



An Evidence-Based Approach to  
Designing Healing Landscapes  
**The Business Case and Funding  
for Therapeutic Gardens**

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Images as credited

Although it is impossible to estimate how many hospitals have incorporated what they refer to as “healing gardens” and other aspects of biophilic design into their buildings and campuses, there is evidence that construction and marketing of healing gardens has increased.

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When Roger Ulrich's oft-cited “View through a Window” study was published in *Science* in 1984, the medical community began, for the first time, to consider the financial benefits of access to nature. If post-surgery inpatients who had views to greenery required fewer high-dose pain medications, went home sooner, and called the nurse less often, perhaps nature was not just an aesthetic frill but rather an investment that made good business sense. Perhaps providing access to nature would promote positive health outcomes not just for patients, visitors, and staff, but for the facility's financial status as well.

The sustainability movement has done an excellent job of making the business case for “green buildings”. Proponents of evidence-based design (EBD) have made inroads in establishing a similar case for healthcare facilities. For access to nature, whose components are difficult to quantify, creating a business case is a more difficult, though not insurmountable, challenge.

Although it is impossible to estimate how many hospitals have incorporated what they refer to as “healing gardens” and other aspects of biophilic design into their buildings and campuses, there is evidence that construction and marketing of healing gardens has increased. LEED for Healthcare and the Sustainable Site Initiative (SITES) now assign credits for natural light, views, and “outdoor places of respite”. In the *2014 Guidelines for Design and Construction of Health Care Facilities*, “Views of and access to nature” is the eighth key element in the physical design component of the Environment of Care (a change from 2010).

The Center for Health Design conducted surveys of design research in healthcare settings in 2009 and 2010, and in both years, 33 percent of respondents indicated they always “implemented healing gardens” (Taylor 2009, 2010). In reviewing the facilities featured in *Healthcare Design* for the years 2007 through 2009, landscape architect Jerry Smith found that 30 to 40 percent mentioned “access to nature” or “views to nature” in the text or illustrations. With facilities receiving

citations of merit in the Showcase issue of *Healthcare Design*, mentions of “views to nature” increased from 66 percent (2007) to 100 percent (2009), while mentions of “access to nature” increased from 36 percent (2007) to 100 percent (2009). While these gardens or views of nature are not necessarily up to the standards discussed in this book,<sup>1</sup> recognition in the medical design world that “nature”—in whatever form—is an asset is encouraging news.

Cost-benefit analyses of the extent to which nature might enhance a patient's recovery are difficult, given all the variables involved. Other EBD interventions such as single-patient rooms and patient lifts are easier to measure because they have fewer confounding variables. However, some viable estimates have been made regarding possible cost savings. A study of the economic benefits of biophilia states, “Over 50 studies have been published that associate biophilic elements as primary influences for faster recovery rates for patients, decreased dependency on medication, reduced staff and family stress, and improved emotional wellness as a result of natural daylighting and views to nature” (Terrapin Bright Green 2012, 15). The business case, including return on investment (ROI) for access to nature and therapeutic gardens in healthcare facilities, can be considered in three categories: improved patient health and well-being; stress reduction for patients, visitors, and staff; and improved patient/resident and visitor satisfaction (Fig. 2).

### Improved Patient Health and Well-Being

Findings from Ulrich's 1984 study revealed that patients with views to nature were released on average after 7.96 days, compared with those viewing a brick wall, who were released on average in 8.71 days—a decrease of 8.5 percent. A later study estimated that if all post-surgery patients in US hospitals were allowed to recover in rooms with views to nature, and the average hospital stay was reduced by roughly half a day, the nationwide saving per year from reduced hospital stay would amount to more than US\$93 million (Machlin and Carper 2007).

