (1999) have indicated potential healing processes that may be supported by gardens, from reducing stress to achieving perspectives about life and death. A small but growing body of empirical research supports the healing potential of gardens in hospital settings. For example, several studies have found reductions in stress levels and health-related complaints among patients (Ulrich, 1984) and staff (Verderber, 1986) who were provided with windows overlooking gardens, and there has been indirect evidence that access to hospital gardens increases patient and staff satisfaction with the overall hospital experience (Paine & Francis, 1990; Cooper-Marcus & Barnes, 1995). Several investigations have provided preliminary evidence about the physical features of gardens that facilitate the healing process (Cooper-Marcus, 1995; Olds, 1989). The provision of gardens and access to nature seems especially important for hospitalized children (Strain & Grossman, 1975; Horsburgh, 1995). In addition, the hospitalization of a child can be extremely stressful to parents and family members, who may also benefit from the availability of gardens on hospital grounds (Carpman & Grant, 1993).

Such gardens, however, put economic pressures on hospitals and have been criticized by some who believe that financial resources are better spent on more direct patient care (e.g., Forman, 1996). In fact, many hospital gardens are paid for by donors after years of fund-raising efforts, and are maintained by volunteers. There is often little training provided for hospital staff in terms of how to integrate complementary therapies, such as healing gardens, into overall patient healthcare. In an era where financial considerations dictate so many hospital decisions, it is essential to empirically assess the contributions that gardens might make to the healing process in hospital environments.

Empirical Evidence

There is a strong tendency for adults to prefer natural landscape scenes to urban views, especially when the urban views lack vegetation and water

(Ulrich, 1977; Balling & Falk, 1982; Orians & Heerwegen, 1995; Schroeder, 1995). In general, adults have reported that when they are stressed or depressed, going to natural settings in the outdoors can help them feel better (Cooper-Marcus, 1995). Aspects of nature such as trees, grass, water, visible sky, rocks, flowers and birds were mentioned as particularly helpful (Olds, 1989). Wilson (1984) hypothesized that such responses to natural settings may be of evolutionary significance, in that modern humans innately respond to the characteristics of environments favorable to premodern humans.

A main finding across studies in a literature review on the environmental preferences of children was that youngsters are mainly concerned about the functional aspects of environments, such as whether a tree affords climbing, a wall can be jumped over, or an object can be thrown (Gibson, 1979). In other words, they prefer opportunities for active use of space (van AnDEL, 1990). For example, Francis (1988) noted that while adults consider, 'what does it look like,' children ask, 'what can I do here?' (p. 72). There are few, if any, studies looking at how children might use the outdoors for comfort or emotional healing. van AnDEL (1990) observed that children sought safe, enclosed, and hidden places where they could look out and not be seen. Appleton (1975, 1996) and Lewis (1994) suggested that settings such as these would have offered comparative safety to our predecessors. The presence of a refuge may be comforting to a child (Kirkby, 1989). Moore (1999) reviewed research on children's environments to generate assumptions relevant to children's gardens, namely that children require outdoor play, environmental quality, opportunities for 'play leadership,' and indoor-outdoor links (p. 327).

The level of stress associated with a hospital visit has been extensively documented, and perceived stress has been associated with negative child health outcomes, such as physical pain and emotional distress (Varni & Katz, 1997; Varni *et al.*, 1996; Kiecolt-Glaser *et al.*, 1998). Kaplan and Kaplan (1983) proposed that hospital environments are stressful in part because they are typically complex and unfamiliar. They theorized that sustained exposure to the hospital environment would likely result in mental fatigue and the experience of 'cognitive chaos' (p. 108). In such circumstances, Kaplan and Kaplan (1983) suggested that exposure to a less complex natural setting would be experienced as relaxing because of the increased familiarity and lower information processing load.

Articles written specifically about healing gardens have been typically found in landscape

architecture journals and gardening magazines. As in most articles on hospital design, these have been descriptive in nature (e.g., Dannenmaier, 1995; Griswold, 1995; Hoover, 1995; McCormick, 1995; Stevens, 1995; Ware, 1995). Missing in these articles have been accounts of how empirical studies might inform the construction of such gardens. In fact, few studies have discussed how gardens are used therapeutically, or evaluate the impact of gardens on patient health outcomes and healthcare satisfaction. Since 1966, only a few dozen reports in the literature contained data that related a particular design feature to a specific clinical outcome for a particular study population (Rubin & Owens, 1996).

Cooper-Marcus and Barnes (1995) conducted a series of case study evaluations of hospital gardens using the Post-Occupancy Evaluation (POE) method, which included behavioral observations, administered survey questionnaires, and patient and staff interviews about the use of the gardens. Reactions of adult patients and staff who used the gardens were almost uniformly positive, with nearly all subjects reporting positive changes in mood as a result of garden use. However, there were no explicit assessments of how the gardens might influence indices of patient healthcare satisfaction, such as assessments of quality, intentions to return, and willingness to recommend a healthcare provider to others (Hutton & Richardson, 1995). In addition, because participants were limited to garden users it was not possible to assess potential barriers or constraints to utilization.

