Healing Environments
WHAT'S THE PROOF?

BARBARA J. HUELAT

with evidence by
THOMAS T.H. WAN, PH.D.

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First Edition

Dedication

To my best friend Joe

and all those on

a healing journey

seeking balance

for the

body, mind, and spirit.

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ACKNOWLEDGEMENTS

passion for healing. Also a special thank you to contributing manufacturers Armstrong, Ajion, DuPont, Herman Miller and Steelcase for their research and evidence to support healing environments.

Healing Environments are not possible without visionary clients. It is the challenge of their defined needs that drive me to look for creative and better ways to address these needs. Dr. Pietrzak has been that exceptional client who truly believes that the environment can make a difference in health outcomes. Thank you Dr. Mik, for your mentorship and trust in our many designs for healing environments. Another special thanks to Dr. Pietrzak for authoring the Forward for this book. Thank you also to other special clients who are true patient advocates; Frankie Picard, William H. Flannagan, and the many dedicated staff members at Potomac Hospital who continue to remind me of subtle patient and community needs, where healing environments do make a difference in patient outcomes.

A very special thank you as well to my contributing author, Thomas Wan, PhD, who has been a friend, mentor and believer in the value of healing environments as well our designs. Dr. Wan has also been responsible for translating Healing Environments, Design for the Body, Mind and Spirit into Chinese as well as publishing and distributing the book in the Far East. It has been an exceptional pleasure working with him and his colleagues bridging healing environments between the East and the West around the globe.

On a personal note, thank you to all of you who continue to support me on my own healing pilgrimage. Thanks to my daughters Sharon and Julie for their encouragement and support. Thank you Abbot Joseph for helping keep priorities in balance. And thanks to my brothers, Bruce, Larry, Jerry, Brian and Guy plus a very special sister-in-law Vicky who together support Mom in her healing journey and battle with Parkinson's Disease.

Many people, friends, family members patients, clients, physicians, researchers and manufacturers have shared with me their research, evidence, stories, needs and hopes for better places to heal. Without them and many others too numerous to name individually, I would not have had the inspiration or courage, to write this book. Thank you all.

Barbara J. Huelat
Alexandria, VA
October 2007

FORWARD
Healing Environments

Our bodies, minds and spirits are shaped by our "environment". Individuals experience physical, mental and emotional environments throughout their lives. These previous environmental experiences affect our approach, understanding and responses to our current environment and largely define us as individuals. Ultimately, environment is the source of all the stimuli or "inputs" that we receive and process. Through complex neurological impulses, transmissions, interconnections and interactions these stimuli are sensed, stored and reacted to. These reactions include physical responses ranging from simple reflexes to more complex responses such as fainting or immune system modulation. Additionally, the entire range of emotions from exquisite pleasure to deep depression can be experienced as a result of environmental conditions. These emotions likewise have a physiologic effect on our bodies.

Science is now beginning to understand the links between physical environment and human physical and emotional well-being. The existence of these links should be no surprise to us. Simply, the forces of evolution would dictate that man, as he is today, flourished in the natural environments of earth. It is unlikely that we would have succeeded as the species we know today if man were completely insensitive to sunsets, water, panoramic vistas, the sounds of birds, etc. Likewise, supporters of creationism also lean to the premise that the creator made man and his environment symbiotic and supportive.

As humans develop, grow and mature, we are constantly receiving stimuli from the environment. It began in our aquatic and rocking pre-natal environment. Growing, we learn to respond to many stimuli with pleasure or other positive feelings. Some of these positive feelings will be linked to physical aspects of the environment. Our psychological wellness, immune systems, neurological systems, cardiovascular system and endocrine functions are all interlinked and affected by these environmental experiences. The responses in these systems can be very subtle and go unnoticed. Likewise they can be overwhelming; such

as phobias resulting from previous experiences. Simply being in a stark cold emergency room that loudly echoes with the sounds of instruments dropped on trays may dramatically increase the anxiety of a patient. Even seeing a picture of what looks like a hospital could trigger a response in some of us.

If we are truly committed to providing the best outcomes for our patients, then it behooves us, at the very least, to investigate, learn and study how the physical environment can augment the traditional clinical sciences to effect optimal clinical outcomes. Barbara Huelat is a leading pioneer in healing environments. No longer must we just make assumptions that these are just good ideas. In this second edition the author brings forward solid evidence and logic for application. Thus, evidence provides the foundation for *Healing Environments. What's the Proof?*

As research on *Healing Environments* continues, no doubt there will be a third and fourth edition. Barbara Huelat's works are setting the stage and foundation enabling the current and next generation of designers, researchers and clinicians to collaborate – inevitably to go far beyond what we deem possible today. My advice for now: "Take two looks at the sunset; and call me after you read this book."

~ Michael P. Pietrzak, MD
Lead Scientist, Project ER One

A Healing Environment

AND IS THERE ANY PROOF?
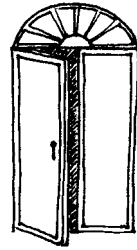
WE ARE CALLED UPON TO BECOME

CREATORS, TO MAKE THE WORLD NEW AND

IN THAT SENSE TO BRING SOMETHING INTO

BEING WHICH WAS NOT THERE BEFORE.

~ John Elof Boodene

HOLISTIC DESIGN

Healthcare Reform

Five Senses

Healing Environments

COMFORT

Positive Outcomes

Reduce Stress

Patient Friendly

Body, Mind & Spirit
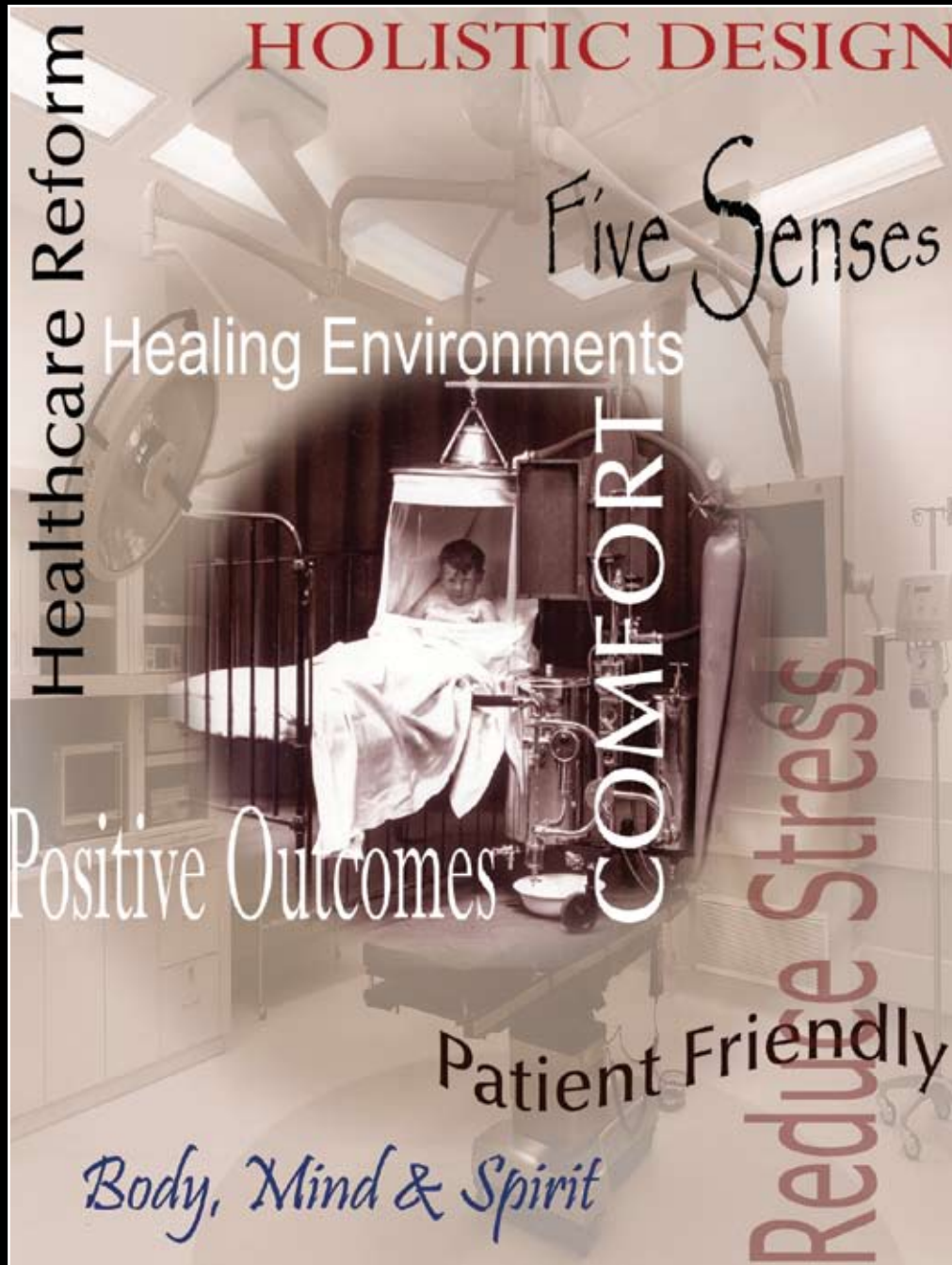
A Healing Environment
IS THERE ANY PROOF?

WHEN TRYING TO DESCRIBE PLACES CALLED "Healing Environments" where healthcare providers treat patients, people use phrases like "patient-friendly", "family-centered", "home-like", "hospitality-like" and "patient-first". But these buzzwords provide ill-defined philosophies that don't quite reach the heart of the matter.

Designers, consumers and healthcare providers might try to create healing environments, and intuitively, the phrase "healing environment" sounds reassuring. Often healthcare organizations believe they have a healing environment, even if they can't quite define it. If they feel they don't have one, they want one—it will improve business, benefit their community and their patients.

Eighteen years ago, in San Diego, the newly formed Symposium for Health Care Design first publicly introduced the concept that environments impact health and wellness. The symposium was Wayne Ruga's creation, and brought together professionals from diverse fields—healthcare providers, manufacturers and designers. Each invited presenter from each diverse field was known for treating the environment as if it impacted healing.

As one of the founding board members for the Symposium of Health Care Design, which later evolved into the Center for Health Design, I shared and explored the philosophy of healing environments with people from these multiple disciplines. During the six years in which I served as a board member, I tested these concepts with some of the country's best practitioners. The Center has had a major impact on healthcare design, introducing revolutionary ideas regarding the integration of the whole person—the body, mind and spirit—in a healthcare environment.
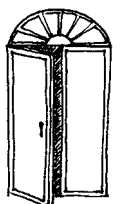
The philosophy evolved over time. Today, "healing environments" continue to be defined and redefined with a host of new qualities including safety, security, accessibility, sustainable green design and now "evidence-based design". My early participation in this evolving process gave me the opportunity to hone a definition of "healing environment" and the manner in which we can define, nurture and prove such a concept.

The most basic definition of a healing environment is our oldest and most common conception: a place where doctors practice medicine—*a hospital*. Since healthcare reform requires that existing facilities perform in a "patient-friendly" manner and facility mission statements often include promises of patient services, care-giving and high-quality care, people have become increasingly willing to accept the idea that modern-day medical facilities provide healing environments.

Furthermore, many Americans believe when they become sick, diseased or injured, they need medical attention to be cured. This belief nurtures the idea that a healing environment involves a hospital, doctors and nurses. We have long associated curing with healing, believing that to be cured is to be healed.

By examining the association between healing and curing, the flaws in this definition become apparent. Though medical facilities may help cure, they do not, in and of themselves, constitute a total healing environment.

Confusing a health-care facility with a healing environment is made easier by the fact that we tend to think of "healing" and "curing" as synonymous; they are not. A patient who is cured is not necessarily healed. For instance, if a facility resuscitates a patient during cardiac arrest, that patient is cured—saved from death. That patient is not healed; the cause of the cardiac arrest remains untreated.

Since people die everyday, we know that medical facilities cannot always provide a cure. However, as hospice patients attest, healing is frequently possible, even in the face of death.

A cure involves the repair of physical damage. Healing balances the body, mind and spirit. Traditional medical institutions seek to provide cures, while healing environments support both healing and curing. Curing and healing are both important aspects of health care, and health-care facilities can support both.

A Personal Experience

My husband, Joe, underwent a stress test that indicated a heart blockage. His doctor referred him to an excellent cardiologist who promptly scheduled an angiogram which determined the location and severity of the blockage. During the procedure, the physician recommended the placement of stents in the arteries of Joe's heart. The physician was an excellent technician, and he completed the procedure successfully. Was Joe cured of his heart disease?

Joe remained overnight in a medical facility of excellent reputation. The hospital claimed to have a healing environment. After the stent-placing procedure, the staff moved Joe to a patient room on the Cardiac Nursing Unit. He was placed in a semi-private room with another heart patient, and he received appropriate care and treatment for the procedure. The friendly and cheerful nurses monitored his blood pressure and vital signs. I stayed by his side.

Could this be considered a healing environment?

Joe shared his semi-private room with a terminally ill man. Though unconscious, the roommate uttered unrecognizable noises. A respirator, monitor and other unknown equipment was attached to the unfortunate man, and it all made intimidating noises. Of the many sounds, Joe found his roommate's gasps for breath the most distressful. Separated only by a thin sheet of cubical drapery, he couldn't help but listen. Both Joe and I found ourselves waiting for the next gasping breath, hoping it would come, afraid it might not.

We found ourselves on deathwatch for a stranger. After visiting hours, I reluctantly left, and the nurses turned off the television. Joe, anchored to his bed with his own noisy attachments, remained in the room with an unconscious, gasping roommate, unidentifiable beeping machines, and concerns about his own health. He could not shut out the noise, worries for his roommate, or anxiety about his own health. He could not control the high stress of his immediate environment.

During the night, his roommate passed away. Although the noise stopped, the stress did not. The roommate's grief-stricken family arrived and spiritual ceremonies were held. The hospital staff took the requisite photographs, finally removed his body and the room was prepared for the next patient. Though Joe hadn't shared as much as a greeting with his roommate, he had just witnessed and experienced a major milestone in a stranger's life.

Many healthy people would have suffered increased stress had they been compelled to spend the night as Joe did. Not surprisingly, this stress manifested itself physically; Joe's blood pressure increased to a dangerous level. The attentive nurses promptly administered medication to return his blood pressure to a safe reading. The next morning, a bewildered nurse who could not understand Joe's radical blood-pressure readings greeted me.
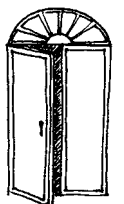
Had Joe been exposed to a healing environment?

The doctors released Joe with instructions to get plenty of rest, avoid stress, and to begin a cardiac rehabilitation program. Certainly the hospital, the physicians and caregivers provided appropriate care and treatment to cure Joe of his heart disease.

However, the healing process could not begin until he left the hospital.

The cure for Joe's heart disease began in a medical facility, a place often considered a healing environment. The doctors found mechanical weaknesses in Joe's heart and buttressed them with stents. The nurses gave him drugs that lowered his blood pressure.

However, many factors inhibited a healing environment—unfamiliar beeps from unfamiliar machines, sharing a room with a dying man and natural anxiety over health.

Because of such factors, medical facilities cannot routinely be said to constitute a healing environment, even though the facility provided a cure.

Evidence

Evidence-Based design has surged since the publication of my first book four years ago. For designers striving to validate the reasoning behind their work, this trend has been very beneficial. Hospital administrators have challenged the design profession with "prove it" regarding the value of patient amenities. In the late 1980's the Center for Health Design published its first list of a literature search of research documenting studies where design had a positive impact on the patient's ability to heal. This occurred before the term "evidence-based design" was used. This list numbered less than 60 examples. Today I googled "evidence-based design" and found more than 55,100,000 entries. Evidence-based design is growing exponentially, and not a minute too soon. What is behind this phenomenal growth?

Sometimes what a patient most wants is what's best for that person. Even when someone is sick—or maybe especially when someone is sick—they don't want to be in a room with another sick person. For more than 30 years we had the evidence to prove the value of the single-bedded room. Concerned healthcare facilities, leading healthcare-design firms, and consumers have fought for single-bed patient rooms so that they don't have to face similar situations as Joe's. There are many other significant reasons.

And yet many hospitals, the main providers of "healing environments," find it difficult to comply with this request. Insurance companies and investors fight the concept because it costs more to build the additional square footage needed for private rooms and additional toilets. Staffing resists the idea since all-private rooms increase their walking distances and limit their ability to easily observe a given number of patients.

Indifferent to these arguments, patient satisfaction surveys have shown a strong preference, and finally research bears them out. Patients that share the same room have an increased risk of medical errors, incorrect medication and cross contamination, especially with shared toilets (Coalition for Health Research, 2004).

With significant evidence for single-patient rooms at a tipping point, the new AIA Architectural Guidelines for Health Care Facilities released in March 2007 recommends that all inpatients be housed in single-patient rooms. (*Guidelines for Design and Construction of Health Care Facilities*, 2006 p37).

Such a recommendation might not pose the financial burden it might seem at first glance. Once built, facilities have a hard time financially benefiting from double rooms since reaching full occupancy is difficult. Patients must be of the same sex and of similar illness to share a room. Hospitals rarely achieve more than 80 percent occupancy in their double rooms.

Evidence-based design has become the new design tool of choice. Armed with this new tool we can now mitigate environmental barriers to healing and specify elements such as better lighting, art programs and even water features with evidence that these amenities can actually improve patient outcomes, and even reduce operating costs. Evidence-based design proves the value of healing environments as well as contributing to the continued growth of these new thought processes (Marberry, 2006).

Evidence-based design is analogous to evidence-based medicine. Simply put, it is the process of making design decisions based on the the best available research. Evidence-based design provides indicators which illustrate improvements in healthcare environments. Areas such as clinical outcomes, financial improvements and human behavior provide some of the strongest validity for success.

Evidence-based design for healing environments is primarily related to three strategic areas including; environmental psychology, clinical science and economical context. Throughout this book, we will explore these areas with observations and suggested evidence to validate the evidence and merits of healing environments.

Environmental Psychology links people with healing space. The focus is on the experience and the emotion that place elicits. This discipline further addresses evidence which supports healing by the reduction of stress. **Clinical Sciences** focus on the medical and scientific components of the environments. This links science to the prediction of improved patient outcomes. **Economic Context** refers to management, cost and operations of medical facilities with respect to how evidence can forecast improved financial outcomes.
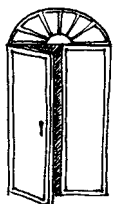
Each chapter presents the art and the science of each topic in terms of observations, discussion of the probabilities and suggestions of what evidence may be found within these three strategic areas of Evidence-Based Design.

This book *Healing Environments: What's the Proof?* examines the growing body of evidence which supports healing environments. Professional observations and personal experiences are also documented. These are intricately and permanently entwined. In my previous book, I shared the hypothesis that healing environments are special places created through a holistic process of design for the body, mind and spirit. In this new book I further suggest that this approach also has substantial evidence to validate improved health outcomes. Each chapter looks at a unique component of healing environments and provides the known evidence and as yet unproven hypotheses.

❖ **CHAPTER 1: THE POWER OF PLACE** looks to environmental psychology to investigate how "place" impacts human behavior as well as health outcomes. Evidence documented in research such as the referenced "CHER" study has validated the successful occupancy outcomes of private bedrooms versus shared bedrooms in healthcare settings. Evidence suggests that medical environments are evolving from medical institutions which focus on "cures" to embrace more holistic humane model environments. "Place" as an environment, is now being evaluated for its contribution to having special innate abilities to change culture, emotions, thoughts and even health. Throughout our cultural history, people of all backgrounds have found that our surroundings influence our behavior.

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Today, evidence and science are proving that our behavior, emotions and cognitive functions are indeed shaped not only by our genetics, but also by our surroundings. It was Hippocrates, who first observed that the people living on the hills outside of town were healthier than those living in the marshy regions, and concludes that the difference was in the air quality. Today science continues to validate the impact of our environment on our health and wellbeing. The healing place provides the background to support the experience and it is the experience, be it good or bad, positive or negative, which has the power to harm or heal. Such experiences can lead to the transformation to health and healing.

Place, as powerful as place may be, is the "experience" which exceeds the power of "space". Evidence for the power of place continues to be defined by environmental psychology, anthropology, sociology and the design professions.

❖ **Chapter 2: The Power of Change** looks to the science and medicine of "Clinical Environments" to discover better ways to remove the physical barriers to healing environments. Technology, limited resources, building systems, codes and redundant medical practices are just some of the challenges that often contradict healing. First, healing environments must "do no harm." We find evidence to support removing barriers to healing in both the medical sciences as well as financial models. These practices can contribute to better outcomes in medical treatment, improved models of care, patient safety such as bacteria mitigation, medical errors and patient falls.

This chapter also addresses financial performance such as building cost, operational cost and patient costs. Removing barriers and negative experiences, challenges us to think outside the box based on new found evidence to change difficult conditions such as codes, standards, financial limitations and the facility's culture. As we find that "experience" defines the quality of health, the environment plays a key role in removing the negative experiences which are critical to healing.

Evidence from the *"Fable Hospital,"* an economic model with a well developed financial breakdown of the costs to build a hospital based on components of healing environments, has provided a financial model to validate a strong business case. Changes such as staff support spaces, views of nature, single bedded rooms, art programs and addressing patient safety now have a price tag as well as guidelines regarding financial recovery time of the initial investment.

On the clinical side, new evidence from the Center for Health Design builds a strong scientific case for patient safety and bacterial mitigation to ensure better patient outcomes. Evidence for these innovative solutions is found in initiatives coming through the "Center" and its "Pebble Projects." These research projects are produced through voluntary facility engagements focusing on the measured multiple outcomes and the benefits of healing environments.
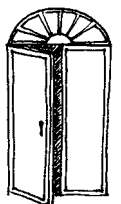
❖ **CHAPTER 3: THE GIFT OF HEALERS** explores "people" issues supported by findings in environmental psychology. Financial studies also support evidence for improved operational outcomes by addressing the social needs of patients, family and staff. Improved operational efficiency, healthcare utilization, walking distances, staff efficiency, and staff satisfaction can be substantiated with design examples.

"Gift of Healers" also adds the power of people to healing spaces. The concept is not new. From ancient times we have known that simple things like listening, story telling, hand holding, or providing physical care in a sensitive manner makes a difference. It is the act of human kindness that improves outcomes. What is new however is that there is evidence that these simple human interactions greatly contribute to the healing process. "Measurement," from Press Ganey, scores dramatically improve with human sensitivity. Research case studies such as those illustrated in "Pebble Project" research also provide evidence to support positive patient outcomes resulting from nurturing relationships. In addition, new "cross-over" disciplines such as environmental psychology, anthropology and the social sciences are also contributing to the evidence in the human sciences, which illustrate the value of human relationships to those in need of healing. The healer continues to play a significant role in the healing environment.

❖ **CHAPTER 4: COMFORT** explores the diverse physical needs of the human body, ergonomics as well as the physiological needs of a diverse population from the very frail to the obese. This chapter finds evidence of healing environments for the body through research linked to the contrasting science of "Clinical Environments." The curing process often overlooks the simple mechanics of the human body and treats the form like an inanimate object that needs to be "repaired." In addition, one often overlooks that the human form is quite diverse in size from the small to obese, from old to young, athletic to frail and well as to the infirm. The healing environment must provide comfort to all. Ergonomics for a diverse population begins to address these special needs.

Evidence suggests that the power of ergonomics can support human diversity; staff work flows, and the physical interrelationship with equipment. There is evidence that improvements in ergonomics provide a strong base for health and healing. Ergonomics supports the directive to design for physical as well as emotional comfort.

❖ **Chapter 5: Vision to Heal, Chapter 6: Healing Sounds, Chapter 7: Therapeutic Touch** and **Chapter 8: The Smell and Taste of Healing** all investigate human senses as our ability to perceive environment. They are a source of pleasure as well as pain. These chapters examine what is known and what is still unknown regarding evidence in alternative areas of healing such as aromatherapy, therapeutic color, vibrational healing, and other complimentary medicine practices where environment plays an active role in the healing process. These chapters also address the evidence for positive distractions such as art, music and pleasant diversion activities as "stress relievers". Evidence to support design for the five senses comes primarily from the discipline of environmental psychology. Here, evidence suggests that healing is experiential. Experiencing pleasurable environments through our five senses produces positive outcomes. Evidence is also supported from the neurosciences, which link the various senses to locations in the brain that translate to emotional responses.

❖ **Chapter 9: Understanding Place**, deals with our ability to understand, navigate and relate to the healing place through the thinking process. It addresses the cognitive process of making choices, finding information, evaluating criteria and relating that criteria to the ability to make an informed decision. Environmental psychology provides evidence for the role which understanding plays in the healing process. Evidence suggests that the informed mind is less stressed and better able to engage in the healing process. Understanding place considers the cognitive abilities necessary to interpret the experience. Healing environments require a comprehensive understanding of the delivery of care, the building spaces and places, the navigation systems of entrances, corridors, elevators and the manner in which to relate to it.
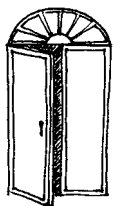
Successful wayfinding is critical to understanding the environment. This chapter addresses the evidence linking successful wayfinding to stress reduction through the neurosciences.

Neuroscience suggests that there is a scientific link between the brain and built environments. Research in this area is just beginning, with intriguing suggestions that can apply to the design of healthcare facilities.

❖ **CHAPTER 10: EMPOWERMENT** is essential for the healing environment in that being empowered places the responsibility of health and healing on oneself. One must be empowered to experience a healing environment. Evidence for the empowered place is supported by environmental psychology. Environmental science suggests empowerment and having control over our personal space provides the ability to have control of one's health, wellness, stress and outcomes. Neuroscience informs us of the role that stress plays on the immune system and therefore has a direct impact on health. The mind- body link has a powerful connection to one's empowerment of place. This chapter deals with the control of privacy, and areas where the immune system and the power of belief impact our health through the empowerment of the environment.

❖ **CHAPTER 11: WISDOM OF BIOPHILIA** design with nature validates our love and connection with the natural world. Science, sociology, anthropology, environmental psychology, chemistry, and neuroscience all confirm how nature heals through biophilia, biomimicry, biodiversity, and biochemistry. Evidence shared within this chapter explores how these specific aspects of nature define how water elements, natural materials, plants, animal therapy and good views of nature can create positive outcomes. The science of nature is filled with evidence that can teach us better ways to design to support healing and wellbeing. The natural world is the ultimate healing environment.

❖ **Chapter 12: Spirit and Emotion** design of the sacred place postulates is there evidence for spirituality as a healing intervention? Science continues to argue the case. However, statistics suggest and our culture overwhelming believes that there is a spiritual connection to health and wellbeing. Healing has long been considered a sacred journey. Spirituality plays a major role in the experiential aspect of healing environments.

This chapter relates cultural beliefs to spiritual healing within a believed sacred space. Observations through chaplain programs, religions and support groups validate the value of prayer, ritual, sacred places and spiritual journeys in the improvement of healing outcomes. The study of neuroscience and architecture has begun to explore a link between the spiritual experience and brain mapping. This chapter addresses what is known and also what is believed regarding the sacred space as it relates to healing and the healing environment.

❖ **Chapter 13: Experiential Design** is what I believe healing environments are all about. Although all of these listed components shape, mold and contribute to a healing environment, it is the experience of the place that allows the healing transformation to take place. Experiential design — design for transformation — summarizes the healing environment experience, what is known and what we have yet to learn. Healing environments move beyond an exclusive special place model, to include the inclusive experiential model- a place unique to the individual.

As an individual embarks on the healing journey seeking health and wholeness, so too the environment must support the experiential quest to bring about a transformation to health and wellness. Specialized studies and research found in both the arts and sciences provide evidence for transformational healing through the power of the environment. However, these diverse studies need to be brought together to define healing environments in terms of experiences that can transform.

The design profession is a pioneer in revealing the secrets and power of this exciting new area of experiential design.
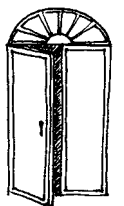
❖ **CHAPTER 14: EVIDENCE BASED DESIGN** by contributing author Dr. Thomas Wan reviews current studies and informatics research for healing environments. Tom has been a friend and mentor in the area of healing environments for more than eight years. Annually we meet together with an Asian delegation of physicians and academicians from Taiwan to investigate the art and science of healing environment concepts. Dr. Wan, through much of his work at the University of Florida substantiates the evidence for healing design. "Evidence-Based-Design" Thomas Wan, PhD, provides a compelling hypothesis for the value of healing environments.

Healing environments extends far beyond the walls of medical facilities. Joe's discharge instructions included life-style changes that only he could implement. While medical facilities continue to provide treatment, healing can occur in many places that may or may not be medical facilities. With the angiogram procedure, Joe's physician began a cure, but healing took place from within Joe, his personal and transformational experience.

The Experience

Throughout this book a healing environment envelops the experience. It is our experience of place that creates the lasting memory and becomes one with our body, mind and spirit. It is the experience of place, not the place itself that provides the sense of pleasurable memories. As we will discuss later, these positive experiences can contribute to healing.

It is the experience—good or bad—that we remember, and it is our memories that provide meaning in our lives.

As Hypocrites said, "The natural healing force within each one of us is the greatest force in getting well." To maximize a facility's ability to provide a healing environment, we must not only ensure that it provides safety and comfort for the physical body, but we must also ensure that it avoids emotional stress.
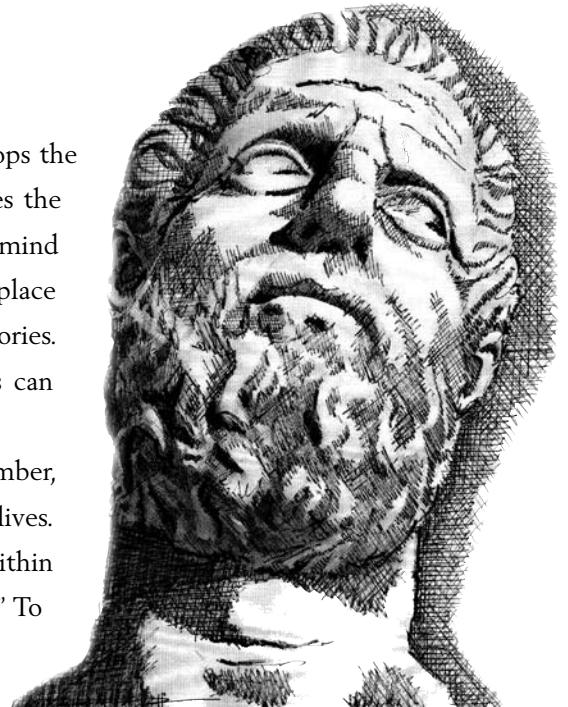
Hippocrates, 400 BC, Greek born physician know as the father of modern medicine. He believed that the body must be treated as a whole, not a series of parts.

ILLUSTRATION: Patricia Raimondeau

Healing environment as a concept and hypothesis continues to grow and define itself. In my continuing study of this concept, I find that we will also find evidence to support diversity of the components. Academia, medicine, science, religion, the arts, alternative medicine, governmental agencies and research groups will all continue to find the evidence to support the value of healing environments. The Center for Health Design, with its associate research groups such as "Pebble Projects", and the "Coalition for Health Research", continue to gather and publish the evidence-base of design applications specific to healing environments. Well-known scientists, whose work is specifically linked to the healing environments such as Roger Ulrich, and Craig Zimring, continue to contribute to this growing body of evidence. However, we also need to look at other diverse disciplines, such as anthropology, biophilia, chemistry, neurosciences, religion, and sociology to integrate their research. CDC, The Center for Disease Control, is also a valuable evidence-based resource to integrate into healing environments.

Healing Environments: What's the Proof? suggests, that there is ample evidence behind the concept of healing environments. The goal of this book defines the characteristics of a healing environment suggesting that ten essential components: place, change, people, comfort, senses, knowledge, empowerment, biophilia, spirit and experience make a difference in health outcomes. Readers are challenged to look differently at humanity's natural ability to heal as well as integrate supporting evidence. And finally, we must "think outside the box" and engage in the transformational model of healing through experiences.

In addition, Dr. Wan adds the final chapter summarizing the current research in evidence-based design. Evidence-based design, like evidence-based medicine has the power to move design to a new level of understanding and value. It is with great pleasure that I am able to share defining evidence that supports the latest scientific proof regarding the power of healing environments.

Barbara J. Huelat, AAHID, ASID, IIDA, 2007
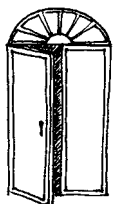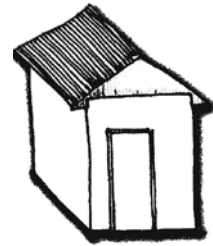
Power of Place

THERE IS NOTHING LIKE RETURNING TO A PLACE

THAT REMAINS UNCHANGED TO FIND THE WAYS

IN WHICH YOU YOURSELF HAVE ALTERED

~Nelson Mandela

Power of Place

*T*HE CONCEPT OF HEALING ENVIRONMENT IMPLIES that a place can heal and therefore it can harm. Believing it could, I looked for proof.

But as I started my quest, I realized I had to quantify my variables. To begin with, I needed to define place. Science describes place in terms of the environmental world, but place can also be defined in terms of the psychology of the environment—and we can adjust these to meet our functional requirements.

Throughout this book, I address both the physical and psychological components of place, specifically addressing those components that contribute to healing qualities. Temperature, lighting, air quality, and views of nature make up the place, but so do the relationships of family, the sacred journey between life and death, the perception of sight, sounds and smells and our ability to adjust to them.

Myrom Hofer, author of *The Roots of Human Behavior*, has researched the influences of environment on behavior and biology. Hofer found that austere environments were correlated with feelings of fatigue. Studies of neonatal units along high power lines, addiction treatment centers in polar outposts and other diverse research projects continually show that our surrounding have a powerful impact on our health and wellbeing.

In 1993, Gallagher wrote, "Just as our world around us affects our behavior, our thoughts, emotions, and actions affect our surroundings. This is the power of place or psychological ecology" (Gallagher, p19).

Often we are not aware of the effect our environment has on our behavior. We're more willing to help strangers on sunny days and we're less eager to eat when surrounded by bad smells, but we don't generally think of sun and scent as influencing our willingness to behave a particular way.
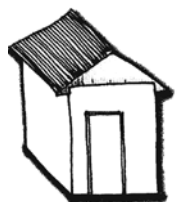
As a graduate student at the University of Chicago, I had the remarkable opportunity to be tutored for independent study by Mihaly Csikszentmihayi, professor of psychology best known for his bestseller, Flow, which addresses the psychological principles of what makes life worth living, happiness and activities and environments that transform.

I had the strong feeling that design impacted human behavior, so I set out to explore this concept. At the time, Csikszentmihayi was working on a research linking people's actions with their level of pleasure and happiness. In his work, he used a personal beeper that identified the exact time the individual experienced a particular emotion. With this action he was able to connect the current activity to the current emotion.

Mihaly and his work with happiness challenged me to consider the role of emotion on health. He found activities were experienced as pleasurable not because of reward or the pursuit but because of absorption within activity. He called this absorption "flow" as it was a metaphor several of his respondents used.

He found two sets of circumstances that facilitated happiness. The first is external, such as environment, activities, performances and religious rituals; the second set of circumstances is internal, such personal ability, concentration ability, and personality (Csikszentmihalyi, 1993). Thirty years later, I'm still using his concepts in my work.

The War

Warfare provides an analogy for curing. In our analogy, the militia uses drugs, antibiotics, immunizations, radiation and scalpels as weapons against unhealthy conditions. Sometimes medical personnel win the war and provide a cure; sometimes they loose the war and the patient dies. Such warfare initializes the healing process.

Figure 1-1. Much like a war, the medical model relays on weapons to cure and irradiate disease. The healing model also relies on the natural ability of the body to seek health and balance.
ILLUSTRATION: Patricia Raimondeau

The warfare approach to medicine served exceptionally well against infectious diseases such as tuberculosis, small pox, and polio. Drugs, immunization programs, and improved sanitation have controlled and eradicated many infectious diseases, but these past successes impede modern medicine's ability to look beyond pharmacology and intervention to cure today's illnesses.

Today's long-lived population faces degenerative diseases, such as heart disease, arthritis, diabetes and cancer. While some of these diseases can be linked with lifestyle issues—smoking, obesity, sedentary living, and uncontrolled stress—they cannot yet be prevented with an injection. Modern medicine has not been able to combat common degenerative diseases in the same manner as the infectious diseases so common a generation ago.

Conventional Western medicine is currently taught as a science dealing with the study of disease. David Sobel, M.D., of Kaiser Permanente's Patient Education states, "Western scientific medicine is largely concerned with objective, non-personal, physio-chemical explanation of disease as well as its technical control. In contrast, many healing systems are centered on the phenomenon of illness, namely, the personal and social experience of disease" (Sobel, 1997).

Where Western scientific medicine focuses on curing the disease, holistic medicine aims primarily at healing the illness—managing the individual and social response to disease. Since many degenerative diseases can be influenced by lifestyle behaviors, holistic medicine may provide more insight into relieving these diseases than conventional Western medicine.
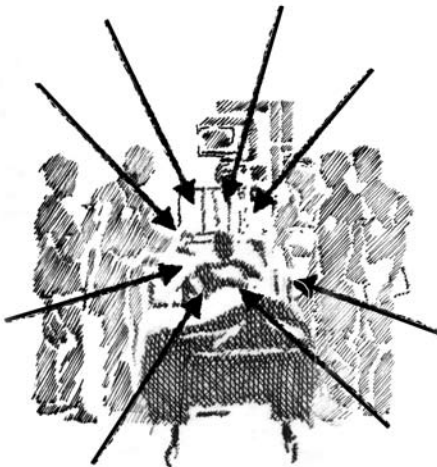
Figure 1-2. Traditional model of care that focuses on "curing". The medical model brings medical treatment such as surgery, pharmaceuticals, and technology to move inward to the patient.
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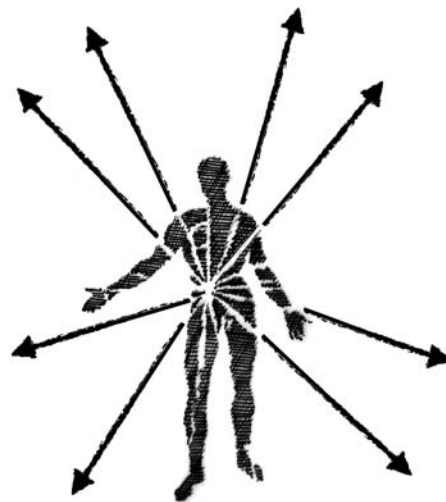
Figure 1-3. Holistic model of care focuses on healing, through the innate ability of the person to heal. The healing model starts from within and moves outward to wellness.
ILLUSTRATION: Patricia Raimondeau
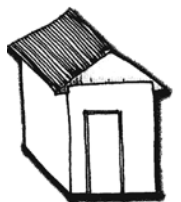
The Experience

A healing environment envelops the experience. It is our experience of place that creates the lasting memory and becomes one with our body, mind and spirit. To illustrate the importance of the experience, I'd like to introduce you to an exercise I use in my speaking engagements:

First, think of a special place that has been a positive experience for you. This place can be anywhere that you might have visited or gone to in your past. It can be as recent as earlier today or somewhere in your childhood. With that place in mind, answer the following questions:

❖ Describe the place... what was it like?
❖ Who was with you?
❖ What elements contributed to your positive feelings?
❖ Describe your physical comfort while being there.
❖ Describe your sensations of the place.
❖ What did you see? How did it smell?
❖ Do you recall any sounds?
❖ What elements touched you? Was there wind, sun?
❖ What textures do you feel?
❖ Did you have anything to eat or drink at the place?
❖ Did you know what to expect before your visit?
❖ Did you learn anything new?
❖ What?
❖ What were your emotional feelings about the place?
❖ Did you feel empowered? Why?
❖ Were there elements of nature in your special place?
❖ What were they?
❖ Did you enjoy any sense of peace, calm or connection with your spirit?
❖ Did you consider any of the physical elements of the space? Would you change any of these elements?
❖ Have you returned?

These questions and your response represent your experience of your special place. This experience has strong memory ties for you, and as you recall the experience today it still evokes pleasure. It is the experience of place, not the place itself that provides the sense of

pleasurable memories. As we will discuss later, these positive experiences can contribute to healing.

You can use the same exercise to recall a place that has had a negative impact on you. You will find that the negative experience has the same powerful impact on your memory. It is the experience—good or bad—that we remember, and it is our memories that provide meaning in our life.

To create a healing environment we want to create a design that provides a positive experience. We want to reduce or eliminate the negative experience. As we continue to define and discover the essence of a "healing environment," we will considerer the experience of the place and try to connect it to healing.

I believe our experience of place creates the lasting memory that becomes one with our body, mind and spirit. To illustrate the importance of the experience as essential to healing environments, I suggest we look to the work of Ray Oldenburg, PhD, professor of sociology at the University of West Florida.

He spent his career investigating "third places." Home constitutes the first place, work makes up the second place, and Oldenburg coined third place for the place where people go simply for pleasure, good company, and lively discussions. Oldenburg finds these third places in coffee houses, bookstores, community centers, bars and other environments that people seek out, to relax, laugh in the company of others, to get away from the pressures of the first and second places (Oldenburg, 1999).

How do places become the great gathering place? What makes them so attractive? What are the characteristics of the third place? Oldenburg finds common characteristics shared around the world and across cultures.

