

Encouraging Healthy, Sustainable Lifestyles and Healing Environments: Nursing's Role in Transformative Natural Design

White Paper

by

Marjorie D. Weiss, PhD, APNP, LEED® AP

Introduction

Transformative Natural Design (TND), *in combination with the HS³™ model*, can encourage healthy, sustainable lifestyles and healing environments in healthcare environments. TND incorporates the principles of the experience ecology, biomimicry and BIM to design built environments. The HS³™ model promotes the functional integration of health, safety, sustainability and stewardship which simultaneously support the health and safety of patients and staff, facilitate efficient utilization of resources as well as protect and preserve the natural environment. TND's experience-based design strategies require front-end involvement of all stakeholders- from project conception to completion. The stakeholders include caregivers, designers, builders and customers. This integrated team must use the experience ecology model to meld environmental design with the ideal customer experience. Once the new building is inhabited, fostering healthy, sustainable practice within the built environment requires an integrated approach. Optimization of sustainable healthcare environments requires that those who inhabit the space understand, practice and promote healthy, sustainable living. This is more easily accomplished in a health care organization which has adopted the tenants of HS³™ integration, to bring the building to life with an ongoing focus on integrated health, safety and sustainability.

HealthCare Trends

1) A Growing Market Segment

Healthcare is the second fastest growing segment in the US economy. In Northeast Wisconsin, health care workers comprise about 40% of the workforce. Healthcare facilities demand 24/7 operational support for a variety of complex functions. Customer and caregiver needs and expectations vary, depending upon location and type of service rendered-inpatient vs. outpatient, emergency and acute care vs. diagnostic and chronic care. Health care administrators are challenged to deliver efficient, safe, cost-effective care, as measured by fewer adverse safety events, financial stability, shorter patient stays, decreased expenses, and growth in revenues.

Hospitals and clinics are complex building types which have a significant impact on the environment. Increasingly, health care leaders are embracing the social responsibility associated with green design, building operations and the ongoing promotion of healthy, sustainable lifestyles for caregivers and patients. The challenge lies in integrating environmental, health and safety concerns with green product design, lean and green operations, closed-loop supply chains and a focus on the health and well-being of patients and caregivers.

2) Patient-Centered Care

Patient-centered care was introduced in 2001 with the Institute of Medicine's report highlighting the six interrelated factors constituting high-quality care (Charmel & Frampton, 2008). Research shows that patient-centered care benefits include: decreased length of stay (LOS), lower cost/case, decreased adverse events, higher employee retention rates, decreased operating costs, decreased malpractice claims and increased market share. Some of the characteristics of patient-centered care include:

- A culture that encourages staff to be sensitive to patient needs (comfort, emotional, spiritual and physical needs met).
- Architectural and interior design that gives homelike feeling and encourages patient mobility, involvement of family.
- An emphasis on family and patient education.
- Recognition of nutrition as integral part of health as well as source of pleasure and comfort and familiarity
- Support for family involvement in care processes (Charmel & Frampton, 2008).

Patient-centric care can prompt changes in building design as well as delivery of care. The Standardized Hospital Consumer Assessment of Healthcare Provider and Systems survey (HCAHPS), a national standardized tool to assess the patient experience, was introduced in 2008. Participation was encouraged by CMS to avoid a 2% reduction in annual payments (Charmel & Frampton, 2008). Patient-centered care has been linked to a decrease in malpractice claims, as well as improved recruitment and retention of staff rates. It seems as if staff who feel cared for themselves, can better care for their patients. Staff recognition and communication programs, employee wellness initiatives and hospital-wide celebrations also contribute to "best place to practice designations.

3-A Focus on Sustainability

Built environments are a significant cause of human illness and environmental degradation. The EPA has noted that indoor air pollution is one of the top five environmental risks to public health in US. People in the US spend 95% of their time indoors (Guenther, 2007).

Since 2000 health care sector has been paying increasing attention to sustainable design; recognizing the “healthcare triumvirate”-patient care, staff productively and well-being and environmental stewardship. The American Institute of Architects definition of “sustainable design creates communities and buildings that advance enduring public and environmental wellbeing” (Bardwell, P.L. (2007).