Similarly, Paine and Francis (1990) presented findings from case studies of outdoor spaces at three hospitals. Data were gathered from behavioral observations in the garden, and each hospital outdoor space was described in terms of location, size, uses and users, and successful and unsuccessful features. The needs of children, both as patients and visitors, were summarized briefly, with an emphasis on providing settings for creative, imaginative, and physical play. As in the Cooper-Marcus and Barnes (1995) study, subjects in the study were limited to garden users, as opposed to nonusers, which potentially constituted a biased sample.

Rationale for the current study

Research suggests that exposure to natural settings may reduce stress and enhance healing. In addition, there is some evidence that the healing environment may influence patient and family perceptions of their healthcare provider, as measured by healthcare satisfaction, quality assessments, intentions to

return, and willingness to recommend a healthcare provider to others (Hutton & Richardson, 1995). As the first empirical investigation of a children's hospital garden, it was important to evaluate patient, family, and staff perceptions and utilization of the garden, and to determine whether there were barriers or constraints to use. It was also important to investigate the ways in which adults' and children's preferences for various features of a garden might differ. Given the lack of empirical research on children's hospital gardens, the objective of this evaluation was to contribute to the knowledge base needed to design more effective gardens in pediatric settings, to provide insights and guidelines about how to use such gardens to facilitate the healing process, and to establish a basis for further research in this area.

Method and design

A Post-Occupancy Evaluation (POE) was conducted to address the research questions, including a visual analysis of the garden (to allow readers to determine to what extent the findings here might generalize to other gardens in other settings), detailed behavioral observations, surveys, and interviews.

Visual analysis: site plan, description and history

The development of the Leichtig Family Healing Garden began with the idea of a garden envisioned by the Hospital's Bereavement Committee in the late 1980s. In 1993, with the creation of a Healing Environment Steering Committee, the focus of the garden shifted and it became part of an overall healing environment program at Children's Hospital and Health Center, San Diego. The definition of the healing environment that guided these efforts is summarized as follows:

"The Healing Environment is a term used to describe the physical and cultural atmosphere created to support families through hospitalization, medical visits, healing and bereavement. Guiding the Healing Environment is a philosophy of caring; that is, the desire to develop a space that engenders feelings of peace, hope, upliftment, joy, reflection, and solace and one which provides opportunities for relaxation, enrichment, spiritual connection, humor, and play. Motivating this philosophy is the belief, which is supported by research, that these factors play a considerable role in the physical, emotional, and spiritual healing process. The goal of the Healing Environment is to transform the hospital setting into a place that addresses the human spirit and supports families to positively cope with and

transcend illness. The cornerstones of the Healing Environment are building design, the arts, family support, and staff attitudes. Physical components of the Healing Environment are the interior and exterior building designs, gardens, family spaces, and the art collection. Programmatic components of the Healing Environment are the arts and culture programs—musical performances, storytelling, artists-in-residence, and the like. Equally important to the Healing Environment are the ways in which we support and treat our families—customer service, family centered care, and the Golden Rule of compassion and consideration.”

After considerable fund raising efforts, the garden was completed and dedicated in July 1997. The 40 × 100 ft. garden is located in the large campus of Children’s Hospital and Health Center, San Diego (see Figures 1 and 2). Features included ‘Sam’ the dinosaur (a 20 × 40 ft. sculpted metal brontosaurus); a sculpted blue-green ceramic tile sea-horse fountain with tile murals of fish swimming through seaweed; a mauve constellation wall with colorful stained glass disks representing the zodiac; a 14 ft. tall windmill with rainbow colored blades and metal birds that ‘fly’ within the structure, powered by the wind; and a multi-colored semi-circular ‘shadow wall’ incorporating cutouts of animals. Flowers and plants selected for their medicinal value provided a border around the garden, and shade was provided by deciduous trees and tall palms. The garden was enclosed with curvilinear, brightly painted four to seven feet high walls, which help to define the space and provide a number of child-scale ‘rooms.’ Seating was provided by seat-height planter walls and seating rocks, as well as three colorful benches set on wheels to resemble flower carts. Ground surfaces included ‘islands’ of grass surrounded by concentric ovals of concrete in shades of teal, green, and blue



FIGURE 1. Two Views of the Leichtag Family Healing Garden.



FIGURE 2. Two Views of the Leichtag Family Healing Garden.

reminiscent of the ocean. The overall feeling of the garden seemed appropriate for Southern California, with a greater proportion of concrete and constructed hardscape elements and relatively less natural plants, flowers, or greenery. Instead, there were sand colored floor surfaces, the sounds of a splashing fountain, palm trees, birds of paradise, shadows cast on walls, and playful and whimsical features.