❖ **ESCAPE.** Escape is a characteristic that provides relief from stress, a place for a break from busy lives and activities. In the third place escape can be seen in the difference between a hurried cup of coffee balancing on the bathroom sink as one shaves on the way to the office versus a cup of coffee down the street with a gang of friends discussing the morning news. This third place characteristic can be explained in terms of the difference between the two places—same function, same coffee but an entirely different experience.

When hospitalized, living in an assisted living center, or visiting the chemotherapy infusion center, where is the place to which we can escape? Where can we avoid the stress of medical treatment and the boredom? Where can we find that cup of coffee with friendly faces? We desperately need the place of escape—a third place—in healthcare facilities.
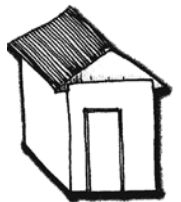
❖ **SOCIAL IMMUNITY.** People enjoy one another's company only where there is a socially neutral environment, where people can easily join and easily depart. We need immunity from social obligations to feel at home. To come and go as one pleases is a characteristic of the third place. The neutral ground makes it possible to be more informal, more intimate, and engage in casual relationships.

Healthcare facilities are hierarchies where physicians are on top and the patient and patient's families are on the bottom. They are not environments of level ground, or socially neutral. It becomes difficult to enjoy the company of physicians and caregivers in this environment. A third place could provide that much needed respite where patients and patient families could go and feel more informal free from obligations of medical care. The 'Planetree" model of care successfully incorporates social neutrality in unit kitchens where family, patients and caregivers share meals together.

❖ **INCLUSIVE.** The third place is open to all, not exclusive to an elite membership. The inclusive characteristic allows us to know others in different roles, merging personalities for the sheer joy of being together for some external purpose.

Healthcare facilities are for the medically challenged exclusive patients—the frail, the sick, the dying, the infirmed, the maimed and the unstable. A third place could offer an inclusive space where the visitors could focus on life and living as well as just being oneself.

❖ **CONVERSATION.** The pleasure of third places involves the activity of conversation. Third place talk is lively, often colorful and always engaging. It is full of laughs, back slapping, smiles, and the wink of an eye. Here, conversation contributes to the quality of the third place, it is typically more spirited than conversation elsewhere, and is more dramatic, more wit and definitely more laughter.

Where can one find light-hearted conversation in the medical facility? We need laughter, the backslapping, and smiles to reduce the worry and stress and to support health and wellbeing.

❖ **ACCOMMODATING.** Third places are available at most times day or evening, with the assurance that welcoming people will always be there. It is an open door when you are bored or lonely, a place to see and be seen. The third place must be ready and available to serve people when they are released from responsibilities elsewhere.

Your visitors have gone home, or perhaps you didn't have any visitors, you are lonely, bored and scared. What can you do to find welcoming people to mitigate these feelings? If we create a third place in this setting, people will feel more comfortable.

❖ **REGULAR VISITORS.** People are attracted to the third place by other people, not by the furniture, food or drink or even the management. It is the people who make it come alive, and the regulars who provide the characteristic. It is also the regulars that welcome the newcomer, who then is likely to become a new regular. This characteristic of the third place can extend far beyond the designated place, and often it does.

❖ **SIMPLE PLACE.** The typical environment of the third place is plain and in some cases even shabby. The design and appearance is not likely to impress, however there are exceptions. The point is that it is not the design or the architecture that is likely to be the hallmark of a third place. This is possibly due to the inclusion characteristic, which welcome many.

Medical environments are far from a simple place, typically they are foreign, strange, filled with high tech equipment. A simple place with comfortable furniture is rarely included in this environment.

❖ **PLAYFULNESS.** Playful and fun nature is a consistent characteristic. Being too serious in just not part of the third place. Playfulness and social activities where one truly enjoys the experience provide the setting for everyone to stay longer and want to come back sooner.

Medicine is serious business. Is there room for playfulness? Dr. Patch Adams feels laughter is good medicine, increasing endorphins and reducing stress. Many facilities have found creative ways to bring laughter into medical facilities.
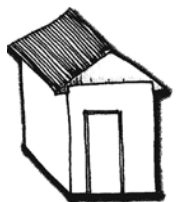
❖ **HOMELIKE.** The third place has none of the typical first place characteristics. Homes are a private setting; third places are public circles. Yet some elements of home are found in the third place. The third place has an identity that a person connects to, a sense of belonging, a sense of ownership—it is my hangout, my home away from home. The regulars who frequent their third place have roots to the place. Third place, like home is a place to regenerate and restore and offers the freedom to be oneself. Finally, the third place has warmth, that sense of comfort typically found at home.

The same homelike characteristics are appropriate for the healing environment. It is not designed to look like home, but include the warmth, comfort and welcoming aspects.

In summary, the characteristics of the third place are universal. We escape to a third place, third places are inclusive and welcome to all, and they are neutral and accessible with conversation as the main activity. Third places have regulars that welcome strangers. They are simple places with simple pleasures, where the mood is playful, where one has fun and forms a strong desire to return. It has qualities of warmth and hominess.

Where is your third place, and most importantly, where is the third place within the medical environment? The benefits of a third place are personal, supporting of the whole person.

Examples of Third Places within Healing Environments

A family room that we created at High Point Regional Cancer Center became a third place. In our preliminary visioning session to kick off the new project, the user team expressed the need for a place of respite for the families. Typically, if any place for family exists, it's a room down the hall with some seating and a few magazines. In their existing cancer unit, the High Point team didn't even have that, and they wanted more for their families. They desired a place where families would want to gather, to network, to share stories, and actually help support and heal the pain that cancer families go through. We talked about what that kind of space that might be.

"Well, guys here are into sports," one staff member volunteered. "People here like to get together to hang out, cook together and watch ball games."

We created an oversized family room—complete with a large residential-style kitchen, an eating area, big comfy sofas, and a big-screen TV to watch ballgames. No one had to tell people what to do with the room. Immediately families started to gather, talk, share experiences, cry and pray together.

On a subsequent post-project trip, I asked the director how the family room was working. I heard that the wife of a cancer patient brought in all her own ingredients and cooked her own Italian dinner for other families. Even after her husband was discharged she came back to cook for them.

The director also shared that it seemed most beneficial for men. She said, "Men often have a more difficult time talking about cancer and the journey. The family room allows men to be men, sit around and seem to let it all out. It's so good for them, and they seem to be able to cope better."

This family room became a third place for the cancer center. The hospital provided the space and made it safe and accessible. The staff had the vision and provided the neutral ground. We designers created a home-like environment. The families added the fun, conversation, and made it their own third place.

Another example of a third place wasn't designed but sprung up naturally. My husband and I hung out in a coffee bar in a local children's hospital one morning while waiting for a meeting. We saw how people eagerly stood in line for their beverage. The manager greeted each by name, preparing the beverage without even asking what they wanted. He always asked how their family was and what else was going on in their lives. Upon leaving, we asked him how he could remember so many names. "These people are all my friends," he said. He'd been there for 17 years.

When a third place evolves naturally, it is the designers' job to nurture and embrace it, to design around it rather than to change it.

A third place belongs in all medical facilities. The characteristics that make a third place are characteristics of healing environments.

Oldenburg (1999) explains, "The effect of the third place is to raise participants' spirits, and it is an effect that never totally fades. Third place interaction is a matter of 'making other people's day' as they make one's own in a situation where everyone gains."

We can learn from third places; we can study them to understand why people seek specific places. In that spirit, I have often observed how difficult medical-center corridors are for patients and visitors. The nature of medical buildings, departments and services creates endless miles of meaningless circulation pathways one must navigate to find destinations. Signage and wayfinding address some of these issues (see Chapter Nine, Design for Understanding).

However it takes more than signs and systems to provide the visitor with a pleasurable experience when walking through the doors. Again Oldenburg has researched the success of America's Main Street, with good suggestions that we can apply to our hospital's main street. Everyone—old, young, and between—claims their own Main Street. It unifies.
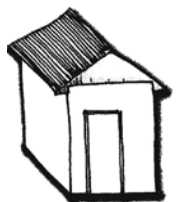
Why is it such a pleasure to stroll down Main Street? On vacation, why do we seek out small town Main Streets? Why has Disney created the Disney Main Street as the first attraction when entering the Magic Kingdom? Oldenberg suggests, "Main Street provides the desire for a break in routine, to catch up on the gossip, or merely to have something to do."

Not many hospital visitors enjoy the leisurely stroll down the facility's Main Street. Main Street in America encourages people to get out of their homes, to see things and be seen. Main Street has an atmosphere; things happen there. It offers a gathering point. Main Street is a primary locator, and all circulation is related to Main Street. One is either uptown or downtown east or west of main.

Concepts of Main Street have been applied to shopping malls, and people go to malls for the same reasons they seek out Main Street: to see and be seen, to do something pleasurable, to interact on a human scale.

Main Street Example in Healthcare

We have designed multiple dementia-care facilities for one owner who ascribes to experiential design (as discussed in chapter 13, *Design for the Experience*). In each of these facilities we have included a Main Street, four distinct neighborhoods, and a third place with characteristics recommended by Oldenburg.

The Main Street is highly visible and very popular with the residents. The focal point is the clock tower, which has become the central gathering point, a third place. People always gather there and are engaged in conversation. It's a happy place, and one with which everyone can identify. The clock tower is located in the center of Main Street with uptown offering more casual activities, and downtown providing entertainment settings. The east/west streets connect to the four diverse neighborhoods.

Although, the research of this new type of experiential environment is still under investigation, the residents and the families enjoy the setting, and staff comment that new residents have an easier time acclimating to this setting than they experienced in the typical dementia-care facility.

Medical Centers and hospitals are large and complex places. Many of them exceed the size of small towns and employ several thousand people. These institutions are in themselves communities, providing all of the components of a town. They have the residential patient bedrooms, retail, dining and food services. They have offices and work places, worship space and gathering places. Contained within are all spaces necessary for daily living—the first place (home), the second place (work), and the third place. It the third place that is noticeably lacking in our medical environments.

Oldenburg (1999) sums up this need. "The environment in which we live out our lives is not a cafeteria containing an endless variety of passively arrayed settings and experiences. It is an active, dictatorial force that adds experiences or subtracts them according to the way it has been shaped. When Americans begin to grasp that lesson, the path to the planners' office will be more heavily trod than that to the psychiatrists' couches. And when that lesson is learned, community may again be possible and celebrated each day in a rich new spawning of third places."

We know that the environment plays an intricate role in the both the physiological and the psychological aspects of our health. Environmental psychologists examine the human environment in terms of the interrelation of physical science and the human emotion. Environmental psychology is the science of the complex interchange of the environment-behavior relationship.

In terms of this science, the term "place" has specific meaning, including the identity of place, sense of place and the attachment to place. These terms describe the experience and emotion of place that supports our meaning of place (Kopec, 2006). The identity of place refers to how individuals internalize place, how one relates to the concept.

For example, the hospital patient may identify the inpatient room assignment as "their room". The sense of place refers to one emotional feeling of the place, their personal experience of place. When a patient is wheeled into a linear accelerator for radiation therapy, the patients' sense of place may feel scary, entombed, isolated and foreign. The attachment to place refers to the individuals' personal bond of both the physical and social bond to the place.

Attachment to place forms a strong bond that contributes to our experience and memory. This attachment can be either negative or positive. For example, a child may have had a traumatic medical experience. As an adult, another similar medical environment with similar sights, sound and smell may evoke fear and trepidation (Kopec, 2006).

According to Kopec (2006), culture contributes to this attachment to place in six ways.

1. **GENETIC.** Coming from a family with a strong background in something provides a strong link to that environment. For example, if mom is a doctor, aunt is a nurse, and dad is a pharmacist, you'll likely feel comfortable around hospitals.

2. **LOSS OF PLACE.** One can form an attachment to the ideal of a place when it no longer exists. As a child, one of my favorite places was a large amusement park called Riverview. It no longer exists, however I still have a strong attachment to old style parks and wooden roller coasters.
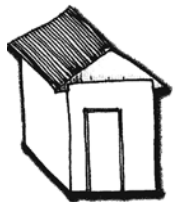
3. **OWNERSHIP.** Owning a place forms a very strong attachment. This is especially true with homes. The childhood home in which you grew up is still your home, even if you have long moved away and your family no long owns it.

4. **SPIRITUAL.** An individual's religion may have places identified as sacred, such as Mecca or the Holy Land. Attachment to sacred space may also include the individual's place of worship, such as a church, temple or mosque.

5. **PILGRIMAGE.** Sacred journeys and the journey through medical treatment can create a strong attachment to the places along the journey as well as the destination.

6. **STORIES.** Tales can form ideal attachment to places we have read about, seen in pictures, or heard about through conversation. Sometimes the places are fictitious or no longer exist. As a child I often fanaticized about castles and kingdoms. As an adult, seeing my first real castle, I was surprised that they really existed.

The healing place will have diverse meanings based on individuals' experiences. How can we provide a meaningful healing environment that supports all who seek healing?

There are five essential ways to accomplish a healing environment.
1. First, stop thinking of a healing environment as a designed space that designers magically create or institutions designate. Healing environments are living, fluid spaces. We must look beyond adding a garden, an art program, or more windows. Although these are good things and can contribute to healing, these elements themselves do not create a healing environment. We must look beyond a specific element to the larger context of characteristics.

2. Second, let design be the facilitator and consider the designed environment as the stage set for the healing to occur.

3. Third, use evidence from diverse fields of the arts and sciences. Consider anthropologists, biologists, environmental psychologists, medical scientist clinicians, musicians, artists, chaplains, theater and the patient as sources of useful information.

4. Fourth, understand the difference between characteristics and elements or components of healing environments. Components are tangible things one physically adds to places, such as a garden or labyrinth. Characteristics are

the experiences, such as the gift of healers, biophilia and emotion. Provide as many characteristics of a healing environment as possible. Characteristics (as the topics of the chapters in this book) describe experiences of place, change, the gift of healers, the five senses, empowerment, understanding, biophilia, design transformation and evidence-based design.

Integrate the physical science with human emotion. People experience the environment both physically as well as emotionally. Each feeds off the other. One cannot experience the physical pain or pleasure without having an emotional reaction to it.

5. And fifth, let the people's individual experience be your guide to determine your success. Observe, research, document and collect the evidence of healing transformation and share so that we might all provide a place for healing transformation. For those of us who shape healthcare environments we have a responsibility to build places that support the bond between healing and place.

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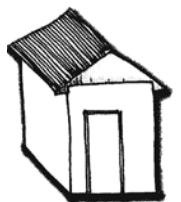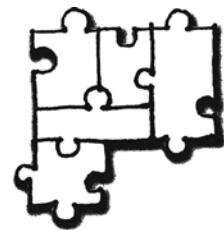
The Power of Change

BE THE CHANGE

YOU WISH TO SEE

IN THE WORLD

~ Mahatma Gandhi

The Power of Change

*C*HANGE HAPPENS, AND OFTEN CHANGE IS GOOD and good for us. However, change forces us to think, respond, and act differently, and this is where the difficulty begins. New equipment arrives. Where does it go, how does it work, and how is it fixed? All these questions are challenges, be they equipment, staff, medical protocol, lack of resources, or a new building. Change does present challenges needing real solutions. Often, we recognize the need to change, especially when ideas, equipment, or processes no longer work. The resistance to change is found in implementing the solutions" that require action. Change is central to the healthcare profession. Medical research will continually be developing new procedures, equipment, therapies, and evidence that will change the ways medical buildings will operate, function, and look. Keeping current and being a "dynamic part" of this change will play a key role in our ability to keep healing environments effective.

This chapter considers "change" as one of the ten elements of a healing environment. However, change by its very nature is illusive and difficult to quantify. Therefore, we must acknowledge that healing environments are always changing naturally. To quantify, plan, develop, and expand the healing environment, we must continually address these changeable elements. These elements, can often be considered barriers to healing. This is especially true when the holistic model is not considered in the planning process. Barriers appear as both conflicts to the goals of the healing environments and also as excuses not to develop a healing environment. However, the barrier can be "changed" from negative to positive to provide support for healing environments. Barriers typically fall into these categories:

❖ Perception vs. Reality

❖ Codes and Standards

❖ Safety

❖ Maintenance and Durability

❖ Technology

❖ Resources

Thorough evidence has proven that these barriers can offer promising support for the value of healing environments.

Recently, a major medical center was planning an expansion to their facility, and wanted to embrace the new concept of 'healing environments'. They asked our firm to evaluate their current facility and recommend what a healing environment might mean for them. A comprehensive taskforce was assembled to study patient and community issues, with data being collected via survey. As it turned out, the community survey became a venue by which patients aired complaints and listed those areas of the hospital that they felt necessitated improvement. Among the issues they cited were things like overcrowded waiting rooms, privacy issues, noisy and disruptive children, long walking distances and confusing pathways, and a need for improved parking facilities. The community was providing information that spoke directly to those issues that create barriers within the healing environment.

The perception of what defines a healing environment proved to be significantly different between the hospital and the community, and hospital administrators were not pleased with the survey results. They had expected patients' responses to be mostly
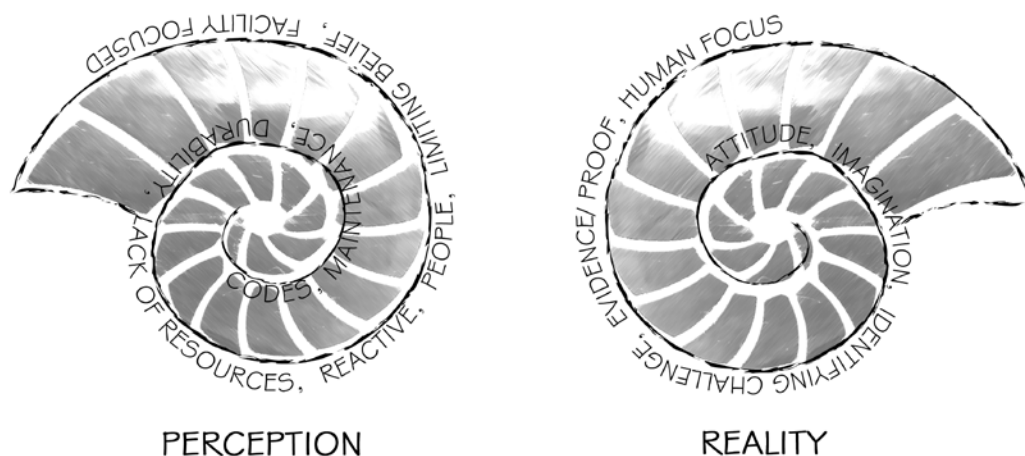
Figure 2-1. Barriers to healing environments are often perceptions of what cannot be done rather than the reality of what is possible. Evidence-based design can often change perceptions to realities.
ILLUSTRATION: Patricia Raimondeau

requests for things like windows, outside views, gardens, light airy spaces, added color, and art on the walls. In the end, the hospital disregarded the information gathered via the patient survey, determining that patients really did not understand the concept of a healing environment. While the hospital was trying to ascertain their own definition of a healing environment, patients were trying to communicate where it hurt. What the hospital failed to realize was that both viewpoints suggested the same conclusion. The hospital was hindering its own efforts to define and create a healing environment because barriers to that environment still existed.

The issues identified by patients in the satisfaction surveys were real issues that needed to be addressed before a healing environment could be entertained, but making changes — however necessary — is often a costly and difficult process. There are many complexities and realities to consider when amending existing environments. For example, improved parking facilities could require building a garage or modifying an existing site. Reality issues like these, as well as perceived barriers, will be addressed in this chapter dealing with the challenges of creating healing places.

Codes and standards have often been cited as barriers to the creation of beautiful healing spaces, yet they are necessary to protect public safety. These safety regulations are in place to provide a minimum legal level of health and safety for the occupants, and they apply primarily to two areas — those of public health and those involving safety. There are also various national and state building codes that specifically apply to location and type of building. Local governments usually adopt national or state codes, and from them they form their own zoning and building construction codes. There are also zoning codes relating to the type and occupancy of the building, setbacks, parking requirements, height restrictions, and specific use classifications. In addition to all the regulations of building codes, medical facilities are closely regulated for the manner in which they practice medicine, deal with staff, provide patient care, address security and confidentiality, and deal with many other health delivery issues.

Codes and standards truly require creativity of the design team to design facilities that comply with governance, while still presenting a patient-friendly environment. Word of bad publicity spreads like wildfire and can greatly affect an institution's credibility and reputation. For example, a few years ago, a community hospital was purchased by a public hospital system which had been involved in a major national scandal. Because of the scandal, the acquired hospital's own reputation was so badly tarnished, the community had to buy back the facility and change its name in order to restore the support of those it served, and even with that, the rebuilding of the hospital's reputation took many years.
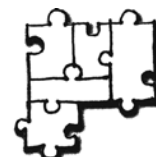
Safety

A leading cause of death and injury in the United States is not car accidents, breast cancer, or AIDS, but preventable medical errors within our healthcare delivery system. More people die from medication errors than accidents in the workplace. Medical errors touch all areas of our healthcare system from major medical centers, pharmacies, and nursing homes, to local surgicenters and even local doctors' offices. "Preventable adverse events are a leading cause of death in the United States. When extrapolated to the over 33.6 million admissions to U.S. hospitals in 1997, the results of these two studies imply that at least 44,000 and perhaps as many as 98,000 Americans die in hospitals each year as a result of medical errors" (*To Err is Human* p26). Medical errors account for a sizable increase in healthcare cost. These errors affecting patient safety include adverse medication, wrong site surgery, surgical injuries, preventable suicides, hospital-acquired infections, falls, burns, environmental accidents, and mistaken identity.

The healthcare consumer is aware that the healthcare environment is less safe than some other types of public space, but few realize that the risk of dying as a result of a medical error far surpasses the risk of dying in an airline or car accident. Today's healthcare consumer has little understanding of his/her safety within the medical system. Most people believe that medical errors are an individual's mistake rather than a larger systemic issue. When this larger system fails, it is due to multiple problems, which unintentionally occur together. This breakdown is difficult to see and even more difficult to predict. "The National Patient Safety Foundation has defined patient safety as the avoidance, prevention and amelioration of adverse outcomes or injuries stemming from the process of health care" (*To Err is Human*, p57). It is not the individual, the equipment, or the hospital that creates the medical error. Rather, it is the emerging environment of all the interactive components within the system. Safety is not just the elimination of errors, but also a holistic environment that includes attitude and functionalism.

Environmental design cannot solve all of the errors; however, design can intervene to help reduce environmental hazards. Designing safe environments means taking into account a number of staff issues such as emotional circumstances, understanding the functional directives, equipment used, and the stress factors that staff is dealing with. Job conditions, equipment, medical protocol, the placement of furniture, noise factors, visibility, and other such factors are all part of the safety equation. Intuitive design, where decisions and workflow become a natural process, allows such items as equipment and hand wash sinks to always be in the same location. Design, which enhances the intuitive reaction to process, can have a positive impact on the safety factor.

Designing for patient safety is an ongoing and holistic process. It takes a multidisciplinary team to address these problems. The following is a preliminary checklist for consideration by the design team:

✔ Understand the function and the medical protocol for the area

✔ Understand the user's emotional state during peak operation

✔ Understand that everyone is responsible for patient safety

✔ Identify effective design tools for identifying and solving unsafe designs

✔ Identify high risk areas

✔ Verify special conditions that may affect the proper use and maintenance of equipment, such as humidity, direct sunlight, temperature, surrounding materials, and technical vulnerability

✔ Observe the "work" process in action, and assess what can be done to enhance the process

✔ Understand the patient flow and the staff function

✔ Specify lighting that supports the use of equipment

✔ Use color to enhance or diminish visibility

✔ Design the functional pathway without architectural barriers, or furniture and equipment obstacles

✔ Specify appropriate furniture to maximize the functional requirement, i.e., the proper height stool to adequately read and operate equipment

✔ Eliminate barriers between equipment and patient

✔ Provide appropriate trash receptacles adjacent to equipment generating paper and other waste

✔ Provide appropriate storage, electrical receptacles, and ventilation for equipment when not in use

✔ Specify appropriate flooring and transition strips for moveable equipment

✔ Design zones for equipment, patient, caregiver and family, ensure that these zones function independently, and do not cross zones during use

✔ Incorporate recommendations from occupational health, building codes and standards

✔ Incorporate ergonomics especially between the equipment and the human operator

✔ Design for good communication visible, audible, and physical

✔ Design for the unexpected – develop "what-if scenarios"

✔ Design for consistency in the location of furniture, equipment, and pathways for the same function

✔ Design for the intuitive experience. Do not rely on memory, especially in high risk, complex, and busy areas

✔ Design for the human factors to enhance the interrelationship between people, the tools they use, and the medical environment

✔ Make patient safety a priority in all designs

Infection Mitigation

Florence Nightingale has been quoted to say, "First do no harm." The challenge to "not harm" patients and visitors seem obvious. However, patient safety is difficult to achieve. Cross contamination and bacteria mitigation are difficult and real concerns for healthcare facilities. Design can play a major role in the mitigation of these issues. The appropriate selection and specification of materials and finishes can help reduce nosocomial infection. Universal design to locate equipment and hand washing sinks in the same location for all rooms can support the intuitive response to wash hands upon entering the room. Each area and facility must be carefully evaluated before specific recommendations can be made.

Currently there are no codes or standards in place that require specific use of material or finishes. Today's designers and specifiers face critical challenges to provide the best-known evidence in the selection of materials and finishes that are appropriate to the functional area under consideration. Although there are few guidelines for the selection of materials, there is a growing body of evidence that does suggest that certain properties of materials may be inappropriate under specific conditions.

A recent paper published by the Center for Health Design discusses the Impact of the Environment on Infections in Health Facilities that examines how
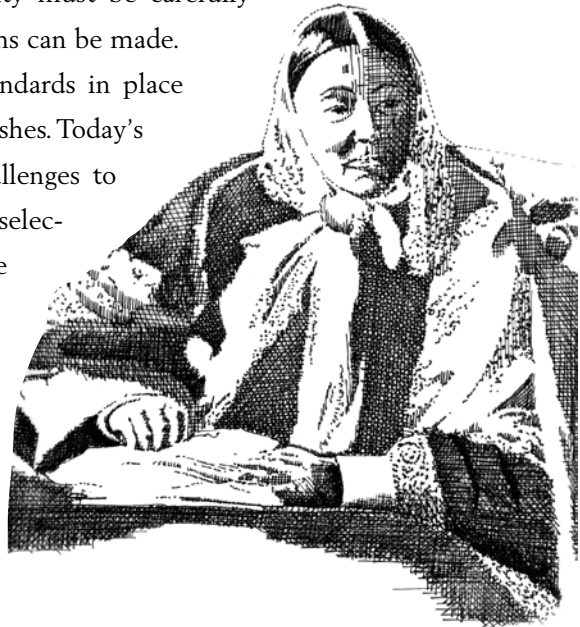
Figure 2-2. Florence Nightingale, nurse 1820 AD. She was know as the pioneer of modern nursing and is attributed to saying that healthcare should "first do no harm".
ILLUSTRATION: Patricia Raimondeau

nosocomial infections spread throughout the hospital environment. This study cites that hospital-acquired infections are transmitted through three primary ways: airborne transmission, surface contact transmission, and waterborne infections spread through contaminated water. The paper also suggests that designers and hospital facilities have a major role in the reduction of nosocomial infection rates in healthcare facilities through careful consideration and understanding of how infections are spread and the routes they take in hospital systems, furnishings, and finishes (Joseph, 2006).

In addition to the above-mentioned study, I am personally involved in a research study to investigate "infection control" with a premiere project, ER One. This is a federally-funded initiative to develop the design for an all-risks ready emergency care facility, optimized to be able to provide emergency medical care during acts of terrorism and emerging illness and built to function as a hospital emergency department during daily operations.

The current phase is a "bridge" project that provides a much needed expansion for the current ED. It also provides a platform for investigating what works and what does not work in a "state-of-the-art" model for emergency medicine. The goal of this project is that these findings will allow useful evidence for the design and planning of the main ER One project.

Within this project, I have an opportunity to work with some exceptional people, such as Ella S. Dade, RN, Director of Special Projects for ER One Institute. Her studies in nosocomial infection, has been the focus of her national and international work with the institute. Her mantra — "infection protection" has served as one of the key guiding principles of this important project. She defines the design approach to ER One is to design in solutions for this complex issue. In a recent presentation she said, "It is preferable to engineer the physical environment or to configure a process, so that it is difficult for an error to occur" (Dade, 2006). Ella continually challenges me to look differently at the complexities of nosocomial infection and find evidence.

This project, "a pebble project", is truly visionary research by investigating what type of nosocomial outbreaks might occur, what are the sources of infection, how they are transmitted, and the challenge to address material selection. We are also working with several industry partners e.g., Agion technology, DuPont solid surface, Herman Miller furnishing, and Microsoft software. The research from this project promises to provide new evidence on a pathogen's ability to survive in this environment.

Although there is currently little evidence on what material can actually mitigate bacteria we do have professional observations on the use of product within high risk areas of bacteria. I recommend the following guidelines for material selection. It may be helpful in product specifications to mitigate hospital-based infections.
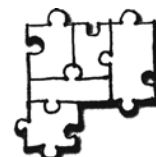
❖ Consider the facility's ability to maintain specified materials. Enlist the support of the environmental service department/housekeeping and maintenance. Ensure the departments have the proper cleaning and maintenance instructions.

❖ Use appropriate materials for appropriate functions, including the use of the area as well as cleaning and maintaining it.

❖ Consider the homogeneous nature of the product. This refers to materials that are consistent in material throughout the materials, such as linoleum and some vinyl sheet goods and solid surfaces. This adds durability to the product and allows it to be chemically or heat welded.

❖ Avoid open seams where bacteria can grow. These are often found in floor materials. Vinyl composite tile (VCT) should be limited to non-clinical areas. When seams must be used like ceramic tile and sheet goods, use adhesives and seam welds that are non-porous, such as epoxy grouts and heat welds.

❖ Pay close attention to "high-touch" areas. These are areas that are in the range of continual contact, such as light switches, edges of cubical curtains, the over-bed patient table, and door levers. Use materials that can be easily cleaned and decontaminated.

❖ Consider appropriate "anti-bacterial" topical applications for products such as carpet and high touch areas. This would include anti-bacterial application to carpet. Be sure to investigate the specifications of the products, as some of them only last until the first cleaning or become inactive when cleaned with specific agents.

❖ Investigate the toxicity of the product. Some materials produce (VOC's) that contribute to illness, especially for individuals with allergies and immune suppressed individuals.

❖ Consider the use of natural materials such as linoleum, rubber, natural stones, terrazzo, ceramic tile, and wood. These materials are highly durable, beautiful and support bacteria mitigation more than their synthetic counterparts.

❖ Carpet is often considered a source of contamination. However, there is little evidence linking carpet to hospital- acquired infections. Carpet, if used, should be specified in combination with a proactive housekeeping team, and in low-spill areas only.

❖ Use color and design to support and identify high-touch areas. The sterile circle can be cut into the floor in the operating room, and the high-touch band can be accented in intensive care and emergency patient rooms. Once these "high-touch" areas are identified, special attention, materials, and details can be used to appropriately specify and maintain them.

❖ Consider furnishings that are easy to clean and do not contain crevices that can collect bacteria.

❖ Provide HEPA filtration in high-risk and immune suppressed patient-care areas.

❖ Hand washing is key to reduction of infections. Place sinks in appropriate, convenient, and highly visible areas. Soap and paper towels should be able to be conveniently located. Locate alcohol-gel dispensers where hand washing is necessary and plumbing is not accessible.

❖ Use automated sinks. Infection rates are lower within areas using these sinks.

❖ Cubical curtains are a primary source of contamination since they are pulled after the hand is contaminated. Cubical curtains are typically not washed between patients. Minimize the use of curtains and provide patients with privacy by other means, such as private rooms, integrated blinds within the glass, or etching on glazing. If curtains must be used, use fabric that has been treated and fabricated with anti-microbial agents. Also consider using a wand at the curtain's leading edge that can be cleaned between patients.

Water Features

Since the outbreak of Legionnaire's disease years ago, the use of water features in healthcare facilities has been challenged. Open water can grow bacteria. Water that is aspirated can spray, that bacteria into the air and affect the surrounding elements and people. So why would anyone want to use a water feature inside a healthcare environment? Because they are beautiful, feel good, reduce stress, and provide a positive distraction. Water is symbolic with healing, cleansing, regeneration, and spirituality. When people encounter water features in a healthcare (or any) environment, they feel that they are one with nature.

Alas, the challenge is being met with the decreased use of water features in the healthcare facility. However research does indicates there is new evidence that indicates that water features are not the evil villains they were once thought to be. A literature search, with a
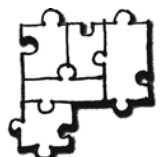
Figure 2-3. Proposed water feature for the ER One Project at Washington Hospital Center, Washington, DC. This feature is planned to mitigate stress as a positive distraction. In addition the water wall also acts as "blast" protection from outside forces. ILLUSTRATION: Patricia Raimondeau

subsequent investigation, was done to determine where and under what circumstances disease, harm, or ill health has been linked to the use of water features.

It turned out that the culprit, linked to illness, was an exterior water feature in a Florida hotel. This water feature had underwater lighting and was home to ducks and a play area for small children. The water temperature was warm enough to support the growth of bacteria, which was contributed by the ducks and children in diapers. The results of this set of conditions produced fatal bacterial infections and spurred the ban of water features. It is interesting to note that the CDC (Center for Disease Control) has never had a single infection reported from a hospital water feature. In fact, the only water contamination within a hospital has been within the hospital's own potable water system (Rogers, 2006 and Hadley 1993).

This investigation does not indicate that all water is safe and can be used indiscriminately. However, the study does provide evidence that we may still consider the responsible use of water features as appropriate. Consider the following recommendations:

❖ Avoid an open water feature where immune suppressed patients would have long-term or direct contact with the feature's spray.

❖ Avoid areas where children play.

- ❖ Use copper plumbing for water supply, drains, and other piping. Copper has natural properties that mitigate bacteria. Also, consider copper pans or liners to hold and reticulate the water.
- ❖ Minimize water spray. Water on the floor contributes to slipping and greater maintenance. Also, in the case any bacteria would get into the water, the spray would get into the air. Consider smooth material for falling water. The higher the texture, the greater the spray.
- ❖ Specify high quality water systems with filtration components. Ensure that there is appropriate maintenance to clean and service the unit.

It may be appropriate to totally contain the water within an enclosure, for visual access only. Water is not always the perfect solution; there are many other important design considerations to provide positive distractions and contribute to a healing environment.

Maintenance & Durability

Cleanliness and the state of visual order are basic to the patient's and visitor's perceptions of a good quality medical facility. However, keeping the medical environments clean and in good repair is one of the greatest challenges faced by the facility management team. Regardless of how beautifully a place has been designed, if it cannot be easily maintained and the materials cannot withstand use, a facility cannot be considered a successful healing environment. Using beautiful, non-institutional materials that can be easily maintained is one of the first steps to overcoming these types of barriers.

I have seen facility administrators embrace the use of carpet to create more patient-friendly environments, only to later discover that the maintenance department was not included in the decision-making process. Subsequently, the department found it difficult to keep the carpet well-maintained and clean. Within a short time, carpet naturally fails — looking dirty and smelling bad — and ultimately presenting an unhealthy image to patients and visitors. A typical reaction to this type of failure is the removal of the carpet, and setting a ban on carpet anywhere within the facility. This kind of reactionary, "throwing the baby out with the bath water" syndrome is still difficult to overcome even with the advent of new and appropriate developments of enhanced products.

The great abundance of attractive healthcare-appropriate materials has not eliminated the need for durable and maintainable products. Today, more than ever, design teams must work closely with facility administrators, maintenance, housekeeping, and clinical staff to specify appropriate materials maintainable by that specific facility. We must understand both the clinical functions of an area, as well as the maintenance and cleaning abilities of the

facility prior to specifying appropriate materials. Healing places must look good, feel good, smell good, perform well, and still be easy to clean and maintain.

Is the lack of resources a barrier to healing environments?

In this age of managed care, healthcare facilities are being asked to do more with less. Many participants involved in providing healthcare challenge anything that even resembles an amenity, assuming that the creation of healing environments requires an investment which surpasses the budget of a standard healthcare facility. We are all challenged to claim responsibility for each dollar spent and the value received for that dollar.

Now, more than ever, patient outcomes, weighted by per-patient costs, decide managed-care reimbursements. Supportive environments can produce better outcomes, both physically for the patient and economically for the facility. An increasing number of studies link supportive environments to healthier patients. For example, aromatherapy in MRI reduces the number of MRI retakes (Sloan Kettering study (Redd, 1991). Factors like rooms with enjoyable exterior views reduce lengths of stay, and pleasing artwork in recovery areas has been found to shorten the amount of time needed under anesthesia (Ulrich). When family members or significant others act as caregivers, patients enjoy increased emotional support. Healing environments depend less on finance than on mind set. The physical benefits enjoyed by the patient can significantly outweigh the cost of the design.

We are challenged to be responsible and are held accountable for every dollar spent. The cost of design is far more complex than the bottom line.

Is Cost a Barrier to Creating Healing Environments?

Let us take a closer look at the larger financial picture of a healthcare facility. Annual building and equipment expenses tend to be roughly 3 to 5 percent of the overall hospital budget. This takes into consideration the building cost amortized over the 20-year financing period. Building cost is often misunderstood; big buildings and impressive equipment appear costly and therefore give the impression of adding to already expensive healthcare costs. The remaining 95 to 97 percent of the costs are not as visible, and make up the facility's operating budget. Salaries and benefits account for more than fifty percent of this figure.

Design that impacts the productivity and efficiency of the staff can directly impact operation costs. (See Figure 2-4.)

We cannot be deterred or intimidated by the mission of those who only understand a "cheaper" way to do things. The climate may be ripe for change, but the challenge to balance both quality with cost and service with flexibility is significant — and crucial to the development of true healing environments.
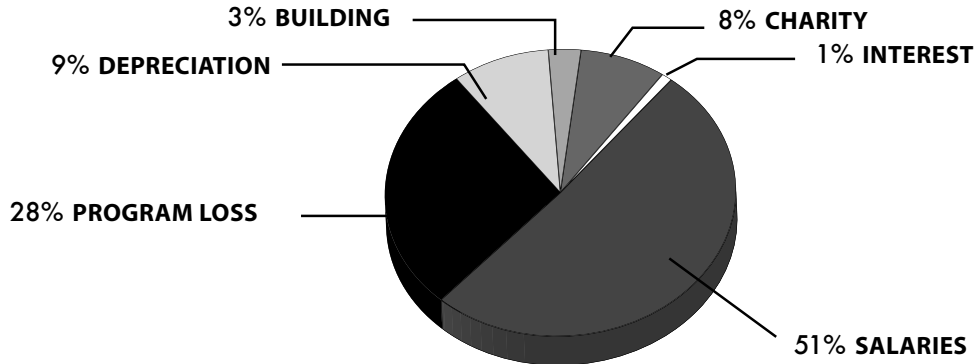
Figure 2-4. This chart illustrates a typical annual budget amortized over a 20 year financial period.
ILLUSTRATION: Joe Parimucha

How much does a healing environment cost?

"How much does a hospital cost?" or a skilled nursing facility, I can easily get a response. The cost can be expressed as simply as a preliminary of $160.00 per square foot, or as specific as $2.9 million for a particular project or medical place. In developing cost to build a medical space, the budget is based on the information at hand. The more information we have, the closer we can target exact cost. When pricing a typical healthcare area — such as an emergency department — we need to include such items as the building structure, systems, medical equipment finishes, furnishings, construction, contingencies, and fees. We have many emergency department models and since we have accounted for them over and over again, we already know what items to add to our spreadsheets. There are very few unknowns. Now we can ask, can this same emergency department be a healing environment? And if so, how much does it cost? Is it the same cost? Is it more expensive? We now find that we have many unknowns. What are the specific "line items" that make this emergency department a healing environment?

At this point, facilities tend to back away from the idea of healing environments. The problem is not necessarily that the endeavor is too expensive, but that it is difficult to define a healing environment with so many unknowns. These unknown variables make it more difficult to ask and answer important questions, such as "what is the value and what are the costs? Often, assumptions are used to fill in the blanks and thus, myths are generated. We have

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observed facilities become very sensitive to unknown costs, and rightly so. Administrators generally assume that healing environments are good things, but they also assume that they are more expensive. So what, then, is the value for the financial commitment?

Addressing the costs of a healing environment is just like addressing any other component of a healthcare project. We start with the known — the facility's mission, demographics, patient needs, and other known actual costs. These may include the cost to deliver healthcare, the cost of construction and building systems, the costs of interior finishes and materials, financial costs, the cost of facility operations, and finally, staffing costs relevant to hiring, productivity, and replacement.

Now let us add some 'healing environment components' to the equation. For example, we might ask, "How do we make our emergency department less institutional?" The answer might be a better waiting room where you don't hear children crying. Or perhaps it's adding a quiet family grieving room, or providing a separate entrance for ambulances. It might also be a matter of replacing the person at the triage desk with another who is more efficient, caring, and sensitive, and who smiles.

Most of these costs can be easily identified. Some of the elements may be part of the project cost, such as adding new rooms or equipment. Other costs, like changing the triage person, are operational. All elements must be considered. The budget should be developed to the point of prioritizing options and establishing recommendations regarding mandatory components of the planning, design, and implementation of the new emergency department. The same process should be followed in all departments and service areas.