The *Green Tsunami* in business and healthcare is forcing more global resource competition, exerting upstream leverage with suppliers and downstream on employees and patients (Guenther, 2008). The Society for Healthcare Architects conference in San Francisco 2000 “Setting Healthcare’s Environmental Agenda” marked the beginning of a focus on the interplay between environment and health. In 2002 the American Society for Healthcare Engineering (ASHE) published the Green Healthcare Construction Guidance Statement of voluntary standards, the “Green Guide for Health Care,” modeled after USGBC Green Building Council’s LEED standards. This was updated in 2004. The Green Guide focuses on construction and operations. The 2004 LEED for Healthcare initially was based on Green Guide for Health Care. In 2007 LEED Healthcare 2007 was released; the first third-party green building certification tool for health care (Guenther, Vittori and Atwood, 2006).

4-Integrated Health, Safety, Sustainability and Stewardship

Health care organizations are beginning to adopt the HS³™ model which promotes an integrated approach to health, safety, sustainability and stewardship. Integrating HS³™ through an organization’s policies, values and actions can promote healthy lifestyles, reduce risk and injuries, protect and preserve the natural environment, and provide workers the support to perform critical tasks efficiently and effectively. Nurses can leverage their role through synergistic planning and cost-effective actions which link health promotion, work injury management, environmental efforts, safety training and surveillance, and regulatory compliance programs. Each area of HS³™ has an interrelated impact on the delivery of patient care and the caregiver. Nurses who promote integrated HS³™ can improve the work environment, improve health and safety, protect and preserve the natural environment, increase productivity and increase job satisfaction leading to increased employee and customer attachment levels (Weiss, 2009).



Transformative Natural Design

Transformative Natural Design (TND) is key to the development of health-promoting environments which support healthy, sustainable lifestyles. TND incorporates the principles of the experience ecology, biomimicry and BIM to design healing environments which

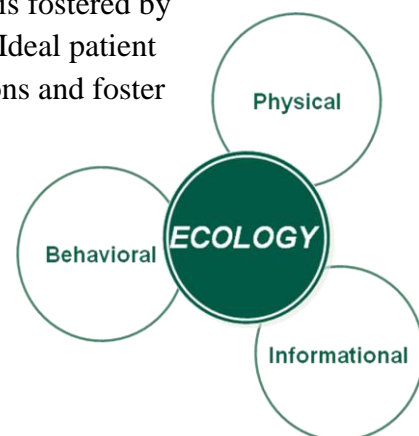
simultaneously support the needs and expectations of patients (customers) and caregivers (workers). TND uses experience-based design strategies which require front-end involvement of all stakeholders- from project conception to completion.

Traditional interior health care space design follows the same path: definition of needs, visioning, design direction, materials selection, finish palette review, interior finishes selection and warranty/maintenance binder information. When experience-based design is the foundation on which new healthcare environments are conceptualized, designed and built, the process must change to accommodate innovations on a daily basis. This becomes even more complex when the building owners require that the environment address organizational values tied to health promotion, safety, sustainability and stewardship.

Experience Ecology frames the delivery of the EXCEPTIONAL CUSTOMER EXPERIENCE via the physical, behavioral and informational spheres of influence. Three key areas to consider:

- 1) Physical elements include all aspects of spatial integration. These include the furnishings, with the micro elements of fabric pattern, color, illumination, texture, scent, temperature, sound and taste all linked to nature.
- 2) Behavioral elements include all movement sequence interactions between workers and customers. This determines person-to-person interactions, time to complete a process, sustainable practices.
- 3) Informational elements include all the documents, forms, signs, communication activities, such as spoken word, gestures, postures, impression and idea exchanges between customers, workers and the environment.

Experience Ecology requires that all the micro elements be designed together based on the desired outcomes for customers and caregivers. The balance is fostered by integrating the elements under the umbrella of sustainability. Ideal patient experiences (IPE) must trigger, not restrain creative innovations and foster both customer and caregiver attachment.