Behavioral observations

Over a two week period in the month of July, 32 hours of observations were collected at various times of the day both during the week and on weekends. This time period was chosen because the weather was generally sunny and it was comfortable to be outside in the garden, with temperatures ranging from 70–85 degrees. Over 200 people were observed visiting the garden. Coding sheets were used to observe visitors to the garden in terms of: (1) demographics—who uses the garden?; (2) traffic flow—where do people walk and move?; and (3) user activities—what are people doing in the garden and how much time are they spending? Specific techniques used to answer these questions were Behavior Mapping ($n=96$) and Behavior Tracking ($n=107$), both of which have been used in published evaluations of healing gardens (see Cooper-Marcus & Francis, 1990, for more detailed discussion of these approaches).

Surveys and interviews

Participants. Participants were recruited from the total sample of patients, families, and staff who visited Children’s Hospital and Health Center, San Diego, and selected at random from throughout the

hospital and the garden to participate. The randomization process included stratification to groups to ensure a representative sample of patients, families, and staff from various sections of the hospital (e.g., inpatient/outpatient, medical/surgical/critical care). Staff from various disciplines were sampled (e.g., physicians, nurses, social workers, front desk, house keeping, grounds, and administrative personnel). Surveys and interviews were administered to adult garden visitors ($n=28$), and adult family members and staff in the hospital ($n=55$). Adult participants included 17 males and 66 females, which is approximately representative of the hospital staff's male:female ratio. Fifty-two of the 83 adults had been to the garden and were familiar with it ('garden users'), 31 had not been and/or did not know about it. Children and adolescents in the garden ($n=12$) and in the hospital ($n=10$) were given a modified version of the interview. The children and adolescents included 12 males and 10 females, 10 were outpatients, five inpatients, one was a convalescent hospital inpatient and six were siblings of patients. Of the 22 children/adolescents interviewed, 13 had been to the garden and nine had not. Of the nine, only one knew about it.

Surveys and semi-structured interview questionnaires were developed based on measures previously developed by Cooper-Marcus and Barnes (1995), piloted in the garden and revised. The survey included participant demographic data, knowledge of the garden, how knowledge was obtained, impact of the garden (if any) on mood, and satisfaction with the garden. The semi-structured interview assessed how visitors, families, and staff reacted to the garden, what qualities and characteristics of the garden contributed to any reported mood change, barriers and constraints to use, and what recommendations they would offer to improve the garden. The child/teen version of the interview targeted demographic data, use of the garden, impact of the garden (if any) on mood, and what recommendations they would make to improve the garden. Survey data was analysed for descriptive statistics. Content analysis was conducted on the interview data following established guidelines for qualitative research (Patton, 1995; Strauss & Corbin, 1990).

Findings and discussion

Adults' use of the garden

Aggregate data from behavioral mapping is shown in Figure 3. As can be seen, the largest percentage

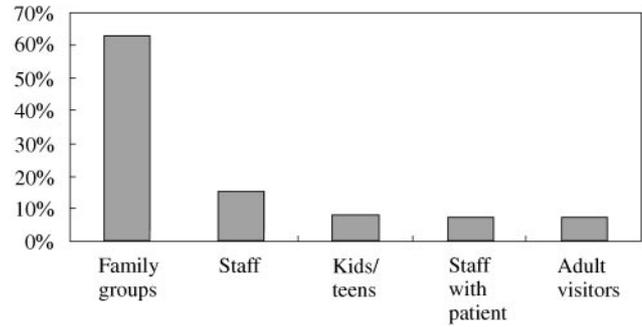


FIGURE 3. User groups in the healing garden.

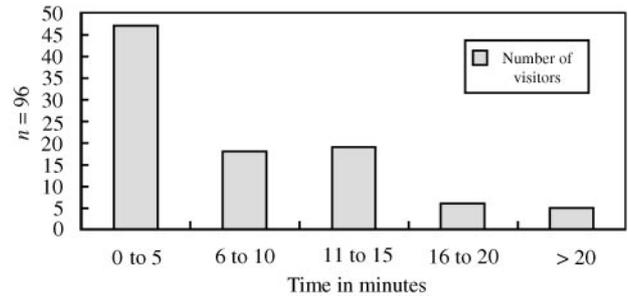


FIGURE 4. Time spent in the garden.

of users were families. Adult family members typically relaxed and talked while their children played or more actively explored the garden. Parents not accompanied by children would often sit quietly contemplating in the garden, or walk around looking at plants and artwork. Staff used the garden for coffee or lunch breaks, talking quietly together or perhaps reading a book alone. On rare occasions, staff brought patients to the garden. In addition, special events such as a bimonthly celebration of life for bereaved parents, memorial services for staff, and news conferences, occurred in the garden.

Several observations about use of the garden deserve mention. First, nearly half of all visitors observed in the garden spent less than five minutes there. Typically these individuals would enter, walk quickly around, and then leave. A much smaller number of visitors were observed to spend more than 15 or 20 minutes in the garden (see Figure 4). Second, although the garden appeared to be well utilized mid-day, it was often empty for long periods of time in the morning and late afternoon. Third, some areas of the garden were more popular than others. Visitors typically occupied the covered benches, or stood looking at the seahorse or windmill. They rarely used the grassy areas of the garden where there were no formal seating arrangements.