Developing a "healing environment budget" is both a critical task and an effective vehicle for inserting meaningful "healing environment input" into the project planning process. Budget information should be developed from general to specific in the same way project programming and planning is developed. In this process, the right amount of information can be folded into the project at the critical time. Once a "healing environment" issue has a line item, it can be budgeted and tested to determine its value and cost. For example, if access to natural light is determined to be a requirement for patients, the issue should be incorporated into the functional planning and program criteria; with good planning it need not carry cost implications. If the requirement is to have outdoor access in the form of a garden, it can also be incorporated into the functional planning and program criteria. This will, however, have a cost implication, as it will require space allocation, site preparation, design, engineering, landscaping, and furnishing considerations.

With the garden acting as a tangible part of the project, we can start identifying specific elements required to create a garden. In the programming phase, 500 square feet for a garden might be added to the space program, and the functional plan may determine the healing garden to be a public space adjacent to the surgical waiting area. The preliminary budget might include $175,000 for the garden. This healing environment component is now part of the project, and like all other components of a facility project, it can be adjusted, evaluated for value, relocated, reduced in size and cost, and even eliminated if a better solution is identified.

The Business Case

To build a business case for healing environments, a Fable Hospital was envisioned. This Fable model based off of evidence of a real model of an equivalent 300–bed regional medical center that replaced a 50-year-old facility. The hospital was to be positioned within an urban setting. This model contained a typical range of services from ambulatory, medical/surgical, pediatrics, oncology, and emergency medicine. The proposed cost was projected at $180 million.

This model incorporated the best-known evidence-based design. Physical improvements were included that would improve indoor air quality, and ecologically based decisions regarding waste, energy consumption, and indoor air quality were added. Other design innovations included windows with a view, single rooms with dedicated zones for patients, and family and clinical activities. The design also maximized the daylight experience. Access to nature, special consultation rooms, an education center, and staff support were some of the special healing environment considerations that were included. This model was projected to cost more than a typical hospital of the same size and setting.

Healthcare administrators, architects, and designers have long wished for the "business model" to provide the evidence that healing environments not only provide better environments for health and well-being, but could actually improve the financial picture for the healthcare facility. That long desired business model now exists with the case study of Fable Hospital indicated with evidence-based design that clearly indicates that it is better for patients as well as for every other stakeholder, including caregivers, investors, and payers. "Better healthcare buildings are simply a good investment (*Berry, Parker, Coil, Hamilton, O'Neil, Sadler, p11)*. The Fable Hospital is not an actual facility, but it was created as a composite of recently designed facilities that have implemented components of evidence-based design modules. The model illustrates that, by using core values and design

innovations, a facility could realize cost sensitivity, eco sustainability, and community responsibility. Design innovations that in actual facilities made a difference and contributed to bottom line success included:

❖ Large single-bed rooms with space zoned for patients, family, and
   staff needs
❖ Design to include space for in-room procedures
❖ Maximized natural daylight
❖ Standards for acuity-adaptable rooms
❖ Large double-door bathroom access
❖ Decentralized nurse stations, that were ADA accessible
❖ Hygiene dispensers of alcohol–rub that are conveniently located and
   appropriate to staff pathways
❖ HEPA filtration
❖ Flexibility for the changing needs of technology
❖ Calming environment of positive distractions to reduce stress
❖ Noise mitigations
❖ Consultation areas
❖ Patient education access
❖ Staff support spaces

"These design innovations and upgrades collectively added $12 million to the construction budget….The significant first-year savings and revenue gains attributed to the facility shows the first-year financial gains are virtually recovered after one year and that significant financial benefit will then accrue year after year" (*Berry, Parker, Coil, Hamilton, O'Neil, Sadler p15).*

Relevant Cost

The Fable Hospital model offers a tool to validate the value of healing environments. However, it is typically "the value engineering model" that is used by contractors and construction managers to determine appropriate costs. The "value engineering" model was developed to ensure the facility owner got the best value for costs spent. Before including or excluding any component based on cost alone, I suggest that the following Ten Point Evaluation be applied:

1. **Does the component solve a patient/visitor health or safety issue?**

   Example: adding benches on a long route from parking to the front door is a health and safety issue. This is more than a decorative or landscaping element and should not be compromised; however, there may be alternatives to solving any of these issues.

2. **Does the component support community needs?**

   Example: adding a major pediatric play area where the community is primarily seniors may be an unnecessary cost. Although this may be appropriate and desirable for children and their parents, in the senior setting there are few to enjoy the feature. The money allocated would be better utilized financing an element designed specifically for a senior population.

3. **Does the component meet the facility objectives and mission statement?**

   Example: Including a consumer library is a valuable component when an institution's mission focuses on patient education. A facility's mission should be a visible component of a healing environment.

4. **Does the component support function?**

   Example: Most windows and natural light are welcome; however, in locker rooms, dressing rooms, and exam rooms, windows may cause discomfort and can be seen as an intrusion on a patient's sense of privacy.

5. **Does the component have long-term value?**

   Example: Solid surface stone-like materials like Corian are more costly than plastic laminate. But when they are used on counter tops in high traffic areas, they last much longer and can be easily maintained and repaired.

6. **Is the component merely decorative?**

   Example: Brass hardware, marble inlays, and chandeliers are often perceived as costly components. Such decorative elements must be selected for a purpose of value. Verify that a material is appropriate for location and function intended, and considered as well as patient perception.

7. **Is the component a trend?**

   Example: Cable lights and faux painting may currently be the hottest trend in the restaurant world, but will it still be in style in 12 to 15 years when the facility next remodels?

8. **Can the component be easily maintained by the facility?**

   Example: Carpet can be a successful material in the corridors of a patient

care area in one facility and a disaster in another. The facility must be able
to successfully maintain implemented components.

9. **Does the component reduce stress?**

Example: Art, aquariums, pleasant aromas, fountains, and gardens, when
used appropriately, can reduce stress and act as positive distractions.

10. **Does the component support the human condition?**

Example: Private dressing rooms and sub-waiting for gowned patients sup-
port human dignity and are appreciated.

The Value

Removing barriers and putting a price tag on the emotional, social, physical, intellectual, and
spiritual needs of patients is a worthy, yet monumental, undertaking. The value must support
unique population needs, and resources must produce a positive outcome for the therapeutic
component to be successful. The resources identified should include budget, time require-
ments, staff training, medical protocols, attitudes, and overall acceptance by the staff.

Care and service take top priority. Healthcare systems are complicated and cumber-
some, but care and service are less expensive, and affect people more directly. In his book,
Turned On, Roger Dow sums up the cost of caring when he writes: "Each of us becomes
more dedicated when we are cared for and treated like human beings. Yet in life, and espe-
cially in business, we are too frugal when it comes to showing people we care. In business
school and on the job we learn all about strategy implementation, planning techniques, how
to read financials, and other such 'matters of consequence.' But at its core, business is about
people" (p7). And in the healthcare business, caring can be a matter of life and death.

"In a world *that has begun to understand its resources as finite, to* maximize the benefits
realized for every dollar invested becomes crucial. The business case for better hospital
buildings is strong." Even though the Fable Hospital does not actually exist, the business
model demonstrates how individual examples of evidence-based design can improve medi-
cal outcomes, staff and patient outcomes, and cost efficiency (*Berry, Parker, Coil, Hamilton,
O'Neil, Sadler, p23-24).*

This case study provides charts with the proposed changes, the actual cost, and the
financial outcomes. For example, design innovations to reduce nurse turnover has a added
cost of $146,000. However, savings of $328,000 were realized in that only 39 nurses left
instead of 55. This model provides the valuable data and evidence to design using the cited
design innovation.

Technology – Friend or Foe?

Technology in healthcare is a primary driver of change. Buildings and departments have been torn down because they could not meet the challenges of technological change. In their place, new buildings are put up to address new changes. Facility master plans try to forecast what new technology is on the horizon when planning new facilities. Technology determines building system requirements like heat loads, plumbing, and electrical requirements. It sets the size and the footprint of the building, it takes up physical space, and it changes the way we move, interact, work, and heal within the healthcare environment. Technology also drives medical function and procedures. It is in every aspect of the healthcare setting from the first walk in the door to our final exit. It is a component of many functions, including an electronic directory, the computerized admitting process through information systems, surgery, x-rays, diagnostic medicine, and even bedside care with those "beeping machines". Technology also continually demands attention. It screams, "Fix me!" when it is not working correctly, and continually demands that we understand the way it works.

New technology can reduce medical errors, medication mistakes, and checking and double-checking the care decisions that doctors and nurses make. Even simple computer systems that use electronic prescriptions in place of handwritten ones have paid off with substantial error reduction (Nordenberg, 2000). Will telemedicine, new equipment, computerization, robotics, and exciting new technology come to the rescue and reduce even more medical errors? The increase of medical errors that jeopardize patient safety is fueling the American healthcare system concern to look for technological answers for these problems (Cook, 1988).

Wrong site surgery, medication errors, post-surgical nosocomial infections, falls, wrong treatments, unnecessary treatment, duplicate treatment and mis-diagnoses are just a few of the disasters that the American healthcare system is concerned with and looking to technology for answers (Gillespie, 2002).

Information Technology (IT) may play a major role to reduce some of the errors as medical records move from being paper-based to being electronic medical records (EMR). This process would put all medical information, within a single patient record. This would then be available to the providers from the outpatient clinic to all hospital bedsides. The EMR would further reduce space taken up by medical records and it would provide information to those who need it during critical diagnosis and decision-making (Healthcare Informatics, 1997).

EMR, combined with telemedicine, can provide more patient information to the healthcare practitioner wherever they may be located. Patient information management is

more likely to be successful when linked with telehealth technologies. This link strengthens integration of clinical management with the EMR forming a strong bond to the clinical encounter (Blendon, 2002). The ability to monitor clinical situations, specifically in remote locations, can help avert medical errors.

While technology has greatly contributed to the ability to saving lives, its scope and complexity have also grown considerably. It is inevitable that medical technology will continue to give the medical world additional tools to make the complex nature of healthcare delivery safer and more economic. It will also provide solutions to battle disease, trauma, and other human health issues. We will see software solutions, linked with virtual medicine, which will allow institutions to be in locations where they need to be. Electronic ordering systems and medical records, telemedicine, new surgical procedures, and genome research are just a few of the technologies that promise hope for human suffering (Wachter, 2000).

Unfortunately, technology cannot be the white horse galloping on the scene to save us from all the medical problems that our world is facing. The white horse needs a human rider. Technology must be partnered with the human touch. However, both our healthcare workforce and our hands-on time with caregivers is diminishing. Is this additional complexity contributing to the increase of medical errors?

The root cause of medical errors is not always human incompetence. It is also systematic errors caused by communication breakdown between department specialists and the institution ability to share information on a timely and consistent manner (Blendon). Equipment design and ergonomics may not have been developed for humans focusing on patient care, but rather for the user to focus on the technology. Anyone who has struggled with frustrations of computer crashes, trying to operate a DVD player, to open a window in a rental car intuitively knows that more and more technology does not solve all problems. More and better technology is not without its problems. Human factors must be considered or new and beneficial technology will be confounded by human resistance.

There has been a great deal of research over the last fifteen years to the magnitude of medical errors in the United States, as legal suits and malpractice insurance continue to surge. Physician load, clinical responsibility, and patient expectations are also increasing and medical errors continue to soar. How can this be mitigated? As investigations of errors continue to reveal the complexities of the medical environment, it is becoming clear that the "attitude" to medically adverse outcomes must change (Reddy, 2007). Human-machine interaction, and finding new roles for technology to act as a failsafe has the potential to significantly decrease patient harm. Healing environments must put the "human" back in the technology loop, providing the much-needed high-tech – high-touch link. There needs to be a delicate balance between medical technology and human intelligence. This balance can contribute to a balance of the curative with healing environments.

Finding Resources

Frequently, a healing place has little or no cost implication. We recently took a client on a field trip to look at outpatient surgical centers before they began developing their own project. At the end of the day, we asked our group what most impressed them during our visits. The director of surgery said, "The garment bags," referring to one of the facility's practice of using garment bags for patients' clothes and belongings. Our client continued, "Currently, we put our patients' belongings in paper bags and put them on their stretchers or ask the families to carry them around all day." Needless to say, we included garment bags, as well as appropriate closets for patients' use, in our project plan for that client's facility. It added a small cost to the client and had no cost implication on the project, yet it added significant value for the client.

Not all solutions are so inexpensive. Including special elements — such as water features, aquariums, or other specialty 'features of delight' — are rarely included in the original budget, and often fundraising efforts become the vehicle for financing these special items. Finding resources to create these healing places is a challenge often met in creative ways. I have seen two ingredients present in all successful creative funding alternatives. First, there must be a real need — not necessarily one that originates in administration or from the board of directors, but real human healing needs. Second, there must be a champion for the cause who is passionate about it and who is not necessarily at the top of the facility's hierarchy. These champions generally come from the ranks of people who work directly with real patient issues. When these two ingredients of need and the champion are present, miracles can, and do, happen.

To summarize, change offers us both challenges and opportunities to make a difference. We can do this by removing barriers which allows the enjoyment and benefits of a healing environment. Innovative solutions realized through evidence-based design, offersthe greatest potential to embrace change. Design provides the guiding principles to identify the barriers and move to successful solutions. Budgets, codes, building maintenance, technology, lack of resources, and attitudes will continue to challenge design innovation. However, supplying sound evidence can mitigate that challenge and find real solutions for medical complexities.
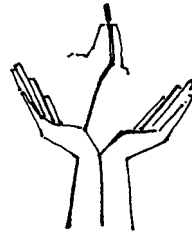
The Gift of Healers

YOU CAN DESIGN, AND CREATE, AND

BUILD THE MOST WONDERFUL PLACES

IN THE WORLD. BUT IT TAKES PEOPLE

TO MAKE THE DREAM A REALITY.

~ Walt Disney

The Gift of Healers

*H*EALING ENVIRONMENTS ARE PEOPLE PLACES that support healers. Healers are people who heal one another. And as healers, they are the most important aspect of any healing environment since they provide care, understanding, and counsel. They offer physical and emotional support. They find answers, hold hands, rub backs, and pray. It is this combination of personal support system of healers and patient care that accomplishes the miracles of healing. The work of healers is the essential link between the body, the mind and spirit. This forms the vital bond of love between people that truly conquers all through life — and into death. It is our interdependence and unconditional love that help us survive bad medicine, overcome hostile environments, and win lost causes. Healing environments — people places that enrich relationships — are places where healers can assist one another on the healing journey.

As the most important factor of a patient's support team, it is essential to understand the body/mind/spirit connection and how it affects not only the patient, but also the healer within the healing environment. This chapter addresses:

- ❖ Relationships and connections
- ❖ Acts of kindness
- ❖ Culture of the healthcare environment
- ❖ Roles of healers
- ❖ Attitude
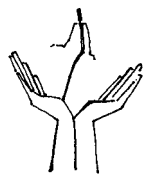
Human Relationships

One of the most overlooked notions in modern medicine is that human relationships are fundamental to a healing environment. Medicine depends on diagnostics, technology, and medical procedures to determine the illness or disease. Consequently, it often ignores the most important and essential access to the patient's healing abilities. Healthcare delivery is a people-service business that includes doctors, nurses, aides, and even maintenance staff as members of the caregiving team. It also includes family, as defined by the patient: spouse, partner or significant other, parents, friends, children, siblings, and even pets. All of these relationships are essential to a patient's ability to heal.

It is often the caregiver who is able to provide the "power to heal" when others fail or when all else feels terminal. Any individual who is able to make that personal connection with another is enabled to rekindle the spirit needed to heal (Chapman, 2004). A healing environment is not complete until it includes a network of nurturing, loving caregivers.

Our health and wellness are interdependent and the society are mutually dependent on each other. We are individuals woven into a society that allows us to develop and thrive together. We live together in families and communities, nourishing and caring for one another in so many ways.

Each of us needs other people to complete ourselves and enliven us. We become ill when we're apart from others, and become healthier when we're involved in helping others. Joined in groups, joined in associations, relationships, teams, or companies, we become part of something beyond ourselves, something larger, something safer, something stronger than any of those alone. In part, it's because humans aren't complete human beings living solo (Sobel, p223).

Social animals by nature, we find it very difficult to be alone. Our mutual dependence on others and on our society provides the essentials required in our daily lives. We form social relationships within families, with friends, in companies, and in communities. Human infants have a very long period of childhood, during which they are extremely dependent on the mother, on family, and on community for development, nurturing, and health. Without this nurture and care, human children would perish well before adulthood. And, even in adulthood, we remain dependent on others in our basic human need for care. Dr. David Sobel says that "Organized groups can accomplish what no individual can. Through cooperative efforts cities grow, land is farmed, and industry and technology develop" (Sobel, p225). This can also be said of healing environments when they include nurturing caregivers.

Just as environment supports healing, our social bonds support health.

People who are single, separated, divorced, or widowed are twice as likely to die prematurely than those who are married. They also wind up in the hospital for mental disorders

five to ten times as frequently. Heart disease, cancer, depression, tuberculosis, arthritis or problems during pregnancy occur more in those with few social ties (Sobel, p227).

The Act of Kindness

As infants, we are fed, held, groomed, played with, and talked to by our parents and loved-ones, and from this caring behavior, we experience comfort and joy. When a child becomes ill, it is nursed back to health, and in those early experiences, we discover the joy and the healing that comes from the love of caregivers. Caregivers also benefit through the act of nurturing, and it becomes difficult to differentiate acts of caring from loving and being loved. This integrated act of caring and being cared for is what keeps us healthy. So how do compassion, nurturing, and caring support health? We benefit from helping others in a number of ways. In caring for others, our focus shifts from our own problems to those of another and subsequently diminish our own stresses. Additionally, the gratitude we often feel in return can be very nourishing to our own spirits. We need to feel that we matter to others, and by helping, we are nurturing that need inside ourselves. Empathy, kindness, altruism, benevolence, insight, joy, suffering, sadness, and compassion are humanistic characteristics that lie outside the medical protocol for curing, yet each plays an important role in healing (Lowen, 1998).
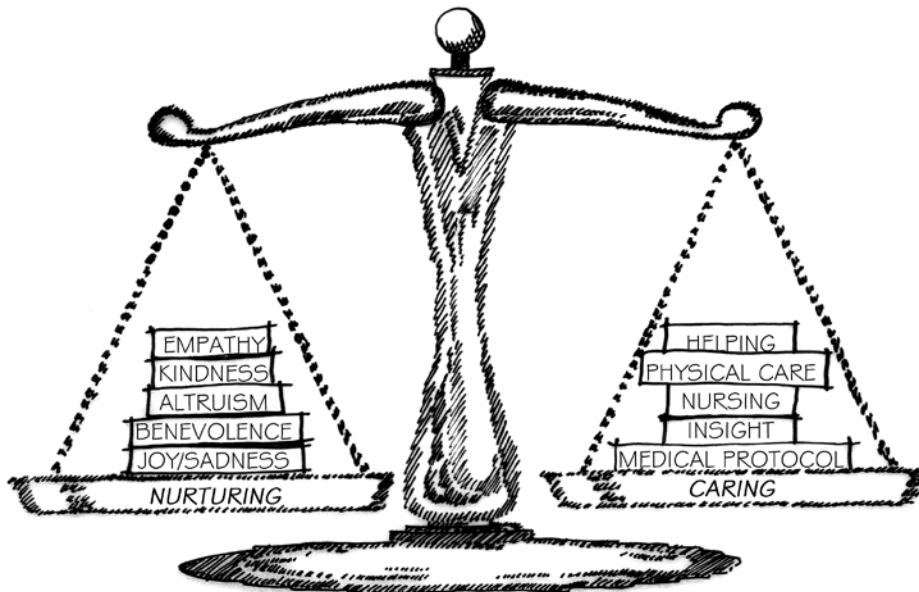
Figure 3-1. The healing arts are a delicate balance between nurturing and caregiver skills – the nurturing act of human kindness must be in balance with the science of medicine.
ILLUSTRATION: Patricia Raimondeau
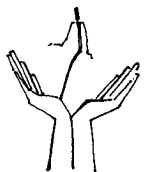
I believe that humankind is at its best, noble. We grieve together for the pain and suffering of others as individuals, family groups, communities, nations, and even the world. Take as an example the response to the terrorist acts of September 11, 2001. While most of us did not know a person the individuals killed, injured, or missing, on that day, we grieved nonetheless with those who did and desperately wanted to help. Thousands across the country left families and homes to assist at ground zero. Thousands waited hours in long lines to give blood. Donations of every kind were made and distributed to people directly affected by the disaster. We saw great acts of kindness by our public caregivers — firefighters, rescue workers, police, and healthcare providers — and witnessed the sacrifices and contributions of "ordinary" citizens who knew only that they wanted, and needed, to do something to take away some of the pain. Caring, whether given or received, is one of our most fundamental human needs.

So why then, do we typically delegate the role of healer to doctors, nurses, and the medical institutions? Is it that we have forgotten our intuitive nature to "care", and have instead accepted the cognitive assumption that modern medicine will take care of everything? Upon delivering a loved one into the hands of medical professionals, do we surrender our healer and caregiver roles because we believe the professionals are better suited to heal and, therefore, do we believe that we are no longer needed? How often are we barred from the bedsides of loved ones while the institution "does all it can" sometimes resulting in never seeing them again.

Picture this current TV commercial: A distraught wife rushes her husband, who is suffering from a cardiac arrest, to a hospital. Once there, the door is literally shut in her face as she is assured that he is "in good hands now," and the professionals "will take care of everything." After all the wonderful proclamations about the product being touted, the commercial winds down to a happy ending reunion between the miraculously rescued husband and his grateful wife. In reality, however, the ending is often not so happy; not all cardiac patients survive for the reunion. I find it haunting to see this woman's anguished face against the closed door separating her from her husband, and see it as a sad — yet all too accurate — expression of our current medical culture.

Facilities, physicians, and even some nurses have stridently held to their belief that family must be removed from emergency situations in order to control the environment and provide the level of care required. However, they fail to take into account that the expressions of love, support, and care from loved ones are often key to giving patients what they most basically need to survive.

At a recent client meeting, a doctor at Walter Reed Army Medical Center explained to those present the importance of patients' will and ability to survive. He used, as an example,

a battlefield phenomenon in which soldiers demonstrate an astonishing will and ability to survive devastating, usually fatal injuries, while awaiting rescue. The injured hang on through sometimes extremely difficult rescue situations and rough transport, only to die as soon as they are delivered to the medical unit. When trying to understand why this happens, one argued that they should not have survived as long as they did, and that they would have died anyway. A more constructive line of thinking, however, suggests that once the patient relinquishes his internal survival mechanism to medicine, he loses his ability to positively affect his own survival. This suggests that modern medicine, despite it's indisputably important role in the treatment of disease and injury, is not as powerful as an individual's own abilities

Continued discussion with the doctor posed several important questions which have factored into the development of my thinking:

- ❖ How can this principle be applied to the design of medical facilities?
- ❖ What can be done to assist patients in retaining their natural survival abilities? And,
- ❖ Can the presence of loved ones, with their reassurances of unconditional love and support, make a difference in the treatment of patients?

Since medical facilities generally do not permit loved ones to be present during the treatment and even the passing on of patients, family and friends are often left with unresolved feelings of grief, guilt, and unanswerable questions: "If I were there, could I have made a difference? Could I have made them more comfortable? Would my presence have made it easier for them?" Sadly, study and observation supports the suggestion that the answers to these questions are all yes: it could have made a significant difference — both to patient and loved one — had they been allowed to be together. Instead, loved ones are left burdened with the anguish of these questions, sometimes for many years after the experience.

Fortunately, many of us have found ways to challenge the system. A friend of mine, who is a healthcare architect, recently spent time with his dying father in an intensive care unit. Barred from spending the night with him, my friend was escorted out of the unit with instructions not to return until morning. Devastated, my friend worried that his father, alone in a strange place, would die during the night, and he felt compelled to return to his father's bedside. Pleading with the nurses did not work. So, relying on his architectural understanding of the structure, he climbed through the ceiling system and returned to his father through the ceiling. Seeing his determination and ingenuity, the nurses at this point ignored his unlawful presence, and allowed my friend to pass the night holding his father's hand. Many caring nurses have shared similar stories with me in which they have broken rules imposing separation to allow loved ones to share those final gifts of love, care, and healing.

Culture in Healthcare Environments

I first became aware of "culture" (in terms of organizational culture of healthcare institutions) at my first "Pebble" meeting in April 2005. Following a tour of a new community hospital, their staff president gave a briefing of their building project. The hospital was beautiful with many healing environment components. Someone in the audience asked the question, "How did you get the hospital administration to buy into such a dramatic change in 'culture' to support this design?" The president admitted that the administration only paid "lip service" to the healing environment concepts recommended during the planning and design process. He continued to say that, after the ribbon cutting and starting to use the new building, they found that they did not know how to work in this new environment. Many of the administration and even the clinical staff left the organization in frustration. They hired a consultant to learn how to change their culture to embrace the philosophy that the building placed them in. They lost even more staff as staff tried to align their culture with the building design. Success was ultimately achieved with a change in management practices recommended by their consultant, and their organizational culture now aligns their built environment. Although I truly believe that "place" has the power to change people, I had never witnessed such a remarkable story where place changed an entire organization. A healing environment "culture" must align with the organization culture to be successful. Cultural transformation is possible through design.

 "Culture" in the healthcare organization has been described as policies and procedures that guide the institution behavior. This culture is based on the institution's mission, objectives, and value, as well as linked assumptions. The physical environment is a reflection of the perceived organizational culture (Hamiliton, 2006). Kirk Hamiliton, FAIA, associate professor at Texas A&M University, challenges us to design buildings based on evidence as well as to design the cultures that flourish within them (Hamilton). The healthcare design can become an important tool for management to change its culture.

Within the institution's culture are various subcultures that may or may not support the facility's mission and culture. For example the emergency department may have a "battlefield" culture, where the goal is "save the life". This culture may thrive on stress of the emergency. Hospice, rehabilitation, a birthing center, and pediatrics may each have a unique subculture within the institution's culture. Each hospital or healthcare system has their own culture that has developed ideally to support the community needs that they serve.

Design can reinforce cultural aspects throughout the facility and campus, including marketing advertisements, accessibility, parking, the admitting process, and the appearance within the environment, such as daylight, art programs, food service, and family amenities. Design can also play a major role in enhancing the experience to support the culture.

Medical anthropology interested in the role of culture in health care, offers a different view of organizational culture as a social setting. Anthropologists have found that most complex societies (including health care organizations) tend to have a number of co-existing, overlapping, and competing subcultures. Anthropological research identifies groups with shared cultural knowledge, and understands how subcultures co-exist and interact within the larger organizational environment and understands that subcultures are highly successful when they co-exist and interact within the larger organizational environment Hudelson 2004).

Roles of Healers

Who are the healers? What role do they play in the healing environment? What do they need to support them? How can the environment help? To truly be a healing environment there must be healers that are allowed to support patients and their families with love and care. Their physical presence and nurturing behaviors are essential for a patient's well-being, and this must be recognized for its role in influencing positive outcomes. It is unnatural and inhumane to keep loved ones from each other, especially in times of greatest need. This healing role often reaches beyond family and close friends, extending the circle to extended families, volunteers and non-clinical staff.

Figure 3-2. We are all healers; family, extended family, clinicians, volunteers, and all who support and care for the patient's well-being.   ILLUSTRATION: Patricia Raimondeau
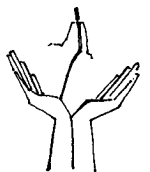
Each of us has the opportunity to be a healer. By our very human nature, it seems, we rarely hesitate to rush to the aid of those in need. Strangers stop on the highway to assist stranded motorists. Passersby administer CPR to strangers in distress. And even in the bustle of our busy modern lives, we take the time to call for help when we see an accident or discover a person in need of assistance. In acts of war or natural disasters, we often see people exhibiting their best acts of healing, displaying acts of heroism — even at the risk of their own well-being. We are shocked and filled with deep sympathy when we witness the discomfort and pain of another, and we want to help because we care.

A medical secretary, for example, can participate in the role of healing. I recall an incident in which my mother-in-law required a simple hernia surgery. While helping her prepare, we discovered her surgery had been scheduled at a distant hospital that neither of my in-laws had ever been to nor liked. When we asked my mother-in-law why it had not been scheduled at her own hospital, she replied, "The lady on the phone said I should go across town, and I was afraid if I told her I wanted to go to my own hospital, the doctor would be mad at me and not do a good job." The scheduling secretary had an excellent opportunity to act as a healer — working with the patient to assure her that she would be well-cared for — but missed it.

As this example illustrates, the healer role extends to many people in a multitude of functions that affect the patient. Doctors, nurses, medical staff of diagnostic technicians, pharmacists, therapists, and other medical practitioners provide medical care, while family, friends, communities, social workers, and spiritual advisors supply the emotional support an individual requires for healing. Therefore, a healer can be anyone who provides uninhibited, compassionate care.

Healing Relationships

People, especially patients, crave relationships that support health and wellness. It is caring and compassion that establish a personal link to healing, and many people can participate as facilitators of this link. However, it is the family that is closest to a patient and is most likely to support unconditional love and nurturing when a loved one is ill or hurting.

The Role of Family

By their very nature, caring relationships are healing, and those who provide the care are healers. Before any other, the mother is the first healer. Dependent on her for life, food, warmth, and protection, the human child would not survive infancy without the nurture and care of that first healer. Often, it is a family member who first diagnoses the health needs of a loved one. Family and friends, being the closest people in our lives, are typically

the first to notice changes in our appearance, in our eating habits, sleeping patterns, and energy and motivation levels. These are the people who ask us questions and encourage us to take action — to seek medical advice, or make lifestyle changes, whether it means taking vitamins or taking a vacation. And even if these suggestions don't help, these are the same people who urge us to go to the doctor and who follow us through the healing process (Lowen, 1998).

It is indeed the family that is the greatest investment in our health. The bond of love is close, whether it is between parent and child, siblings, spouses, or friends. When they suffer, we suffer, and we miss their companionship when they are not well, or gone. Families go to great extents to facilitate each other's return to health, playing a major role in the entire journey, from sickness to health. We must remember that we are treating more than the patient, and that the family must be accommodated and integrated into the healing process.

At a recent conference on Intensive Care Design, I listened as a seasoned ICU nurse shared how she could predict a patient's success in healing based on how well his or her family was kept informed by the medical professionals. This astute observation provides yet another excellent opportunity for designing better facilitating healing.

The Role of Staff

Members of the medical staff — typically hands-on nurses, support technicians, pharmacists, other paid caregivers, as well as volunteers — also play a key role in the healing process. Enjoying a more hands-on, caring relationship with patients, nurses, nurse practitioners, and physician assistants generally have a greater opportunity to provide positive support to patients than doctors. Because of this, patients often feel more at ease with these providers, resulting in speaking more freely and asking critical questions. Nurses tend to use simpler language with patients and to explain things in more personal terms than doctors, and patients often consider these less intimidating professionals as 'go-betweens' for representing their best interests to physicians. Most importantly, to the patient, these 'hands-on' caregivers represent 'real people' with whom the patient can identify and form close bonds (Lowen).

Typically, this relationship is reciprocal. Both the patient as well as the caregiver benefit from the interaction. These caregivers are truly concerned with the needs and well-being of patients and patients' families, and both feel this care. Over the many years that I have worked with these professionals in a variety of settings from hospital departments and doctor's offices to senior facilities, it is clear to me that the 'hands-on' caregiver it is the one who strives for improvements in care for his/her patients. Many of these caregivers have shared their stories with me.
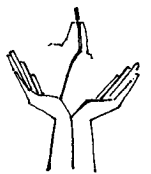
The Role of Physician

Many doctor-patient relationships are missed opportunities for understanding. In the past, physicians knew patients and their families well as extended family, not simply patients. They had time in their appointments to socialize and listen to each other. This scenario, however, is a thing of the past, and with this passing, we have lost an important link to healing. Today's physicians have little time for such social encounters. Physicians must generally adhere to a tight schedule, and they are often too rushed and preoccupied with diagnosis and possible procedures to stop and listen to the patient. Often so focused on taking patient history or asking about symptoms and complaints, the physician sometimes fails to look at his or her patient. The entire time spent between doctor and patient is often only a few minutes and more than likely does not address a patient's real health needs. It is hardly a surprise, then, that less than 12 percent of all initial office visits result in a correct diagnosis (Sobel).

Additionally, many doctors prefer to see patients alone, with no family present, as they find it easier to retain control and concentrate on the patient. Dr. Lowen, however, does not agree with this practice. As a noted physician with a unique understanding of the art of doctor-patient relationships, he has explained that healing does not abandon the science of medicine, but rather integrates modern science with a sensitive approach to medical care. When asked, patients invariably indicate a desire to have family present during consultations. Dr. Lowen is convinced that the involvement of family speeds — rather than impedes — the flow of important information and shortens the time required to get to know a patient (Lowen).

How physicians communicate with patients is another area in which they influence their patients' care. As the most powerful tools a doctor possesses, words can heal — and they can harm. Dr. Lowen offers the following maladroit sentences from his list of hundreds as some of the most commonly used among physicians:

❖ You're living on borrowed time.
❖ You're going downhill fast.
❖ The next heartbeat may be your last.
❖ You're a walking time bomb.
❖ You can have a heart attack or worse any minute.
❖ The angel of death is shadowing you (Lowen).

Dr. Lowen also shares the story of a patient explaining the most terrifying ordeal of his recent heart attack: hearing an orderly yell across the emergency room, "We're losing him! We're losing him!" (p65). Fear does not motivate patients to heal. "When fear predominates," Dr. Lowen writes, "intelligent decision making is undermined. Worse still, intense nega-

tive emotions aggravate symptoms, adversely affect healing, and impair a patient's prognosis. Sickness humbles and corrodes the sense of self, rendering patients despaired and especially vulnerable to words of a doctor on whom they depend for healing and staying alive" (p73).

Perhaps these dire predictions are a form of inspiring fear for one's life as an attempt to expedite conformity in otherwise reluctant patients. Or perhaps the litigious nature of our culture compels physicians to give patients the truth, in its most blunt form. Whatever the reason, "[w]hen a physician does not cushion a dire prediction with kindly words, the patient infers an absence of compassion. The physician thus de-professionalizes a relationship which, to be effective, needs to be bonded by respect and trust" (Lowen, p74). Regardless of motive, there never is benefit in assaulting a patient with words that dis-empower.

Indeed, words have the power to inflict great harm, but they have a far greater potential to heal.   The healing process demands more than science and medicine, requiring positive expectations and faith in the physician. Optimism is essential to the release of healing energy, and words act as part of the delivery mechanism. Positive reinforcement carries life-giving benefits. Hippocrates, the father of western medicine, said "for some patients, though conscious that their position is perilous, recover their health simply through their contentment with the physician" (Lowen). This trust in one physician is critical to both the art of healing and the ultimate success of the physician. Optimism and healing words can promote well-being even when recovery is not always possible. "Patients who sue doctors or hospitals consistently say that the prime reason is a perceived lack of caring. Another reason is the impression that a doctor is unavailable when needed or has abandoned them. It appears that litigation resultes more from miscommunication than malpractice per se" (Lowen p148). Still another answer is that a doctor ignored the patient's concerns and failed to consider his or her perspective. Compassionate physicians who invest time with their patients are rarely sued for malpractice, but patients would be likely to litigate an indifferent stranger.

The Role of the Patient

Like their healers, caregivers, family, and physicians, patients must develop a special art for dealing with medical professionals. Medicine seeks to cure, and patients seek healing. Therefore, that goal of healing must be incorporated into the medical process of curing. Healing requires relationships based on equality, which must be earned. Patients can do a great deal in cultivating this type of relationship. As patients, we must first understand the limitations of science and medicine. Science and technologies have indeed created 'miracles' in modern medicine, but they still can neither prevent death nor correct many terminal conditions. Doctors and professional caregivers are a critical part of the team to recovery, but the patient cannot simply surrender the responsibility for healing to professionals. A

patient must assume responsibility for his or her own health and well-being, and understand the consequences of lifestyle choices. Doctors can make recommendations for change, but patients must understand that treatments or prescriptions cannot guarantee happiness or healing. We cannot expect medicines to correct the problems of culture, social and economic realities, violence, terrorism, difficult relationships, or any of the other issues that affect our lives (Lowen).

When we do seek medical advice, it is the patient's responsibility to do so as informed patients. We must be able to articulate our chief complaints and all components associated with them — complaints, vitamins, supplements that we have and are currently taking — and to know and be able to articulate the effect each of these things have, and have had, on us. In order for patients to be empowered in the process of their own health, a full partnership between the patient and physician is imperative. Patients must not simply accept doctors' decisions passively. They must share obligation and responsibility with their physicians. Patients must develop listening skills and learn to ask questions about their health and recommended treatments.

The Role of the Environment

The role of the environment is to support the relationships of the staff, physicians, family, patient, and institution. Its basic premise is to transform the medical place into a place of healing. that embraces human relationships and needs. In a properly designed healing environment it is a place where human emotions are paramount, and the mere function of the place supports those emotions. It is a role that is most forgotten, placing the medical protocol before the people medicine administers to. This book is an attempt to provide the philosophy, tools, and evidence to create the holistic environment that administers the human needs.

Healing environments provide both common and special places to accommodate and support human interaction with patients. One of the most important caregiver teams consists of the patient and his or her family. This team typically functions together through the entire patient-care process — from initial medical consultation, through diagnosis, tests, procedures, treatment, and follow–up care, and up to the return to the normal activities of daily life. Family and friends often become a patient's eyes and ears, asking questions and taking notes when a patient is too tired, ill, or stressed to clearly understand the diagnosis or treatment plan. Family also provides physical support, like transportation, as well as emotional support, motivation, guidance, a cheery attitude, or simply listening. Close friends and neighbors also assume this role.

A Healing Attitude

One of the greatest gifts that we give one another is a positive attitude. This can change the course of an illness. Positive attitudes can instill hope and encourage recovery. Negative attitudes can harm. Take, for example, a young child who breaks into tears after falling. Mom scoops the child up, kisses away the tears, reassuring her child that everything will be okay. In response to Mom's attention and positive attitude, the child is soon happy and smiling again. We innately believe in the power of Mother. Even as adults, when confronted with a serious illness or injury, we seek the nurturing and comfort of "Mom", even if she is no longer available or able to provide care. Throughout our lives, we respond similarly to others who care for us, relying on them for assurance. If a caregiver's attitude is not hopeful and positive, the negative impact on the patient's ability to heal can be significant.

Patient Satisfaction

What is it that the patients want? What do they think? How do we address their needs? Patients like everyone else, have human needs, and they want to be addressed as normal people, not as the "hospice patient", or the "gall bladder in room 519". Understanding the needs of healers and patients could be as simple as listening. However as the healthcare systems grow and a complicate environment develops, listening becomes more difficult and often impossible to do. Healthcare facilities have turned to market research organizations with survey tools to assist them in understanding the needs of the communities that they serve. The facilities understand that satisfaction is important, as a happy patient with a good experience will return, tell others about their good experience, and have better outcomes.

For the past 50 years, the American health system has operated on the popular Maslow's hierarchy, which matches healthcare delivery in priority levels, including safety, effectiveness, timeliness, efficiency, equitability, and being patient-centered. Many studies have indicated that, although patients do expect a basic level of safety and technical care, they are often seeking something else (Clark, 2006). When confronted with life's most difficult situations, such as major illness, people often seek humor, love, and the divine (Clark). A safe environment is not at the top of the patient's priority list. In 2004, a study was done to analyze more than nine million patient responses from diverse types of facilities. This study was to identify the most critical factors in patient satisfaction. It was interesting to note the dramatic difference in what the staff and the patient considered most important to the patient was dramatically different. For example, the staff thought that physical comfort would matter most to patients, while patients wanted caring behavior as their first priority (Clark). Paul Clark and Mary Malone, in their report: *What Patients Want*, found that study after study indicated that patients are consistently seeking "personhood" how they
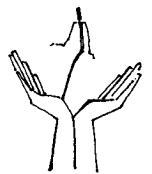
are treated by those delivering care. They further cite Press Ganey annual reports, which continually identify the attention to personhood as a significant way to address the patient's perception of safety (Clark).

Patient satisfaction surveys are important tools for measuring and understanding the needs of the healthcare consumer. Press Ganey, the Picker Institute, the Jackson Foundation, and many other groups are dedicated to answering the mystifying questions regarding what the average healthcare consumer wants. Press Ganey, a leader in "Patient Satisfaction" surveys, has been providing information to facilities regarding the desires of their patient population. Press Ganey alone has worked with more than 7,000 healthcare client facilities to improve their performance, based on statistical information gathered and analyzed by the group.

These groups provide a scientific approach to understanding the needs of their clients. Today, most healthcare systems heavily rely on their "Patient Satisfaction" scores in addressing strategic planning decisions and when considering upgrades and changes in their facilities. These surveys and statistical information can be extremely important in design and should become a standard of care (www.pressganey.org). In general, patient/family satisfaction is an important consideration in support of healing teams.

For Patient/Family Satisfaction:

❖ Design to support and respect "personhood" by responding and being sensitive to the unique needs of people.

❖ Keep the environment as "normal" as possible. Eliminate the institutional experience.

❖ Listen and be attentive to patient/family concerns and complaints.

❖ Design for the patient journey, where the patient/family begin their pathways through the healthcare system and to their destinations.

❖ Take into consideration that a family member will accompany the patient in every step of the process.

❖ Provide easy parking and convenient drop-off access for patients.

❖ Eliminate undue walking or driving to several different locations with an ill patient when accessing pre-operative services.

❖ Create waiting areas that accommodate family support.

❖ Remember to provide accommodations for special populations, like children and seniors.

❖ Design examination rooms to accommodate at least one visitor in addition to the patient and the physician.

❖ Arrange Admitting/Discharge, Check-in/Check-out, and other areas where private information is collected to accommodate both the patient and a companion.