Windows that provide views to nature also allow in natural light. Dovetailing these design opportunities can potentially lead to significant cost savings. A number of studies have reported reduced hospital stays and lower cost of pain medication during hospitalisation when patients are housed in sunny, daylight rooms, as compared with rooms without access to natural light. One study found that the mean length of stay for bipolar patients in rooms with direct morning sunlight was 3.67 days shorter, as compared with those who had none (Bendetti et al. 2011). Another study considered the cost of medication for patients recovering from lumbar spinal surgery. Those housed in rooms with 46 percent higher sunlight intensity than dimmer rooms perceived less pain and accumulated 21 percent less in pain medication costs for their length of stay (Walch et al. 2005). Studies have also found better sleep patterns and a reduction in aggression among patients with Alzheimer's disease and other forms of dementia after they spent a short time each day outdoors in natural light or sunlight (Calkins and Connell 2003; McMinn and Hinton 2000; Whall et al. 1997). Such reductions can lead to lower costs in staff time and necessary medications.

### Stress Reduction

Stress has profound physiological and psychological effects on those served by a healthcare facility, as well as on the staff who care for them. Reduction in stress for patients/residents, visitors, and staff leads to measurable positive health outcomes and higher satisfaction. The evidence is clear that gardens and nature elements—plants, flowers, trees, water, wildlife—help in the reduction of stress by providing positive distractions, along with opportunities for exercise, social support, and a heightened sense of control (Ulrich 1999). When users of the gardens at four San Francisco area hospitals were asked how they felt after spending time in the garden, 95 percent reported a positive change in mood—more relaxed, less stressed, better able to cope (Cooper Marcus and Barnes 1995). Other studies have reported a similarly high percentage of people who experienced a positive change of mood (Whitehouse et al. 2001).

Studies documenting the use of gardens in hospitals—whether or not they are designated “healing gardens”—often report that staff members are the predominant users (Cooper Marcus and Barnes 1995, 2008). Healthcare is one of the few services that is stressful not only for the customer but also for the provider (Berry et al. 2004). There is a serious shortage of staff, particularly nurses, and an inordinate cost in hiring and training them. Stress and burnout lead to high turnover. Poor working conditions can lead to medical errors. A review of the literature reveals that EBD interventions such as improving ergonomic design, air quality, noise, and light can have significant impacts on staff health (Ulrich et al. 2008). It is worthwhile considering how a garden might assist in improving staff health, satisfaction, retention, and even reduction in medical errors. A study exploring the outcomes of exposure to views from nurse work areas found that of nurses whose alertness level remained the same or improved before and after a 12-hour shift, 60 percent had exposure to exterior and nature views. Of those whose alertness levels deteriorated, 67 percent were exposed to no view or only a nonnature view. “Access to a nature view and natural light for caregiving staff could bear direct as well as indirect effects on patient outcomes” (Pati et al. 2008, 27) (Fig. 3).

Even relatively brief exposure to actual or simulated nature settings can elicit significant recovery from stress in as little as three to five minutes (Parsons and Hartig 2000; Ulrich 1999). While it is difficult to put a dollar value on the reduction of stress, let us hypothesise that a hospital has installed a garden with positive therapeutic qualities, easily accessible from staff break rooms, at a cost of US\$500,000. Assume that there are 500 nurses and that 10 percent of them use the garden regularly. Assume also that this contributes to reducing work-related stress and that nurses are thus less likely to quit their job due to burnout. Estimates of replacing one nurse who works, for example, in an intensive care unit in the United States range from US\$35,000 to US\$100,000 for recruitment and orientation, depending on the area of the country (Ulrich 2002). Hypothesising a replacement cost of about US\$60,000 for one nurse, the savings of not having to replace the 50 nurses who use the garden and are less stressed would be  $50 \times \text{US}\$60,000 = \text{US}\$3 \text{ million}$ . If roughly half of the cost of their reduced stress resulted from use of the garden, then the cost of their replacement would still be approximately three times the cost of the garden. While this is only a hypothetical calculation, it provides some indication of the possible economic benefits to hospitals of investing in gardens (Fig. 4).