These issues were investigated further through the surveys and interviews, and will be discussed subsequently.

Survey and interview data. An explicit goal of the garden was to help families, patients, and staff escape from the stressful environment of the hospital. The majority of adults surveyed endorsed going to the garden to get away from stress, relax and rest, or in some way improve their mood. Survey responses from staff, patients, and visitors who had been to the garden (including those surveyed in the garden and the hospital) are shown in Table 1.

In the interviews following the surveys, participants shared more of their perceptions of the garden. For example, a pediatric resident reported coming to the garden to get away from stress, ‘We had something really stressful happen just prior to coming here, we came here to debrief. It is a good setting to get away from the hospital stress, to feel more peaceful.’ A father of an infant in the intensive care unit said, ‘This is a better place to wait than the waiting room, we couldn’t stand being in there, wondering if she’d make it. This is quiet and peaceful, the greenery, the colorful flowers, the sound of the water.’ A mother who comes back to visit the garden periodically described how it helped her to make sense of a very difficult time, ‘My son was only in the hospital for 17 hours and then he died. Later there was a memorial service here for the children who have died, for their parents. The memorial service was beautiful, very meaningful, someone had brought flowers, and let the petals drift gently in the grass in the breeze. It was a way to share our grief with others who had also experienced this loss and it was healing, it helped with this process of healing.’ Most garden users reported a positive change in mood after visiting the garden, as shown

TABLE 1
Why people visit the garden.

Reason for going to the garden	Per cent <i>n</i> = 52
To relax and rest	28
To get away from my stressful environment	24
To enjoy the garden, be engaged	18
Walk by it on my way to work, rarely go in	12
It helps me cope with my worries	8
To meditate, outdoor therapy	4

in survey responses in Table 2. Participants shared more information about specific aspects of the garden they perceived as helpful in their responses to open-ended interview questions following the surveys. Content analysis was used to determine frequencies of the various aspects mentioned by adult garden users (see Table 3). Mood changes were attributed to combinations of the garden’s features, such as being outdoors in an enclosed natural space, hearing the sounds of running water, seeing the trees, plants, and flowers, and enjoying the colors and artwork.

One staff member, for example, said ‘The water, the sound of running water in the outdoors, the different colors, everything together, the plants, the greenery, even the sand-like dirt, it is put together well, it is relaxing.’ A parent noted ‘It makes me feel more happy, I think it is the playful colors, the feeling of being in a completely separate and unique place. . . It takes me back to a time when there were not so many worries.’

Increasing satisfaction. An implicit goal for the garden was the hope that it would increase consumer satisfaction, and providing empirical evidence to support or refute this belief was a second major goal of this research. With this in mind, several survey questions specifically targeted consumer satisfaction and willingness to recommend Children’s Hospital to others. Survey and interview responses suggested that the garden did increase the satisfaction of adult family members staff.

As shown in the Table 4, 50 per cent of the garden users reported that the garden ‘definitely’ increased their overall satisfaction with Children’s Hospital. Several of those interviewed made comparisons between Children’s and other hospitals, and described how the garden influenced them to perceive Children’s as providing a higher quality of service. A mother of an outpatient explained, ‘We have been

TABLE 2
Reported mood change as a result of visiting the garden.

Mood change	Per cent reporting <i>n</i> = 52
More relaxed, less stressed, content	54
Refreshed, rejuvenated, stronger	12
Pleased, more positive, better	12
No difference in mood	10
Able to think, find answers, cope	6
More connected in religious or spiritual way	6

TABLE 3
Features of garden most enjoyed by garden users

Feature	Adults <i>n</i> = 52	Children <i>n</i> = 12
	Per cent reporting*	
Fountain – sound of running water	33	83
Bright colors	25	17
Being outside in a garden	23	33
Flowers, trees, plants, greenery	19	33
Artwork (windmill, shadow wall, constellation wall, dinosaur, animal tiles)	14	83
Fresh air, sunshine, breezes	12	—
Sense of enclosure provided by the walls	12	—
Multi-sensory stimulation	8	—

*Many participants mentioned more than one aspect of the garden as helpful.

TABLE 4
Consumer satisfaction with the healing garden *n* = 52

The survey asked:	Definitely Yes	probably yes	no opinion	probably no	definitely no
• Does the healing garden increase your overall satisfaction with Children's Hospital?	50%	30%	12%	4%	4%
• Would you recommend that others visit the garden?	72%	11%	11%	6%	0%
• Does the healing garden influence whether you recommend Children's Hospital to others?	20%	28%	26%	14%	12%
• In your opinion, is it important for hospitals to include healing gardens? (<i>n</i> = 83: garden users and nonusers)	74%	16%	9%	0%	1%

to a lot of hospitals over the last three years. None of them have anything like this. If the hospital takes this care, at this level, then it makes me think there would be an emphasis, you know, on preventative medicine at all levels, which is a very good thing.