❖ Include waiting space for families in diagnostic areas such as labs and radiology. The patient and family will be more content if they are able to share waiting time together.

❖ Provide convenient telephones, restrooms, and access to refreshments in or near family waiting areas.

❖ Assign private areas for consultation and grieving.

❖ Design to support the patient/family emotional and spiritual needs.

❖ Allow for sleeping accommodations in patient rooms and near critical care areas.

❖ Provide recreation areas where patients and families can spend time together to celebrate holidays and other life milestones.

❖ Provide cooking, laundry, and shower facilities for families of acutely ill patients.

❖ Design to support good communication between staff and patients/family.

❖ Design to communicate that the institution cares.

For Family/Staff Satisfaction:

❖ Keep family informed, especially if a patient is being moved or if there is a change in the patient's condition.

❖ Respect the dignity and privacy needs of the family.

❖ Provide convenient access to support staff, such as the patient's nurse and social workers. Their offices should be clearly identified and should indicate hours of availability.

❖ Provide meeting space for staff and the patient's family.

❖ Advise family how to access various areas in the facility, especially after hours.

❖ Involve the family in reading and understanding the medical chart. Remember that patients have a right to access their medical records.

❖ Involve family in the patient's treatment plan and encourage their participation in the caregiver team.

❖ Avoid traffic flow conflicts. Zone patient areas and separate family zones from treatment zones.

For Staff Satisfaction:

- ❖ Provide secure, convenient parking conditions.
- ❖ Arrange work areas for shorter walking distances, good access to patients, equipment, and supplies.
- ❖ Understand the workflow process, and design to support it.
- ❖ Provide comfortable ergonomic task seating, a good work environment, and convenient access to restrooms, respite, and refreshments.
- ❖ Provide access to nature and the outdoors. Develop spaces that utilize natural light.
- ❖ Provide comfortable staff lounges, private lockers, and security for personal valuables.
- ❖ Provide access to appropriate meeting spaces to encourage collegiality.

For Physician Satisfaction:

- ❖ Provide secure, convenient parking accommodations.
- ❖ Provide convenient access to restrooms.
- ❖ Provide easy access to dictation and medical records.
- ❖ Provide comfortable lounges with access to the internet, laptop connections, work areas, cable TV, refreshments, and private locker rooms with showers.
- ❖ Provide meeting spaces to support collegiality and clean, comfortable "on-call" sleep rooms.
- ❖ Allow for appropriate consultation rooms for meetings with patients and their families.

The Evidence

Human satisfaction, be it patient, family, staff, or physician, involves simple basic human needs that respect the human condition. The satisfaction evidence is a primary tool used by many healthcare facilities to show how well the facility is doing in meeting the satisfaction needs of the community's satisfaction needs. This is not a new development. However, new environmental issues are providing additional qualitative data to the surveys, and subsequently making a significant impact on facilities' design. We are also seeing surveys targeted on staff satisfaction (Press Ganey).

"The Center for Health Design, a leading research and advocacy organization of forward-thinking healthcare and design professionals who are leading the quest to improve

the quality of healthcare through building architecture and design." The website goes on to say that the organization's mission is "to transform healthcare settings – including hospitals, clinics, physician offices and nursing homes- into healing environments that contribute to health and improve outcome through the creative use of evidence-based design." A subset of their organization is a facility-focused environmental research program called "Pebble Projects". These projects typically include satisfaction measurements in their research models. At one "Pebble Meeting", Bronson Methodist, Kalamazoo, MI, cited a reduction of nurse turnover by 6.5% and a patient satisfaction increase by 95.7% (April 13, 2005, Pebble Meeting presentation). Results such as these have contributed to the success and growth of environmental research in the area of satisfaction measurement.

According to the Center for Design's website, "Pebble Projects" takes its name and mission from the concept of a pebble that, "tossed into a pond,…creates a ripple effect." The "Pebble Projects" started in the San Diego Children's Hospital & Health Center in 2000, as the group's first research project.

Today, the "Pebbles" have grown to be included in more than 70 participating facilities, including one of our exceptional clients, The ER One at Washington Hospital. This research group of evidence-based design provides examples from various healthcare organizations as to where design has made a difference in the delivery of care. The outcome of this research is impressive and making a major contribution to evidence-based design. It is also currently being shared with other healthcare facilities and those who design them. Some of their major findings include that design can improve the quality of care, attract more patients, help with the recruitment and retention of staff, can increase philanthropic and corporate support, enhance operational efficiency, and improve patient and staff satisfaction. The ripple effect of the "Pebbles" is changing the healthcare experience for the better.

Evidence-based design uses the best available evidence to make successful building design decisions. But these decisions must not only be based on known evidence but must also carefully balance the full spectrum of needs – staff, physicians, family, and patients – to create a truly successful healing environment. If the focus is on the physicians, and does not consider the needs of the housekeeper or lab technicians, relationships will fail. If the focus is solely on the patients and ignores the needs of their families, healing will be incomplete. However, when the basic needs of the healers' sense of place are met, support is generated for people to function at their best. This creates an environment in which all are best able to provide nurturing care for patients to support of healing. Human needs are always interrelated.

Healing environments are people places that thrive on the healer's gifts of nurturing and caring. "It is important, even vital to be able to connect with other people and to be

part of life in general; our lives, our health and our destiny are connected with others. The great surprise of human evolution may be that the highest form of selfishness is selflessness" (Sobel 237). As we continue the journey in understanding the nature of healing environments, we will find in them the care and love shown by the healers that consistently make the difference in healing the whole human being.

Comfort

"DWELL COMFORTABLY IN THE MIDST

OF PROFOUND UNCERTAINTY."

~ John Keats

Comfort

*I*N SUPPORT OF THE PHYSICAL FORM, we have a great deal of data, research and evidence, as medicine has traditionally focused on the curative model that treats the physical form. To understand the physical body in relationship to healing environments, we will discuss the overlooked areas—non-medical support. This is where design compliments medical protocol. The science of medicine deals with practical applications, yet the human misery associated with those applications is often ignored.

Today's healthcare focuses on the physical manifestation of our bodies and is delivered in high-tech environments filled with extraordinary equipment. Medical institutions promise new treatments for medical maladies and possible cures for disease. The glamour of new three-dimensional imaging equipment that can see into the human body compels us. Robotic surgery promises to enable the surgeon to work far more accurately than possible with the direct human hand. MRIs are becoming a common diagnostic tool. Lab tests, without a physician ever seeing the patient, are becoming the tool of choice for diagnosing most illnesses. This high-tech approach to healing is growing exponentially; now, more than ever, we need to identify and promote human comfort factors. The medical world has become dependent on technology for most areas of diagnostics, protocol, and cure. Medical technology continues to grow, as electronics and computerization join with the science of medicine to produce new equipment (Blum, 2006).

As exciting as this new equipment is, it has not been able to replace or deliver compassion. Most end-users are terrified, intimidated, and do not understand technology. And despite all of the medical technology, we still get sick, we still have accidents, and we still

die. One of the shortcomings of the technical approach to curing is the "victim belief." The use of this glorious technology fosters in us a belief that our bodies are victims of something: a disease, a germ, or a trauma. As victims, we're freed of all responsibility. The structure of our legal system supports this belief (Pulley, 2007).

The human interrelationship with technology plays a major role in patient safety. Technology automates medical processes, reducing the number of opportunities to make errors. This trust in automation has cultivated the idea that human-delivered care is somehow flawed. In a vicious circle, this belief leads people to use more technology and develop more and more complex systems. With technology intervening between medicine and the caregiver, the patient has become less visible.

Recently, I spent a day and night in an ICU with my mother following major surgery. I noted that the staff were driven to respond first to the equipment, the alarms, and the readings. They came into the room only to reset and chart the readings, often without even looking at my mother's face. Taking the patient's blood pressure, pulse and other vital signs have been delegated to a more reliable and unfeeling machine. The personal touch between the caregiver and the patient has been greatly diminished. Furthermore, the tethers between patient and machine are painful, uncomfortable, restrictive and disempowering. Does this really contribute to patient safety? Are we really addressing the needs of the human body?

How do we address the needs of the human body in a healing and dignified manner? Our human form is diverse in size, gender, age, fragility, and ability. Medicine specifically administers to that body by scrutinizing, examining, cutting it up, drugging it, manipulating it, and injecting it in hopes of fixing it. Humanity has put up with the pain in the hope that medicine will cure. Medical miracles often occur, and our human form endures. How can we administer to the human form, while accommodating the increasing role of technology in medicine? This is an especially important question as the technology markedly improves physician's toolkit.

On way we can administer to the human body concerns designing for diversity. We can recognize that our form comes in many sizes, needs, abilities and complexities. The Americans with Disabilities Act, ADA, has provided and mandated that basic needs of the disabled are met (www.pacer.org.) HIPPA has mandated that basic privacy needs are addressed. Government has begun to require that design address some of our basic physiological needs, but this is just the beginning.

What about the proportion of frail patients? This number continues to grow as the baby boomers age. What about the obese? Their proportions are also growing within the population. Design decisions that we make today will physically affect these diverse populations.

Figure 4-1. The man in a Petri dish illustrates extraordinary promise for new cures while often ignoring the human condition. ILLUSTRATION: Patricia Raimondeau

Obesity has become an epidemic in the United States. It is a complex, multi-factorial chronic disease involving environmental (social and cultural), genetic, physiologic, metabolic, behavioral and psychological components. It is the second leading cause of preventable death in the U.S. (AOA, American Obesity Association www.obesity.org Fact Sheet). Over 30% of adults are considered obese, which is more than 60 million people. Obesity is responsible for $100 billion in healthcare costs and some 300,000 deaths annually, according to the American Obesity Association.

Obesity statistics for children are especially alarming. Childhood obesity is growing at the rate of 20% per year, with about 16% of teenagers being overweight. This is a very serious epidemic and has major impact on the physical accommodations in our medical facilities.

Bariatrics is defined as a branch of medicine dealing with the causes, prevention and treatment of obesity. The definition has been expanded to include a type of person, product or environment intended for the obese person. Obesity is a disease that encompasses a wide range of weights and size. Body Mass Index is a measurement tool to determine excess body weight. This tool defines 'overweight' as 25 BMI; 'obesity' is 30 BMI, and 'severe obesity' is defined as a BMI of 40 or more. This weight ranges roughly 250 pounds to over 1200 pounds (AOA Fact Sheet).

Accommodating patients of these weights and sizes requires assistance, equipment such as lifts, and special training. Basic tasks, such as movement, bathing and toileting also require special assistance. These patients require special furnishing and equipment. Except for facilities that offer gastric surgery as a specialty, few facilities have dedicated units for obese patients. We can learn a great deal from facilities dedicated to providing care and a cure for this disease (Harrell, 2004).

Our client Potomac Hospital, has a gastric surgery specialty. In our challenge to design for the specialty unit, we found that we needed to look beyond the patient unit and bedroom. To understand the issues for this patient population we also needed to follow this patient and their family through the bariatric journey of their entire hospital experience. This patient is not confined to their room and patient unit, but moves freely through admissions, waiting, cafeteria, diagnostics and educational spaces. The entire facility must be able to support bariatrics.

We have found only a limited amount of attractive furnishing that addressed design, weight capacity and ergonomic criteria. I personally find that furniture that looks like it is for the obese, also looks discriminating. Do we place oversize furnishing in one section of waiting rooms, and furnish the remaining in standard furniture? Designing for this population is not just about attractive furniture. Bariatric design must also create a design which addresses the patient experience including hospital gowns, potential embarrassment of special equipment, staff safety, patient safety, durable materials, and providing a normal environment for healing (Gallant, 2006).

As obesity in the United States continues to grow we are finding a demand for mechanical devises to assist in patient handling. There is a direction to move to "a no manual lift" to address staff injuries, as well as patient comfort (Joseph, 2006). This directive is recommending ceiling lifts over floor lifts for their ease of use, patient comfort, patient empowerment, increased mobility, increased continence; improved staff satisfaction enhanced regulatory compliance and patient safety (Joseph).

Guidelines and standards are moving into place for bariatric design much like the development of ADA (American with Disabilities Act). This movement has led to the development of a bariatric line of healthcare furniture and equipment.

The development of such furniture must be sensitive to the human factor, ergonomics and non-stigmatizing. The design of bariatric furniture should look like standard furniture and not call out that this furniture is for the obese. A healthcare facility once asked me, "How much space should be set aside in the cafeteria for the bariatric patient?" Designating one part of a cafeteria for the obese is discriminating and very disempowering to the potential patient.

Ergonomics

Ergonomic design accommodates the relationship between a person and their environment. The ergonomic design considers human anatomy and allows a person to complete the intended task or function without discomfort or injury.

The healthcare environment is full of complex ergonomic issues, and these affect staff, visitors and patients. Patients must be transported and lifted. Goods, carts, and supplies have to be moved. Handles—low and high—must be reached. And work occurs at all heights. These factors contribute to challenging ergonomic conditions, and solving anthropometric issues is not as simple as specifying an ergonomic task chair. How does a healthcare facility address these concerns?

Defining and implementing an ergonomic program solves some of these complex issues. The ergonomic process detects and defines a problem, then modifies the workplace until an ergonomic issue no longer exists. Such a program requires a multi-disciplined approach, including facility engineers, administration and staff. Ergonomic programs can be established in-house but often require the professional assistance of an architect, an interior designer specially trained in ergonomic design, or a trained ergonomic consultant.

Cornell University conducts extensive research in ergonomics, using both qualitative and quantitative methods. The research incorporates social and biological sciences and integrates the humanities and design. Their results form a foundation of evidence-based design of ergonomics. Some of their current projects include "how the design of ambulatory hospital facilities affects patients'" and "the ergonomic medical experience." The studies have looked at a variety of specific departments with reference to the task at hand.

Cornell reports that healthcare's greatest issues concern staff accidents and patient falls. In the acute-care setting, staff accidents resulting in injury came primarily from physical interaction with the patient—transfers in bed, toileting, bath and chairs, dressing, position-

ing feeding and making the bed. In the long-term care setting, accidents were similar, with injuries also accrued from lifting and moving equipment (Menzel, 2004).

The studies suggest that the staff can be trained to more safely use both equipment and care for patients. Mechanical support such as ceiling lifts can also help. However Cornell cautions that this solution requires specific training. Offering a reward system and including random evaluations can help keep an ergonomic program successful. Refer to Cornell University's web sit for further information on the research studies in ergonomics (Nielsen, 2003).

No one really knows what the future of medical technology will reveal. Current trends, however, indicate that advancing technology will continue to play a major role in the delivery of healthcare. For technology to have long-term success, it must be *understandable* to the end-user.

The Evolution of the Medical Environment

Healing did not always take place within complex medical structures with technology and science driving cures. As a people, the study of health in the human body began in China, India, Greece and Egypt as many as 5,000 years ago. These traditional cultures viewed life as an integrated whole, an approach that unified the body as a system of physical, emotional, and spiritual aspects of life.

"These ancient societies believed in a universal life force. In India it is called 'prana,' in Japan 'ki,' and in ancient Greece 'Preuma'" (Monte, p7).

The question these ancient researchers asked was simple: what gives the body, or any part of the body, life? Understanding this life force became the central focus in determining how healing provides the body power to mend its own wounds, overcome disease, and to succeed in the face of difficulty. Conversely, today's medicine relies on drugs and surgery for the treatment of health-related problems.

Various traditional peoples from around the world have applied healing to factors such as diet, herbs, massage, purgatives, and sweats. Fresh air and sunshine are known to aid in the healing of illnesses. The oldest medical book in the world, *The Yellow Emperor's Classic of Internal Medicine*, designates life balance as the key to health and long life. It describes the balance of yin and yang—moderation and balance—in food, drink, rest, and conduct as a means of keeping body united with soul. This insures good health and a long life.

The health practices of Ancient Greece embraced the protection of the life force with moderation. Hypocrites taught us the balance of the four humors of fluids and founded the first school of medicine on the Greek Island of Cos in 460 BC. The school was dedicated

to the scientific understanding of health and the body. His teachings removed superstitions and the belief that illness was a gift or punishment visited upon humanity by the gods. He believed health was a natural and orderly process that could be understood and treated. For a state of health to exist, elements within the body must be in balance. Likewise, illness was considered to be a state of imbalance within the body.

Although Hypocrites was the first to use the scientific approach to medicine, he described medicine as an art, stating, "the healing art is the noblest of all the arts". A few years ago, my husband and I made a pilgrimage to Hypocrites' early Asklepios hospitals. The sites were perched high on the cliffs overlooking spectacular views of the Aegean Sea. Sunshine and fresh air were abundant. The physical place where healing occurred was as important as healing itself. The hospitals included physician therapy areas, therapeutic baths, theaters, gymnasiums, healing gardens, and spiritual sites dedicated to the gods. These Asclipian hospitals were truly a balance between the mind, body, and spirit (Margotta,1996).

Medicine and the medical place later moved into the Dark Ages. In the thousand-year period between 500 and 1500 AD the great medical arts and life's balance of Greece and Rome appeared to be lost. Barbarian invasions and the great plagues of the Middle Ages dominated the era.

Several schools and monasteries, however, were able to keep the ancient medical arts alive. Byzantine physicians in the Eastern Empire, centered in Constantinople, preserved Greek medicine, along with the practice of good hygiene, while leprosy, plagues, and wars scourged Europe. These turbulent times led to the rise of hospitals, which initially were developed by charitable organizations, most notably the Church. These early hospitals were actually sections of a church set aside to accommodate people who otherwise would have died in the streets. People of means had the luxury of dying in their own homes, cared for by family, servants, and physician. These early hospitals did not actually practice medicine but instead provided charitable care to the diseased and dying within a spiritual environment. Almshouses, sick houses, pest homes, and lunatic asylums evolved into our contemporary healthcare facilities (Margotta).

The Physical Environment

In addition to the complex physical structure of building types, the health network—of which the building is just a small part—can overwhelm the patient. We live in a society that emphasizes broader, interactive scopes, with world markets and global communications. Healing environments are often housed in medical buildings built around technological

2838 BC	**2000 BC**	**1553 BC**	**1550**
CHINESE MEDICINE	MESOPOTAMIA	EGYPTIAN	INDIAN MEDICINE
Principles of Yin & Yang	Oldest known medicine	MEDICINE	"Chakra" healing
	Doctors were priest answerable rules		
	for diet & cleanliness to gods		

AD 400	**AD 23**	**460 BC**	**770 BC**
FIRST HOSPITAL	Celsus & Pliny	HIPPOCRATES	HELLENIC
In Western world	Medical encyclopedic	Father of medicine	MEDICINE
	work	Related medicine	Aesclapius cult-god
		to define disease	of medicine

DARK AGES

Epidemics & plagues

AD 1000	**AD 1223**	**AD 1347**
PERSIAN	MEDICAL THOUGHT	PLAQUES
MEDICINE	Foundation of medical	& PANDEMICS
Practice of surgery	universities	The Black Death killed
		a quarter of the population

AD 1600'S

AD 1552	**AD 1535**	**AD 1530'S**	**AD 1453**	**AD 1368**
CHINESE	ART & ANATOMY	EARLY THEORIES	HUMANISM	ACUPUN CJRE
PRESCRIPTION	Da Vinci father of	ON INFECTION	IN MEDICINE	Chinese energy
	anatomy	proposition on the	Diagnosis & treatment	of healing
		spread of disease	based on exam	

GOLDEN AGE
OF SCIENCE
Progress in surgery, anatomy
& philosophy

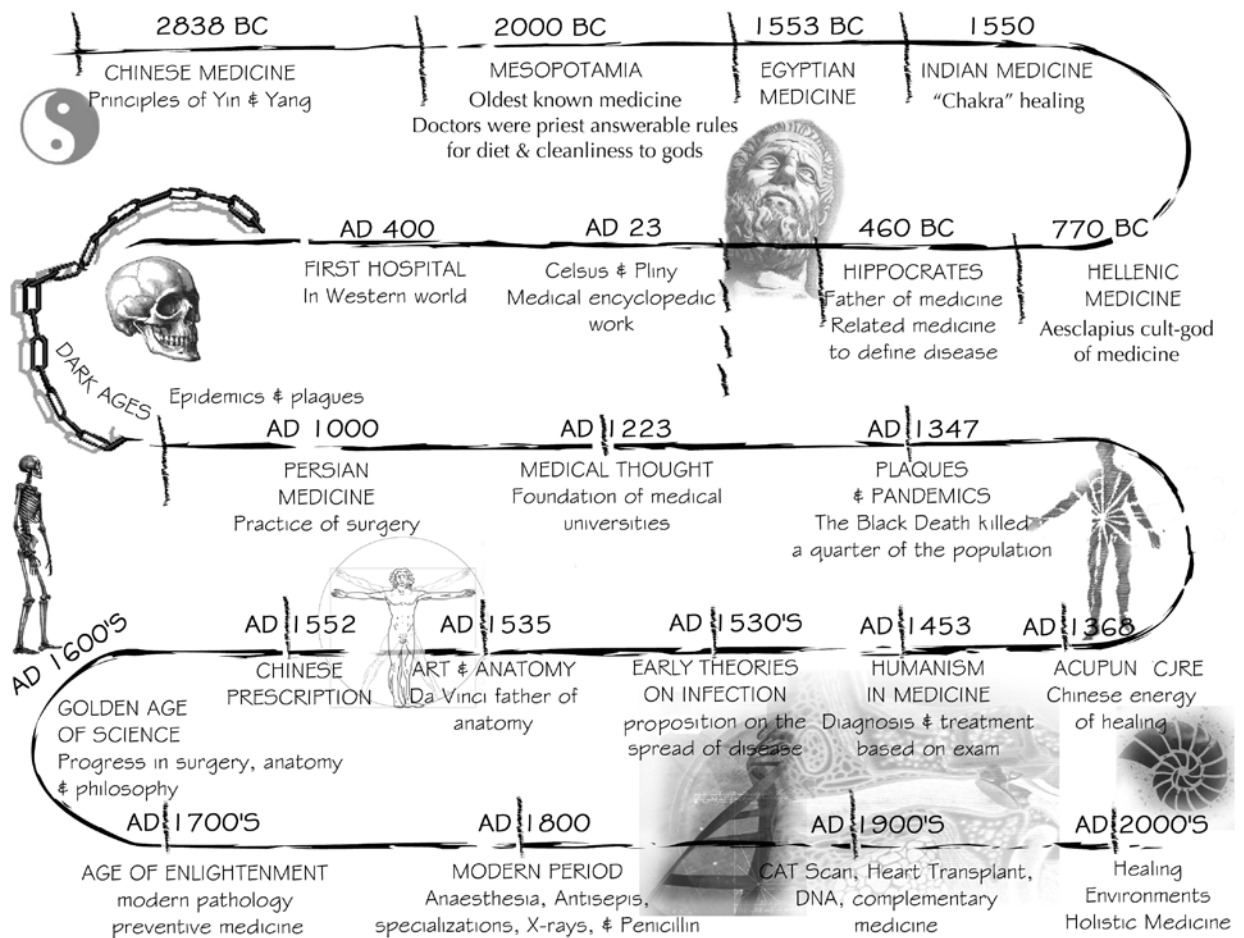|			
AD 1700'S	**AD 1800**	**AD 1900'S**	**AD 2000'S**
AGE OF ENLIGHTENMENT	MODERN PERIOD	CAT Scan, Heart Transplant,	Healing
modern pathology	Anaesthesia, Antisepsis,	DNA, complementary	Environments
preventive medicine	specializations, X-rays, & Penicillin	medicine	Holistic Medicine

Figure 4-2. World view of healing throughout the ages. Today we are beginning to see the convergence of modern medicine with a holistic approach to medicine.   ILLUSTRATION: Patricia Raimondeau

needs. These buildings consist of engineering and operational systems, multiple departments, circulating people, materials, and information.

Many believe designs addressing these complex systems form the entire healthcare-design process. However, the truth might be that addressing these complex systems is so demanding that we find little to do that offers comfort and soothing to the patient, and even the staff.

The nature of these building types, their function, and constraints must be understood before we can look to create healing places.

Hospitals and medical buildings are considered to be the most complex of our built environments. The medical building involves industrial engineering, mechanical engineering, electrical engineering, production engineering, as well as architectural programming,

planning, and equipment consultation. Operational methods, staffing patterns, and management styles are then translated into sensible models, and hopefully, reflect the most efficient system for each facility. Structural systems combine the need for vertical and horizontal space with structure to support loads in an organized construction system to fit functional space requirements. Air-handling systems control temperature, humidity, pressures, and the cleanliness of circulating air. Traditional air-handling systems are designed to suit a variety of special needs within each area of the hospital (Porter, 1982).

We rarely think of building systems as a component of healing environments, but they are. A room that is too noisy, too hot or too cool, or is too dry or too humid can stress the patients, visitors, and staff. In addition, there is mounting evidence that these systems contribute to accidents and hospital-acquired infections. Therefore, design of a healing space must address the following building systems.

Most of these systems should seem invisible, functioning in the background and supporting medical and personal needs, such as electrical power to support lights and respirators. Plumbing should function properly and be there when needed. Hot water should be there when it is needed.

This should go without saying, but when my oldest daughter gave birth, the room in which she spent the night had no hot water in the shower, and this was in a major university hospital. Her friend had used the same hospital to give birth three years previous, and she too had had no hot water for showering or washing. When systems are not invisible they offer stress and physical discomfort.

Other problematic systems include: noisy air handling systems, loud transformers, lighting that can't be adjusted, too few bathrooms, and unsightly air-cooling systems. Cooling towers that block the view from a patient's window or medical gasses that hang ominously over the head of a hospital bed are equally stressful.

A healing environment carefully plans reliable and efficient support for patient well-being. A building's heating and cooling system is one of the most critical areas by which to provide comfort. Our bodies try to maintain an even temperature; warmth can give us pleasure, but too much heat can make us miserable. If the temperature drops, blood is rerouted to protect our vital organs at the expense of our fingers and toes. Body temperature is determined by receptors responsive to the atmosphere and is gauged on change rather than fixed points. The feeling of being hot or cold is relative to where we were before, and therefore, makes patients' control of HVAC important. To be warm, cozy and snug is to feel that all is well with the world. Although we gravitate to sunlight and love to bask in the sun, our brains and bodies like it better when it is cool. Ideally, we are most comfortable in a low ambient heat, approximately 65° F, with good ventilation and localized heat spots. Ambient heat, especially in-floor heating
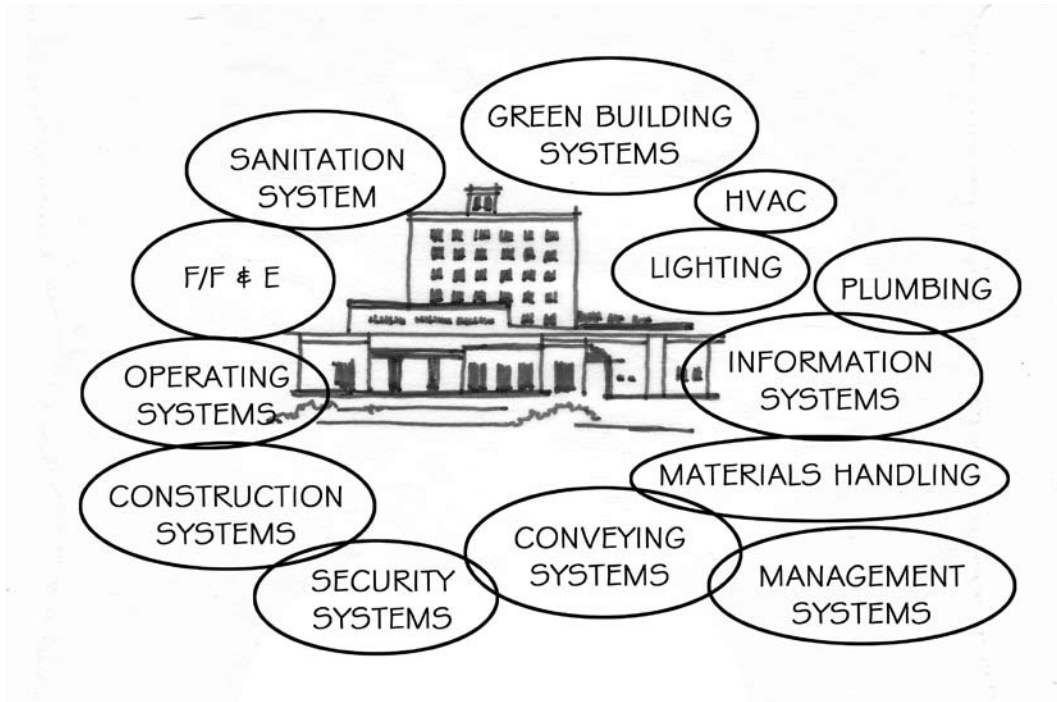
Figure 4-3. Complex medical building required to support medical and personal comfort needs.

ILLUSTRATION: Patricia Raimondeau

is the most desirable. Other forms of central heating tend to deplete moisture from the air; humidity levels of 30%-65% must be maintained for comfort and a healthy building. High humidity encourages growth of microscopic organisms, and low humidity is a core problem of "sick building syndrome". When heat from the outside is uncomfortable, it increases stress and anxiety; it makes us seek coolness to refresh and calm ourselves. However, our air condition environments are often too cold, especially for the elderly or a physically inactive patient (Mitchell, 1994). Localized or individual controls are important. The addition of ceiling fans is effective in keeping air moving especially, in those areas where patients can become overheated or have temperature variations. It has become common practice to add ceiling fans adjustable by patient's themselves in labor and delivery rooms.

Building interiors, often the core of a healing environment, have complex functional issues. They are heavily used, often 24/7, and are subject to spills of bodily fluids, nuclear medicines, harsh cleaning chemicals, medications, as well as food and drink. Material and finishes are key components in providing comfort and delight our senses as described in Chapter 5, 6, 7 & 8. These materials, however, must accomplish far more than providing delight; they must function efficiently under difficult conditions, and support patient safety (Reznikoff 1989).

Equipment is scary; unfamiliar equipment is even scarier, and big, ugly equipment that makes noise and may hurt or reveal bad news is terrifying. But medical equipment is the modern miracle worker of technology. This equipment can reveal the mysteries of the body and provide information unheard of even a few years ago. As Americans, we are fascinated by the marvel of new technologies. We want the latest and greatest promise of the cure for our families and ourselves, yet even with all this technical enchantment, we are still afraid. When equipment is understandable—by design or explanation—it can help ease the fear of being connected to that piece of equipment.

Technicians who carefully explain the function and purpose of a machine, the sounds it may make, and how it will benefit the patient have a wonderful opportunity to contribute in a positive way to the healing process. In more complicated procedures, like a cardiac catheter procedure, it has been shown to be helpful for patients to arrive before their procedure to see and touch the machine and understand the procedure before the equipment is invasively inserted into their body.

The design of the environment that houses the medical equipment can do a great deal in humanizing the space which the patient is using. Every possible design consideration should be given to make these areas understandable and user-friendly. Designing the space is the first line of defense.

Lighting, especially indirect, can soften and de-institutionalize the space; the selective use of color and materials can help disguise the size of equipment. If possible, it should be built-in. This makes it less obvious and less visible to patients. Even partially built-in equipment can help reduce the perceived size and minimize the fearful image that it often conveys. Minor equipment, like its accessories, should be kept totally out of view of the patient; millwork can be nicely designed to house these types of necessary support tools. Keeping wires and cable neatly organized and off the floor and out of view is also helpful. Spaghetti wire sprawled out over counter tops and floors not only looks unsightly, but also leads to apprehension of the quality of the facilities technology.

Windows should be used whenever possible—especially when they can be viewed from the position of the patient while undergoing the treatment or diagnosis. When windows are not possible, other positive distractions like fish aquariums, guided imagery, decorative ceilings or nature. These serve to help patients redirect their focus in a positive way and reduce the stress of the situation.

Equipment and technology must also address the comfort factor. Very little medical equipment has been designed with user comfort in mind. We know from the studies in ergonomics that equipment interface is one of the areas where the most accidents occur, such as reaching, lifting, posturing and moving. We need to ask the questions: Can we get more

accurate readings if the patient is more comfortable? Will fewer errors occur if the technician can read the print screen from where they are working? The design of equipment must move to good ergonomic design with both the patient and technician in mind.

If technology is invasive or painful, assurance and compassion should be incorporated into the procedures. High-tech areas require comforting staff. Patients should be informed as to what the procedure will feel like. Will the bed, board or seat be cold or hard? Will it feel small or tight? Will the machine make noise? If so, what kind of noise will it make? Will it whirl or rumble? Why does it rumble? Will the procedure make the patient feel hot or cold? Will there be an odor? What is the normal sensory expectation of the procedure? The more a patient understands a procedure, the more relaxed and better able to successfully participate in the healing process he or she will be.

Common mammography equipment, for example, is stressful, often painful, and not very user-friendly. During a recent project that included a mammography suite, a technician told me how she sympathizes with women who undergo this procedure. "It's a common procedure, and I've been doing them close to 20 years. But they're always painful and not very dignified, and I won't let anyone give a mammogram unless they've had one themselves."

Equipment not only looks scary, but it feels awful and is often painful. The painful touch of technology ranges from the tape that fastens devices to our skin, to large cold metal forms that we must lie on, sit in or be squeezed by. No one will dispute the need for equipment, but we should question the interface between man and machine. Simple adhesive tape used to connect a breathing tube to a critically ill patient is often the last thing felt and smelled before they leave this world. We witness the pain and discomfort as these patients try to pull attachments from their bodies.

Millions of dollars are spent by the cosmetic industry to create an appealing product, and successfully so—they smell good, look wonderful, and feel sensual on our hands. Children's bandages come in a multitude of colors with scratch and sniff flavors. Why, then, can't our medical adhesives and breathing tubes be developed to have that same kind of appeal?

Aromatherapy, music, art, and comfortable furnishings can physically enhance and humanize the high-tech space of today's medical facilities. Patients form a first impression of the space and the coming event before ever reaching the diagnostic areas with equipment. Often rooms such as liner accelerators, MRI, and other heavily shielded rooms require thick walls to properly shield radiation given off by the equipment, and the pathway into these spaces feels long, isolated, and even tomb-like. The creation of appropriate entrances can minimize this experience. These entrances can be designed to be circuitous or incorporate

"switch backs" to avoid the feeling of going through the depths. Art, accessories, and appropriate lighting can also provide necessary positive distractions.

Ergonomics is a growing field with good research coming from Cornell. However, there is currently little research in the area of comfort and healing. While much can be accomplished through design to enhance high-tech spaces and make them more comfortable, attractive, friendly, and understandable, equipment and machinery are still frightening and non-ergonomic. Industrial design innovations in these areas can make medicine more palatable. With the collaboration of industrial design firms and clinical device manufacturers, a new field of new medical products has been created.

Technology—such as microrobotics, miniaturization, and biosensors—will enable us to gather new levels of information about our bodily systems before they become life threatening. Gene replacement therapy, in which missing or defective genes are replaced and supplied by the administrating physician, may not only be used to treat serious diseases, but they may also lead to prolonging active lifestyles.

To deliver quality healthcare within a healing environment, technology must provide support for the physics of the human body. All people should be able to move freely within their environment; the environment should be flexible and adaptable, comfortably and aesthetically accommodating patients' physical needs and medical functions.

A Healing Vision

A Healing Vision

W E PERCEIVE OUR WORLD THROUGH TASTE, touch, smell, hearing and vision, but eighty percent of our perception occurs through sight, and seventy percent of the physical sensation receptors are found in the eye (Ackerman, p230). This means design professionals who focus on visual impact can design to the most predominant sense, and this chapter discusses how a rethinking of the way we see things can help us create a healing environment. What we see is often an illusion. Illusionists use a disconnect between eye and brain to fool their audiences. Similarly, designers can craft a delightful environment, using magic of their own to create positive distractions.

Vision is far more than the paint on the walls and the color of the carpet on the floors. Vision, and the manipulation of what we see, is a powerful tool by which we can alter our environment and support healing. A MRI, for example, doesn't need to look so scary, a hospital entrance can be made to look welcoming, and an assisted living facility can be arranged to look a lot more like home. These techniques can reduce stress in patients and their families.
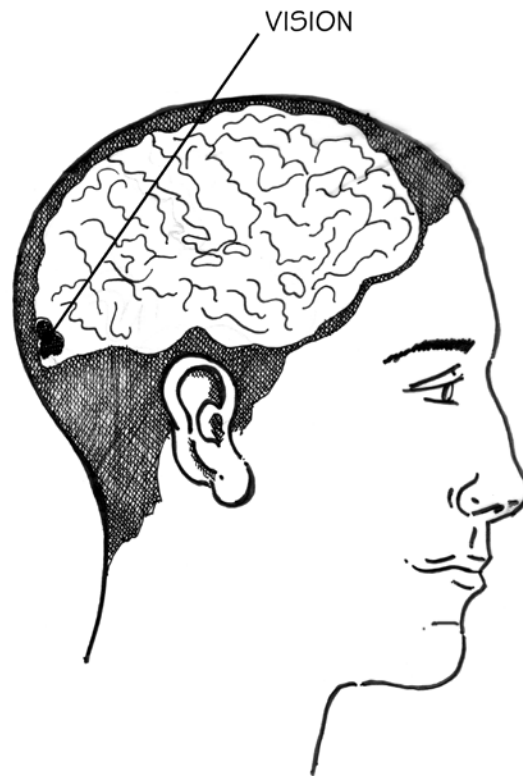
VISION

Figure 5-1. Vision is part of the sensory system which is part of the larger nervous system. The sense of sight consists of the sensory receptor found within the brain's visual cortex which is linked with the neural pathways. (Hubel, 1989) ILLUSTRATION: Patricia Raimondeau

Light and Color

Light and color interact with each other in mysterious ways. That color and light impact mood and behavior is well documented, as anyone with seasonal affective disorder could tell you. The interplay between color and light affects mental health, with balanced light reducing hyperactivity in classrooms and reducing negative behavior in prisons and mental health facilities. Furthermore, at the cellular level, the cell's ability to reproduce is affected by variances in lighting in both plants and animals (Ott, 1973).

However, why color makes such a difference to behavior and physiology is poorly understood. Light can be warm and inviting or harsh and glaring. Just as color can be playful and uplifting, it can also be dull and depressing. Light and colors create attitudes and stimulates our emotions.

How can we responsibly use color in the creation of a healing environment when we don't understand how color and light effect physiology?

The Science of Light and Color

Color and light must be considered together. Color is not merely pigment in paint or the swatch of a textile. Color cannot be discussed in the absence of light since light is required to see color. Light itself is colored, and the very color of light influences how we see color in the environment (Ott, 1973).

The visible spectrum of light is the portion of the electromagnetic spectrum that is visible to the human eye. Wavelengths from 400nm to 700nm make up the visible spectrum, with wavelengths in the low end appearing violet and blue and wavelengths at the high end appearing deep red.

Light sources vary in their wavelengths and create variable colored light. For example, incandescent lighting appears warmer, fluorscent lighting seems bluer, sodium light appears red, and daylight has a large range of yellow to red wavelengths.

We see a range of wavelengths because we typically see reflected light; light falls on an object, and the surface of that object either absorbs or reflects the light wave. For any object to appear to have a color, the wavelengths of the light source must selectively absorb some part of visible spectrum and reflect the remaining light. In this complicated way, light and color from the light source and from the lit object interact to affect the colors we perceive.

Light is energy, and our cells absorb this energy. This impacts our physical and emotional self. The process of seeing color can be explained by describing eye mechanics and the processing of the brain, but science has not been able to explain why color elicits effects on behavior and physiology, creates an emotion, or supports healing (Livigston, 2002).

Evidence for Color and Healing

Little research substantiates how color can be used to support healing, especially in the interior design industry. CHER, the Coalition for Health Environments Research, has done a preliminary literature search of American publications, examining about 3,000 studies. They conclude the following:

1. No direct link exists between color and a medical outcome.
2. Selecting a specific color to induce a particular outcome cannot be substantiated.
3. A particular color cannot be shown to evoke a particular experience.
4. Studies support some connection between color and emotion, but no evidence shows that any particular color evokes a given emotion.

5. Popular press has oversimplified the human response to color with very generalized and prescriptive statements suggesting that a color will have a given response.

6. The study of color in the healthcare setting is complex. No study has been able to isolate the potential response to color from the vast experiential elements found in this particular environment (Brent Tofle, Schwartz, Yoon, Max-Royale, 2004, p7-9).

CHER contends that color plays an important role in the healthcare setting even though it was unable to determine how or why it mattered.

This study was released in 2004, after the first edition of my book. Much of what I had included in that edition was founded on my personal observations. With a careful review of the CHER study and prolonged discussions with one of the CHER authors, I have revised and clarified this section. The new edition discusses what we know about color, what we do not know about color, and how we can take evidence from other areas and apply it to the healthcare environment.

Color Matters

We know that color matters. In the food industry, color helps ascertain if produce and meat are fresh, and color is added to almost all processed foods to make them more appealing. Flour is bleached; juice is made pink; apples are waxed to a high gloss.

Color is taken seriously in retail, print graphics, and marketing. Nearly every magazine photo we see has had its color manipulated. In retail, most large displays have been subjected to color tests, and most display producers understand that color saturation can produce after images and other optical illusions if not properly designed.

People use color symbolically. For example, the Department of Motor Vehicles uses yellow for caution and red to stop. Insurance adjusters tell us that yellow and orange cars are the safest to drive, gray and silver are involved in more accidents, and red cars get the most traffic tickets.

What can we learn from these related fields to help design healing environments?

Retail marketing studies have helped people figure out how to attract shoppers. Can we use the same techniques to attract patients? The restaurant industry has figured out how to make food more appealing through the manipulation of color. Can the same techniques be used to make food more appealing to patients?