Another way of calculating this is to hypothesise that the nurse turnover rate is reduced from 14 percent to 10 percent, as happened at Bronson Methodist Hospital, Kalamazoo, Michigan, after the hospital moved into a new building that incorporated EBD, including an interior garden. The hypothesised Fable Hospital was said to employ 391 nurses. If 39 nurses left (10 percent of 391) instead of 55 nurses (14 percent), there would be a saving of US\$328,000, or US\$20,500 per turnover, as assessed in this study. This scenario attributed 50 percent of the reduced nursing turnover to the design of the new facility, or US\$164,000 (Berry et al. 2004).

### Improved Patient and Visitor Satisfaction

Another important argument for high-quality landscapes and gardens is the influence on patient, resident, and visitor satisfaction—the extent to which hospital patients are likely to be “return customers” and residents in senior facilities are likely to recommend them to others. For example, San Diego Children's Hospital (now Rady Children's Hospital) aimed to gain a larger proportion of the market in pediatric services in its region when it inaugurated a healing environment programme in 1993. Physical components of the programme included improved interior and exterior building design, gardens, family spaces, and an art collection. As part of this programme, the Leichtag Family Healing Garden was opened in 1997. Two years later, an extensive study of the garden revealed that 50 percent of users said that the garden “definitely” increased their overall satisfaction with the hospital; 72 percent reported that they would “definitely” recommend that other parents or staff visit the garden; 48 percent responded that the garden would “definitely” or “probably” influence whether or not they would recommend Children's Hospital to others. Finally, 90 percent of respondents (including those who had never been to the garden) expressed the view that it was important for hospitals to include gardens (Whitehouse et al. 2001).

Increasingly, procedures that used to require a hospital stay are being performed at outpatient ambulatory-care centres. As sedation is





1. Nature's healing value (Image: Feng Dexian/ Modified from "Bedok Reservoir" on <https://flic.kr/p/6124Rs> by Gaurav Vaidya/ licensed under a Creative Commons Attribution 2.0 Generic License).

2. The Donor Tree in the PlayGarden at Rusk Institute of Rehabilitative Medicine, New York City, unobtrusively recognises those who have supported the garden with monetary gifts (Photo: Naomi A. Sachs/ Courtesy of Wiley).

3. Staff at the Mount Hood Medical Center in Oregon were involved in the design and fund-raising for the new healing garden at that facility (Photo: Legacy Health/ Courtesy of Wiley)

4. Burnout and stress lead to high staff turnover and may contribute to medical errors. A garden located and designed to facilitate restful breaks may provide a significant return on investment (Photo: Chris Garcia/ Courtesy of Wiley).

often required and a family member or friend has to wait, sometimes for hours, to take the patient home, it is possible that gardens will become an important component of these centres, and thus the design of these spaces may contribute to customer satisfaction and loyalty. A study of ambulatory facility design found that the physical attractiveness of a facility enhanced patients' satisfaction and perceived quality of care. "There is a strong correlation between patients' overall rating of care and their willingness to recommend a facility to others. . . . Customer loyalty translates into an increase in the customer base, an important consideration for administrators responsible for growing market share and revenue" (Becker, Sweeney, and Parsons 2008).


In 2011 the first of the baby boomers turned 65, and the coming decades will see an enormous increase in the demand for senior living facilities. A study by Mather Lifeways found that in assisted-living centres for dementia patients, outdoor activity space was considered almost as important as the top-ranked overall feature, which was described as physical supports such as handrails and walking surfaces (Keane, Cislo, and Fulton 2003). *The Independent Living Report*, sponsored by the American Seniors Housing Association, found that the appearance of the outdoor space was almost as important as the location of the community, which ranked as the most important feature in their study (Wylde 2009). Far from being a frill, usable outdoor space may be one of the most cost-effective ways to upgrade an existing facility and to ensure that a new facility will be positively viewed by residents and visitors (Rodiek et al. 2013).

The marketing director of a retirement community in Illinois stated, "Definitely, quality outdoor space is an excellent investment. Families and residents appreciate the beauty and tranquility of quality gardens and the wildlife attracted by the flowers, water features, and greenery. From a marketing standpoint, quality outdoor space is a huge selling feature and draws many touring new prospects. Outdoor space encourages normalcy with residents and families struggling with the decision to move from a home to a facility. These same gardens and outdoor space become the backdrop for brochures and marketing materials distributed to outside communities" (D. McHale, Tabor Hills Premier Retirement Community, Naperville, IL, pers. comm., 2012).