In healthcare, the architect, the builder and healthcare providers must be committed to a team-based approach to simultaneous facility design and process improvement, focused on patient-centric care. Interdisciplinary teams must identify each patient attachment point and design ideal patient experiences in detail (physical, behavioral and emotional components of the

experience). Each process is mapped out and the expected outcomes delineated by the team members. The goal is to fuse the design process and ideal patient expectations to strengthen the brand in the marketplace (Weiss & Tyink, 2009). Architects, interior designers and caregivers can use a variety of tools in this experience-based design process, focused on IPE processes and sustainable, health-nurturing environments as driving factors. Design concepts, such as circles of care, can be manipulated and measured with BIM to help stakeholders make informed choices. These innovation team discussions provide insight for facility design and standardization of patient care processes.

Biomimicry is the science of infusing the environmental strategies of the natural environment in the built environment and human experience. Just as nature is the ultimate healer, efficiency and sustainability expert, so too the principles of biomimicry exploit this expertise to bring about a transformative environment that support healing and wellness. Since the 1977 publication of “Biomimicry: Innovation Inspired by Nature,” Cofounder of the Biomimicry Guild, Janine Benyus has been a leader in promoting biomimicry (Benyus, 1977).

Research has shown that green buildings that incorporate natural vegetation and links to nature improve functioning, decrease stress and improve healing and improve moods. Positive moods impact on cognitive and social functioning by enhancing learning, increasing the efficiency has written with decisional processes on complex tasks, greater use of inductive problem solving and increased innovativeness. Complex cognitive strategies are less likely to be utilized when people are depressed, unhappy or stressed. Ulrich (1993 and 1984) showed the health promoting and stress reducing effects of passive viewing of nature through windows, videos and photographs. Cognitive functioning has been linked to environmental influences as well as worker self-efficacy. Doux found that positive feelings led to heightened right parietal brain region activity, the section of the brain associated with more global, expansive cognitive style which led to increased creativity and problem-solving. Lohr (1996) found that subjects working in windowless room with plants worked more efficiently and had lower blood pressure readings than workers in the same room without plants. People with nature views scored better on direct attention testing than those with view of built environment (Tennessen & Cimprich, 1995; Hartig & colleagues, 1991).

Negative environmental impacts include ambient conditions, noise, temperature, air quality and lighting. Researchers from Rensselaer Polytechnic Institute were the first to measure the correlation between comfort and productivity at the West Bend Mutual Insurance Company new office space in 1991. Median productivity improved 16% from old to new building and 2.8% of the improvement was attributed to Johnson Control’s PEMS-personal environments modules to control temperature, ventilation, lighting and sound masking (Palmer & Mariscal, 2001). Systemic review of the effects of physical environmental stimuli in healthcare settings on the health and well-being of patients show that the physical environment is an important factor in both the healing process and support for patients’ feeling of well-being (Dijkstra, Pieterse & Pruyn, 2009). This research has led to an increased awareness of micro-

environments in health care settings. However, despite the fact that providing physiologically and psychologically healthy interior environment quality is considered important in improving employee health and productivity, traditional interior design practices, cost of materials, lack of understanding of life cycle all adversely impact on the application of sustainable environment design practices (Kang & Guerin, 2009). For example, in health care environments, design considerations that need to be addressed include the impact of “out gassing” from fabrics, carpets and finishes, the use of recycled content (post consumer and pre consumer) composite wood, agrifiber and wheat board, and low emitting adhesives and sealants. Design imperatives for indoor environmental quality include length of entryway systems with at least 6 feet long in primary direction of travel to capture dirt. Shielding from radioactive materials, exhaust for hazardous chemicals, disposal of biologics and hazardous materials as well as safety mechanisms for high end diagnostics are also a design factor. Other design considerations include, exposure to latex, plastics and other potentially-toxic materials.

BIM-(Building Information Modeling) is a workflow tool that allows all stakeholders to be involved in the micro elements that are the foundation for the design and construction process. BIM is continuous computer-aided design that minimizes errors and omissions, looks at overlap and redundancy, as well as construction sequencing and accurate materials acquisition and use. Healing environments utilize the micro elements of nature to



design versatile, flexible spaces that allow for evolving uses. The choreography of micro elements that comprise the total healing environment can be a daunting task, but BIM helps all stakeholders focus on the end result.