Regarding willingness to recommend, 72 per cent of respondents reported they would 'definitely' recommend that other parents or staff visit the garden, and 20 per cent said that the healing garden

'definitely' influenced them to recommend the hospital to others. Finally, 90 per cent of respondents (including those who had never been to the garden) expressed the view that it is important for hospitals to include gardens. A physician commented, 'It makes me feel more positive, relaxed, serene, even though I can only be out here for a few minutes. It seems so removed from my work in the hospital!' In sum, the data suggest that the garden did have a

TABLE 5
Recommended changes for the healing garden

Suggestion	Per cent requesting <i>n</i> = 52
More trees, greenery, and vegetation.	50% of adult respondents
More interactive activities to engage children	18% adults, 66% children
More private areas for families and patients	11% of staff
More seating	10%
More water features	10%
Music or wind chimes	10%
Litter can(s)	2%
Birdbaths or feeders	2%
Drinking fountain	1%
Better Maintenance	1%

significant positive impact on aspects of consumer satisfaction.

Changes requested by adults. Adult garden users were asked if they would recommend any physical changes for the garden, and the majority (87%) did. As can be seen in Table 5, 50 per cent requested more trees, vegetation, and greenery.

While only 11 per cent of staff commented on the need for privacy or refuge, these were staff who worked directly with bereaved families, or who worked therapeutically with emotionally disturbed children. For example, a mental health professional explained, 'Maybe there could be a planted area that screened off a place in the garden—a nice planted area, perhaps with a climbing rose bush or jasmine, something green and pleasant.'

Children's use of the garden

Data from behavioral mapping revealed that the younger the person (i.e., as soon as they were able to walk), the more likely they were to be engaged in active or explorative play (see Figure 5). It is important to consider the sample of children and teens obtained during this particular week of behavior mapping. Most were not identifiable as patients, and appeared instead to be healthy siblings of patients. This trend was also found in the interviews. Participants included seven siblings of patients, four outpatients, and one nonverbal inpatient (whose mother answered based on experiences with her daughter in the garden). All but one of these twelve children appeared healthy and energetic. Patients who were in more fragile condition were rarely brought to the garden.

Interview responses were consistent with behavioral observation data. Young children (ages two

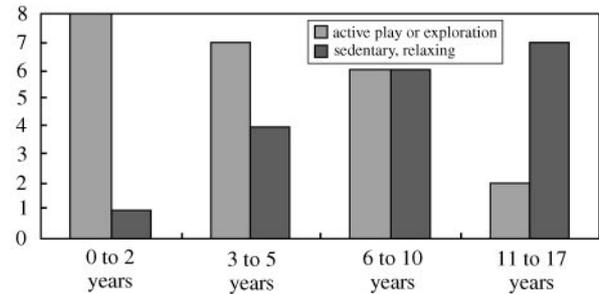


FIGURE 5. Use of the garden by age group and number of participants.

to three) typically mentioned the water, a favorite object (e.g., the dinosaur), or their favorite things to smell. Four- to five-year-olds mentioned their wishes to climb, run, and jump, or talked about the animal representations (e.g., tiles, artwork) they could find and name. Six to 10 year olds were most likely to request more 'things to do', seeming to run out of ideas for creative play and to crave more structured or dedicated play areas. However, for special populations, the garden appeared to be very successful. One mother explained, 'For my son, this garden is wonderful. He's autistic and the garden seems almost built for him. He loves the waterfall. He is very visual and is also working at learning the names of animals. He does much better out here than in the waiting room, so it is less stressful to me, and really a lot more enjoyable, to bring him to this hospital. I tell all kinds of people to come here.'

Themes from brief interviews with children in the hospital. Participants in this group included five inpatients (from intensive care units in hematology-oncology, orthopedic-rehabilitation, or critical care) and five outpatients (cardiology, allergy, or hematology-oncology clinics). Only one of them had actually been to the garden, and only two of them knew of it. In general, they were less mobile, energetic, and healthy than the population from the garden, and hence had different needs and different perspectives on what is important in a garden. For example, a 'two and a half' year old female outpatient from hematology-oncology had not been to the garden, but very much enjoyed the other outdoor spaces at the Hospital, 'I am going to see the doctor because I am broken. And to see the 'animals'. Her mother added 'She likes the topiary animals and can name them in the front of the hospital, she brightens up coming here because there are animals and places in the hospital that she recognizes that help to make her feel more secure here.' In fact, it appeared that this young patient associated the hospital more

with seeing the 'animals' than with her treatment for cancer. Similarly, an eight-year-old female inpatient from orthopedic-rehabilitation who had been in a car accident and was wearing several casts also was very interested in the garden stated, 'It's too loud for me in the play room and the music hurts my head... I'm tired of crutches. The garden looks pretty. Is it quiet out there?'