It is estimated that, depending on the age of the community, from 14 to 41 percent of current residents in assisted-living facilities have moved there because of the recommendation of another current resident (Wylde et al. 2010). The same study found that

"very satisfied" residents (97 percent) were far more willing/likely to refer others to their community than simply "satisfied" residents (31 percent). The quality of accessible outdoor space is a significant component of residents' overall satisfaction with a facility. Another study hypothesised that improving residents' satisfaction with outdoor space would increase the number willing to recommend the facility to others. The authors posited that since word-of-mouth referrals from existing residents constitute an important resource for recruiting new residents, improving the quality and accessibility of outdoor areas could generate an estimated increase of four percent in new residents, resulting in more than US\$170,000 in additional yearly revenue for a community of one hundred residents (Rodiek et al. 2013).

Access to nature may also help to attract staff. Some healthcare facilities take prospective employees to the healing garden not only to showcase that particular amenity but also to demonstrate their commitment to an overall high level of care.

In conclusion, it is significant that access to nature is starting to be recognised and incorporated into healthcare design as an essential component of the environment of care. Now is the time for more hard numbers to back up its value. Healthcare facilities are businesses that need to take care of the bottom line. The more that proponents of therapeutic outdoor spaces can cite research that supports their claims, the more their clients are likely understand the value of investing in such amenities. The more that proponents can make the business case for access to nature and therapeutic gardens, the more likely they are to make it past the schematic design phase. 

<sup>1</sup> See *Therapeutic Landscapes: An Evidence-Based Approach to Designing Healing Gardens and Restorative Outdoor Spaces*, by Clare Cooper Marcus and Naomi A. Sachs.

#### References

- Becker, Franklin, Bridget Sweeney, and Kelley Parsons. 2008. "Ambulatory Facility Design and Patients' Perceptions of Healthcare Quality." *Healthcare Environments Research and Design Journal* 1, no. 4: 35-54.
- Bendetti, Francesco, Cristina Colombo, Barbara Barbini, Euridice Campori, and Enrico Smeraldi. 2001. "Morning Sunlight Reduces Length of Hospitalization in Bipolar Depression." *Journal of Affective Disorders* 62, no. 3: 221-23.