We attach meaning to color in three ways. The first is through **nature**. People associate certain natural elements with particular colors. For example, people associate water with

blue tones, plants and vegetation with green, sun with yellow, and fire with red. Most people wouldn't associate water with red or sunlight with green.

The second way we attach meaning to color is through our **culture**. These learned associations are passed down from one generation to the next and may include religious or regional relationships. For example, we find bright colors of Cuban and Caribbean influence in Florida; we find whitewash and muted colors in New England. We find rugged earthtones in the Northwest, and clay colors and teal in the Southwest.

These color schemes evolve from nature. For example, adobe clay and turquoise is native to the Southwest and may have given rise to the popularity of those colors in that region. Local people express their environment in manmade articles through these palettes. They offer local appeal as the palette links to the local natural landscape.

The third way we attach meaning to color is through our **emotional** experience of color. For example, we say we see red when we're angry; we say we're feeling blue when we're depressed. A yellow belly is a coward, and we can feel green with envy.

Natural Response

We have all admired Mother Nature's beautiful color palettes—the beautiful sunrise sparkling on the horizon, the amazing indigos and purples of a sunset, the blaze of autumn in the rich fall sunlight. These shows of color and light delight us, create an emotional response and we look forward to our next encounter. As a designer, I must say, it's hard to compete with Mother Nature. Competition may be impossible, but there is much we can learn from her.

In the animal kingdom, we find the coloration evolved to fulfill a very specific need. Insect exoskeletons blend into sticks and leaves where predators won't see them. Colorful mandrill faces and baboon behinds help attract mates. Contrasting spots on bird beaks tell baby seagulls where to peck to get food from mom and dad. Certain lizards and snakes change color to regulate the body temperature (Benyus, 1997).

How does that tree frog blend so nicely in the forest? The frog blends in by adapting its color of skin to match its environment. It might save bright flashes of red or orange to attract mates or frighten predators. Can we employ the same principle to create distraction of some of the disturbing views we find in healthcare environments?

How does the beautiful peacock attract his mate with his colorful feathers? Actually, the peacock feather has no pigment. Instead, its feather has multiple layers that respond to light through reflection. This makes it four times brighter than pigment. Perhaps we can use some similar effects to attract visitors and patients.

We want to do more than borrow the aesthetics of nature. We want to learn why and how nature creates these effects. Nature knows what works and how to endure. Janine Benyus is credited with starting a new movement called "biomimicry," which is a philosophy inspired by nature (www.biomimicry.net). *See Chapter Eleven, Design with the Natural World, for more on Biomimicry*, (Benyus, 1997).

Cultural Response

Cultural responses to color vary around the world. Colors play important roles in rites of passage, religious icons, and compass directions. A healing response evokes the therapeutic power of color as expressed within the culture. Varying cultures also use nature to attach meaning to ritual as seen in the ancient Chinese culture and the philosophy of Feng Shui.

Feng Shui, the Chinese art of placement, describes color in terms of the components of life: water, plants, fire, earth, and metal. Color is related to the natural component of our world and not an experience, emotion, or color preference. It groups like colors on the color wheel while each element is associated with a specific color that supports life and health.

Familiarly, reds and oranges are associated with the fire element. Greens are associated with the plant or wood element, blues and aquas are associate with the water element, earth tones are associated with the earth element, and finally grays, blacks and reflective tones are associated with the metal element.

Figure 5-2. The Chinese "art of placement" links color to components of life, therefore green is linked with plants, blues with water, earth with browns, red with fire and blacks with minerals.

ILLUSTRATION: Lili Shoulders

The association of color healing is based on the premise that health can only exist where the flow of energy—chi—is balanced. If chi is blocked or stagnant, energy creates stress and illness. The colors used in Feng Shui are a simple way to associate color groups used universally. Across cultures, each color component can be easily identified with an element of nature.
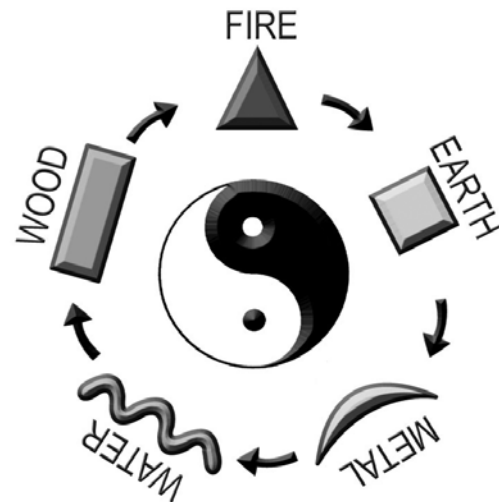
The practice of Feng Shui is considered unscientific in most areas of Western science, even though the practice has withstood many centuries. Despite its straightforward approach, Feng Shui is often tied to religion or occult practices.

In far Eastern cultures, the practice of Feng Shui is considered both an art and a science. It is the art of "intention" and the science of "quantum physics." Feng Shui embraces the conscious placement of an article in a specific location as a means to evoke an event in one's life. This is the "intention." The quantum-physics aspect encourages attention to the details of color as energy in a balance with the movements of energy. Ideally, Feng Shui can support our living environment and protect us emotionally, physically, mentally, and spiritually. Our surroundings can be nurturing and filled with colors and objects that both delight and inspire us (Gerecht, p26).

The Sanskrit culture also employs color in healing. Sanskrit writings describe the body as having a series of seven major energy centers known as charkas (Liberman, p41). Liberman states: "These charkas, located at the sites of major endocrine glands and corresponding to particular states of consciousness and personality types, were each responsive to or ignited by a different color."

In Sanskrit, for example, purple or violet is associated with the crown charka at the top of the head; color therapy associates violet with the brain and the nervous systems; and in

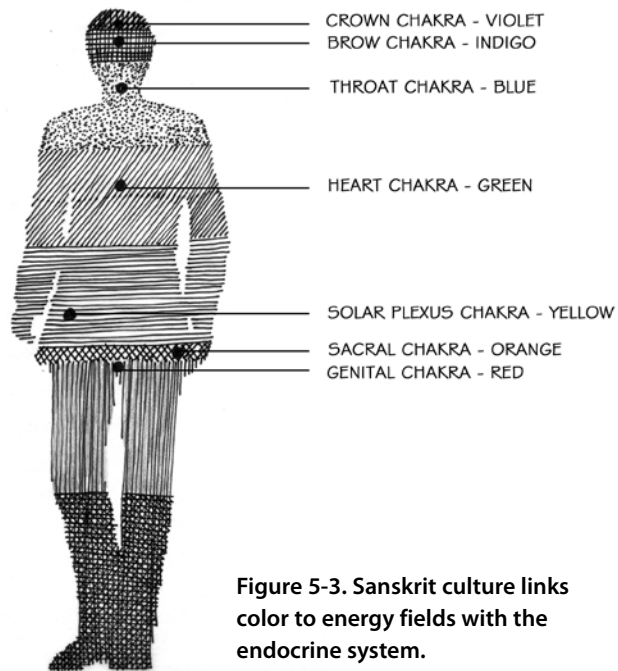**Figure 5-3. Sanskrit culture links color to energy fields with the endocrine system.**

ILLUSTRATION: Patricia Raimondeau

Feng Shui, purples are linked to the water element, which is associated with knowledge (Wright, 2007).

Emotional Response

The emotional response embodies personal attachment, reflecting what we like, the colors we prefer to wear, and the colors with which we surround ourselves. Emotional response may be based on nature, associating an aqua setting feeling to embrace the Caribbean Sea. It may be based on a cultural ritual, such as stained glass window of a country church where

grandma attended. The emotional response may simply reflect the mood we're in that day. For example, I'm feeling down today so I want to surround myself with bright colors.

The emotion of color is very personalized, and even within a particular individual, color preference can fluctuate. Despite this, it is important to remember that the emotional response is just as important as the scientific, cultural and nature associations, even though this factor is more difficult to quantify.

Some basic predictors reflect standardized emotional association to color. However, personal responses rely on the percentage used of the color, patterns used, location and other contributing sensual experiences used with the color. This understanding is called color psychology.

The Frank Mahnke Study conducted in the United States, Europe, Australia, and Japan in 1991-1993 found universal associations with some colors. These colors showed little variance in meaning between cultures. This study found the following emotional links to color:

Love	Red
Hate	Black
Peace/Tranquility	Mid and Light Blue
Mourning/Sorrow	Black
Happy	Yellow
Jovial	Orange/Yellow Orange
Life	Green/Olive
Luminous	Yellow
Noble	Blue

(Mahnke, 1996 p53-58)

Emotion of color can be carefully integrated into the environment through a simple process of establishing the intended color palette to the desired experience of the area. It may be helpful to use some words to help describe the mood of the experience. Developing characteristics for the imaging department that reflect the desired experience might be helpful. For example, if you come up with words such as cheerful, bright, comfortable and soothing, they can be attached to a color scheme. Sometimes I prefer to attach color words to the desired function of the space, such as, cooling water tones to help the patient feel relaxed in the diagnostic area. Regardless, the emotions attached to color are an essential component of the color-planning process.

No single color by itself is bad or good but is dependent on how and where it is used. Individuals will react to color in different ways depending on their own background, culture and emotional state. Some patients on some prescription drugs have a heightened sensitivity to color. Although a medical professional may not specifically practice color therapy, color

will have an impact on that patient. Therefore, color should be employed with knowledge, keeping in mind that colors, light, and patterns can have a stimulating, relaxing, or neutral impact on patients, visitors, and staff.

The following provides an overview of our basic knowledge of color relying on both art and science. Determining the appropriateness of color within the healing environment requires an understanding of this knowledge.

Red

SCIENCE: Reds and similar colors of light have the highest of visible wavelengths, ranging from 625nm–760 nm. Wavelengths higher than these are called infrared and cannot be seen by human eyes, although some infrared frequencies can be felt as heat. Red is an additive primary color of light, complementary to cyan. Red is one of the three primary colors of visible light. Red has the after image of blue or blue/green.

Red is the last color experience by an infant before birth, the first color experienced after birth. Red is also the last color recognized in the aging process (Ackerman, 1990).

NATURE: In the natural world, red is associated with fire and heat.

CULTURE: OSHA uses red to indicate danger and stop. In some cultures, red is also associated with power, passion, and sexuality. Taps for hot water are often labeled red. Red is commonly the color of fire-alarm boxes, fire extinguishers, and the firefighter profession itself. Red denotes "stop" in stop signs, traffic signals, brake lights, and the flashing lights of a school bus. Red is the color of blood. Red indicates extreme danger on Western color-coded scales, such as wildfire hazard signs or the U.S. Homeland Security Advisory System. Emergency exits on passenger aircraft and in general are indicated by red signs and lighting.

EMOTION: Red is a warm tone that is stimulating. Red has been said to raise blood pressure and increase respiration. It has also been said to be stimulating, and a color that expresses anger, passion and danger (Eiseman, 2006).

Orange

SCIENCE: The color orange occurs between red and yellow in the visible spectrum at a wavelength of about 585–620nm. It is a pure chroma in the color theory, with a hue of 30° in HSV color space. The complementary color of orange is azure. With pigments such as paints, the primary colors red, and yellow mixed together produce this secondary color (Ackerman).

NATURE: Like red, orange represents fire, sunrises, sunsets and citrus fruit.

CULTURE: OSHA uses orange to convey caution. The department of motor vehicles also uses orange to convey cautionary messages. Orange is the contrasting color of blue and is highly visible against a clear sky. Therefore, orange is often used in safety.

EMOTION: Orange is a warm color more powerful than either red or yellow. It is associated with energy and thought to have a tonic effect on colds, like the citrus effect of oranges (Eiseman).

Yellow

SCIENCE: Yellow is any color of light that stimulates both the red and green cone cells of the retina, but not the blue cone cells. Light with a wavelength of 565–590 nm appears as yellow, although light with both red frequencies and green frequencies, (such as mixing orange and lime light, or red and green light) also produces yellow. Its scientifically defined complementary color in terms of color mixing using light is blue. Yellow lasers have among the lowest input-to-power efficiency. Intense yellow has been known to fatigue the eyes.

NATURE: Yellow in nature is primarily associated with sunlight.

CULTURE: Yellow is often associated with aging, yellow skin and teeth, aging eyes, urine, and bile. Yellow is sometimes associate with being cowardly. In the English language, yellow has traditionally been associated with jaundice and cowardice. In American slang, a coward is said to be "yellowbellied" or "yellow." In Hindu mythology yellow is thought to have the power to influence the intellect.

EMOTION: Yellow is said to provide a good emotional boost for despondent moods. Yellow is said to aggravate hyperactivity, fear, insomnia, jealousy and aggression. Yellow is a bright, cheerful color, often associated with happiness and peace (Eiseman).

Green

SCIENCE: In hospitals and gardening, green represents nitrogen, which is the largest component of our atmosphere. Green is a color with many different shades, all within a wavelength of roughly 520–570 nm. Green is considered one of the additive primary colors. It is the complement of magenta (Ackerman).

People who are red-green colorblind can often distinguish between the two colors but confuse them with other colors. For example, colorblind people often confuse bright green with yellow and dark green with brown.

The term "green" does not define an exact color unless it is conjunction with some standard or an absolute color space like SRGB.

NATURE: Green is associated with vegetation and nitrogen. Green is seen commonly in nature, especially in plants. Many plants are green mainly because of a complex chemical known as chlorophyll, which is involved in photosynthesis.

CULTURE: Green symbolizes traffic signals, railway signals and ship signals. Fire escape exit signs are green in some countries, but red in others. Green is considered the traditional color of Islam because of its association with nature.

EMOTION: Green has a cooling, soothing, and calming affect both physically and mentally. Green is considered a sedative and helps in sleeplessness, exhaustion, and irritability (Eiseman).

Blue

SCIENCE: Blue corresponds with a wavelength range of about 440–490 nm. Blue is one of the three primary additive colors in the RGB system; blue light has the shortest wavelength range of the three additive primary colors (Ackerman).

NATURE: In nature blue is associated with water and sky, cold and winter.

CULTURE: Blue is associated with the Virgin Mary, heaven, divinity. It is also associated with conservatism and stability, honesty and trustworthiness.

EMOTION: Calming, cooling and refreshing, blue is good for reducing over-excitement. Blue is also said to lead to depression. Blue is good for relaxing and mediation. Blue is the most preferred color. (Eiseman).

Violet

SCIENCE: Purple refers to a wide variety of shades of color occurring between blue and red.

Purple is also used in a more specialized and restricted sense by color scientists to indicate those colors between violet and red, which are not spectral colors but mixtures of red and blue light. Violet includes the colors along what is called the purple boundary (a straight line between violet and red) on the CIE chromaticity diagram (Ackerman).

NATURE: Purple has a special, almost sacred place in nature: lavender, orchid, lilac, and violet flowers are considered precious.

CULTURE: Purple is the color of mourning for widows in Thailand. It has been traditionally associated with royalty in many cultures. Royalty and people of authority or high rank traditionally wore purple robes. The Purple Heart is a U.S. military decoration given to soldiers wounded or killed in any action against an enemy of the United States or as a result of an act of any such enemy.

EMOTION: Purple is associated with the brain health, creativity, inspiration, mental balance, as well as supporting artistry and spirituality. Because purple is derived from the mixing of a strong warm and strong cool color it has both warm and cool properties (Eiseman).

Neutral colors

SCIENCE: Earth tones are defined as various shades of brown, which makes them difficult to scientifically classify as a singular color. The color brown, the base hue of earth tones consists of a dark orange, red or rose, of very low intensity. Some pale orange colors of low saturation are called light browns. These are all considered earth tones.

Brown paint can be produced by adding black or a complementary color to either red or orange paint. As a color of low intensity, brown is a tertiary color in the original technical sense: a mix of the three subtractive primary colors produces brown if the cyan content is low.

Brown exists as a color perception only in the presence of a brighter color contrast. On the other hand, orange, red, or rose objects are still perceived as such if the general illumination level is low, despite reflecting the same amount of red or orange light as a brown object would in normal lighting conditions (Ackerman).

NATURE: Brown is the color of Earth, ground, and rock.

CULTURE: Brown represents safe and secure places. Sometime considered uninteresting, earth tones include browns, beige, and animal tones like fawn, squirrel, and dove. Much as the name implies, earth tones are grounding and supportive, neutralizing the environment. Softer neutrals are more supportive than dark tones like dark brown. Neutral colors stabilize but can also be sluggish (Malrz, 1930).

Black

SCIENCE: Black is the shade of objects that do not reflect light in any part of the visible spectrum.

Scientifically, black is not a hue; a black object absorbs all colors of the visible spectrum and reflects none of them. Sometimes black is described as an "achromatic color."

In practice black is a color; cats and paint can be black. In physics, a black body is a perfect absorber of light, but as shown by Einstein, when heated, black is the best emitter. In elementary science, ultraviolet light is called "black light" because it is unseen (Ackerman).

NATURE: In nature, black represents night and darkness.

CULTURE: Black is sometimes associated with the good vs. bad dualism. In arguments, things can be black-and-white, meaning that the issue at hand is dichotomized. The yin and yang are black and white.

Black can refer to something sad, tragic, or hopeless. For instance, one can have a black day or a black future. Black Tuesday is the name of the stock market crash on October 29, 1929 that started the Great Depression. Black can be used as an adjective describing evil characteristics or forces or something that is wicked or dishonorable. Examples include "black deeds," "a black lie," or this phrase: "his black heart has concocted yet another black deed."

Black frequently symbolizes ambiguity, secrecy, and the unknown. A black box is any device whose internal workings are unknown or inexplicable. (Haralson, christianethicstoday.com.)

EMOTION: Black is darkness at its deepest level. We often seek darkness or shadows to avoid stimulation. We hide in the shadows when pursued or pursuing. Black is also associated with evil, sadness and the mystic. Design and print graphics often use black as sophistication and classic imagery (Eiseman).

White

SCIENCE: White is the presence of all light, and therefore all color. White is lightness at its fullest level, and supplies the full spectrum as reflected light. White reflects light of all parts of the visible spectrum equally. Newton demonstrated that the prism separated colors already present in the light. White light is the effect of combining the visible colors of light in equal proportions. White has high brightness but zero hue. In painting, white can be created by reflecting ambient light from a white pigment (Ackerman).

NATURE: In nature, white represents snow, ice and crystals. In nature, the color white results when transparent fibers, particles, or droplets occur in a transparent matrix of a substantially different refractive index. Examples of classic "white" substances include sugar, foam, pure sand, salt, snow, cotton, clouds, and milk.

CULTURE: White noise, in acoustics, is ambient sound that is often a nuisance. Whiteout is a weather condition in which visibility is reduced. In Chinese and Indian tradition, white is the color of mourning, death, and ghosts. In India, white also stands for peace and purity.

White is the traditional color of bridal dress in both Western and Japanese weddings. In Western weddings, a white dress is thought to be symbolic of purity. White is often associated with Conservatism. White is associated with surrender or truce.

EMOTION: In an emotional sense, white often represents purity, cleanliness, something that is sterile or frosty. Someone who stays calm under pressure is called an ice man or an ice queen. White is often used as the opposite of black. In a black and white argument, black represents the wrong side and white represents the right side (Eiseman).

Healing Color

Color therapy used in traditional medicine is thought to impact healing. A specific colored light generates energy to impact the health of a specific organ. Color therapy was once only used in complimentary medicine, but today it is considered a standard of care for some illnesses. For example, light and color therapy is used for inflammation of the eye and for treating jaundice. As we look at how color has been used throughout the centuries and across cultures, we begin to see some commonality.

Tony Torrice, ASID, an interior designer, studied the impact of colors on health, especially its affect on children, and he won the 1985 Human Environment award from the American Society of Interior Designers for his life's work. His design practice focused on children's healthcare facilities, day care and schools.

In his book, *In My Room* (p31-49) he says: "I'm convinced that color plays a vital role in our well-being and overall health." In his research, he devised a color game that encouraged children to have a say in the coloring of their own environments. His instructions to the children included the following:

Using the six rainbow-colored cards, fan them out in the order they appear in the spectrum—red, orange, yellow green, blue and violet. Lay them flat on the table or on the floor side by side as you prepare to engage your child. You ask the child which one he or she would like to keep.

He goes on to explain:

"That's the first color question you pose, making sure not to prejudice a selection by suggesting there might be a correct answer. As my research has explored time and time again, the colors children pick spontaneously as their preference corresponds to a physical part of the anatomy that may be developing a deficiency or requires support in a skill particular to that area. A boy learning a second language is apt to choose green, the same color the boy with a speech problem might choose. Clearly, both conditions deal with vocal skills."

I have often been asked, what constitutes a healing color? How is a healing color palette defined? Can a color heal? And what is the evidence? The most frequently asked question in my seminars deal with the healing attributes of color. Manufacturers have asked similar questions so that they can produce materials appropriate to the healthcare market.

There is no straightforward answer to these questions. Often a misused tool, color selections can be influenced by fashion trends that have nothing to do with healing. Such choices can often aggravate medical conditions. The industry and the design community are searching for the prescriptive directive to create healing colors.

While we know there is no "bad" color or right color, palettes can be counterproductive within healing environments; but they can also support healing. Designers can achieve a healing environment with color.

To use color to heal, it is very important to remember that color is an experience, not a chip from a box or paint can. The experience rather than the material creates the healing. Even in the case where one paint color is used throughout the room, that color will have thousands of variations as it falls away from light and is reflected by other elements of the room. We must consider color in transition with expected movement.

We must keep in mind what we know about the science of color and the differences between science, culture and emotion. We must use that knowledge to support the desired experiential function of the area.

There are mistakes in color for healthcare. Color has reflective qualities and can reflect on skin tones, which can contribute to misdiagnosis. Color plays tricks, as optical illusions demonstrate. I experienced this first hand with a carpet I specified. Using a carpet design that could be custom colored, I changed components of the carpet to work within my color palette. Specifically, I changed one small component to be a dark red. This red color created a visual movement in a diagonal direction that could not be detected until one walked down the corridor. This movement created a vertigo experience for some medicated patients, and the carpet had to be immediately removed.

Boring, bland palettes are thought to be safe. Yet these palettes are one of the biggest contributors to the "institutional look". Monochromatic palettes, regardless of the specific color utilized, can actually be harmful—especially if that singular color is used with intensity or used in an inappropriate area for the function of the space.

I personally find turning to the healthful aspects of nature to be extremely helpful in developing healing-color palettes. I find full spectrum color palettes, like full-spectrum lighting, are the most harmonious for healthcare environments. A full-spectrum palette balances hues, tones, and tints of all six colors: red, orange, yellow, green, indigo and violet. Using a full-spectrum palette does not mean all areas are the same color with each wall painted a different color, but that all of the colors are used, even in small percentages.

This is an important component of my color planning process. I have developed my own personal photo library of beautiful outdoor environments. These show natural color palettes of extraordinary color combinations. I present these images to the client, and we discuss the experience of these different places. Looking to nature for her magical secrets of color has never ceased to amaze me, and this technique has always rewarded my effort.

I find color planning serious work. It is a process by which a color palette is developed to support a specific function with a particular desired effect. For example, I prefer to describe a blue palette as a water palette, using a simple, fresh watery blue with soft accents of sand

and colorful fish. In this way, I start to define the experience, and this will help determine the amount of each color and where the colors might be located. I avoid icy schemes, however, we should not be afraid to use icy colors and distribute those colors carefully with warmer colors.

Color schemes can be enhanced with touches of the hue's compliment, such as orange (blue's complementary color), perhaps in fabric for the cubical drapery. Looking back at the photograph of the nature scene, one can start to see many extraordinary color combinations, color adjacencies and proportions. Accordingly, adding hints of red, yellow, and terra cotta colors in plastic laminate, upholstery and art will bring instant heat into the blue scheme.
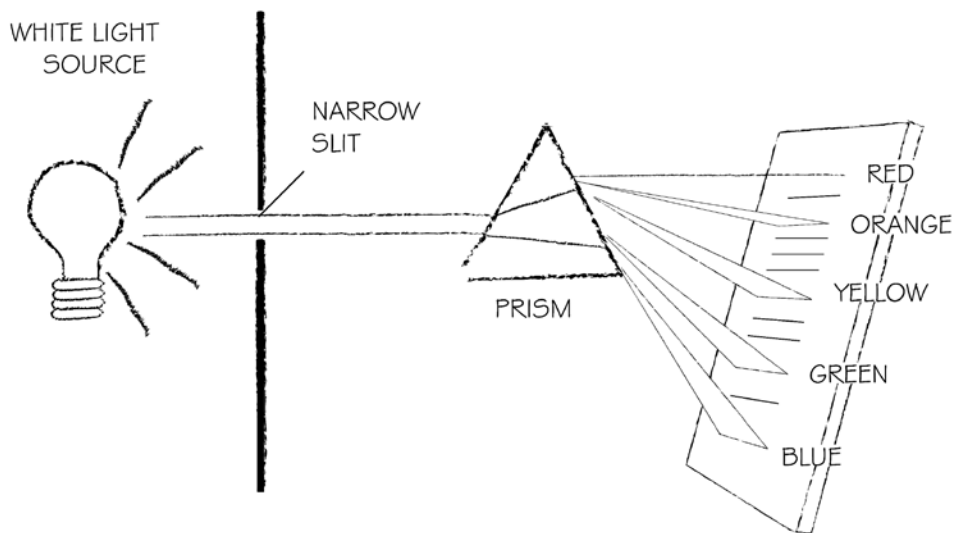
Figure 5-4. White light passes through a prism and breaks the light into spectral components of color.

ILLUSTRATION: Patricia Raimondeau

Even neutral palettes can achieve full-spectrum harmony, using soft neutrals as background with small amounts of color accents ranging from blues to reds represented in art, upholstery, plants, or other accessories. If the color palette does not support the desired experience, the area will not support healing (Pile, 1997).

Vision has long been associated with knowledge. "Seeing is believing." "Vision is enlightenment." If we can see clearly, we are not afraid. Similarly, the feeling of being "in the dark" is associated with fear and the unknown. Our visual sense is so much greater than what we see in front of us, and creating healing environments should address the greater aspects of vision. Vision can support the feeling of empowerment with a critical component in healing. The feeling of being empowered provides hope to cope with illness. *See Chapter Ten for more on Empowerment.*

Therapeutic Touch

"A CHILD'S HAND IN YOURS...

WHAT TENDERNESS AND POWER

IT AROUSES. YOU ARE INSTANTLY

THE VERY TOUCHSTONE OF

WISDOM AND STRENGTH."

~ Marjorie Holms

Therapeutic Touch

OUR CONTEXTUAL ENVIRONMENTS ARE rich and diverse—from the pathways under our feet to the breezes that blow across our face. These elements touch us in more ways than the physical sense. Touch is essential to our health. Touch alerts us to danger, such as a hot fire or sharp object, and it helps us nourish ourselves, find mates, and procreate. We communicate through touch: handshakes, a pat on the back, or a tender kiss. Touch is the first sense that develops after we are born. In the dark, when our sense of sight is dimmed, we rely on our sense of touch to help us navigate. In the dark, our sense of touch is heightened, and we become acutely aware of the ground beneath our feet. Our eyes often trick us; an object may look cool, but touching it tells us it is hot. An icy sidewalk may look dry, but touching it with our foot signals danger.

Our sense of touch rarely makes mistakes. It provides a sense of empathy, intimacy and affection. Touch connects us to life; our body is one big touch receptor. There are touch receptors in nerve endings all over our body, from our hair to our toes. Our first reaction to new stimulation is strong and then decreases unless the stimulus is repeated (Crawford, p66-67).
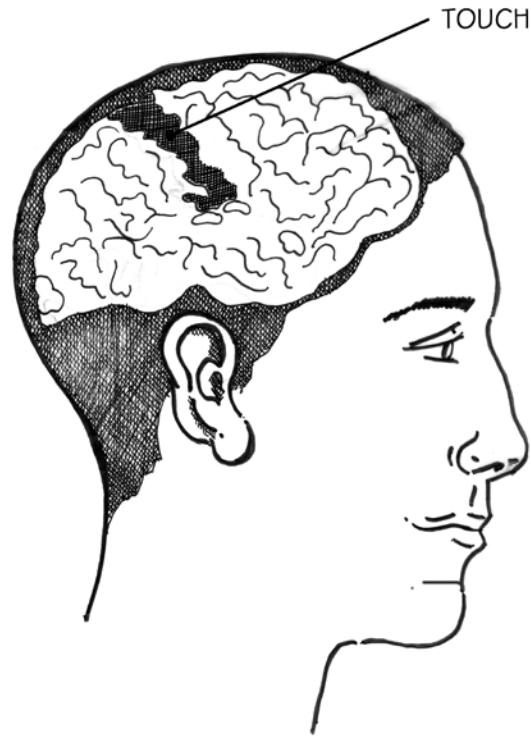
Figure 6-1. The somatosensory system includes ascending pathways from the body to the gyrus in the cerebral cortex. This is the region where the receptor for the "sense of touch" is located. Neurons link touch receptors to various parts of the body. ILLUSTRATION: Patricia Raimondeau

The Evidence

Being touched and cuddled is essential for healthy human development. A study of ten orphanages in 1915 found that all but one child under the age of two died from unknown reasons. Nutrition and sanitation were found to be adequate, but because a fear of infectious diseases led to a "no-touch" policy, infants were seldom touched or handled—and many died (Sobel, p42).

This observation led to a major change in the treatment of children in orphanages. All babies were picked up, touched and gently mothered several times a day, and the death rate decreased to less than ten percent.

We know that premature infants thrive on touch; touch offers comfort, encourages weight gain, and reduces medical costs. Babies who are massaged do better and are sent home earlier those who are not (Montagu 1986). Touch therapy has long been in use for preterm babies. The more infants are touched, the higher the survival rate (Pediatrics, 1986).

Infant touch is also important for the baby's parents, and helps support mother-infant bonding. Touching has health benefits for the mother, improving the immune system (Reite 1984).

Touch is not only important for infants, but adults as well. There are numerous examples in the hospital setting, such as the emergency departments, intensive and cardiac care units where touch has made the difference between life and death. Patients find touching, especially a light stroking of the arms, relaxing and pleasurable. A loving touch from another slows the heart. The benefit of touch for patients is described in J. Lynch's book *The Broken Heart: The Medical Consequence of Loneliness* (Lynch, 1979).

In research at McGill University, baby rats that were handled on a regular basis were better able to handle stress throughout their life. It resulted in fewer damaged brain cells. In the rats' later life, they were able to handle complex memory problems three times faster than non-handled rats (Meanery, Aitken, Van Berkel, Bhatnagar and Sapolsky, 1988).

For the past number of years, I met annually with a group of medical dignitaries from the University of Kaohsiung Medical University, Taiwan to discuss current trends in healthcare design. They recently shared with me that they use massage before every surgical procedure. Surprised, I asked why and how they were able to implement such action. They said it was simple—massage before surgery provided better outcomes than surgery without massage.

Tactile sensations are important ways of calming the mind. When planning healthcare environments, we must specify elements for the way they feel, rather than simply for the way that they look. Textures are touches that can cause pain or reduce stress. A beautiful stone floor may be difficult to navigate in a walker or wheelchair, and it may cause excruciating pain for a patient on a stretcher. Vinyl upholstery may seem ideal for cleaning, but vinyl is hot and sticky to a person sitting in the same position for a long period of time.

Massage therapy satisfies our basic human need for nurturing. Healthcare environments are full of curing and caring. Curing is often associated with painful pricking with needles, pushing and prodding on tender bodies and uncomfortable touch treatments. But caring can include therapeutic touch with the uncomfortable treatments. Once thought of as a luxury, massage and therapeutic touch are becoming a necessity.

Massage therapists use their hands as finely tuned yet powerful tools to promote health and wellbeing. The origins of therapeutic massage are based on the common instinctual response to hold and rub a hurt or pain. It is found in all cultures as an integral part of health care and preventive medicine. Hippocrates, the father of Western medicine, considered massage of prime importance in any health regime. Galen and the Romans also greatly prized the healing benefits of massage. With the re-emergence of holistic health theories and

therapies, therapeutic massage is experiencing a renaissance and is regaining its rightful place among health care practitioners.

Studies have shown that massage can ease pre and postoperative pain, relieve aching muscles, improve range of motion, increase blood circulation and lymph flow, and even reduce blood pressure and heart rate. In fact, many health insurance plans now cover prescribed massage therapy.

The following represent a sampling of evidence-based benefits of massage therapy:

❖ Preliminary results suggested cancer patients had less pain and anxiety after receiving therapeutic massage at the James Cancer Hospital and Research Institute in Columbus Ohio.

❖ Women who had experienced a recent death of a child were less depressed after receiving therapeutic massage (Research Study, University of South Carolina).

❖ Studies funded by the National Institutes of Health (NIH) found massage beneficial in improving weight gain in HIV-exposed infants and facilitating recovery in patients who underwent abdominal surgery.

❖ At the University of Miami School of Medicine's Touch Research Institute, researchers found massage helpful in decreasing blood pressure in people with hypertension, alleviating pain in migraine sufferers, and improving alertness and performance in office workers.

❖ Although therapeutic massage does not increase muscle strength, it can stimulate weak, inactive muscles and, thus, partially compensate for the lack of exercise and inactivity resulting from illness or injury. It also can hasten and lead to a more complete recovery from exercise or injury (American Massage Therapy Association).

Therapeutic touch is a scientific laying on of hands. Dr. Delores Krieger, professor at the Department of Nursing, New York University, has conducted numerous experiments and found changes in vital signs, blood chemistry and in physical outcomes. Research on therapeutic touch supports the practice that touch acts as stabilizing and relaxing techniques that aids in achieving physiological homeostasis (Macrae, 1993).

As humans, we like creature comforts: soft fabrics, blankets, and cushy pillows. Comfort is the thing we touch, the quality of the air we breathe, things that touch us, the textures under our feet, furniture that supports our bodies, the ambience in which we relax and heal. We like to feel warm when things are cold and cool when things are warm. Air movement and temperature control are critical elements of touch and comfort.

People, like many animals, have strong nesting instincts, a rich desire to find a friendly place and security, especially when we don't feel well. A bed is our natural nest and the perfect place to recuperate and regenerate. When overworked and tired, we seek our beds to give us pleasure. We share our beds in the most intimate ways—with a lover, or cuddling a baby, or rocking them in their own cradles with love. We hide from the boogieman under the covers, and whisper secrets to our best friend. We crave the ultimate luxury of breakfast in bed, or sleeping until noon. A bed is our own individual healing place; we spend one third of our lives in bed.

I remember from my own childhood the pleasure of jumping in bed with my grandmother on Saturday mornings, and the wonderful bedside stories my mother would read. Long after I could read the stories myself, I lingered at the bedside while my mother read the same stories to my younger brothers. The mechanical hospital bed, however, seldom provides this nesting respite. It is one of the most difficult places of transition when a person is hospitalized, institutionalized, or goes into a nursing home, or assisted living facility.

Hillrom, a major manufacturer of hospital beds, does a good job of integrating patient controls into the bed. These beds have nurse call buttons to summon assistance, radio and television controls, lighting controls, and we have even added overhead fan controls to these beds. There are also numerous controls to raise, lower and adjust the bed to many angles for the comfort of the patient and convenience of the staff. A companion over-the-bed table on wheels allows a bedside place for eating, writing and reading.

The modern hospital bed does so many things, but it doesn't allow for snuggling or cuddling with your loved ones. It isn't soft, warm or cozy. Even with wood headboards, they look and feel institutional.

Sue Baier, the author of *Bed Number Ten*, spent more than 18 months in a hospital bed and four months in an intensive care bed as she battled Gullain-Barre Syndrome, a paralyzing disease that left her mind alert. She passionately describes the entrapment of the hospital bed and how handholding became painful for her and her husband, as visitor chairs and hospital beds are just not compatible ergonomically.

Bed designers should consider human ergonomics in design, such the offering of a double bed, the availability of memory foam, or adjustable density levels, comfort foam side bars, more residential in styling, and especially bed side rails that were compatible with visitor chairs.

I painfully recall visiting my grandmother two weeks after she was admitted to a nursing home. She couldn't figure out the sleeping arrangements. Why was this stranger sleeping in her bedroom? Where was her husband's bed, and what would they ever do about sex? The bed was too small, she hadn't slept in a single bed in years, and she hated the pillow.

The next day I brought her feather pillows that she'd received years before as a wedding present. She hugged them to her face and sobbed. We can make it better, even in small ways.

Animals as Healers

Animals can also positively contribute to the sense of touch. Animals provide unconditional love. They don't care if we have a bad hair day, are a few pounds overweight, or live in a poor neighborhood. They just want you, your company and an occasional pat on the head or kind words. Animals are now found working in healthcare spreading their love.

Research has shown that heart-attack victims who have pets live longer. Even watching a tank full of tropical fish may lower blood pressure, at least temporarily. A study of 92 patients hospitalized in coronary care units for angina or heart attack found that those who owned pets were more likely to be alive a year later than those who did not. The study found that only six percent of patients who owned pets died within one year compared with 28 percent of those who did not own pets (Sobel, 1997).

The therapeutic use of pets as companions has gained increasing attention in recent years for a wide variety of patients: people with AIDS or cancer, the elderly, and the mentally ill. Unlike people, with whom our interactions may be quite complex and unpredictable, animals provide a constant source of comfort and focus for attention. Animals bring out our nurturing instinct. They also make us feel safe and unconditionally accepted. We can just be ourselves around our pets.

Numerous studies indicate how beneficial animals are to health. For example, a research team assigned a dog or cat for stockbrokers with high blood pressure, and soon the study participants became very attached to their pets. The pet-owning stockbrokers had lower blood pressure at the end of the study than did the stockbrokers on medication only. While the authors of this study acknowledge that medication can lower blood pressure, they note medication cannot reduce stress. This implies that pets can (Friedman, 1983, Anderson 1992).

Other correlations exist. For example, pet owners have lower triglycerides and cholesterol levels than non-owners (Anderson, 1992), pets decrease feelings of loneliness and isolation (Kidd, 1994), and seniors that own dogs go to the doctor less than those that don't (Siegel 1990). Also, pet owners have fewer minor health problems (Friedmann, 1990, Serpel, 1990), and medication costs dropped from an average of $3.80 per patient per day to just $1.18 per patient per day in new nursing home facilities in New York, Missouri and Texas that have animals and plants as an integral part of the environment. (Montague, 1995).

The Gift of Touch

Handholding is one "gift of touch" family members and loved ones can provide to patients. A friend, explaining how her brother held her hand the entire night preceding cancer surgery, attributes the success of her surgery to the feeling of energy she received from him. Another friend described holding her dying father's hand for three day in an intensive care unit—this was all she could do for him, and her love for him would not allow her to let go of his hand or leave his side.

Hospitals don't make giving this gift easy. As my friend held her father's hand, she received painful backaches from the uncomfortable visitor chair and blisters on her wrist from rubbing against her father's bed rails.

Hospital beds for infants and small children are far from comforting or cozy. Only recently, I shared photos of an existing pediatrics project we were just starting with a young designer who was aghast at the sight of the metal-slatted cribs.

"What are those cages doing on the unit," she asked.

I explained that they weren't cages, but actually cribs. Parents have similar feelings seeing their children housed in these cage-like furnishings. Family can often bring a favorite pillow, or a blanket or other comforts from home, but we, as designers, must work with furniture manufacturers to design better and more appropriate products.

We must pursue the concept that furniture can provide the touch of comfort. Furniture can be slept on, curled up on, played on, snuggled on, lived on, and truly offer a comfort zone. We need to provide comfortable seating for patients, friends, children, parents or spouse, especially in times of greatest need. Seating should be thoroughly welcoming in waiting rooms, day rooms, consultation rooms, and grieving rooms. This is especially true for the most stressful places, like emergency and surgical waiting areas.

In our practice, we routinely add a few oversized chairs for obese visitors, and find that they are routinely the first to be taken. They tend to look more comfortable; especially when compared to those chairs all ganged in a row, with common arms in between them.

Ergonomic task chairs have become standard within office workplaces. Designed with adjustable arms, special tilts, and posturing mechanism they improve the comfort and health of office workers. There are, however, few good—and many questionable chairs—that make their way to hospital bedsides and other areas of healthcare facilities. Senior facilities and hospitals struggle to find the right chair for populations ranging from large, obese males to a small, fragile woman weighing less than a hundred pounds. Creative options available to commercial populations are just not available to the healthcare patients. *See Chapter 4, Comfort.*

Our sense of touch is acute and thrives in a variety of finish materials. We should think of surfaces that thrill our senses, from our fingers to our toes. Typical healthcare environments are full of synthetic materials, which are often necessary. We need to identify ways to blend materials that address function and maintenance requirements with what we find beautiful to touch. We should pay close attention to where we place our hands, and strive to have pleasant surfaces here. For example, check-in/check-out areas should be constructed of nice-to-touch materials like wood, stone, or even a Corian surface. Within in the healthcare environment, these areas are small, yet they can provide a welcoming impression and can still be easily maintained for many years. Chair arms, countertops, and over-bed-table tops are furnishings that should be considered important when we design with sensitivity of touch in mind.

In addition to surface materials, fabrics can also add a gentle touch within healthcare environments. Window and cubical draperies, as well as bedspreads, provide tactile vibrancy, and are often a welcoming relief from typical institutional room dressings. Window draperies, instead of mini-binds, for example, add softness and warmth to a room—for both mind and hand.

If mini-blinds are required, drapery can be still be added to soften the area. Walls can also provide a rich textural experience; wood walls provide warmth, and stone can offer sensations of smooth coolness and relaxation; they can also provide a sense of solidity without being cold or hard. Glass walls should be avoided, as they feel cold, sharp, and even unfriendly. Glass, however, is a good alternative when the view is important or pleasant.