In fact, the only two participants who were not interested in going to the garden at all were severely ill, with advanced cases of cancer. Both had been in the hospital for several months. One was an eleven-year-old female inpatient, who appeared to have very little energy, and said, simply, 'My hand hurts too much. I don't want to go.' The other, a 17-year-old inpatient undergoing chemotherapy, touched her head, where she had lost all of her hair, before she answered, 'I don't want to go anywhere. I wouldn't want to go there. I don't like to leave my room, really... I will go, I guess, for the ceremony of life for one of the guys from here who died last month, with the SOMFAB ['Some of my friends are bald'] group, I would go.'

For the other hospitalized children, it appeared that it was important to get away from the hospital and be in a different place, and a quiet garden where there were colors and flowers, animals and waterfalls sounded inviting to all who were well enough to go. For the younger patients, having child-scale places and features, such as artistic renderings of animals, seemed especially salient in helping them feel secure, and in making their experiences more positive at the hospital. For adolescents who may have been self-conscious about their appearance, privacy became more of an issue.

Changes requested by children and their adult caregivers. Eighteen per cent of adults and 66 per cent of children (typically those who were relatively healthy, such as outpatients or siblings of patients) requested 'more things for kids to do.' The literature on children's preferences suggests that healthy children seek places where they can be active, and engage in 'manipulative play' (e.g., digging in sand, building with blocks, moving rocks) and 'active play' (e.g., climbing, tumbling). The garden seemed better suited for hospitalized children and children with developmental delays and chronic health conditions.

Barriers and constraints to use

The evaluation incorporated feedback from participants throughout the hospital in order to provide data addressing the issue of barriers to use. Surveys

TABLE 6
Do people in the hospital know about the healing garden?

Survey item:	Participants from within the hospital		
	staff n = 32	families n = 23	patients n = 22
Have never been to the healing garden	28%	95%	90%
Did not know about the healing garden	10%	48%	80%

and interviews conducted with family members of patients within the hospital ($n = 23$) indicated that 95 per cent (22/23) of family members had never been to the garden, and 48 per cent did not know about it. Of the 10 children interviewed in the hospital, two knew of the garden, and one had visited it (see Table 6). Interviews with family members ($n = 23$) and staff in the hospital ($n = 32$) identified four factors as major barriers to use: (1) knowledge; (2) accessibility; (3) beliefs about the garden; and (4) underlying philosophy toward treatment. Each will be described in detail in the following paragraphs.

Knowledge of the garden. As shown in Table 6, nearly one third of staff and the majority of families and patients had never been to the garden. Of those family members who did know about the garden, the majority (54%) found out about it incidentally; for example, they saw it through a window or walked by it. For example, a father whose son had been in the intensive care unit for two weeks said, 'We would like somewhere else to go, to get outside and take a break from the stress. We go back and forth from this room and the cafeteria, sometimes outside by the rose bushes, which are nice and colorful, the color helps... They may have told us about this healing garden when we came here with my son, but I don't know, I can't remember.' In fact, families in the hospital who were surveyed about the garden typically asked the interviewer for maps and information as soon as they found out about it. Thus, informing patients and their families was one major difficulty.

Accessibility. Thirteen per cent of families in the hospital mentioned difficulty finding wheelchairs to take their child to the garden. This was particularly important for patients located farther away from the garden. In fact, several staff noted the distance as prohibitive and hoped that new gardens would be

constructed closer to them soon. Other staff members requested better wheelchair access and IV electrical outlets. The staff who requested these items were mainly those who worked in the building housing the orthopedics/rehabilitation and hematology/oncology units. This building was located approximately 500 yards from the garden. It had no gardens of its own at the time of the study for patients requiring intensive levels of care, who were more likely to be bothered by the bumpy transition from concrete to decomposed granite in the garden, or require an IV electrical outlet. However, wheelchair-bound patients and staff from the Convalescent Hospital, located adjacent to the garden, reported no problems with wheelchair access. In support of this, behavior trace analysis performed after a wet morning showed wheelchair tracks going all around the garden over both concrete and decomposed granite surfaces. Thus, interview responses and observation data suggested wheelchair access was a problem for the more fragile patients, such as those who have recently had surgery, or were receiving chemotherapy. It did not appear to be a problem for more hardy patients. Finally, 26 per cent of families in the hospital mentioned that their children were simply too ill to go to the garden.

Beliefs about the garden. There appeared to be some confusion about the purpose of the garden, and typical questions were, 'Who is it for?' and 'What are acceptable activities for the garden?' Fifteen per cent of the staff believed it was for families only (e.g., bereaved families) and that staff, or even children, should not go there. Other staff wondered who to ask for permission to hold special functions. Families mentioned that they saw it and thought it was part of the playground of the nearby Children's Center for Child Protection, or that it was for some other type of family or patient with special needs (e.g., bereaved families or children with a particular illness). Families also were not sure if they were 'allowed' to go there, or 'allowed' to bring their kids (patients or well children), and did not know who to ask for 'permission.'