- Berry, Leonard L., Derek Parker, Russell C. Coile, D. Kirk Hamilton, David D. O'Neill, and Blair L. Sadler. 2004. "The Business Case for Better Buildings." *Frontiers of Health Services Management* 21, no. 1: 3-24.
- Calkins, Margaret P., and Bettye R. Connell. "Mary, Mary, Quite Contrary: How Do You Get People to Use Your Garden?" Paper presented at the Joint Conference of the National Council on Aging and the American Society on Aging, Chicago, Illinois, March 16 2003.
- Cooper Marcus, Clare, and Marni Barnes. 1995. *Gardens in Healthcare Facilities: Uses, Therapeutic Benefits, and Design Recommendations*. Concord, CA: The Center for Health Design.
- . 2008. "Post Occupancy Evaluations of Six Healthcare Gardens in the Chicago Area." Unpublished manuscript.
- Machlin, Steven R. and Kelly Carper. 2007. "Expenses for Inpatient Hospital Stays." Statistical Brief No. 164. Rockville, MD: Agency for Healthcare Research and Quality, US Department of Health and Human Services. [http://meps.ahrq.gov/mepsweb/data\\_files/publications/st164/stat164.shtml](http://meps.ahrq.gov/mepsweb/data_files/publications/st164/stat164.shtml).
- McMinn, Bryan G., and Lorraine Hinton. 2000. "Confined to Barracks: The Effects of Indoor Confinement on Aggressive Behavior among Inpatients of an Acute Psychogeriatric Unit." *American Journal of Alzheimer's Disease* 15, no. 1: 36-41.
- Parsons, Russ, and Terry Hartig. 2000. "Environmental Psychophysiology." In *Handbook of Psychophysiology*, 2nd ed., edited by John T. Cacioppo and Louis G. Tassinary, 815-46. New York: Cambridge University Press.
- Parsons, Russ, Roger S. Ulrich, and Louis G. Tassinary. 1994. "Experimental Approaches to the Study of People-Plant Relationships." *Journal of Consumer Horticulture* 1, no. 4: 347-72.
- Pati, Debajyoti, Tom Harvey Jr., and Paul Barach. 2008. "Relationships between Exterior Views and Nurse Stress: An Exploratory Examination." *Health Environments Research and Design Journal* 1, no. 2: 27-38.
- Rodieck, Susan, May M. Boggess, Chanam Lee, Geoffrey J. Booth, and Alisan Morris. 2013. "Can Better Environments Lead to Cost Benefits in Assisted Living Facilities through Increased Word-of-Mouth Referrals?" *Health Environments Research and Design Journal* 6, no. 2: 12-26.
- Roy-Fisher, Constance. 2007. "Finding Funding Sources for Healing Gardens." Jupiter, Florida: Studio Sprout. <http://studio-sprout.com/files/Finding-Funding-Sources-for-Healing-Gardens.pdf>.
- Taylor, Ellen M. 2009. *Survey of Design Research in Healthcare Settings: The Use and Impact of Evidence-based Design*. Concord, CA: Center for Health Design.
- . 2010. *Survey of Design Research in Healthcare Settings: The Use and Impact of Evidence-based Design*. Concord, CA: Center for Health Design.
- Terrapin Bright Green. 2012. *The Economics of Biophilia: Why Designing with Nature in Mind Makes Financial Sense*. New York: Terrapin Bright Green.
- Ulrich, Roger S. 1984. "View through a Window May Influence Recovery from Surgery." *Science* 224, no. 4647: 420-21.
- . 1999. "Effects of Gardens on Health Outcomes: Theory and Research." In *Healing Gardens: Therapeutic Benefits and Design Recommendations*, edited by Clare Cooper Marcus and Marni Barnes, 27-86. New York: John Wiley and Sons.
- . 2002. "Communicating with the Health-Care Community." In *Interaction by Design: Bringing People and Plants Together for Health and Well-Being*, edited by Candice A. Shoemaker, 19-32. Ames, Iowa: Iowa State University Press.
- Ulrich, Roger S., Craig Zimring, Xuemei Zhu, Jennifer DuBose, Hyun-Bo Seo, Young-Seon Choi, Xiaobo Quan, and Anjali Joseph. 2008. "A Review of the Research Literature on Evidence-based Healthcare Design." *Health Environments Research and Design Journal* 1, no. 3: 61-125.
- Walch, Jeffrey M., Bruce S. Rabin, Richard Day, Jessica N. Williams, Krissy Choi, and James D. Kang. 2005. "The Effect of Sunlight on Postoperative Analgesic Use." *Psychosomatic Medicine* 67: 156-63.
- Whall, Ann L., Margaret E. Black, Carla J. Groh, Dawn J. Yankou, Barbara J. Kupferschmid, and Norman L. Foster. 1997. "The Effect of Natural Environments upon Agitation and Aggression in Late Stage Dementia Patients." *American Journal of Alzheimer's Disease and Other Dementias* 5, no. 12: 216-20.
- Whitehouse, Sandra, James W. Varni, Michael Seid, Clare Cooper Marcus, Mary Jane Ensberg, Jenifer R. Jacobs, and Robyn S. Mehlenbecket. 2001. "Evaluating a Children's Hospital Garden Environment: Utilization and Consumer Satisfaction." *Journal of Environmental Psychology* 21: 301-14.
- Wyld, Margaret A. 2009. *The Independent Living Report*. Washington DC: American Seniors Housing Association.
- Wyld, Margaret A., Edie Smith, David Schless, and Rachel Bernstecker. 2009. "Satisfied Residents Won't Recommend Your Community, but Very Satisfied Residents Will." *Seniors Housing and Care Journal* 17, no. 1: 3-13.