HS^{3™} and Transformative Natural Design

Nursing must be involved in Transformative Natural Design to instill the principles of integrated health, safety, sustainability and stewardship into the design of future health care environments. Nurses work in an interdependent system comprised of the experience ecology:

physical environment, work processes, organizational culture (e.g. formal and informal values, norms, expectations and policies, etc.), workforce demographics and information technology (Becker, 2006). The HS³™ model encourages organizations to consider the interdependencies and patterns of interaction between these elements rather than focusing on the individual elements alone. The HS³™ model helps nurses to work more closely with facilities, environmental services, pharmacy and other support functions to focus on the “healthcare triumvirate”-patient care, staff productivity and well-being and, environmental stewardship (Weiss, 2009). Integrated HS³™ helps caregivers and health care organizations connect to their communities in new ways by reflecting and responding to community values, embracing the micro elements of nature-nurturing, peaceful, healthy, relaxing and healing. Nurses have a huge influence on health care delivery in every setting.

Nurses are boundary-spanners and have the skills to lead HS3 model implementation.

In an environment of increasing regulatory constraints, diminishing profit margins, streamlined-workforces and resource realignment, nurses have a responsibility for decreasing the fragmented approach to health, safety and sustainability that leads to injuries, errors and™ waste. Each area of HS³™ has an interrelated impact on the delivery of health care services. Nurses who adopt the HS³™ model can improve their work environment and positively impact on their own health and safety. They can also improve patient health and safety, protect and preserve the natural environment. The increase in productivity and job satisfaction leads to increased employee and customer attachment levels.

The HS³ 4-Point Test

1-Is this healthy?

2-Is this safe?

3-Will this protect and preserve our natural environment?

4-Is this the best use of our resources (people, financial, material)?

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By designing health-promoting environments, nursing can demonstrate their leadership in environmental stewardship. As patient advocates, nurses build bridges with other departments and can impact on waste removal and procurement. Nurses can help organizations learn and adhere to environmental preferable purchasing policies, improve waste management processes, decrease use of chemical pollutants, promote healthy food choices, and provide leadership in environmental stewardship (Sattler & Hall, 2007). Nurses are at the hub of hospital activity, natural leaders who need to learn more and be more environmentally proactive (Sattler & Hall, 2007). Progress has already been made by leveraging purchasing through GPOs-reducing packaging, using unbleached, recycled paper, fewer chemicals. Since the mid 1980's, concerns for blood-borne diseases, the HIV/Aids epidemic led to-all waste in red bags. This changed in mid 90s as paper became the largest source of waste in health care. Mercury thermometers are passé. Battery recycling is a major concern. Landfills, lakes and oceans are filling up with toxic, no-biodegradable plastics. Incinerated waste releases dioxins in the air. The DEH=Di 2ethylhexyl phthalate-found in plastics is now being replacing with DEHP free alternatives.

From the use of IV bags and tubing to the selection of pesticides, herbicides, fungicides, and pest management practices, nursing has a role in designing health-promoting environments. Nurses can foster discussions on the use of healthy food in the staff cafeterias, procurement of local foods, hormone-free milk and poultry, as well as hosting educational sessions and farmer's markets on hospital grounds. The opportunities are endless.

In the building process, nurses can work with architects and builders to insure that the design and building process fosters health, safety and sustainability. Here's an example. BIM (Behavioral-Image Modeling) is a paradigm in health care used to integrate prevention and health promotion in brief interventions. By combining the forecasting BIM tool with behavior modeling and process flow, health-promoting environments and interactions can more easily be linked together. The salient images that BIM (Building Information Modeling) produced are similar to the salient images that can be used to lead to improvements in health-promoting behaviors. For example, placement of stairs vs. elevators, signage to encourage stair use, location of supplies, access to technology, etc. all impact on care delivery processes, as well as health-promoting activities. BIM ties micro elements together in meaningful ways to encourage health-promoting, as well as efficient environments.