Underlying philosophy toward treatment. It appeared that there was a value system driving the beliefs cited above. For example, several nurses mentioned that there was insufficient staff to take patients to the garden (e.g., volunteers) or that it was too time consuming to explain to families about the garden and how to get there. Their priority was on more direct, mainstream patient care.

Summary

The first major goal of this research was to investigate whether patients, families, and staff used the garden to reduce stress, and to determine the ways in which children's use of the garden differed from adults. Surveys of garden users revealed that most adult family members and staff went to the garden to escape the stresses of the hospital and enjoy the relaxing and restorative elements of nature. Ninety per cent of adult garden users reported a positive change in mood after spending time in the garden. In interviews, many parents and staff mentioned that the garden was a particularly meaningful and special type of place to them for a variety of personal reasons. These included coping with bereavement, processing stressful work situations, sharing quality time with children away from the hospital room, and working with patients. In contrast to adults' sedentary and passive use of the garden, children tended to be more involved in active exploration and play. Most of the children observed were healthy siblings of patients, or outpatients. Very few hospitalized patients were brought to the garden. All children surveyed in the garden said they would like to come back again.

The second goal of this research involved the issue of consumer satisfaction. The data suggest that the garden was associated with increased satisfaction. The majority of adult garden users specifically reported increased satisfaction with Children's Hospital, and many also indicated increased willingness to recommend Children's Hospital to others.

The third major goal of this research was to identify any constraints that might limit use of the garden. Most staff, family members, adult visitors, and patients surveyed and interviewed in the hospital reported that they did not use the garden, and many families did not know of its existence. Content analysis of interview data revealed the following constraints to use: lack of knowledge about the garden; access difficulties, such as being too far away or difficulty getting a wheelchair; confusion over the purpose of the garden; and philosophy toward traditional biomedical treatment.

Recommendations

Garden users identified specific physical features of the garden that helped them to relax or feel more positive. These data were used to subsequently improve the Leichtag Family Healing Garden, and may provide empirical guidelines for the design of

future children's hospital gardens. Adult garden users identified the following features as helpful, in order of most to least mentioned: (1) the sound of running water; (2) the presence of bright colors; (3) being outside in a garden; (4) the flowers, plants, and greenery; (5) artwork specific to the garden such as the windmill, shadow wall, dinosaur, constellation wall, and animal tiles; (6) feeling fresh air, sunshine, and breezes, (7) the sense of enclosure provided by the walls; and (8) the opportunity for multisensory stimulation.

When this same group of participants was asked if they would recommend changes for the garden, the vast majority of them did. Recommended physical changes included adding trees and greenery, and using a vegetation screen to create a private corner or refuge (e.g., for teens, grieving parents). Other recommendations included building a wheelchair path to link the entry to the center paved area, and posting the location of IV electrical outlets. Many of these recommended changes are consistent with the design review checklist for hospital outdoor spaces provided by Paine and Francis (1990), supporting the importance of using empirically based guidelines in the design of hospital gardens.

Recommendations related to children. Results from this research indicate that healthy children and hospitalized and ill children have different needs for a hospital garden. Aspects of the existing garden favored by children, from most to least frequently mentioned, included (1) the fountain, with running water they could play in; (2) novel features such as the dinosaur, windmill, shadow wall, and animal tiles; (3) the flowers and trees, (4) being outside; and (5) the bright colors. The vast majority of healthy children (e.g., siblings of patients, outpatients without physical health problems) who were interviewed said they would like 'more things to do' in the garden (e.g., for active or manipulative play), and many parents and staff also recommended this for the children. This finding is consistent with the literature on children's preferences for outdoor spaces, which suggests that the value of a place is not determined by its appearance or aesthetic qualities, but by its potential for affording different activities (e.g., Gibson, 1979; van Andel, 1990).

Children, adolescents, and adult participants were encouraged to share their ideas for activities that would be harmonious with the needs of other garden users. Children suggested the following: (1) allow 'healthy kids,' or siblings of patients, to bring their hospitalized counterparts to the garden to help them feel better; (2) encourage children to

garden, plant flowers, weed, water plants, trim flowers (e.g., lavender) by picking them, sweep up, and rake; (3) make potpourri with flower petals; (4) pick flowers to give to kids in the hospital; and (5) make things, such as signs to identify the plants.

Adult caregivers also generated ideas for children's activities in the garden: (1) put signs around that invite kids to touch some of the plants, or smell them, or pick them, for example, 'touch me, I am soft,' or 'smell me, I am lavender,' and have the kids in occupational therapy make the signs, or paint the signs; (2) have kids find plants with healing properties, or make it into a scavenger hunt with a surprise discovery at the end; (3) make a coloring book of things from the garden and hand it out with a few crayons; (4) have a section where kids could actually garden, and 'touch' everything; (5) for the plants that need constant pruning, invite kids to pick a flower to give someone; (6) add a sand box; (7) have a potting area and get kids involved in planting; and (8) allow kids to make things to be displayed in the garden while they are in the hospital, maybe with the theme of getting better.