Our sense of touch is not just for our fingers and our hands. We have thousands of nerve endings in our feet, so what lies underfoot has a profound impact on our perception of our environment. Hard surfaces, such as stone, ceramic tile and marble, feel solid and secure; if these surfaces are highly polished, however, they can look and feel slippery and become dangerous. Wood feels warm. Carpet feels pleasant and comfortable underfoot.

A bath is also a touch sensation. In the name of cleanliness, the bathroom has become sensually neutral, if not hostile. Hard, synthetic surfaces with cold chrome grab bars have become industry standard for obvious hygienic reasons, but bathrooms also offer opportunity to sooth the mind and body (Lupton, 2002).

Large absorbent towels can massage our skin. Shower curtains can add color and texture to the room. Conversely, a constantly dripping faucet can become the source of mental torture, especially to those who are confined to bed. Whenever possible, fixtures, faucets, towel bars, and hardware should not feel or look institutional. Grab bars are available in colors and materials other than stainless steel. The addition of hand-held showers not only

meets the needs of handicap patients, but can also provide a wonderful shower that pulses energetically at an even temperature.

The bathroom floor is the primary source of texture to the bathroom. Shinny, high-glazed floors can look slippery and cause anxiety. Ceramic tile is by far the best material available, but care should be taken to detail.

For example, close grout lines without deep recesses so the floor is not difficult to navigate in a wheel chair, walker, or when pulling an IV cart. Thresholds between floor materials can also become a source of difficulty for patients who tend to shuffle their feet rather than picking them up in a normal step. Even thresholds at nearly level heights feel are difficult for surgical patients pulling or pushing an IV cart. It is essential to consider this in our planning stages.

It is also important to remember that our sense of touch detects temperature. Most people seek warmth: the warmth of a fire, the sun rays through a window, and especially the sun on a beach. We are drawn to warm climates, hot tubs, saunas, steam baths and solariums. We are now finding that sunbathers can actually get addicted to the "sauna-bather high." The chemicals released in the brain relieve pain, produce endorphins and create euphoria. The exposure is also linked to an increase of serotonin, which is the hormone associated with relaxation and sleep (Sobel, p46-48). Knowing this can help us create a healing environment.

A fire provides the touch of warmth, and we feel drawn to gather around it, raising our spirits and making us glow. Real fireplaces, however, are rare in healthcare facilities, but they are gaining in popularity and are always worth the effort. They are now standard in dining rooms of all Sunrise Assisted Living facilities.

We have recently designed one on the inpatient floor of the Women's Center at Rockingham Memorial Hospital, in Harrisonburg, Virginia. Women of the community had outpatient services located in a charming old home until the necessity of added technologies dictated their relocation into the hospital building.

In the special dementia-care facilities, designed especially for Alzheimer's residents in MeadowView, we put fireplaces in each neighborhood livingroom. These fireplaces have electric logs with artificial flames, but they incorporate the crackling sound of real wood. These are especially delightful. The women loved the charm of their old place, especially the fireplaces that were in nearly every room, so in designing the new facility we decided to incorporate the beloved icon of their "hearth" as the focal point of their new center. To these women, the hearth was the essence of womanhood as nurturing caregiver.

Proofreader's notation:
If this refers to Rockingham, it should come before the sentence on MeadowView.

My Question:
How do you want me to handle this? Please Advise

Consider the following questions when looking for ways to support therapeutic touch through design:

✔ Are the heating and cooling systems comfortable, and can the patient control them himself or herself?

✔ Are finishes and furnishings comfortable to the touch?

✔ Do beds provide adequately for patient comfort?

✔ Are flooring surfaces, transitions, and thresholds appropriate, or will they become obstructions for patients dragging IV stands into their bathrooms and hallways?

✔ Can the touching of pets be incorporated?

✔ Can anything be done to make the touch of equipment more comfortable?

✔ Can visitors easily hold a patient's hand?

✔ Is the seating ergonomic, and does it allow for the population diversity of patient weight and size?

✔ Is lighting conducive to massage therapy?

✔ Is the environment conducive to therapeutic touch?

Touch is the most basic means of experiencing our environment, and therefore it is the most immediate way of understanding the nature of things that surround us. The purposeful use of textures, furnishings, materials, water, temperature, and air helps communicate and satisfy our human experience.

Healing Sound

"ALL SOUNDS OF THE EARTH ARE LIKE MUSIC"

~ Oscar Hammerstein

Healing Sound

CONSIDER THE FOLLOWING:

You are sitting in a darkened room. At moments you feel intense, spine-tingling thrills that begin at your neck and radiate over your head and down to your toes. You actually shiver with pleasure and get goose bumps. You may even weep. What could possibly be the source of such delicious sensations? Fabulous sex? A well-wrought movie? A glorious painting? The birth of a great idea?

Music

Dr. David Sobel describes the power of music based on the results of a Stanford University study that documented respondents listening to music:

Music can be intense as well as healthy pleasure. One survey showed that some of us find music more thrilling than anything else, including sex. And at least part of the thrill of music may come from the release of endorphins, the powerful opiate-like chemicals produced in the brain that relieve pain and induce euphoria (Sobel, p58-59).

Dr. Sobel goes on to further describe that we have built-in responses to certain tones and tempos. Interestingly, the human heartbeat ranges between 72 and 80 beats per minute; likewise, most Western music is set to this tempo. He explains how studies have shown that heart rate actually synchronizes with music and alters the brain's electrical rhythms. Music impacts our respiratory rate, blood pressure, stomach contractions, and levels of stress hormones. Muscles flex and extend when set to rhythms, which can increase your endurance and regulate breathing in exercise.
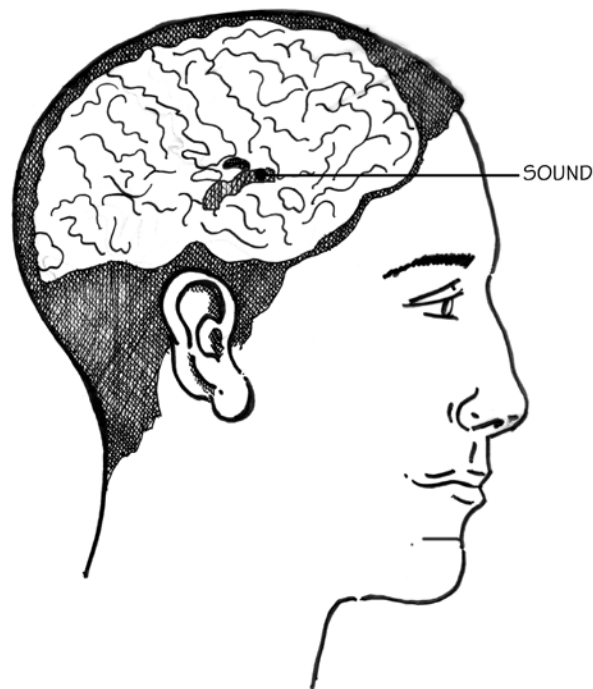
Figure 7-1. The primary auditory cortex is the region of the brain which is responsible for processing the sense of sound. Neurons are organized according to the frequency of sounds to which they respond best. (Zatorre, 2005)   ILLUSTRATION: Patricia Raimondeau

Happy and upbeat music can motivate our exercise workouts. Each of us reacts differently to music, but the common attraction is that music has the power to distract us from less pleasant thoughts and feelings.

According to Sobel (p60), "When music is played for patients before, during, and after surgery, it has been found to reduce anxiety, lessen pain, and reduce need for pre- and post-operative medication, and speed recovery."

Dr. Sobel estimates music has an effect comparable to that of an intravenous dose of 2.5 milligrams of Valium on patients.

Florence Nightingale, in her *Notes on Nursing*, says, "Noise…that which creates expectation…causes the damage in the patient. Unnecessary noise then is the cruelest absence of care."

Surrounding noises and vibrations seriously affect our sense of hearing, and sound vibrations are very powerful as they create resonance, which can alter physical matter.

From ancient times, music and sounds have been used in healing therapies. Tribal dances, drumbeats, and religious chants have ceremoniously been employed to induce healing;

today, many surgeons pop a favorite CD into the sound system to reduce stress during surgical procedures. Sometimes, patients are even consulted as to the type of music they prefer.

We are comfortable in a landscape of familiar sounds, but if we are alone at night we often discover sounds we are unaware of in the daytime. Sleeping in unfamiliar places, especially hospitals with all of their unfamiliar sounds, can feel threatening, and sounds can be noises with hurtful results.

Hearing a person in pain in the adjoining emergency cubical, for example, or a child crying during a painful treatment, or a person gasping for breath, are all stressful sounds. Other distressful sounds come from noisy equipment, clattering carts, banging doors, beeping monitors, loud speakers and call systems which inundate our sense of hearing.

According to Ackerman (p187-188), "Noises that irritate us are sounds loud or spiky enough to be potentially damaging to the ear. Because a loud noise grates on our psyche, or actually hurts, we want to get away from it."

The following are some of the most painful sounds found in our healthcare environments:

- ❖ **Loud banging in air-handling units.** This annoyance is most disturbing in quiet areas, such as office spaces, patient bedrooms, and waiting and consultation rooms. This can be remedied by the addition of dampers to ductwork.

- ❖ **Loudspeakers and call systems.** Speaker systems are typical to medical centers, hospitals and even outpatient clinics, and are used to announce events like emergencies or to call an individual to a particular location. "Without the loudspeaker, we would never have conquered Germany," Hitler wrote in his *Manual of German Radio 1938*. Hand-held beepers can replace these annoying systems.

- ❖ **Banging doors.** Banging doors can be annoying to most anyone, but especially for a person who is continually exposed to the same banging door all day. Simple closures can be added to allow a door to slowly close.

- ❖ **Equipment.** The terror of medical equipment is intensified by the sounds they produce. Unfamiliar sounds heard without context are the most frightening. One of the most feared sounds comes from the simple monitor, which is attached to a patient and used to monitor blood pressure and heart rate. Most monitors produce steady beeps with corresponding graphic displays on a small screen. These devices are very common and

well understood by most staff, but for a patient, it is a source of stress as they carefully listen for each unfamiliar beep, anticipating the next, worrying it may not come. Should the sound change, patients and family alike become scared. I once saw a woman run down the hall screaming that her husband had died when the beeps changed to a flat tone. The monitor just needed resetting. It is difficult to eliminate these noises; nursing still needs to hear them. Eliminating the fear of these machines must be the first course of action. Nursing needs to carefully explain different sounds and what they mean to patients and their families.

❖ Music headsets can also be a positive distraction for patients. Long-range solutions should include redesigning monitor equipment that can communicate the same vital information in a less stressful manner. I have seen some facilities turn them down as low as allowed by code and add a flashing light to compensate and support the sound. This light was placed out of the patient's and family's line of vision.

❖ **Loud or unwanted television.** Televisions are everywhere. In our homes, we often have more than three, or even one in every room—including the bathroom, kitchen, and bedroom. They are in elevators, and now even on mass transit and family cars. Televisions are usually placed in waiting areas to give people something to do while waiting. They are most annoying when an individual has no control of the volume or the subject matter. The best solution to this problem is to eliminate the need for waiting.

❖ By providing personal beepers, which allow visitors to move around freely and be called when they are needed, noise can be reduced. If televisions are used in group areas, there must be an alternative seating location for individuals who do not wish to participate. Televisions work best when they are used to educate and inform waiting patients and visitors.

❖ **Crying and noisy children.** Happy children are delightful and can provide positive distractions to waiting patients; unhappy, crying children, however, can be both noisy and stressful, especially if in close approximation to the ill. This situation usually occurs in waiting rooms, especially where there are long waits, like emergency rooms or surgical waiting areas. Again, the ideal solution is to eliminate the need for waiting and to let children and others move about until the time comes when they

are needed. However, when a waiting room is required, it should have a child's corner with appropriate child activities that are shielded from adult waiting areas.

❖ **Human Pain.** Hearing the sounds of another person in pain, or having difficulty breathing, or vomiting, or crying are among the most distressing sounds we hear in healthcare environments. This is especially disturbing in close quarters like the emergency department, intensive care, or treatment areas, so care should be taken to carefully insulate them acoustically and separate them into individual cubicles or rooms to contain the sound. When this is not possible, patients can be provided with headsets to have comforting music as distractions.

❖ **Overhearing private conversations.** This is a major issue in almost every medical facility. Overheard conversations can be mildly annoying, as in the case of hearing a staff member talk on the phone, or extremely stressful for a patient in recovery hearing discussions of the negative outcome of a surgery. Great care must be taken to provide appropriate space for sensitive conversations. Design should also be sensitive to the acoustic shielding of inappropriate voice transfer.

❖ **Noisy corridors.** Footsteps, carts, carts, and more carts, equipment, moving beds, intercoms, janitorial and maintenance activities all contribute to a noisy din. Many hospital corridors, especially those on inpatient units, are as noisy as a major highway at mid-day. This is the area where a patient's rest and sleep are essential for healing. But much can be done with acoustical materials to soften noise. Designers can employ carpet, acoustical wall material, ceiling baffles and acoustical ceiling, for example. Care should be taken to insure carts have soft wheels and soft bumper guards to minimize the banging. All carts and equipment should eliminate any metal-to-metal contact. Acrovyn bumper guards, corner guards and door-jamb covers can also reduce impact noise in major traffic corners. The best solution, however, lies in good circulation planning that provides for separate service corridor pathways. Such planning eliminates much of this type of traffic from patient areas.

Eliminating or neutralizing annoying sounds is critical to designing healing environments. After that, the next step is delighting our sense of hearing. A pleasing soundscape can be as enriching to the body and spirit as the most beautiful visual interior.

The *Reno Gazette* cited a study in Italy that evaluated patients' experiences in Intensive Care Units. Seventy-two percent of the study's participants complained of bad experiences, ranging from sleep deprivation, fear, anxiety, loneliness, unceasing noise, and seeing or hearing others suffer and die (Mazer).

The author further explains, "I know that the causes behind each of these symptoms can be linked to one or more auditory factors and are external to the patient's diagnosis."

Some facilities use sound systems for the delivery of personal music, staff communications (paging), patient communications (nurse call), and alarm systems to advise and protect. Nighttime programming of these systems can be specifically designed to respect the circadian rhythms linking sounds and images to assist in addressing patients' sleep, and to endure physical difficulties.

Adding music to the healing formula is not a new trend. Musical incantations and references to healing have been found in writings of the ancient Greeks and are among the oldest medical therapies documented on papyrus. Healing sounds—chants from the most primitive drumbeats to the more complex Gregorian —have been linked with healing and cures across cultures and throughout recorded history.

Today we can use sound and music to reclaim and support some of the sensuality lost within healthcare environments and as a therapeutic part of a prescribed treatment plan. Music can also be helpful in counteracting the side effects and in easing the pain of treatments such a chemotherapy, radiation therapy, and kidney dialysis. It can be especially helpful for patients who must be confined or separated from others, such as those in burn, or bone marrow and transplant units.

Music is also nourishing for premature babies. According to Sobel (p62-65), "When Brahms' 'Lullaby' was prescribed for these babies, the results were striking. The infants gained weight faster and were able to leave the hospital an average of one week sooner than the babies who didn't hear the music, at a savings of $4,800 per infant."

Dr. Sobel believes music affects the immune system, establishing that high levels of stress hormones appear to be suppressed when a person is exposed to music. Music therapy and the evolving field of psychoacoustic therapy support this belief. Some of the musical selections Dr. Sobel recommends are: Bach's *Air on the G String*, Pachelbel's *Canon in D*, Haydn's *Cello Concerto in C*, and Debussy's *Claire de Lune*.

The Mozart Effect

The Mozart Effect was first introduced to the public in 1997 in a book *The Mozart Effect*. This book was a product of years of research, study and the hands-on experience of Don Cambell on the power of music, specifically Mozart. This concept has moved into hospitals, classrooms, audiotapes, lectures and training adapting the suggestions of the book to solve real life health issues (Campbell, 2001).

The power of Mozart's music has come to public attention largely through innovative research at the University of California. At the Center for Neurolobiology of Learning and Memory in Irvine, a research team began to look at some of the effect of Mozart on college students and children.

Francis H. Rauscher, PhD. and her colleagues conducted a study in which thirty-six undergraduates from the psychology department scored eight to nine points higher on the spatial IQ test (part of the Stanford-Binet intelligence scale) after listening to ten minutes of Mozart's *Sonata for Two Pianos in D Major* (p448). Although the effect lasted on ten to fifteen minutes, Rauscher's team concluded that the relationship between music and spatial reasoning was so strong that simply listening to music can make a difference (Cambell, p15). It is believed that the complex music facilitates certain neuronal patterns involved in high brain activity, similar to mathematics.

In follow-up studies, the research continues to support the earlier findings. According to Cambell (2002), "The scientists suggest that listening to Mozart helps organize the firing pattern of neurons in the cerebral cortex, especially strengthening creative right-brain processes associated with spatial temporal reasoning."

We are now finding that this powerful link to music may be even more significant than early research indicated. The research of Alfred Tomatis, MD, has established a link between healing and music, in particular to the music of Mozart.

Certain types of music can be therapeutic, effecting both physiology and the emotional health of the listener.

"Music has the power to put people at ease, relieve stress and create an overall feeling of well-being-emotional responses that the operator of any health care environment should be interested in providing," suggests Dr. George Patrick, Chief of Rehabilitative Medicine at the National Institutes of Health in his book, *The Effect of Vibroacoustic Music on Symptom Reduction*.

Therefore, music can be considered a new design tool by which to enhance and even improve the overall hospital experience. Not all music, however, is welcome, relaxing or soothing to listeners (Campbell).

Sound Medicine

As research backs findings, doctors now accept the power of music and song. Music combined with cogitative neuroscience is an enormous area of research. This new area of research has grown with the expanded use of MRI, PET scans and EEG tools. These tools tell us what is happening in the brain as we're exposed to music.

In the past, music therapy was thought of as a nice and pleasant thing for patients. Now we know that music therapy can help patients with brain damage, Parkinson's and Alzheimer's.

According to Dr. Tomaino, director of Neurological Function at Beth Abraham, in the Bronx, NY, "The higher cortical activity that allows us to quickly pull out information from our memories, relay it and process it in the moment is damaged in Alzheimer's disease. For those long-term memories and information about past experiences are still in there, they just need to be tapped into."

Research that our memory links to music and is saved as symbolic data; it can be retrieved and associated with meaning. "How the brain responds to music and sound changes with exposure to it," says Tomaino (2006, p29). "And some people are more auditory than others."

I personally experienced this with my grandmother, who was in a late stage of dementia and had been unable to speak for months. Following her 96th birthday party, we all got into the car to return her to the nursing home. As soon as the last person got into the car and the doors closed, she began to sing loud and clear, "Hey, Hey the Gang's All Here", with all the right words, and correct melody.

Parkinson is another disease where music helps patients, according to research. Music works very differently with Parkinson than with dementia or Alzheimer patients. Parkinson disease impacts the patients' motor skills. These patients have difficulty dressing and are plagued with tremors. In many cases, music can initiate the internal mechanism that can improve motor skills.

Dementia patients respond well to music from their teen years, while Parkinson's patients will walk more smoothly to any type of music; however, a lively beat seems to be more beneficial. Parkinson's patients get dressed easier to music and can suddenly pick up their feet and walk down the corridors to the swaying rhythms of "Ramblin Rose" (Tomaino, 2006).

Again, I witnessed this amazing response personally. Just recently, my husband and I took my mother, who is in Stage 5 Parkinson's, to a fundraising gala. We were hoping she could manage dinner, and then we'd take her home. Just as dinner was being finished, the

orchestra began to play the familiar sounds of the "Big Bands." My mom dropped her cane, grabbed my husband's hand, and danced the "boogy woogy," jitterbug, and swing.

This connection with music improves the quality of all of our lives.

Psychoacoustic Therapy

Although sometimes confused, psychoacoustic therapy differs from music therapy, which is the use of musical instruments in performance to create a therapeutic exchange with a listener. Psychoacoustic therapy is a musical prescription for specified sounds, prepared for a specific health issue or a specific individual's listening needs. Psychoacoustic therapy might be used in the following settings:

❖ Within individual therapy areas where speakers might be installed to add prescriptive sounds.

❖ In tandem with other healing or curing modalities to support the healing process, such as chemotherapy treatments or dialyses. Chairs can include built-in sound systems; some may also include vibrators for massage.

❖ With acupuncture for pain control.

❖ In high-stress areas for stress reduction.

❖ In psychology treatment or consultation areas in support of therapy sessions.

❖ Use in operating rooms and recovery areas. Patient involvement in the music or sound selection is critical.

❖ Within Intensive and Critical Care areas with individual headsets.

❖ In public space areas, such as lobbies and waiting rooms. Music choreographed to video walls can also be very successful.

❖ In garden and water features, nature sounds can be incorporated.

❖ In mediation rooms and chapels as quiet background music.

❖ As distractions from unwanted noises and sounds.

❖ In parking lots, happy vibrant music can be a surprise welcome, but can also act as the first opportunity to de-stress visitors to the facility.

The sound of chirping birds or bubbling water can be a delightful addition to an environment of a healing garden. Sound design should be made integral to the architecture and interior design of healing environments. Speakers and other devices requiring wiring should be appropriately concealed and made to harmonize with the space—not simply added as afterthoughts. Unlike some other forms of decorative furnishing, sounds do not simply hang on the wall like artwork.

Psychoacoustic therapy can add a pleasant dimension to medical spaces, enhancing a healing atmosphere by soothing nerves and offering distractions from pain (Goldman, 1992).

Humor and Laughter in the Healing Environment

While humor is difficult to quantify, laughter is a natural response to humor. We have quantifiable research that shows laughter increases the secretion of catecholamine endorphins, decreases cortisol secretion, and lowers sedimentation, which implies a stimulated immune response (Adams, p67). Hearty laughter elevates alertness and numbs pain, and humor can liberate us from problems and distract healthcare worries. Most of us do not take laughter and humor seriously and often consider it too childish to be considered in design medical places.

Once, when my daughter was very ill with intense stomach pains, I took her to the emergency room and was comforted to finally hear her laughing as she described the funny monkey pasted on the ceiling. With her laughter, I knew she was on her way to recovery.

There are many ways to introduce humor into healthcare environments. Clowns can regularly make bedside visits—and not just to the pediatric units. Joke books and funny movies should be plentiful in all waiting rooms, on bedside tables, and even in the chapel. Cartoons and funny pictures can add a happy surprise to patients and visitors, especially in high-stress areas like radiology and mammography dressing rooms, exam room ceilings, and diagnostic rooms.

According to Adams (p67-69), "Some hospitals have begun [this] process already. At Duke University Hospital, humor carts deliver videos, cartoon and humor books, juggling equipment, toys and games. DeKalb Hospital, near Atlanta, has created a Lively Room for romping. The clowns of the Big Apple Circus in New York City have created Clown Care Units, which visit children's hospitals on a regular basis to bring joy and assist with patient care. The Association of Therapeutic Humor is creating a practice to introduce humor as therapy. Finally, Gesundheit Institute is building the first silly hospital, where the entire context will be geared to fun and play."

Other suggestions for introducing humor into healthcare environments include having a well-stocked costume and prop room, space for performing artists, humor classes, and safe places where people can laugh, cry, or even scream. Adams suggests patients naturally choose funny units over solemn wards. In his lectures, he typically asks the audience if they would prefer a fun playful room or a traditional healthcare environment; the playful room was the choice 90% of the time.

"Health is based on happiness—from hugging and clowning around to finding joy in family and friends, satisfaction in work and ecstasy in nature and arts."

Dr. Patch Adams prefers to be considered a clown rather than a doctor and finds humor as an antidote to all ills. According to Adams (p66), "I believe that fun is as important as love. The bottom line, when you ask people what they like about life, is the fun they have, whether it's racing cars, dancing, gardening, golf, or writing books. People crave laughter as if it were an essential amino acid. If laughter is contagious, let's start an epidemic."

Sounds can also be beautiful. Music, laughter, cascading water, as well as a breeze drifting through leaves can bring us great personal pleasure through our sense of hearing. One of the most important things to remember about sound is that it never goes to sleep. We hear sound at various levels of consciousness. Our sense of sight shuts down when we close our eyes; smell shuts down when we sleep; touch and taste require an action. But our sense of hearing is always readily alert to acknowledge danger and delight.

Healthcare designers are challenged to eliminate or reduce stressful noises, create sounds that clearly support function, and finally, to provide pleasure and support therapy. Healing sounds can transcend music in its original role as a source of healing energy, bringing all its beauty and harmony to the healing arts once again. Pythagoras, the Greek philosopher, advocated daily singing and playing of an instrument as a means of cleansing the emotions of worry, sorrow, fear, and anger. Music—and the pleasure received from its participation—is a simple way of reclaiming sensuality in our hearing and healing.

The Smell and Taste of Healing

SMELL IS A POTENT WIZARD

THAT TRANSPORTS YOU ACROSS

THOUSAND OF MILES AND ALL THE

YEARS YOU HAVE LIVED.

~ Helen Keller

The Smell and Taste of Healing

*T*HE SENSES OF TASTE AND SMELL ARE LINKED, biologically and emotionally. Smell enriches the pleasure of food. Smelling wine indicates the quality of the vintage; smelling spoiled milk or rotten food alerts us to the danger of eating it. Without the sense of smell, food greatly diminishes in appeal. Delicious smells make us salivate and engage our imagination in anticipation of eating. This contributes to the rituals we attach to food preparation and presentation.

This smell-taste link results from the fact that biologically, smell and taste share the same airshaft. When a taste lingers in our mouths, we can still smell it as we inhale. It is interesting to note that smells are far more active than the sense of taste. According to Ackerman (1990), it takes 25,000 more molecules of cherry pie to taste it than to smell it, and a head cold inhibits smell by smothering taste.

Scent and taste are integral to life. Scent can only be experienced by inhaling through breathing, and taste is activated through life's substance of eating. Both scent and taste complement the healing environment; bad odors and foul taste inhibit a healing space.

Proofreader's notation:
Needs revision

My Question:
How do you want me to handle this? Please Advise

The Sense of Smell

For centuries, flirts and lovers everywhere use the power of aroma to lure a mate, spark attraction, and achieve recognition, but only recently has the vomeronasal organ, the detector of pheromones, been discovered. Smells help us judge danger—we smell smoke before we see or feel a fire—yet it is often the most ignored and misunderstood of our five senses. Because of its connection to the emotional area of the brain, it greatly influences our subconscious mind, which, in turn, influences our moods and memories. We must pay attention to smell if we want to design a healing environment.
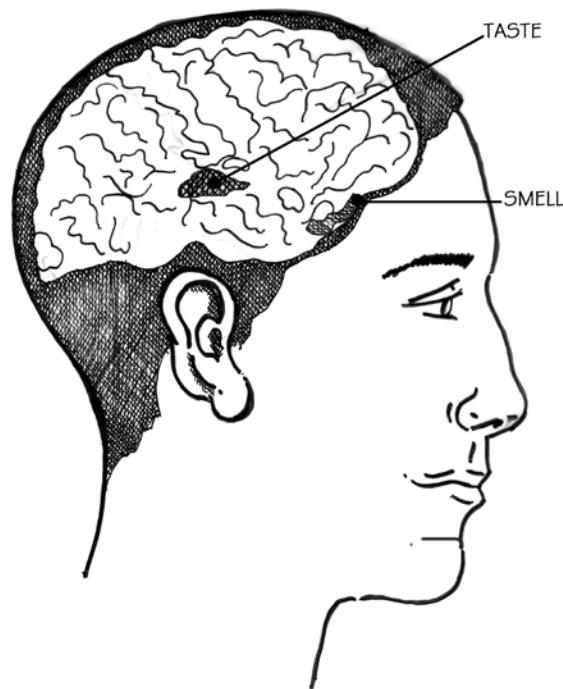
Figure 8-1. Brain and the smell and taste receptors work together. Olfaction intensifies the sense of taste. These along with each of the other five senses are activated in separate areas of the brain's cerebral make up the outer layer of the brain's hemisphere.   ILLUSTRATION: Patricia Raimondeau

Considered the most primitive of our senses, smell is the most powerful and sensitive. Of all our senses, scent has the fastest and most direct route to our emotions. We are able to distinguish thousands of odors and fragrances, and we remember those scents for the rest of our lives. We have five million scent receptors, which replenish themselves every thirty days. Our noses work with every breath we take—an average of 23,040 times a day (Crawford 1997). People we love smell good to us, and this forms an important emotional link between people.

The Evidence of Aroma

The sense of smell and the important role it plays in our health, wellbeing and pleasurable experiences is often misunderstood. Smell is connected to the emotion-generating area of our brain. It is connected with our moods and memories.

According to Sobel 1996, p6), "The nose reacts to gaseous molecules carried on currents of air. It is strategically located over the mouth, where it can survey all food entering the body. The chemicals we inhale stimulate two pea-size membranes secluded deep within the nose. Spirited sniffing supplements the amount of odor-laden air reaching these olfactory antennae. Once inhaled, the gaseous molecules stimulate the olfactory receptors and trigger an electric signal, which speeds directly to an ancient part of the brain, the rhinencephalon (literally, nose brain) in the limbic system. Basic life processes are regulated from here: heart rate, respiration, temperature, and blood sugar levels all depend on messages from the limbic system" (Sobel, p66).

Our olfactory nerves are closely linked to memories and emotions. For example, the smell of suntan lotion can instantly transport us to the beach and seashore. In studies, people smelling a pleasant aroma recalled more happy memories than those smelling unpleasant odors (Sobel, 1997). We can use this concept to link the present with past positive memories and experiences. Designs that incorporate aroma can create ideal emotions for a healing environment where the air feels refreshed and vigorous from the energy of plants rather than from the toxins of synthetic aromas and propellants.

Studies have shown us that infants are able to identify their mothers by smell alone; the same is also true for their mothers. We each have a personal odor that tells people a lot about us. Fear, stress, and anxiety can alter the way we smell, and illnesses, cancer, for example, can sometimes be detected through the sense of smell.

Toxic substances and air pollution often found in medical facilities have the potential to damage our sense of smell and can even make us ill. Smelling these substances sends signals to the brain. When we have no control over these odors, we breathe them and our brains are forced to ignore the signals, causing damage to our sense of smell. Our medical facilities are full of different artificial smells from cleaners, disinfectants, soaps, and chemicals, to stale air. Artificial agents are used to eradicate medical smells, the smell of sickness, as well as bathrooms and body odors. These types of odors increasingly disturb our facilities, and, in their attempts to purge the environment of these smells, more offensive odors are often introduced.

On the other hand, however, we have many smells and fragrances that enhance and encourage healing.

Aromatherapy

Aromatherapy is the science of scent. The use of aromatherapy is growing quickly and is demanding respect—even within traditional medicine. According to Sobel, (p69), in a recent scientific study, "Subjects in a laboratory were wired to physiological monitoring equipment and interrogated with stress-provoking questions, like 'What kind of person makes you angry?' Then they rated mood, while changes in blood pressure, heart rate, respiration, and brain waves were measured. Sometimes, before the stressful questioning, a subject sniffed a fragrance. A whiff of spiced apple seems to modify the stress response: lower blood pressure, slower breathing, more relaxed muscles, and slower heart rate. The fragrance inspired subjects also reported feeling happier, less anxious, and more relaxed."

In some cases, patients with insomnia, anxiety, panic attacks, back pain, migraines, and even food craving are now being treated with modern aromatherapy (Valnet, 1990).

Aromatherapy uses fragrances extracted from plants to form essential oils to heal the body, the mind, and the spirit. These oils have individual and distinctive odors that stimulate emotional, psychological, and physical responses.

According to Monte, (p212), "Aromatherapists state the emotional and psychological states that these fragrances give rise to create physical responses—changes in pulse rate, respiration, perspiration, and immune response—which in turn can heal the body."

Aromatherapy relies on human experiences for successful outcomes. The smells, for example, found in a forest, a room—or anywhere—are recorded in our unconscious mind, then related to the experience itself. When a smell is encountered again later, we will remember the emotions associated with the experience, even when we are unable to recall the details of the experience. The smells themselves contain all of the conditions under which the source plant grew—including geographical information, season, characteristics of its response to the sun, the earth, and rain. These components are implicit in the essential oils and fragrances used in aromatherapy.

Michele Musella, RN, Director of Women's and Children's Services at Potomac Hospital in Woodbridge, Virginia, shares her success with aromatherapy in that hospital's Postpartum Unit. She provides mothers with aromatherapy options during the labor, delivery, and postpartum process. She has found lavender to be a favorite to assists with pain, stress, nervousness and even headaches. The lavender flower lifts away from the plant; its leaves are relaxed and light. Ms. Musella delivers essential oils in a diffuser and has even developed a take-home kit of the oils for new mothers to help with the stresses of new motherhood.

Known to influence the body directly, essential oils have been used in traditional medicine as healing herbs and as medical compound, which create their own atmospheres. Essential oils are worthy of studying and experimentation, especially in healing envi-

ronments when moods need to be changed, senses need to be heightened, and positive distractions provided.

In England, hospitals use aromatherapy to relieve insomnia and to encourage comfort by disguising typical hospital smells. Scents are widely used as substitutes for sedatives and pain management; they act as deodorants and are used in creating an overall feeling of patient well-being.

Sloan Kettering Memorial Hospital in Manhattan has introduced atomized fragrance during high-stress MRI procedures; patients who were exposed to the fragrances experienced 63% less anxiety than those who were not. Anxious patient movement during long procedures has also been reduced with the use of aromatherapy, resulting in fewer expensive retakes (Redd, 1991).

Aroma by Design

The following checklist can sensitize us to the power of design with aroma:

✔ Use materials that are easily cleaned and do not absorb odors.

✔ Avoid materials that require strong chemicals for cleaning.

✔ Specify the cleaning process with every material selected. Use the least toxic cleaning agent available.

✔ Avoid toxic chemicals and prohibit smoking.

✔ Employ the use of essential oils, especially in stressful areas.

✔ Use aromas to support therapeutic functions.

✔ Design aromas in support of the space, function, and population.

✔ Remember the powerful link aroma has to memory and the limbic system; design aroma to support positive memories or provide positive distractions.

✔ Use positive food smells; take care, however, to avoid them in areas adjacent to surgery and recovery.

✔ Create designs with access to fresh air and nature; provide access to the outdoors.

✔ Keep air moving, but avoid drafts.

✔ Use plants and 'flower power.'

✔ Consider using negative ions; they can revitalize stale air by incorporating ionizers.

Research may eventually discover that particular odors react like specific drugs. However, aromatherapy, like color therapy has conditioned responses that varies between individuals.

The Consuming Sense of Taste

Our appetite is a consuming passion, and fortunately food is a sensory pleasure that both nourishes and provides us pleasure. All animals must eat for survival, but as humans, we savor our food with passion as reward, punishment, celebration, commemoration and most of all, immediate pleasure and gratification.

Our sense of taste is pleasurable because of its ability to fill our stomachs and affect our moods, thoughts, motivation, and performances. Eating and our appetite, like our other senses, form a strong mind/body relationship. But how does food and taste get into our minds and the environment?

Evidence of the Sense of Taste

Our sense of taste is closely linked to our sense of smell, as over 80% of our flavor comes from our sense of smell (Sobel, p65). Every day and with every meal we make decisions about our food that either makes us depressed or lively. If we make good decision, we will live, work, and play better. If we make poor decisions about our food, our mood declines, we feel sluggish, and we can't think clearly. The way we eat and what we eat contributes to pleasure we derive from food.

Food is pleasurable not only from our senses, but also due to the chemical reaction within our brains. According to Sobel, (p94-95), "The brain has a special network of cells that guard the brain from toxins in the bloodstream. Neurotransmitters, the chemical messengers of the brain, affect our appetite for certain foods—and certain foods affect production of brain neurotransmitters. Since these chemical messengers carry signals between nerve cells in the brain, they can influence our moods and behaviors, acting like natural drugs."

Dopamine and norepinephrine make us react quickly and think clearly. Serotonin, the chemical created from eating turkey, causes drowsiness.

Our sense of taste is supported and supplemented by all of our senses: smells, texture, temperature, color, pain and even sound. We have approximately 10,000 taste buds and can taste the presence of salt in one part of 400; we can taste bitter in one part in 2,000,000 (Crawfor, 1997). Food affects our mood and our health.

Foods trigger chemical reactions; sweet things can produce a high; spices can arouse; carbohydrates are relaxing as they release insulin, which regulates serotonin that induces the feeling of calm. Chocolate and cheese contain PEA, which is the same chemical our bodies produce when we are in love. Every meal can enliven or depress us.

"Recent research suggests that foods may act like weak drugs, affecting our moods, thoughts, motivations, and performance—even hours after we've eaten. Certain foods trigger the release of brain chemicals which we experience [as] pleasure" Sobel, p95).

Our experience with food is not just about eating. It's also is about preparation, cooking, presentation, and finally, about consuming it with pleasure. Sensual food is to be enjoyed for what it is; sharing food is an important pleasure and an important family and social event. Food is a simple way of bringing family and friends together, and has a positive effect on our health and well-being.

Environments in which food and snacks are available feel more comfortable to us; often, the mere presence of food is comforting. Animals feed, but humans savor with pleasure.

The act of eating is a pleasurable pursuit that we engage in from the moment of our birth, and in some instances, prior to birth when as a fetus, we suck our fingers or thumb in the pursuit of oral gratification. As children grow, mothers continue to nourish them at her breast or from a bottle with nutriments and love. In these beginnings, infants are unable to distinguish nourishment from love and begin to associate nourishment and the act of eating with love. Within this involvement children grow in stature and emotional security. Gradually, other elements are added—such as rewards and punishments. A mother may reward her child's good behavior with a cookie, or candy or some other culinary treat, and when a child misbehaves, she may deprive the child of these same treats. Some pediatricians even give their young patients a sucker for being a "good boy or girl."

What people are willing to eat is determined by a complex system of attitudes, ideas, and assumptions that form local and cultural patterns, including religious restrictions, taboos, and ideas pertaining to the merits or nutritional attitudes. Most of the major religions have dictated what can be eaten. Historical events and religious occasions were commemorated with feasts of food and drink. The Greek philosopher, Epicurus, defined the eating ritual as a "refinement of life." The word Epicure has come to define someone of refined taste for the better things in life (Le Guére, 1994).

In the medical environment, patients and their families come to these facilities with all their food-need complexities. Healthcare facilities typically provide food for "sustenance" only, with little or no attention paid to the "experience" of eating. Patient food trays are typically unappetizing with cold and bland food. They are often served with indifference or just dropped off at the bedside, even if the patient is not there. Hospital cafeterias have

been labeled worse than airplane food, and facility dining rooms are often hidden deep in a basement with no windows. Patients and visitors seeking nourishment, sometimes under stress, often seek comfort food, but much of the time they can't even find a cup of coffee. Most healthcare facilities do not support or delight our sense of taste.

Design can support the memory of pleasure associated with food and appetite. Great examples of this include "family kitchens" on inpatient units. In these spaces, families can cook patients' favorite meals to share not only with the patient, but also unit caregivers. This concept not only provides familiar and well-loved foods, but also creates a bond between family and staff. It's an excellent opportunity to interact with nutritionists to tailor special dietary requirements with favorite foods. This is a very special concept used in the "Planetree" model of care.

In our recent Rockingham Memorial Hospital project, inpatients are greeted by a waiter or waitress and presented with an appropriate menu tailored for them. They are not given a generic menu listing all of the items they can or cannot have, but with one that only list what is available to them. Special needs or extra helpings of favorites are discussed, and the server goes to the kitchen to fill the order and returns at the appropriate time when the patient is known to be in their room. The meal is served, not delivered. The patient is asked if everything is satisfactory, and if they need anything else.

Servers provide a service. Patient satisfaction has increased; the patient tray line has been eliminated; food service personnel turnover has decreased; and the hospital was able to reduce by two full time staff members.

Other visionary hospital facilities have adapted this delivery model. Before planning for this new model we visited hospital facilities to review this practice.

Design of food service areas in healthcare facilities must extend beyond the functional requirement of providing food. We must also provide a place to celebrate children's birthday parties, candlelight dinner for new parents after the birth of their baby, as well as a convenient coffee bar to ease the stress of long waits. Consider the following recommendations in designing for the sense of taste:

Eating is a multi-sensory experience; it engages all the senses, especially the senses of smell and sight. Food and presentation should look delicious, attractive and appetizing, and smell wonderful.

Remember, just the presence of food is relaxing and reassuring. I suggest doing an assessment of a "food availability study", establishing what types, availability, what times, and the locations of food service within the facility. A single-source cafeteria rarely meets all the food needs of the patients and visitors.

Think of "food service" in terms of more than meals. It can include snack areas, coffee bars, ice cream shops, candy carts, fruit and juice bars and even vending. Food service should address food as a sustenance as well as comfort.

Remember to include favorite food of the community's ethnic background. They should be served in the appropriate manner and with applicable tableware. Serve health foods and a healthy menu. If not in a healthcare facility—where? Include social gathering places that include food service. This is especially important in long-term care facilities. Families visit more frequently if there is a supportive environment for entertainment, social interaction and sharing of food.

Elicit the Taste Experience

In planning the location and design for food service, consider the following:

❖ Consider providing food service in gardens, atriums, courtyards and roof-
tops as they are gathering and social spaces, enhanced by nature.

❖ Cafeteria and dining rooms should look fresh, smell good and be designed
to promote social interaction.

❖ Windows and natural daylight are important in food-service areas.