Why should architects and contractors get nurses involved in TND? Four good reasons: 1-Nurses are boundary-spanners in healthcare settings, with the ability and expertise to link health, safety, and sustainability, 2-The community benefits from health care environments which promote healthy, sustainable living and healing, 3-Nurses understand the connection between green buildings and human health. 4) It makes good business sense.

Summary

Nursing Stewardship and

Sustainable Environments

As advocates for community health, nurses recognize that health care delivery presents both a challenge and an opportunity to integrate sustainable design, construction and operational (process improvement) strategies.

A healing environment is predicated upon the premise that the land, people and building must all work together in harmony.

By its nature, the design, construction and operation of buildings have a negative impact on the natural environment.

Nursing can use sustainable or restorative design (TND) to lesson that impact through thoughtful design and implementation of building projects.

Transformative Natural Design (TND) is a tool for developing health-promoting environments. TND incorporates the principles of the experience ecology, biomimicry and BIM to design built environments which simultaneously support the health and safety of patients and staff protect and preserve the environment. The HS³TM model provides the framework for ongoing integration of health, safety and sustainability within the healthcare organization. The physical design of work spaces, behavioral expectations, and access to information technology, along with the work culture that prioritizes integrated HS³TM through its strategic planning, policies and values can reinforce healthy lifestyles, reduce the risk of disease and injury and provide support needed to enhance productivity and at the same time protect the natural environment and community resources TND can be a tool which provides organizations with the built environment to support patient-centric care. Nurses, however, are the architects of both how the ideal patient experience is delivered, and how resources are used to promote and preserve the environment . Therefore, it is imperative that nurses help design the healing environment so it can support healthy, sustainable living for both caregivers and patients. The result? Healthy, sustainable lifestyles, healing environments, and ideal patient experiences.

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References

- Bardwell, P.L. (2007) Architecture & Design” tutorial of Healthy Facilities Management magazine. Spet. 2007. 20(9) 52-55.
- Benyus, J. (1977). Biomimicry: Innovation Inspired by Nature. William Morrow publisher. www.biomimicryguild.com/Janinefirstchap.html. Accessed: 9-5-2009
- Charmel, P.A., Frampton, S. B. (22008). Building the care for patient-centered care. Healthcare Financial Management, March 2008 80-85
- Dijkstra, K., Pieterse, M., & Pruyn, A. (2006). Physical environmental stimuli that turn healthcare facilities into healing environments through psychologically mediated effects: systemic review. Journal of Advanced Nursing. 56(2): 166-81.
- Guenther, R. Hall A.G. (2007). Healthy buildings: impact on nurses and nursing practice. Online Journal of Issues in Nursing. May 12(2) 10 pages
- Kang, M. & Guerin, D. A. (2009). The state of environmentally sustainable interior design practice. American Journal of Environmental Sciences. 5(2): 179-186.
- Palmer, M. & Mariscal, A. 2001. Green buildings and worker productivity: A review of the literature. Environmental Valuation and Cost Benefit News. , City of San Francisco SF Environment. www.sfenvironment.com, http://temp.sfgov.org/sfenvironment/aboutus/innovative/greenbldg/gb_productivity.pdf accessed 4/8/2009
- Guenther, R. @008 Commentary Why should healthcare bother? Frontiers of Health Services Management 25(1): 25-32.
- Guenther, R., Vittori, G., Atwood, C. (2006). Values-driven design and construction: Enriching community benefits through green hospitals. Center for Health Design. Paper presented by the Center for Health Design and Health Care Without Harm at conference sponsored by RW Johnson Foundation, Sept, 2006. CHD
- Sattler, B & Hall, K. (2007). Healthy Choices: Transforming our hospitals into environmentally healthy and safe places. Online Journal of Issues in Nursing, 207 12(2): 4-4.
- Weiss, M. & Tyink, S. (2009). Delivering ideal patient experiences. *AAOHN Journal*, 57(5); 210-215.
- Weiss, M. (2009). Changing the conversation: The occupational health nurse’s role in Integrated HS^{3TM}. *AAOHN Journal* (57)7: 293-299.

Weiss, M. & Tyink, S. (2009). Creating sustainable ideal patient experience cultures. *Med-Surg Nursing*. 18(4): 249-252.