There are few reports, if any, on the environmental preferences of hospitalized children. In the current study, it was difficult to find hospitalized children who had visited the healing garden—eighty per cent of the children and adolescents interviewed in the hospital did not know the garden existed. Thus, an important direction for future research would be to specifically investigate the needs and preferences of this population. Significantly, most of the hospitalized children expressed strong interest in going to the garden once they found out about it. Results from behavioral observations and interviews in the garden did suggest that children who were very young, who had been in the hospital for a long time, or those with physical or developmental disabilities, were responsive to and appreciative of the garden or other hospital outdoor spaces.

The available literature (e.g., Appleton, 1975; Balling & Falk, 1982; Kirkby, 1989) suggests that children, particularly hospitalized children, would be attracted to landscapes that provide opportunities for refuge. Although the garden in this particular study did not afford classic refuges (e.g., places where children could look out and not be seen), the enclosed feeling of the garden was mentioned by some parents as providing this sense of refuge for children. It also seems helpful to include features in the garden likely to be highly familiar to children. For example, the garden in this study was bright, colorful, and full of novel child-scale artwork.

Recommendations to address constraints to use. To ensure that hospital gardens are used once they are designed and built, the following guidelines are recommended. First and perhaps most importantly, staff need to be educated as to the purpose of the garden, who it is for, and how to incorporate use of the garden into patient and family care. To keep staff informed, periodical feedback to staff about how families are benefiting from the garden is essential. Second, to ensure that families and patients know about the garden and are able to have access to it, colorful brochures with pictures, information about the garden, and maps on how to get there are needed. These informational items should be included in new patient packages, and in the patient information book in hospital rooms. Third, installing posters about the garden in elevators or other high-traffic areas could further increase the visibility of information about the garden. Finally, assigning volunteers and hospital interns to bring patients and families to visit the garden would increase its use and accessibility.

In sum, results from this evaluation suggest that well-designed gardens can have a positive impact on the sense of well being of participants in the hospital environment. In addition, there is evidence that gardens can increase consumer and staff satisfaction with the hospital. Respondents in the present study indicated that particular features of the garden, such as greenery and plants, shade, the sound of water, and adequate seating, were particularly helpful, findings that are supported in the literature on environmental preferences for emotional healing. However, it is not enough to attend to merely the physical design and construction of the garden. It is equally important to attend to the human side of the equation: to educate patients, families and staff about the garden and to encourage its use.

Limitations and implications for future research

The POE framework used in this study had several limitations. First, much of the data were descriptive, thus conclusions must be considered tentative at best, primarily useful for guiding future research. For example, data suggested that use of the garden reduced stress and increased satisfaction for patients, families, and staff. Future research should further evaluate these tentative conclusions using a more quantitative approach. Second, survey questions may have demand characteristics, particularly for the assessment of satisfaction. Because the

garden was referred to as a 'healing garden,' this potentially biased participants' responses. In addition, participants were surveyed about particular features of the garden they found healing, with response choices based on previous studies. This approach answers the question of 'what features' are healing, but does not address the question of 'why' people find these features healing. In the future, well-designed qualitative research, with open-ended questions, could further illuminate these issues. Additionally, given the relatively brief exposure to the garden, expectations of 'healing' are most likely constrained to the emotional benefits of stress reduction afforded by being in a pleasant environmental space. Whether these brief episodes of stress reduction can lead to sustained emotional coping, and resultant physical health benefits, remains an empirical question.

The present study also had sampling limitations. The garden had a preponderance of hardscape (constructed elements and colorful concrete), as opposed to more traditional vegetated spaces, thus, the findings must be considered in this context. The ideal blend of built hardscape characteristics of gardens with natural landscape is an empirical question that further research will need to address. In terms of time and season, the study was completed in July and August, thus, the weather was quite warm in Southern California, and participants may have been biased to request more shade elements. Further, the climate in San Diego is typically benign for most of the year, even during the winter season. Given that many parts of the world experience the full spectrum of weather extremes, may make an outdoor garden for some children's hospitals in certain parts of the world of little utility or added value for many months of the year. Future research will need to evaluate a diverse group of children's hospital gardens across countries and seasons. Finally, participants who were interviewed in the garden came there because they chose to, leading to the possibility of a biased sample. Participants were also gathered from within the hospital, however, few of these had visited the garden or knew about it, thus there was insufficient representation of individuals who were aware of the garden and chose not to go there. In addition, very few severely or chronically ill children were found who actually used the garden. Thus, it is important for future research to further investigate the use of children's hospital gardens for children with severe developmental disabilities and chronic health conditions. As suggested by the findings of the present study, chronically ill and handicapped children

may have very different requirements for a hospital garden environment.

Notes

This research was supported by an intramural grant from Children's Hospital and Health Center, San Diego. Address correspondence and reprints requests to: James W. Varni, Ph.D., Professor and Senior Scientist, Center for Child Health Outcomes, Children's Hospital and Health Center, 3020 Children's Way, MC 5053, San Diego, California USA 92123. E-mail: jvarni@chsd.org.

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