❖ Food presentation addresses stress, creates a positive distraction,
and empowers.

❖ Delightful presentation increases the appetite, as successful restaurants
can attest.

❖ Tabletops and patient food trays should have fresh flowers.
Elements of nature are great de-stressors and are pleasurable.

❖ Patient food trays should be served with dignity, pleasure
and professionalism.

❖ Food should be available in visitor "high-stress" areas, such as emergency
and surgical waiting.

❖ Finishes and materials should be appropriate for food spills in food-service
areas. Stained carpet and upholstery is not appetizing.

❖ Comfort foods should be available in "high-stress" areas; these might include special coffees, herbal teas, hot chocolate and candy—especially chocolates.

❖ Food should be available in long-wait areas, or beepers could be provided to allow patients and visitors to move about or go to the dining room.

❖ Food should be accessible in remote campus areas. Food courts and coffee carts are often good solutions for remote buildings, outpatient facilities, and wellness centers.

❖ Provide family kitchen areas or a family pantry on inpatient units. This allows families to be involved as caregivers and also provides foods familiar to the patient.

❖ Include family celebration centers. Children's areas could include areas appropriate for birthdays and seasonal holiday celebrations.

Food is virtually the perfect purveyor to all our senses. Norman Cameron in *The Psychology of Behavioral Disorders* sums it up in saying:

> "Our language is full of ambiguous allusions to Social acceptance and rejections, to verbal assaults, to Gastric needs for food, and to the spiritual Need for sustenance. Thus, we eat our words And swallow our wrath, the Lord spews us forth, We sink our teeth into a problem, drink and Reject its biting comments. When the human Being, with all his verbal ambiguities in his Behavior, becomes confused, he often acts out as Social operations what was intended to be only Verbal metaphors." (Adams, p66)

Pleasure derived from the sense of taste is a five-sensing experience in that it involves far more than the stimulation of our taste buds. Taste involves the pleasure of the presentation of food, the texture, the sound of the texture being broken, and finally the taste. One of my favorite five-sensing experiences is wine tasting. We enjoy the beautiful color in the glass, whiff the pleasure of the bouquet, and feel the glass in our hand. We anticipate the taste. What about the sound? We clink the glass with another saying "to your health".

Is there a Sixth Sense?

I ask this question in most of my lectures, and not surprisingly most people agree that there is a sixth sense of intuition. It is often described as having "this feeling," "knowing it in my gut," and "just can't explain how I know". Mothers and lovers are known to have this sense about their loved ones.

This sense appears to be an accumulative link and a multi-sensory experience in which we take in information by more than one of our keen senses. Examples include "tasting" odors, being "touched" by light, or "seeing" sound. These experiences stimulate our senses, evoking our memory and imagination. They can provide the whole gamut of feeling from great pleasure to great pain.

According to Ackerman (Ackermans, p285-291), multi-sensing—or the blending of senses where the sensation of one sense stimulates another—is called synesthesia, derived from the technical name for the Greek syn (together) plus aisthanesthai (to perceive).

Our daily lives are full of experiences, and our perceptions of these experiences are multi-sensory. Gestalt psychologists tell us that people of diverse cultures all perceive non-sense words to certain shapes, sounds, color and smells in ways that fall into clear patterns (Ackerman). We all have a certain amount of "synesthesia" in our sensing process; however, those who regularly experience intense synesthesia are rare—about one in every 500 people (Ackerman).

The multi-sensing of our environment may be an avenue to reach people with impaired cognitive skills. We understand that when one is deprive of one sense, the remaining senses become stronger and take over for the missing sense, such as a blind person will often develop a keen sense of hearing. This also appears to be the case with cognitive impaired persons often responds to multi-sensory stimulation (Duffy, 2001).

One of my favorite examples of multi-sensory environments concerns "Snoezelen" environments. The Snoezelen concept was developed in the late 1970's by a Dutch therapist, Jan Hulsegge and A Verheul at the DeHarttenberg Institute, an institution for persons with cognitive disabilities. Using a sensory tent, they blew fans, projected images, sounded musical instruments, let people touch objects, let people smell scented bottles, let people taste favorite foods. Low-functioning patients demonstrated positive verbal and non-verbal feedback.

Today this research has grown into a worldwide movement in over 30 countries with thousands of sensory environmental installations and a selection of commercially designed products woven into the specially designed environments trademarked under the company of Snoezelen. They create environment with lights, sounds, tactile surfaces, moving images and other sensory experiences in setting that are both comfortable and safe.

The therapists working in these specially designed environments believe that by creating these favorable conditions specifically designed to optimize the unique needs of their patients, they expand the meaning of the world through the senses. They theorize that by providing activities that provided meaningful sensual stimulation, they create favorable conditions to improve patient's quality of life.

In the Bloomview Hospital in North York, Ontario, a Snoezelen room is used for children to help them relax. The hospital serves children with disabilities and chronic illnesses.

Bloomview Hospital shared the story of "Sarah," a severely disabled child who had never responded to anything visual—until she had the opportunity to use a Snoezelen room (Hospital Wellness, March 1995). Her mother said, "When we held a clump of fiber optic strands in front of her face, she showed delight and could actually see something."

The underlying philosophy is that children, especially those with special needs who spend a lot of time in the hospital, need a place to be just kids. Most kids can run and play; these multi-sensory environments offer a unique opportunity for severely disable children to have a place of their own.

Today, sensory stimulation is no longer just for kids. We include a Snoezelen room in all of our "MeadowView" Memory Care Village projects—facilities for dementia. The executive director of these facilities, Julie Dancer, finds they use less medication to calm residents. A disruptive resident is escorted to the room and engaged in multi-sensory activities, which provide a positive distraction and a calming effect. Dancer also confides that staff use it when they need a break.

Joy Richares, Nursing Service Director at Baycrest Centre for Geriatric Care in North York Ontario, talks about her Snozalon room in their Alzheimer's Unit. "While we have not yet conducted formalized research to look at behavioral outcomes, I did want to share with you some of our anecdotal findings to date. We have found this type of room works extremely well with several groups of dementia behaviors—those whom are extremely agitated and aggressive, wandering and hording, as well as those residents who are under stimulated."

The MeadowView dementia care facilities incorporate multi-sensory experiential spaces. I have the exceptional opportunity to work with Dr. Michael Pietrzak, Executive Director of the International Brain Institute and President of MeadowView Memory Care Villages. Dr. Pietrzak explained to me that the brain's neurons have a strong bond in the early adult phase of life. It became the mission to design the MeadowView facilities that explored this concept.

We recreated a memory-care village for dementia residents where dementia residents could experientially relate to their earlier years. Our design focused on the experiential

activities of social life as perceived through the senses. For example, the central core of the facility—the atrium—became the social setting. We recreated facades of familiar public building from the train station, church, town squares and band shell. The atriums are flooded with natural lights, full-size trees, and an assortment of live animals. As you wander through the space, you see familiar shapes and colors; you hear birds, animals, and the piano from the band shell. You smell fresh-baked cookies from the soda shop, and you can stop in and get a bite to eat. The residents can participate and delight in activities of daily life through their senses, even when verbal communication is no longer possible.

It is also possible that our immune system forms our sixth sense. Certainly, the immune system offers the greatest body-mind-spirit link. Our immune system, like our other systems, takes in information (from the sense organ) about our environment. Information is communicated to our brain, causing a physiological response.

"According to this emerging view, the immune system is much more than a mechanism for fighting off microbial invaders. It is a specialized network of biosensors designed to pick up information from within and around the body and relay that information to the brain, where it can motivate animals or people to behave in specific ways" (Steven, 1999).

Just as a loud noise of an ambulance startles and tells us to move out of the way, our immune system antenna triggers similar useful behaviors. "We think the immune system is essentially a sense organ," says Steven F. M, a neuroscientist at the University of Colorado at Bolder. "It's just spread around the body more than most senses are."

We are already aware of common immune system responses, such as shivering or sleeping when we are coming down with a cold or flu. These responses are highly effective mechanisms in recovering from these illnesses. It has long been held that the brain communicates with the immune system; we know that some white blood cells are responsible for attacking microbes and are sensitive to brain chemicals triggered by stress hormones. Communication in the reverse direction—from the immune system to the brain—has only recently been explored (Weiss, 1999).

Interleukin—Ior IL-2—is a chemical secreted by the immune system cells, and attacks foreign particles. It helps the body's immune defenses by joining other cells to fight and triggering actions that keep microbes from spreading. It also has a direct effect on the brain and spinal cord.

According to (Weiss, 1999), "IL-1 induces shivering and fever—useful because it elevates body temperatures and reduces bacterial growth—as well as general inactivity and loss of appetite and libido—which makes sense because an animal is better off avoiding the risk of going out, being seen and perhaps being attacked when it is sick and less able to defend itself."

Many symptoms of illness and stress appear to be highly specific and useful responses triggered by the body's sixth sense—the immune system.

In the healthcare environment, our antennas are highly charged. We sense our space, knowing intuitively what is or is not safe, familiar, or comfortable environments. All of our senses are alert and often abused. We smell things that sicken us or make us loose our appetite; we hear things like an ominous prognosis, which sends images to our brain to attack or give up hope.

Our healthcare facilities challenge us to combine great imagination with deep emotional sensuality to support well-being. It is often the lack of good design—poor proportions, bad lighting, odors, painful touch, discomfort and bad taste—that contributes to our stress and depressed us. We truly need to stop sensual abuse. We need to delight, allure the senses, even our sixth sense. Above all, design needs to be for and with the senses. The senses are natural to the experience, the very essence of our humanness that bridges cultures, languages, religions, gender and age.

Sensing, senses, sense, sensitive, sensitivity. Isn't this what defines design? Healing environments demand we thoughtfully understand and creatively address unique aspects of our human condition. The benefit of designing for our senses transcends the measure we usually associate with comfort, satisfaction, and encouragement in our ongoing search for successful 'Patient Outcomes.'

Understanding Place
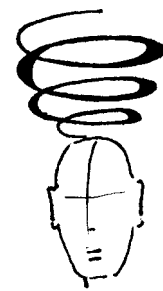
I KNOW THAT I

KNOW NOTHING

~ Socrates

Understanding Place

*H*EALING INVOLVES MORE THAN PHYSICAL implications for the body. It also benefits from mental input. When one understands the environment, the mind can help the body heal. Knowledge therefore supports health and healing in a powerful way. We've heard the adage, "Seeing is believing." If we can see clearly, our fear is diminished. Similarly, we associate the feeling of being "in the dark" with fear of the unknown. The mind is a powerful healer — and a destroyer as well. In this chapter we examine the development of an "understandable" environment and its role in promoting the healing process.

Knowledge and understanding provide initial steps towards healing. Knowledge results in both awareness and said ability to act on said knowledge. In matters of health, we often fear both this awareness and even said awareness — we feel afraid of the unknown and afraid to know the implications of the disease. We fear the journey upon which we must embark. Even so knowledge offers hope — perhaps we can participate in the journey rather than endure it as a passive rider.

Knowledge of our health and healthcare system helps us understand our needs in two ways. First, our perception of the place — gained through our senses as described in Chapters 5, 6, 7 and 8 — and second, our cognitive processes — where we interpret the environment through information manipulation — allow us to function in our journey towards health. Perception and cognition are difficult to separate because of the interrelated mind/body link, and given the complexity of the medical place, we rely heavily on both skills.

For example, through perception, our senses scan the hospital, searching for the elevator. Finding one elevator, we quickly assess if this particular elevator will bring us quickly to Dad in the Intensive Care Unit. Our eyes look for the sign that says "Visitor Elevators," and we see the familiar shape of an elevator. However, understanding this environment is not just visual; given knowledge supports it. The person at the information desk informed us that Dad is on the fourth floor ICU.

At a very basic level, patients need access to as much knowledge as they can accept, the amount of which varies from person to person. Some people want all the information they can get; others feel intimidated by too much detail. Some need to know everything to understand and manage their stress; some feel frightened by the information and need others to share the burden.

Examples of Successful Systems

Knowledge should be amply provided in medical facilities, so it can be easily found. All healthcare facilities — including small outpatient offices, doctor's offices, and major medical centers — should include resource centers and libraries. They need to be user-friendly, accessible, and inviting, and each must be tailored to the particular populations and communities that they serve. For example, patients should be able to check out videos and health-related literature from small offices, while larger facilities can provide full libraries with books, journals, videos, and specially tailored on-line literature searches.

Our recently completed project, the Short Stay Center at Rockingham Memorial Hospital, provided both a healthcare library and a smaller resource center in the Woman's Pavilion. The hospital featured the library as its centerpiece. One can see it from the atrium or garage, and must pass it to get to the visitor elevators, dining room and conference center. Access to the library is available even when the library is closed. It is beautiful, too, as it attracts people with its glass walls, lighting, and floor pattern. In addition to the library, Rockingham hosts other resources for women. The women's resource library is located on the birthing floor and provides circular warm wood bookcases, pleasant fabrics, artifacts, comfortable chairs, and a hearth in the center. Women enjoy gathering for consultations, classes, or just browsing the shelves for needed information. Today's healthcare consumer is looking for both enlightenment and resource centers that can provide access to the power of knowledge.

Patient knowledge and education must meet individual needs. Education must not only include what the patient needs to know, but also what the patient wants to learn. The patient's desire for knowledge will change over time with the illness, and facilities should be able to accommodate this without intimidating or patronizing the patient. Further, facilities must account for the patient's culture, age, language, communication skills, and health beliefs. Patients and their families want to know what to expect with an illness and how their lives will change. They also want to know how to maximize the probability of a successful recovery. Patient education should be an interactive process, different from the one-way dictation of information which is usually associated with patient teaching (Ellers, 2002).

Patient and family education has proven its ability to impact positive outcomes for patients. Patients with knowledge and understanding of their treatment plans follow their medical regimes better, have a decreased rate of re-hospitalization, and use the hospital system better. One of the most successful patient-centered programs is "Planetree," a philosophy of care that focuses on a high level of patient education, self-care, and family care. The program takes its name from the sycamore, the tree under which Hippocrates taught his students. According to the website, www.planetree.org, the Planetree model of care embraces compassion, comfort, aesthetic beauty, dignity, shared knowledge, and the freedom of informed choice. It originated in a single-patient unit in San Jose, California, and it has flourished in experimental units across the country. Today, entire hospitals, such as Griffin Hospital in Danbury, Connecticut, embrace this program.

(See *Plantree Model*, next page.)

In Planetree programs, the patients take responsibility for their own therapy and wellness. In consultation with their physicians, patients decide on personal treatment plans. They assume responsibility for their medications and participate in the review and documentation of their medical records. "The Planetree approach is exhibiting improvements in quality of care, nursing satisfaction, patient satisfaction and maybe even physical satisfaction" (Webber, 1992). One of the core components of Planetree is the empowerment of patients through education. The Planetree model provides patient and family education by developing customized information packets, strategic collaborative care conferences, and patient / family support. Planetree was one of the first models to initiate "open chart" policy that enables patients to read and write in their medical records. Planetree was also an early advocate of self-medication programs, encouraging patients to keep their medications at the bedside and assume responsibility for their administration.
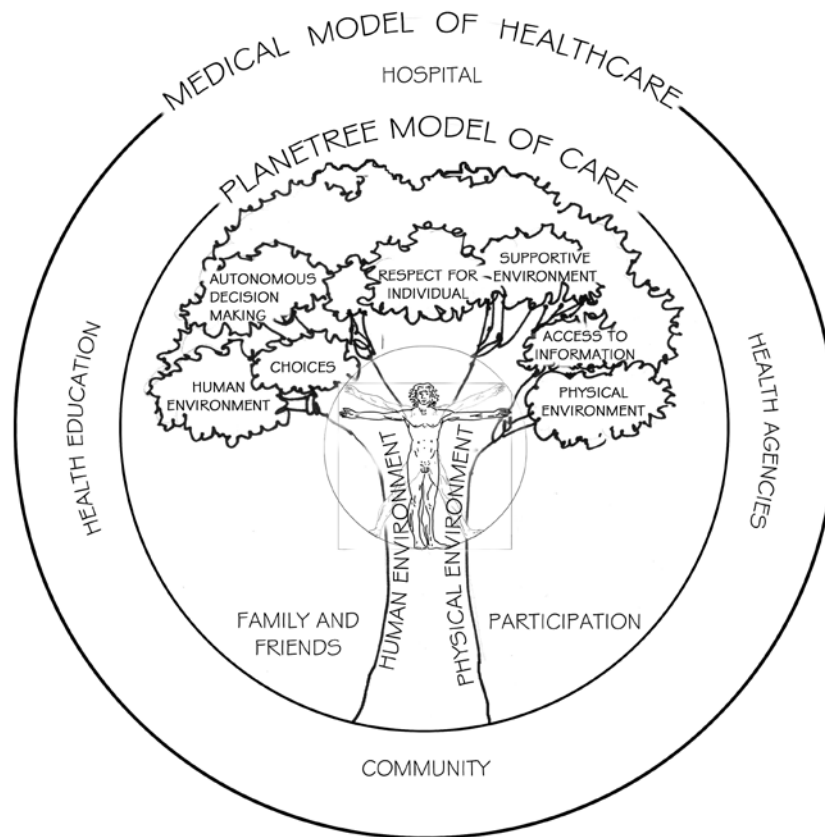
Figure 9-1. Plantree model of care: This model includes all components of the healing community placing the patient in the center. ILLUSTRATION: Patricia Raimondeau

Characteristics of Successful Patient-Education Programs

In my professional practice, I found that successful patient-education programs share the following characteristics:

❖ **Easy access to information and resources:** These learning centers must have high-quality education materials that are easily accessible and user friendly. The librarian must be pleasant and able to assist the visitor in research.

❖ **Attractive:** These areas must be attractive. Just as prime retail space lures potential customers into the door with intriguing merchandising, patients and their families must be similarly engaged. Once in, visitors must be treated to comfortable and pleasing surroundings. Image counts — the learning space cannot look institutional i.e. like a medical library. High-

end coffee shops or computer cafes provide better examples. These are areas where even frightened people would be attracted to drink a cup of chai and research a medical issue.

❖ **Fun, interesting, and engaging:** Learning should be fun and interesting, even when it involves learning about health. Consider the concept exemplified in the Healthy Life Pavilion at Walt Disney World in Orlando, Florida. Using videos, rides, theatrics, interactive activities, and personal health charting, the exhibit provides education on the immune system, the brain, healthy lifestyles, and the development of new babies, while being engaging at the same time.

❖ **Visibility and good location:** The learning space should have prime real estate; it should not be buried in the bowels of the hospital. Finding good information should not present a wayfinding problem, and location in prime areas of public circulation invites users. Being encouraged to frequently walk by the learning area helps patients and their families overcome their natural anxiety and join in the space's use. Glass-filled designs let passers-by see the users, encouraging new users to participate.

❖ **Interactivity:** Interactive learning becomes more personal to the visitor. Health screening, self-charting, and family/team programs can motivate people. The Holistic Health Center in Hinsdale, Illinois, uses an interdisciplinary team to address all aspects of an individual's health needs. The team provides counseling on spiritual matters, emotional factors, and disease prevention. Patients participate in conferences and chart personal progress, thereby improving the outcome of their healing processes.

❖ **Healthy Life-Style Centers:** Centers that focus on wellness provide information on health rather than disease and illness. In addition to literature and videos, these centers offer classes on healthy cooking styles, smoking cessation methods, exercise, yoga, and meditation.

❖ **Skills Training:** Today's health-learning centers are not quiet little corners where one asks permission to use a big book out of the locked cabinet. Today's consumers want more than just printed words; they are looking for skills that can support their families' health needs. These might include parenting classes, CPR, and home safety.

❖ **Cultural Sensitivity:** Health-learning centers must provide information appropriate to the population(s) they serve. Information should be distributed in the appropriate languages. Funded by the National Institutes of Health, we recently designed a clinic that was specially focused on the disease affecting the Latino population. We brought the clinic out of the protected NIH campus and into the community where the incidence of disease was prevalent. The move provided a comfort level for this population, which positively impacted the research and outcomes.

❖ **Convenient Hours:** If we provide health information for today's consumers, it must be available when consumers can get there and use it. Convenient "after hours" availability is essential to success.

❖ **Engaging Teaching Aids:** Learning must be user friendly and engaging. One of my favorite examples is a concept for physical rehabilitation called "Easy Street." Created by designer David Guynes, many rehab facilities across the country now use "Easy Street." Simulated street scenes from the local neighborhood — including a bank with ATM machines, a supermarket with baskets, aisles, and canned goods, and vehicles that must be entered and exited — help patients regain skills needed to enjoy the real world. These teaching aids provide enjoyable and practical approaches to rehabilitation.

❖ **Food and Sociability:** Feed them, and they will come. That old philosophy still holds true today. Food and sociability attract people, and learning centers should provide refreshments. Access to food and drink can be integrated into a program such as a cooking class.

Montessori education presents a compelling model for understanding the medical environment. Marie Montessori, best known for her pioneering work in children's education, defined her goal as, "…the development of a complete human being, oriented to the environment, and adapted to his or her time, place and culture." Focusing on human behavior and universal needs appropriate for understanding in any setting, Montessori suggested that humans lack instincts to ensure survival as animals do. Summarizing Montessori, (Lillard,1992) said that Montessori noted that human intelligence allowed people to discover reality, thus allowing them to adapt to every environment from the desert to the arctic. Patients and visitors in medical environments face similarly daunting

challenges. Long-term care residence with advanced dementia can realize cognitive benefits from Montessori-based activities.

Montessori education programs were designed into our work with Dr. Michael Pietrzak on Meadow View dementia care facilities. For example, we created a "General Store" for Montessori therapy that contained attractive product displays that would be typical for a country store. The program engaged the dementia resident to take products, weigh them on a scale, count them, package them, and even restock the shelves. Residents would also go to the store to bring needed items for baking and cooking programs. The general store, with its attractive and familiar shelves, became a popular destination. Meadow View incorporated "Montessori Carts", which contain elements to make up each activity, such as a box of buttons where the activity may be to sort white buttons. There are various numbers of these carts each with different activities used throughout the facility. These Montessori based learning activities can be interesting and engaging (Montessori, 1995).

Sixteen residents in long-term care with advanced dementia (14 mostly women averaging 88 years old) showed significantly more constructive engagement (defined as motor or verbal behaviors in response to an activity), less passive engagement (defined as passively observing an activity), and more pleasure while participating in Montessori-based programming than in regularly scheduled activities(Orsulic, 2000). Principles of Montessori-based learning programs as reviewed here are becoming more popular in dementia care facilities, as these programs provide normal activities and positive distractions for these residents.

Knowledge as the Best Defense

Understanding the medical environment is critical to healing since understanding decreases stress, allowing the body to heal, and a lack of understanding creates fear. As a child, Jason Gaes experienced a cancer-treatment program at the Mayo Facilities in Rochester, MN. In his 1991 book, "My Book for Kids with Cansur," Jason describes this fear, "The rezin I wanted to write a book about having cansur is because every book I read about kids with cansur they always die, I wanted to tell you kids don't always die. If you get cansur don't be scared cause lot of people get over having cansur and grow up without dying…. Being scared is a bad part of cansur too. It makes you feel bad and makes your stumich hurt. And it doesn't help to be afraid anyway" (Gaes, 1977).

Jason describes various aspects of cancer treatment, including radiation and chemotherapy treatments, which, from his point of view, are not as bad as they look. Jason has done what many of us strive for — through description, he made it less scary for children who will follow him in the healthcare journey.

Consumer-minded adults also advocate knowledge as a catalyst to healing. The People's Medical Society publishes books directed at consumers of medical services. Their books provide consumers with information on how to survive medical experiences and hospitalization. For example, *Take this Book to the Hospital with You, A Consumer Guide to Surviving Your Hospital Stay* suggests that no one can represent your best interest better than you can, and knowledge of the hospital system provides the best line of defense (Inlander and Weiner, 1997).

Wayfinding

Wayfinding within a medical building is a cognitive solution to understanding the hospital environment. To maximize the visitor's ability to relax and heal, patients and their families must find their environments understandable and comfortable. We need a sense of place; we need to know where we are, how to get to our destination, and how to find our way back home. How do we create an understanding place, in a confusing, complex, and often hostile healthcare facility? Our environment provides sensory visual clues, such as landmarks. Unfortunately, most hospitals and medical centers are complex mazes of long and confusing corridor systems, with bends, turns, and foreign-sounding signs. Nothing looks familiar, and visitors, often stressed with demands of an illness, can find it frustrating to cope with confusing corridors.

Each visitor enters the medical facility with a personal reality; each has his/her own level of "knowing," and different levels invoke different needs. Some visitors—such as a first-time visitor who has never been in a hospital or has never had a healthcare problem—may not realize how different and confusing a healthcare facility is compared to a shopping mall or airport. For these people, the hospital may be more foreign than a distant country. The visitor lacks experience, and this can lead to great confusion.

Some patients, aware of their ignorance, don't want to know how to navigate. They want an escort to their destination. Other patients who lack appropriate knowledge will hide it. They don't want anyone to know they don't know. Other visitors enter the healthcare system aware of their unfamiliarity but are unwilling to stay that way. They will be proactive and seek out information. They may read up on their illnesses, get maps, and plan intently for the visits. They actively seek to become knowledgeable consumers of healthcare services. They want options and answers. This kind of patient wants to deal with the hospital experience and the illness on a cognitive level.

However, while these various types of visitors may each take a different approach, they are all striving for the same goal: to navigate the complex, high-tech medical environment of a healthcare facility at a time when illness, stress, and fatigue have depleted their emotional, physical, and cognitive resources. The basic ability for people to get from point A to point B, is a process called wayfinding.

Good Wayfinding Promotes Healing

Most importantly, good wayfinding design promotes healing, because being able to understand their environments provides patients and their visitors with senses of control and empowerment. These are key factors in reducing stress, anxiety, and fear—feelings that undermine the body's ability to heal (Arthur, 1987).

As Carpman and Grant found when analyzing the relationship between disorientation and design, "it is important to consider that wayfinding problems have their own particular cost in the healthcare environment. Stress caused by disorientation may result in feelings of helplessness, raised blood pressure, headaches, increased physical exertion, and fatigue. In addition, patients may be affected by the wayfinding troubles of visitors who, because they became lost, may have less time to spend with patients." (Carpman, 2001).

Successful wayfinding systems make financial sense. Costs associated with wayfinding problems are often hidden. Concerned staff members take time to observe a lost visitor, give directions, or even walk the visitor to his/her destination. This action requires a great deal of time away from their jobs and patient care in providing directions to lost visitors. In a study of a major tertiary hospital, it was calculated that $220,000 per year was attributed to wayfinding problems (Zimring, 1990). Successful wayfinding systems can contribute to better Press Ganey scores as Methodist Hospital in Henderson, Kentucky demonstrated by adding interactive display stations. These stations have two languages to provide directions, and use friendly touch screens, which are easy to navigate. The station has a phone with two languages to provide directions.

Being lost also contributes to late and missed appointments. The infrequent hospital visitor typically lacks the ability to judge how long it will take to navigate the unfamiliar environment (Zimring, 1990). Being lost is also disempowering. The wayfinder often feels that it is his/her fault that he/she is lost. He/she may not understand the terminology, language, or the circuitous pathways, and that person may hesitate to ask for directions (Passini, 1992).

Ensuring that patients and visitors feel comfortable with basic navigation from the beginning as they approach and enter the facility not only reduces stress and frustration. It also communicates to everyone who enters the structure that the facility is organized, professional, and capable. In today's economy, with many institutions vying for increasingly scarce consumer healthcare dollars, it's more important than ever that providers consider the image they are presenting to the outside world. Further, putting patients and their visitors at ease with a sense that the facility is well-planned and orderly brings other benefits as well. Patients and their visitors are more likely to arrive for their appointments on time and with a trusting and open attitude toward staff. Research does support the value of good wayfinding systems (Ulrich, 2004). There are more than seventeen studies that address components of good wayfinding systems in hospitals. When addressed, wayfinding can make a significant contribution to the institution, the visitors, and the staff.

Good Wayfinding Supports Healing

Healthcare facilities are the most complex buildings that are accessed by the public. Nonetheless, healthcare facilitates do understand that wayfinding problems exist and their wayfinding characteristics are problematic for their institutions as well as the visitors they serve. Redesign of a wayfinding system offers several benefits. Good wayfinding promotes:

❖ Reduced stress and frustration for the visitor;

❖ Functional efficiency;

❖ Visitor accessibility;

❖ Safety;

❖ Patient empowerment, improving cognitive skills in spatial understanding; and

❖ Improved bottom line (Passini, 1992).

The benefits are proven, and the need is great. How then, can the confusing, complex, and often hostile environment of the healthcare facility be transformed into a space with user-friendly, manageable, and intuitive wayfinding? For starters, let's discuss what wayfinding is, in more detail.

Wayfinding Defined

Wayfinding is a person's spatial behavior or orientation. Spatial orientation is the static relationship to space or the environment. The concept of spatial orientation is the predecessor of wayfinding. This relationship requires the user to form an overall mental image of the place's layout. This image is referred to as the cognitive map of the setting. Cognitive mapping concerns the ability to visualize a map, and wayfinding uses the cognitive-mapping process to solve location-based problems.

Unlike spatial orientation with its static relationship to space, wayfinding is a dynamic relationship to the space. It is dynamic in that people's movement with their direct sense of orientation to place must be accommodated as a spatial problem-solving process with three specific and interrelated processes: (1) decision making and the development of a plan of action; (2) decision execution, which transforms the plan into appropriate behavior at the right place in space; and (3) information processing, understood in its generic sense perception and cognition, which in turn are responsible for the information basis of the two decision-related processes (Passini and Arthur, 1992). Wayfinding is a three-step decision making process:

1. "I need to locate the patient in room 224", creating the plan
2. "I need to find the elevators to the second floor and locate room 224" and third executing the plan
3. "I recognize the elevators, I exit on the second floor, and I locate room 224".

To accomplish the problem-solving process, the wayfinder relies on five particular wayfinding skills.

These five factors are crucial for successful wayfinding.

1. Knowing where you are ("I have just arrived at the front door of the surgery center.").
2. Knowing your destination ("My instructions from my physician's office indicate that I need to check in and register with the information desk.").
3. Knowing which route gets you to your destination ("The information receptionist told me to follow the signs to the elevator and take the elevator to the third floor surgery waiting room and check in desk.").
4. Ability to follow that route ("I need to locate and interpret appropriate signs that lead me to the elevators, exit the elevator on the third floor, and locate the surgery waiting room.").

5. Ability to identify when you have reached your destination ("This appears to be the surgical waiting room, and the desk is most likely for registration.").
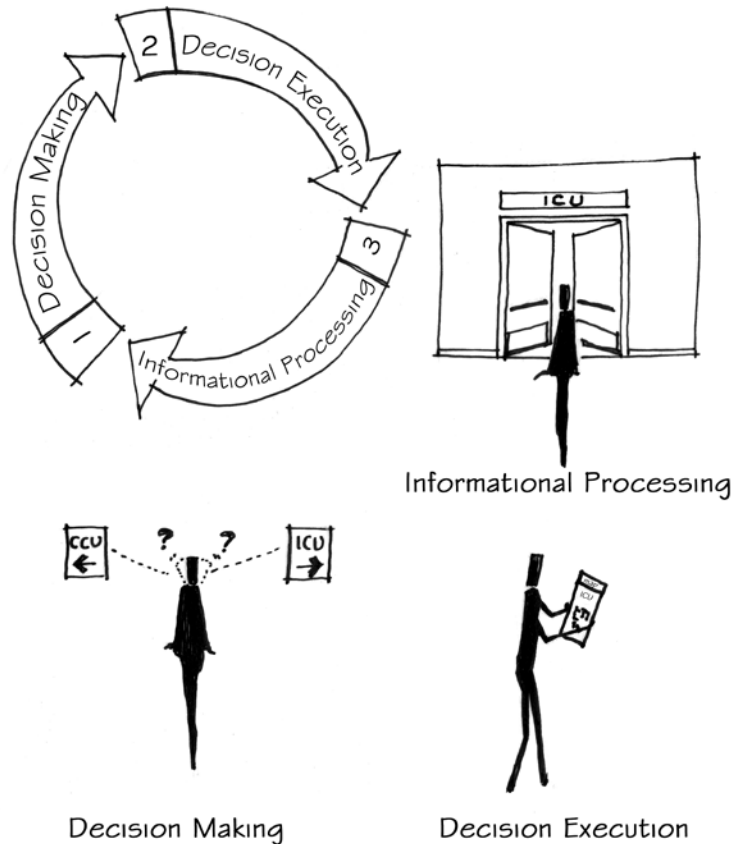
Figure 9-2. Wayfinding Spatial Relationships: Wayfinding requires a three step process to successfully negotiate the medical environment.   ILLUSTRATION: Patricia Raimondeau

Time to Wayfind

Merely having a destination or having the skills previously mentioned does not typically solve wayfinding problems in healthcare facilities. The visitor may not know, prior to arriving at the facility, how long it will take to arrive at the final destination. Only after this visitor arrives, and perhaps only after attempting the trip once, can the length of time needed to

make the entire trip be accurately estimated. No one enjoys being late, and likewise, people do not enjoy waiting needlessly. To ease the resulting stress, a healing environment must display appropriate information concerning the length of time it takes to get from the front doors to a particular destination available.

As patients and visitors embark on their journeys to and through the healthcare facility, they bring previous experiences with them. They look at what they see and evaluate it in context. Wayfinders will then try to understand the spatial characteristics of the environment. With this information, they consider the signs, maps, landmarks, and other indicators to understand the place. They will then examine their options and determine the best routes to their destinations.

What Makes a Good Wayfinding System?

Good wayfinding systems consider the knowledge of the wayfinder as well as tools and clues to aid in successful decision making and clear recognition of pathways and destinations. Tools of good wayfinding are components designed to support spatial orientation and cognitive mapping. Redundancy and overlap of these tools are also helpful to assist people with varying cognitive skills. They do so in four ways.

1. Some people are cognitively focused, relying on maps and written directions.
2. Others respond to verbal communication, where one person explains directions to another.
3. Others respond to visual cues such as landmarks, colors, and noticeable features.
4. Some gain understanding primarily through action.

For example, signs may not be the language of the user. Graphic arrows, color cueing, and pictographs may support the text. A successful wayfinding system also considers the process in which people receive information and establish a sense of spatial orientation. A good wayfinding system is redundant and supports all four methods.

Wayfinding Building Blocks

Good wayfinding is possible for hospitals. Each building has a natural circulation system based on paths selected by users. A good wayfinding system takes advantage of that, and such a system consists of numerous components that, like stacked building blocks, rely on each other for a solid foundation. Good wayfinding assembles these blocks in an understandable manner, as described below.
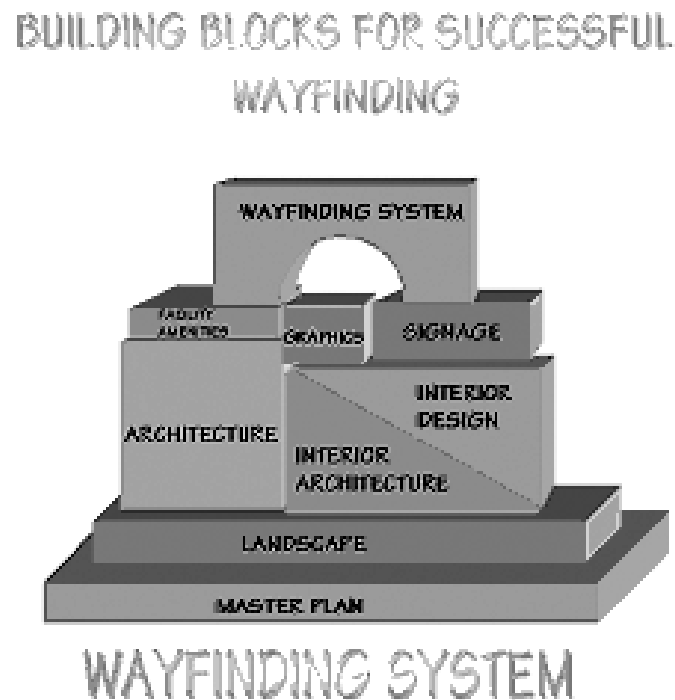
Figure 9-3. Wayfinding Building Blocks: Good wayfinding is a system with a good foundation that relays diverse components within the facility.   ILLUSTRATION: Barbara Huelat

Master Plan

Sometimes, hospitals and medical communities consist of a series of buildings that start out simply, with a main entrance and a primary corridor to main elevators. Yet over time, the facility may grow, interrupting the original pathways. With each expansion, buildings get new spaces, new entrances, new elevators, and new circulation pathways. Buildings become denser, corridors become circuitous, and a few landmarks start to exist. A signage system can be added, but it is often inadequate for the visitors who become hopelessly lost. But with a master plan, this confusion can be avoided. A good wayfinding system can be built upon the solid foundation of a facility's master and site plan. A good master plan considers the facility's growth and expansion. With the help of such a plan, wayfinding is still easy for people after the original facility has expanded. The master plan addresses how visitors will use future expansions—it evaluates how visitors enter buildings, find new elevators, and how buildings interconnect. In short, the master plan establishes good circulation pathways.

Landscape

The second block is the landscape on the site. Trees, plantings, flagpoles, water features, and outdoor furnishings are elements that can be strategically placed to lead to building entrances and other desired destinations. Elements of the landscape can also provide memorable landmarks to mark the pathways.

Interior Architecture

The third block is the building's architecture, which has a direct relationship to ease of use. For example, windows in corridors aid in visitor orientation. Essential architectural elements—entrances that are easy to identify, clear pathways, easy-to-see visitor elevators, and landmarks that create visual cues at decision points—contribute to a good wayfinding system.

Interior Design

Interior design can work in conjunction with a building's architecture to optimize a wayfinding system, supported by color palettes, materials, and lighting. For instance, interior finish materials can delineate visitor pathways from staff pathways, and varying color palettes with departments or floors can facilitate wayfinding. While lighting makes signs more visible, it can also provide direction on circulation pathways.

Architectural Planning

Unfortunately, most medical centers are not designed for people to easily find their way around. Rather, the focus is on medical protocol. Often, the circulation system of entrances, bridges, connectors, corridors, and elevators is confusing, even for a seasoned user. Corridors are rarely set up on a grid system, like those used in city planning. In fact, with the exception of recently completed facilities, few model systems exist. However, a good architectural plan, which considers the building's function and the flow of people and equipment through it, is an essential component of a successful wayfinding system. Good architectural planning creates buildings with direct pathways that are simple for all users to navigate.

Signage

Signs can build on good interior design to perfect a wayfinding system. In a medical setting, signs provide four types of information:

1. **Informational** [where to find assistance, hours of operation, etc.],
2. **Directional** [i.e., For the Radiology Department, Turn Left],
3. **Identifying** [identifies an area, such as the oncology department],
4. **Regulatory** [i.e., Radiation in Use]. All types should be incorporated into the design in a logical, consistent, and user-friendly way.
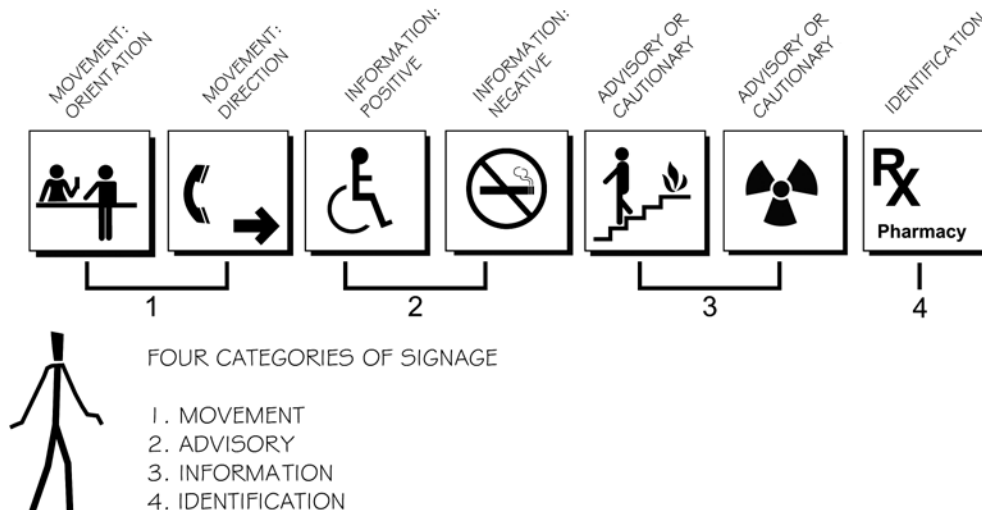
Figure 9-4. Signs are part of a family of signs, each sign provides diverse information including movement or directional signs, information which includes directives, advisory including regulation signs, and identification which are all of the room and departmental signs.   ILLUSTRATION: Patricia Raimondeau

Graphics

Graphics also contribute to a good wayfinding system. The adage that a picture is worth a thousand words is especially true in wayfinding. Using symbols, wayfinding graphics should repeat the messages from signs. This technique helps communicate with those who do not read. Even preschool children understand the international symbols for "No Entry" and "Bathrooms". Other common symbols—those for telephones, ATM machines, and changing stations—also help in wayfinding. Symbols also assist those who may be too embarrassed to ask. Wayfinding graphics should consistently use the facility's logo, and it should appear on signs, printed material, and badges worn by staff. This consistency shows that all messages come from the same facility. Lettering should be easy to read.

Facility Amenities

Facility amenities include all services that make wayfinding easier. The best wayfinding amenity is people on staff who show that they care about visitors' abilities to find their destinations. Visitors usually feel comfortable questioning staff members, and conspicuous name badges should identify them. Optimally, staff can even identify lost visitors and offer help before they ask for it.

Information desks staffed with smiling people are helpful and hospitable. Some facilities provide valet parking, and this makes parking and finding the front door easy. Buses that are clearly marked can shuttle visitors from remote parking areas to a variety of destinations and make the hospital experience less stressful.

Visitor information centers, like the concierge desk in a hotel lobby, can receive visitors and provide a variety of functions. Most importantly, the center is the identifiable place where visitors and patients can ask questions. Visitor information centers need to provide basic information about services, procedures, and locations of departments, bathrooms, and restaurants. The centers must be both centrally located and the first thing visitors see when they enter the facility. The people who staff these centers are as important as the place itself. The staff should be able to demystify the environment and give clear, appropriate directions. A happy, smiling face should greet visitors and assist in the arrival process. A pleasant face can do much to alleviate the visitors' fear and anxiety.

Finally, nothing is more basic to good wayfinding than a map. In clear graphics, the map should include the name of the facility, major locations, an arrow that shows which direction is north, and a you-are-here identifier. Maps become even more useful when a staff member reviews the map with the visitor and traces an appropriate path for him or her. Maps should be posted at key entrances, elevator banks, and transitions between buildings. Directional signage supports the map's directions at all major intersections.
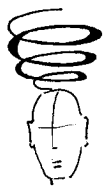
Progressive Disclosure

As large complex facilities with a wide variety of services and destinations, airports face challenges that are similar to hospitals. (Many travelers like hospital visitors are not familiar with the layout and may be tired and stressed.) However, airports are often better designed. Why? Successful airport wayfinding relies on the process called progressive disclosure, which provides only enough information necessary to get the visitor to the next decision-making point. For example, as travelers approach the airport on the highway, airport wayfinding provides them only with information regarding the appropriate exit. Then, once the travelers have exited, the signs provide information concerning parking locations and drop-off areas. Airports do not provide parking information on the highway signs.

Hospitals rarely employ this model, and they tend to provide too much information at inappropriate locations. Signs should direct hospital visitors with the same ease as those for airport travelers to and through airports. While road signs frequently identify hospitals from highways, airport signs should continue to direct people after exiting the highway. The progressive-disclosure method, as used in airport signage should direct people to correct buildings, hospital parking, and patient drop-off areas in a sequential manner. Once in the buildings, the method should direct wayfinder to the next decision-making intersection. Each sign should offer no more than three possible directional options.

Wayfinding Checklist

In summary, the following components are helpful in creating an understandable environment for the visitor:

✔ Apply the progressive-disclosure model of wayfinding.

✔ Identify all parking, buildings, and entrances.

✔ Use consistent graphics, color, and logos.

✔ Create a user-friendly handheld map, and repeat that map in lobby directories.

✔ Develop an appropriate wayfinding system that is specific to your facility.

✔ Incorporate environmental cues such as landscapes.

✔ Include windows in corridors for outdoor orientation.

✔ Design main entrance drop-off areas.

✔ Offer valet parking.

✔ Provide easy and well-identified parking.

✔ Clearly delineate handicap parking and access routes.

✔ Establish clear routes to primary destinations.

✔ Train all staff in giving directions—the same way to the same place.

✔ Have a highly visible visitor-information center.

✔ Develop a sensible room-numbering system.

Wayfinding Checklist (continued)

✔ Identify all destinations in the same vocabulary.

✔ Use symbols and icons to bridge language barriers.

✔ Provide clear, concise, and consistent signs that have strong contrast and visibility.

✔ Clearly light all signs.

✔ Use lighting to feature landmarks.

✔ Provide easy access to patient education.

✔ Offer learning centers with extended hours, high visibility, and a friendly staff.

✔ Differentiate public elevators from staff and clinical elevators.

✔ Display clocks in primary waiting areas.

✔ Provide telephones in emergency areas, waiting areas, entrances, and dining areas.

✔ Clearly identify restaurant and toilet facilities.

✔ Provide guides and wheelchair transportation for visitors in need.

✔ Avoid convoluted corridors.

✔ Remove clutter from corridors.

✔ Post estimated journey times.

What Neuroscience Tells Us

The Academy of Neurosciences for Architecture (ANFA), a subset of the American Academy of Architects, is an organization with the mission to promote and advance knowledge that links neuroscience research to a growing understanding of human responses to the built environment. According to their website this organization studies the links between the science of neurology with the brain's response to the built environment.

Research in the field of neuroscience has grown exponentially in the last 10 years. The data generated by researchers in this field is extensive, however there has been minimal evidence bridging the built environment with neuroscience. We understand that neuroscience is both the science of the physical organ of the brain and the study of how the mind processes things. Neuroscientists study the brain at the level of molecular biology, as well as perception. The link between this science and the built environment is complex. However, the academy is working with neuroscience to create meaningful studies that can be incorporated into meaningful information to consider in the healthcare environment.

The academy has investigated neurosciences within architecture in three different types of environments: education, sacred space, and healthcare. A workshop was held in Woods Hole, Massachusetts to investigate the neuroscience and architecture for healthcare in August 2005. The invited guests include specialists in the fields of neurosciences, healthcare architecture and environmental scientists. The workshop addressed what research has been done, where the gaps were, and what could be done to fill the gaps. The goal was to identify what knowledge exists that links areas of the brain to elements of architecture that can affect health outcomes (Edelstein, 2005).

It is going to take many years of research before such intriguing questions seemed to be posed. with their solutions applied to architectural practice, but that's the challenge that makes this frontier of discovery so exciting (Eberhard, 2003).

The human brain, the center of knowledge and consciousness, is the new frontier in understanding our perception of the environment. It is vast, mysterious, and was largely unexplored before modern science began to illuminate it. The next chapter, on Empowerment, will probe deeper into perception, emotions, and experiences that specifically link our health to the environment. Knowledge, as discussed in this chapter, is power, and sharing that power brings empowerment.
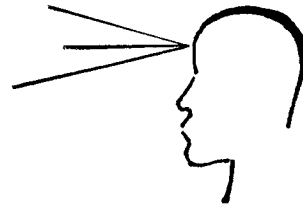
Empowerment

LIFE IS NEVER MADE UNBEARABLE BY

CIRCUMSTANCES, BUT ONLY BY THE

LACK OF MEANING AND PURPOSE.

~ Victor Frankls

Empowerment

W E HAVE DISCUSSED THE FACT THAT KNOWLEDGE is power, and this shared knowledge affords us empowerment; however, empowerment itself is somewhat ellusive. It cannot be written out as a prescription, or accomplished through surgery and yet is critical to successful healing. Empowerment moves our beliefs from the curative model of something being done to the body (having no control), to a healing model in which well-being happens from within an individual (empowerment). A gift to an individual's belief system, empowerment allows the mind to give the body permission to heal, while actively engaging its own healing process.

Empowerment of the mind requires support of an individual's belief system. Our belief system, whatever it may be, is our link to the body/mind healing connection. Our beliefs and expectations shape outcomes. Medical practices and healing outcomes are closely linked to the beliefs of a culture's social, economic and religious practices. In our Western culture, we use numbers and measurements to determine if we are healthy and if a healing practice is successful. We monitor blood pressure, check blood count, measure blood sugars, weight, and height, and compare our results with others of the same gender and similar statistics. We use the resulting numbers to confirm our state of wellness. Lab tests and diagnostics are part of our modern day medical belief systems. Doctors can tell by looking at the numbers on a lab sheet whether or not we are sick — often without having to look at a patient's face.
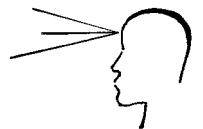
Empowerment is an essential component for healing places that embrace the whole body. "Descartes was the first to suggest that the body did not need the mind to properly function, heightening respect for the machine-like qualities of the body that have become the dominant focus of contemporary Western Medicine." (Benson, p67)

What We Can Learn from Scientific Disciplines

Empowerment is having a sense of control of a situation. Most patients lose their sense of control when entering the healthcare environment. Much like a jail, they take away your, cloths, they assign you a number, you loose your privacy, you must eat when they tell you and what they give you and you are restricted in your access to family and friends. When you lose your sense of control of your environment, you may feel that you have little or no control over your health and recovery processes. Environmental psychology tells us that we must have a sense of control over our world for health and well-being. Kopec 2006). James Averill, a professor of oncology at Lincoln University, suggests there are three types of this control:

1. **Behavioral Control**, which addresses our ability to change an environmental event, such as lighting and temperature;

2. **Cognitive Control**, which is the ability to change the ways way we perceive our environment, such as our abilities to understand medical jargon and treatment plans and

3. **Decision-making Control**, which is the ability to choose how we respond to an event, such as partnering in treatment plans, or having access to family after visiting hours.

(Kopec, 2006)

A well-constructed design for the healing environment can strengthen the existing sense of control. It is important to remember that control must incorporate the behavioral, cognitive and decision-making process. The most successful designs to support empowerment are intuitive, in that controls are where you would expect them to be, for example, lighting and temperature controls would be in easy reach of the patient. This would ensure the ability of the patient to directly access them, and he/she would not have to ask a staff member access them. Empowerment should extend to the staff as well. In so doing, they will have all functional items at their fingertips which will greatly reduce time spent searching for them.

The medical environment is a stressful environment for all – everyone including the patients, family and staff. In order to give the qualities of a healing environment, one must seek methods that reduce stress, while enabling the healing process. Stress is not only a chal-

lenging emotion, but also one of the greatest threats to the empowerment of patients. It can contribute to both an illness and the outcomes of a patient's recovery. The role of stress in the environment was first linked to Dr. Hans Selye, a pioneer in psychosomatic medicine, who first attributed the term "stress"

Stress to the body/mind relationship describes stress as the rate of wear and tear within the relationship. He described well as the induced changes within the body. Kenneth Pelletier, author of *Mind as Healer, Mind as Slayer*, describes stress as an integral element necessary to all living things in order to effectively cope with their environment. Stress is both a necessity and danger.

Stress Can Make Us Sick

Consider taking a sick child to the hospital. She has been out of school for the last few days, and you think she just had the stomach flu, but today it has taken a turn for the worse. Your child has been vomiting and is in a great deal of stomach pain. You gather her up and listen to her painful cries in the back seat. You missed the turn off to the hospital. You finally get there, but every place you try to park is designated for someone else, the doctors, the chaplain, the volunteers – where is emergency parking? You rush in with your crying child, and the nurse says that she will take her from here, while you are to fill out the forms. You hear your child crying in the distance. You can't think straight. You can't even remember your phone number. They tell you to wait in the waiting room; all you want to do is see your child. The stress, the fear of the unknown continues to mount. It seems like hours before someone calls you, only to find out that she needs emergency surgery. It turns out to be appendicitis. Although not a life threatening issue, the event evoked high stress.

We have all dealt with life's stress. We push ourselves, mentally, physically and emotionally to cope with stressful situations. As stressful as the situation is, when all is resolved, we push it from our memory. Resolving the situation is the best way to heal ourselves of the stress. Dr. Esther Sternberg, a neuroscientist, says that we can and do get sick from stress. During a stressful event, our released hormones change ways our bodies defend themselves. Stress has a direct route to the immune cells. Hormones and nerve pathways kick in when we are stressed and may make us prone to sickness by interfering with the ways our immune systems ability to cope with disease. There are different ways individuals respond to stress. Stress when your child is in the emergency room, your stress level may mount to the point of feeling hopeless, making stress spin out of control. However, once the situation has stabilized, you quickly control your stress. If the emergency had not been resolved and manifested itself into a chronic illness or a disease, where the stress was prolonged for months or
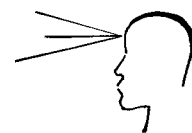
even years, the stress could make you ill. We know that short-lived stress is important to aid in reacting quickly to an emergency, so when does stress turn from good to bad, in regards to your immune system (Sternberg, 2000)?

Part of this answer is the response time of various actions within the immune system. For example, the response times for the hormonal stress to react to stimulus occur within milliseconds, seconds, or minutes. However it can take the immune system hours or days to respond to the invader. So it is unlikely that a single, powerful stressful event would have much impact on the immune response. However, if this stress event turns chronic, the immune system begins to be affected negatively. When stress continues indefinitely, a stress hormone called cortisol is pumped out. If unchecked, cortisol shuts down the immune
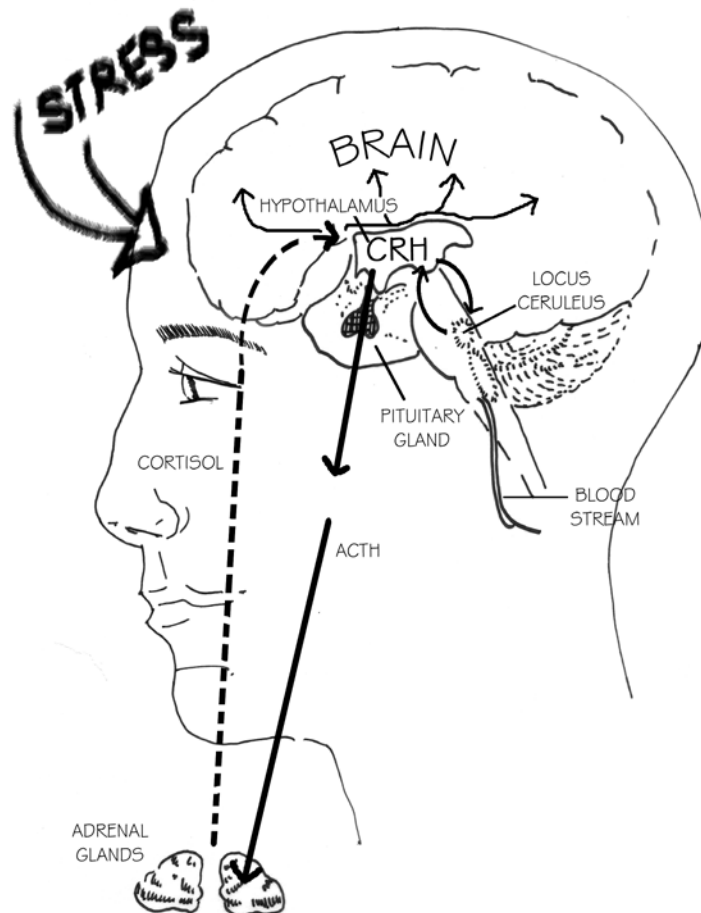
Figure 10-1. The stress response within the brain is made up of many pathways which interconnect the brain with glands and other parts of the body. When encountering stress, it is the hypothalamus that triggers the signals coming from the blood stream or nerves. The hypothalamus then sends out the CHR molecule (corticotrophin – stress releasing hormone). This action then triggers the pituitary gland to make cortisol. Cortisol affects many parts of the body where it actually shuts down CRH, which aids in controlling the negative effects of stress (Sternberg, 2000). ILLUSTRATION: Patricia Raimondeau

cells, and they become less able to fight the new cortisol invaders. A chronic load of stress accumulates and eventually takes a toll on aspects of health (Sternberg, 2000). "Chronic stress of any sort results in increased cortisol, which should attenuate immune responses and make the host more susceptible to infectious disease" (Sternberg, p115).

The types of stress that deplete the body's immune system are chronic illness, physiological stress and chronic psychological stress. "Our perception of stress, and therefore our response to it is an ever-changing thing that depends a great deal on the circumstances and setting in which we find ourselves. It depends on previous experiences and knowledge, as well as on the actual event that has occurred. And it depends on memory, too" (Sternberg, p121).

In his book *Creating Health*, Dr. Deepak Chopra, MD reminds us of our commonly held belief that stress is something that comes from outside of ourselves — like noise and chaos. He continues by explaining that stress is actually part of our response mechanisms for our own perceptions of an event. This distinction becomes critically important to our discussion. If stress is not an outside force acting on us, but rather our reaction to an event or occurrence, it becomes clear that we do have some measure of control over our responses. Chopra explains that cortisol hormones are secreted in response to stressful events, and he uses as an example, a study that shows there is an increase of this hormone in people who have been scheduled for surgery. The most surprising part is that detailed study reports concluded that it was not the surgery itself that caused the increase in the cortisol, but the anticipation of the surgery that caused the level to rise.

The medical environments, which patients trust to cure and heal them, have many elements that can contribute to stress and are counterproductive to healing. These environments can actually cause harm. Environmental stress challenges our health and our ability to heal, because it can include clutter, disorder, toxicity, sensual, electromagnetic, and chemical pollutions including sensual, electromagnetic, and chemical, and unhealthy diets. Our environments are extensions of ourselves; we adapt our personal spaces — such as our homes and workspaces — to our individual needs. Home should be a nest of comfort and security for us, and it should become our ultimate mode of self-expression and personal identity. Since our "nest" and personal surroundings are so closely linked to our emotions, they should be free of stress inducers as much as possible. We clean our homes, removing unpleasant smells and dealing with dirt and clutter, and control the temperature for ourselves. We take an active role in creating environments that meet our personal needs and lead to our personal satisfaction, knowing that home should be our center of harmony — and free from stress.
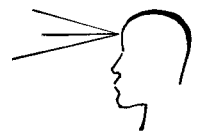
Interpersonal Distances

In the healthcare environment, privacy is greatly compromised. Even with diligence to support physical and verbal privacy, security, and even patient dignity, emotional privacy is greatly at risk. Emotional privacy deals with the individual's comfort level of the interpersonal interaction of people and the surrounding environment. Environmental psychology tells us that we have four interpersonal comfort zones:

1. **Intimate Comfort Zone:** Zone of the most intimate encounters such as spouse, parent, children or close friend.

2. P**ersonal Comfort Zone:** A wider zone to include casual friends and acquaintances such as someone from church, the office, or the bridge club.

3. **Social Comfort Zone:** This expanded zone includes people of similar interests, exposures, culture and communities. They may be people that are unknown personally, but accepted within a group because of a common affiliation.

4. **Public Comfort Zone:** This is the comfort zone where people are in the company of strangers, but are brought together by a common need, such as in public areas, on the streets, in hospital buildings or waiting for public transportation (Hall, 1969).

An individual will tolerate the disruption of personal space when he/she feels secure and empowered. However, when he/she feels at risk, vulnerable, or insecure, the individual will be less able to tolerate the breach of his/her comfort zone. The comfort zone of a person that is hospitalized, or even being seen in a doctor's office, is often at risk due to the stress resulting from being in the unfamiliar medical environment, and the necessity to physically invade the zone for medical protocol. Design can address the comfort zone with spacing apart from furnishings to help maintain the individual's comfort zone, by using accessories and positive distraction to change the perception of the spacing. The designer must understand the specifics of the medical function and then plan the space for the patient's comfort zone.

Broad environmental stressors, such as those we find in our workplace, community, and social places are more difficult to control. The cumulative effect of these stressors can negatively impact our health and well-being. Throughout my practice, I have observed how our environment is perceived at six different levels — from intimate to global, and I have discovered that the more personal a space is, the greater its impact on our well-being.

❖ **Level 1:** Our skin, face, hands, feet, and most intimate body parts are our most personal places. We've all heard the saying "being comfortable in your own skin," referring to the comfort we feel within our own bodies. This is the space in which we are generally the most empowered. We hug

and kiss only those we love, and we extend our hands to others only with a personal invitation. We only let a few select people into this, our most personal environment.

❖ **Level 2:** Clothing is the next level of personal intimacy with ourselves, and again we typically have control over this aspect of our personal space. We select colors and fabrics that please us, that we find comfortable, and that make a statement to the world.

❖ **Level 3:** The third level of environment is the personal space in which we have physical contact with objects; the physical contact of a favorite chair, for example, or a bed, or a task chair at the office. We are typically still empowered at this level because we are able to choose our own bedding and the chair in which we prefer to curl up and relax.

❖ **Level 4:** The fourth level is the home. It is at this level of a personal environment where "other" is likely introduced into the equation of environment as it is at home where we share our space with family members. Because home is typically a shared space, it is at this level where we start seeing stressors, which deplete our empowerment. Lights may be too dark to complete a task, or family members may be less organized than we are, leaving clutter about and in the way.

❖ **Level 5:** Moving from the home and into the workplace, we often have even less control over our environment. We may encounter additional environmental stressors such as office clutter, noise, lighting, and technologies.

❖ **Level 6:** The last level of environment is the broader community of the world, in which we live and interact. It is here where we find ourselves with very little empowerment over our surroundings.

The greater our empowerment over our environment, the less we are impacted by environmental stressors; the further we move from our most intimate spaces, however, the greater our risk of being exposed to stressors. This does not mean that we must withdraw to our most intimate surroundings, but there are many ways we can actively participate in shaping our spaces, whether intimate or global. We can adapt and rearrange our spaces, move from them, create distractions, and make the spaces more comfortable and, therefore, less stressful. Like a snail in its shell, we carry our personal spaces with us wherever we go. Creative and resourceful, we regularly adjust our spaces. This can be in the form of something as simple as putting on a sweater when we are cold to implementing a major renovation to provide more comfort for ourselves and our families.
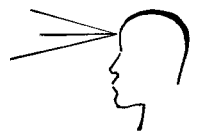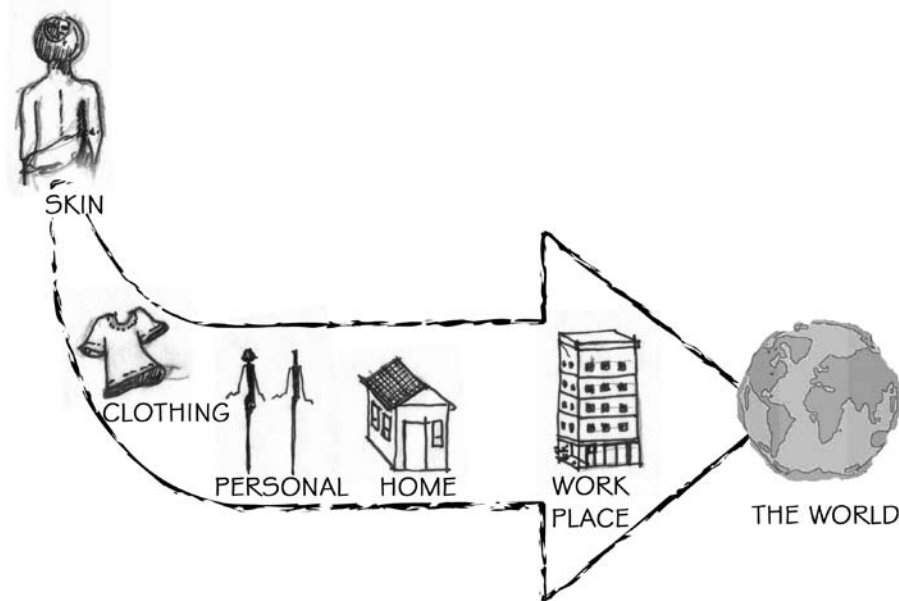
Figure 10-2. Empowerment is achieved by control over one's personal environment. The stress hormone cortisol can increase as one gives up control and moves the interpersonal to the external global environment. ILLUSTRATION: Patricia Raimondeau

Crowding is a stressor and major breach of the comfort zone. Crowding refers to the perception of being physically encumbered by space and/or people. Regardless, if one is crowded by too many people or too little space, the reaction is stress. This affects our emotions and is displayed in behavior. Once encumbered by this stress, one loses control with few to no recourse actions. If a situation like this occurs, such as being in an overcrowded waiting room feeling they will never be seen, the options may be to leave, yell at the receptionist, become belligerent, or just sit there and seethe. If one is physically crowded, such as when on a stretcher crowded with four other stretchers in a crowded triage area on a busy night in the emergency department, the stress may be manifested by indicators like perspiration or cardiac function. Increased crowding equates to increased levels of stress. (Kopec, 2006) For example, one can increase the perception of ceiling height when the floor "footprint" is tight, or keep the temperature cooler in rooms that tend to be overcrowded.

Building codes and healthcare guidelines provide standards for minimal space requirements for varying medical spaces. However, it is often difficult to anticipate when special conditions like a physical exam that will compromise privacy into an individual's comfort zones. Therefore, it is important to plan and anticipate those areas that require flexibility, particularly in emergency departments and waiting areas. In addition, this is an opportunity to include positive and visual distractions that alter the perception of space.

Large crowds, especially in cases of natural disasters and mass casualties involve emotional and negative circumstances. We saw this behavior in the New Orleans Hippodrome during Hurricane Katrina. The emotions and negative excitement of the crowds, lack of information, and crowd perception become contagious. Emotions become intense and lead to causing rational behavior to be lost. This emotional behavior can lead to a frenzied state where the emotions themselves take over, creating an unstable environment.

Crowd control and mitigation have become major design challenge for our project of "ER One". ER One, as mentioned earlier, is an emergency department being designed for natural disasters and mass casualties in the Washington, DC area. This project contains unique designs including flex space, which allows the space to grow, alter, and change as a situation changes from standard work flow to a contingent situation. This project also includes a separate space that provides people with current information as to what is happening. For example, the everyday coffee area includes a beautifully designed video wall that provides morphing images of nature. In the contingent situation, the nature scenes become emergency broadcasts that provide the latest news and facts about the emergency situation.

Patients are often physically, emotionally, mentally, and cognitively compromised. Although this compromised state may only be temporary, the outcomes can impact the person's health and well-being. Evolutionary anthropologists suggest that people prefer defined edges between open areas and enclosed shelter. This concept is called "prospect-refuge theory" (Wilson, 1984). It suggests that we seek shelter or refuge when we need respite and recuperation. However, we also require visual access to the bigger picture, the large scope of the environment. We desire to feel secure, but we also want to know what is happening around us. The real estate market confirms this, as the most valuable real estate offers the shelters with the highest levels and best views.

Prospect–refuge is important to take into consideration when designing areas of multiple treatment spaces such as infusion, chemotherapy, dialysis, and emergency areas. The design needs to provide a defined, secure refuge space that offers the personal control of their individual space. It must also provide access to the bigger picture, such as action areas of the nurse station or caregiver zone. Ultimately, you will want to provide this patient with as many controls as possible, such as light and temperature, privacy and sociability, entertainment, family, food and drink, and as well as ongoing access to information. When some of these controls are not possible, it becomes highly critical that the design includes the perceived security of prospect–refuge. This can often provide perceived control and comfort, offering the patient's visual access to the caregiver team and the team's perceived ability to deal with the compromising situation.
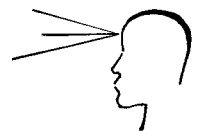
Another factor that impacts a patient's empowerment is their state of health. A well, ambulatory patient, such as one who is visiting a doctor in a clinic, has a great deal of control over his or her personal space. A negative clinic environment, however, can influence a patient's level of stress. A waiting room full of crying children, for example, or one that is simply too crowded can elevate feelings of stress. As a patient's level of incapacitation increases, his or her level of empowerment decreases. In a hospitalization, for example, when confined to bed or a nursing unit, environmental stresses begin to encroach on an individual's ability to affect his or her own environment. In these situations, patients may generally have little control over their levels of comfort. They rarely have any control over room temperature, lighting, or even their own beds and bedding. Environment is reduced to what they can reach, feel, or experience from the spaces of their beds.

For a patient in an ICU, environment is even further restricted to what touches the skin. The entirety of their environment becomes what a patient feels, sees, or hears: the tape that holds a breathing tube, medical equipment attached to the body, or beeps and flashing lights from monitors. It is in this most restrictive environment that a patient has the least control. Sadly, many of us leave the world in this environment.

Often the most hostile of medical environments, ICUs offer patients little comfort and no control over their personal space. Stressors mount, weakening the immune system — which, under normal circumstances, is intricately designed to protect our bodies from harm and disease. Confinement and its resulting loss of empowerment negatively affects our immune system just when we need it most to help combat illness or injury. For example, we may perceive an occurrence (the stressor), like being lost in a medical facility, as a negative event, which in turn stimulates a mental reaction (the stress). We become tense, frustrated, and nervous, and we feel anxious as questions and scenarios begin to play in our minds: "I can't find the radiology department. I'm going to be late. What if they cancel the test? And if they cancel the test, will the surgery be cancelled for Friday?" Finally, the fight-or-flight response — which is an automatic physical reaction to stress — is set off as a result of the frustration and anxiety of being lost.

"When physical danger is perceived, the mind/body takes all the steps necessary — including an increased heart and pulse rate and a flood of adrenaline — so that we can fight to our maximum capability or run away as fast as possible." (Benjamin, p15) "Today, the fight-or-flight response is still a vital importance so that we can react quickly to the threat of physical injury, and in short bursts it will do us no harm. However, in this more civilized era, anxiety can last for months, years — even a lifetime — and it is this long term, unremitting stress that causes the problem." For example, if your child has a prolonged serious illness, coupled with environmental stressors, the results may be felt in severe suppression

of the immune systems over time. (Benjamin, p15) Hans Selye, the preeminent pioneer in stress research, theorized that all of us have only a limited quantity of energy available for our bodies to use to adapt to both physical and mental trauma. If we use too much energy adapting to mental trauma, we may not have enough left to adapt to physical problems, such as illness caused by bacteria, viruses, or foreign cancer cells.

Biofeedback researcher Dr. Barbara Brown believes that any internal process can be learned and once learned, it can be controlled by patients when they have access to the right tools. Biofeedback, and other tools like it, give rise to one of the most important questions of modern medicine: If we can consciously control our skin temperature and other "automatic" responses, can we control our immune systems? These are tools of empowerment available to us to strengthen the immune system to use its full power (Brown, p451).

Examples in biofeedback have led me to believe that we, as designers and healthcare professionals, do have the ability to control environments, and by sharing control with patients, we help empower. Once a patient has some degree of control over the elements of the environment, he or she is better suited to assume some control over choices in his or her health care. We have the ability to change and understand our attitudes, and to move away from stressors or even provide positive distractions to combat their effects. The way in which an environment is designed can, and does, have a positive influence on patients, which, in turn, can have a direct impact on stress reduction— thereby supporting the healing process.

The following are some simple examples of ways to empower patients to reduce stress:

❖ An educated consumer is an empowered one; provide patients and visitors with knowledge, education, and understanding.

❖ Empower patients with proactive participation in their healthcare journey.

❖ Encourage participation in evaluating options in medical protocol and self-charting medical records.

❖ Invite patients to be part of their own medical planning.

❖ Empower patients to select their social support of families and friends.

❖ Empower and encourage patients to select their social support of families and friends. Strong social support can assist in making good decisions as well as in providing comfort.

❖ Provide opportunities for patients' control over environmental factors such as the lighting and temperature.
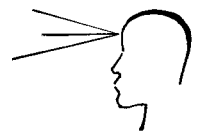
❖ Provide for dignity, respect, and privacy.

❖ Encourage good communication; it is essential to empowerment.

❖ Provide privacy for discrete verbal communication.

❖ Allow as many choices as possible, including the timing of events, food selections, therapy options, and support networks.

❖ Plan for behavioral, cognitive, and decisional controls for patients, family, and staff. Control is an essential component of empowerment.

❖ Design for flex space and positive distraction in areas of possible over-crowding.

❖ Consider raising ceiling heights and lowering the temperature in small rooms.

❖ Plan seating arrangements to support the comfort zones.

❖ Avoid ganged furniture, and arrange furniture so that it does not engage direct eye-contact with people out of the comfort zones.

❖ Show patients and visitors that their comfort and dignity are important. Provide comfortable seating and dignified surroundings.

❖ Respect and encourage the spiritual needs of patients.

❖ Include the prospect–refuge planning concept in multi-treatment areas such as infusion and dialysis.

❖ Assist patients in understanding medical equipment.

❖ Listen to the patient's needs, wishes, and even complaints. Keywords and catch phrases like "frustrated", "confused", "intimidated", "overwhelmed", "scared", "feeling trapped", or that the "walls are caving in" are indicative of major stresses and should be given particular attention.

The Mind/Body Connection

The Emotional Link

I have always found that personally dealing with healthcare issues is a very emotional experience. Facing personal and family health issues requires rational thinking and careful planning. However, if a health issue involves your mother, father, or child, even yourself, one gets caught up in all sorts of emotional actions, reactions. Within these states, we find ourselves in varying emotional states, including sadness, irrationality, denial, anger, confusion, hopelessness, and even repression of these emotions. What role do these emotions have in our health?

Perth, professor at Rutgers University and a consultant in Peptide Research in Rockville, MD discovered the "Opiate Receptor" and many other peptide receptors in the brain and body which led to her identification of "molecules of emotions" and the science behind the mind/body medicine. "It's clear to me that emotions must play a key role, and that repressing emotions can only be causative of disease. A common ingredient in the healing practices of native cultures is catharsis, complete release of emotions. Positive thinking is interesting, but it denies the truth," (Perth, 1993). Chemicals that run through our bodies and are brains are the same chemicals that are involved in emotions. We need to understand the emotional response to health and the role that these emotions play in healing (Perth, 1993).

Sternberg explains that the role of emotion is to communicate our feelings so that others can react. "Feelings" are the key here. Our "words" expressed through our cognitive communications are often dramatically different from our feelings. Feelings are communicated through emotions. What science is beginning to find is that negative emotions harm and positive emotions heal (Sternberg, 2000). Perth feels that we are at the brink of a scientific revolution incorporating the mind and emotions back into science. The implications for medicine and design are enormous. Perth points out that the best pharmacy we have already exists within our own brain. It has every drug that we could ever need. "I believe that happiness is what we feel when our biochemicals of emotion, the neuropeptides and their receptors, are open and flowing freely throughout the psychosomatic network, integrating and coordinating our system, organs, and cells in a smooth and rhythmic movement. Health and happiness are often mentioned in the same breath, and maybe this is why; Physiology and emotions are inseparable. I believe that happiness is our natural state, that bliss is hardwired. Only when our systems get blocked, shut down, and disarrayed do we experience the mood disorders that add up to unhappiness in the extreme" (Perth, p144).

Understanding emotions plays a key role in our health and wellness, reminding us of the importance of finding ways to bring positive emotions into our environments. We have
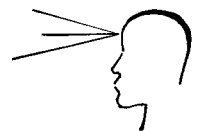
talked about the benefits of "positive distractions" to help take our minds off of the disturbing implications of medical treatment and the healthcare system. Although creating these positive distractions may be pleasant and useful, it is not getting at the "truth". As Candace Perth explains, it is dealing with emotion that is healthful, not just diversion. Healing environments can provide the distractions through decorative art like music and aquariums, but we must also administer to the human emotions through listening, caring, and supporting the fragile psyche when a patient is going through his or her healing journey.

Both the environment and people can contribute to our pleasure emotions. I recently returned from a speaking engagement in Las Vegas. On a very late night checking in at the conference hotel, I discovered that they had booked my reservation three days earlier, and then canceled it as a "no show". Tired and now very stressed, with a scheduled presentation in the morning, I asked the desk clerk to make a new reservation. He said that he would call the booking agent in the morning and get my reservation transferred to the conference account, and he assured me that I was not to worry about anything. "You just get a good night's sleep, have a great presentation, and go out and have fun. Everything will be taken care of before you check out," he said. And I didn't worry about it, I did have a great presentation, and I had a great time. That desk clerk had a major impact on my ability to sleep that night, the success of the presentation, and the pleasure of my stay. The luxury hotel environment certainly contributed to my pleasure. However, it was the desk clerk that dramatically changed my emotions from negative stress to confidence and pleasure. These emotions can be brought to the healthcare setting with similar results.

Can just believing in something make you sick or healthy? The placebo effect, "remembered wellness," and the power of belief are all examples of the body/mind connection within the realm of health and healing. The power of belief can also work against us as seen in the nocebo effect. The mind/body can also remember sickness negative emotions create stressors that can manifest themselves into stomach ulcers and even heart attacks. Can we choose to make ourselves sick or well?

The Power of Belief

The power of belief can have a dramatic effect on our health and wellness. Belief can be many different things, like a fervent prayer, a deep conviction, or a set of assumptions. For a healing belief to be effective there must first be an expected belief on the part of the patient's behalf. Second, there must be an expected belief on the part of the caregiver or physician. And third, that expected belief must be shared by the patient and the caregiver.

We are not born with beliefs; we acquire them throughout our lives. Beliefs are not physical or psychological, but they are our body's physiological responses. These are

learned responses that change the body's nerve and hormone responses, which ultimately affect our immune cells. "Even today, the idea that the immune system could be taught was considered an outrageously heretical notion by most classical immunologists. Immune cells can't think; they can't be trained, like dogs, to do tricks. Immune cells respond to molecules that crash up against them, get stuck to proteins protruding on surfaces, get gobbled up into the cell's interior, and cause other molecules to be made in the cell's protein factories and spit-out magic antibody bullets that surround the prey and destroy it. There is no room for learning here (Sternberg p161)."

However, Sternberg futher describes the work of Bob Adler, an immunologist, who found that the immune system could indeed be trained. Adler, led the way in experimentation of conditioned stimuli, in which nerve chemicals or hormones could affect immune cell function in a physiological manner. There is an element of this learning in prescriptions, where we learn and come to believe that a drug may make us well. Any amount of actual improvement that we receive from this learned expectation is called the "placebo effect". "About one-third of the therapeutic effect of every pill comes from the placebo effect" (Sternberg, 164).

The Placebo Effect

The Placebo Effect is imagination acting as the ultimate healer. It is another descriptor for a physical change that happens in the absence of any known or accepted medical intervention. Therefore, it is the ultimate proof of the mind/body connection. Theoretically, a placebo can be any dummy preparation or surgical procedure that is inert. With a placebo, nothing is absorbed into the body. Every thought, however, generates an electrochemical change, and therefore, thinking can affect change. Taking a pill, for example, that is thought to be poisonous versus one that is thought to offer a cure, elicits different metabolic reactions within the body. The active mechanism is the recipient's imagination. "The placebo is actually granting permission to heal; it is a symbol the imagination can incorporate and translate into wondrous biochemical changes that are as yet beyond the comprehension of the finest scientific minds. The wise doctor within each of us knows how to make pain disappear, and tumors melt" (Achterberg, p84-85).

The placebo effect reaches beyond medication and surgery. Within the healing environment, this body/mind connection can play a major role in "imagery", which has long played a key role in healing. The thought process invokes the sense of vision to communicate the mechanism of perception, emotion, and bodily change. Imagery is one of the greatest, oldest, and best-known healing resources as it affects the body intimately in both a mundane and profound manner. Imagery is used to treat cancer and other diseases. Patients, for
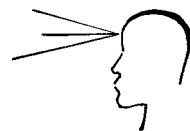
example, may be asked to imagine things like "pack men" eating away at cancerous tumors. Biofeedback such as a technique to lower blood pressure, is another tool that employs imagery in many types of medical protocol. We can utilize imagery techniques within healthcare facilities to create supportive healing environments.

The Use of Imagery in Healing Environments

Designing to support patient imagination and the use of imaging is an ever-present variable in an individual's personal journey toward healing. "Imagery is not only a natural concomitant to all healing, but is involved in every interaction health care professionals have with their patients" (Achterberg, p3.) Jeanne Achterberg, the author of *Imagery in Healing* describes this process as bodily sensations brought to awareness through the creation of internal pictures within the mind. For example, a tickle in the throat may produce an image of a red roughness. When we have an understanding of our own biology, we are better able to develop a picture of the internal image for ourselves. We may also use that information to speculate as to the source of that tickle. To help in diagnosis and healing, we must design to include visual images.

Designers can use Autogenic — a therapy using visualization or guided imagery to health — to incorporate imagery in healing environments. Autogenic is a simple self help technique that is easily learned. It involves a series of attention focusing exercises designed to induce relaxation. Patients use this exercise in a state of realization, and are instructed to imagine or be in mental contact with various parts of the body. They are then asked to center their concentration in the specific area of need. Autogenics often uses special phrases or casual suggestions similar to yoga and mediation, of relaxation and encourages imaging specific parts of the body, then letting the exercise work rather than trying to force a change. Imagery is often referred to as "sensory information", as it often involves multi-sensory experiences from the patient's inner image to support the senses with sound, smell, and therapeutic touch. Autogenic can employ imagery from videos, sound systems, aromatherapy, or a guide therapist. It can be a passive, tranquil background, or very active to engage a person in the experience.

One of my favorite examples of guided imagery is at Disney World in Epcot Center's Healthy Life Pavilion where there is an attraction called "Body Wars". The Body Wars action ride teaches participants how the body's immune system works, taking riders into a laboratory and on a mission to find and release a splinter that has invaded a virtual body and caused an infection. Riders enter as active medical participants and, through "Disney Magic",

are reduced to microscopic size in order to enter a capsule injected into a human body. Using special effects, the ride carries participants through the body, incorporating images, sounds, smells and movement. Surrounded by the inner landscape of the human body, riders feel the heart beat, the lungs inhale and exhale, experience the circulation system, to find the infection and rescue the body from the invader. It is an exciting journey through which we can discover images and techniques useful in our own body wars. Using Disney's Body Wars ride as an example, healthcare education and design should go beyond the use of books and journals to incorporate similar visual techniques.

Designers have begun employing video walls of relaxing, soothing images that support healing and well-being. The Wall Street Journal (7-2-99) cited several examples of video walls within healthcare facilities Children's Medical Center in Augusta, Georgia, uses a video aquarium in the main lobby, which utilizes thirty-three television monitors to create a digital world of larger-than-life sea creatures. The concept of video walls in children's facilities is quickly spreading, and proponents are now pushing even further – to interactive video. Designed to be more than entertainment and distraction to take young patients' minds off distressing procedures, these walls are also educational and therapeutic. Egleston Children's Hospital in Atlanta was designed with the intention of helping patients cope more easily with cancer, "so when a kid comes into the cancer center, they have this environment that takes them away," says Tricia Benson, administrative director of Egleston. Designers for Egleston developed a video wall of space images showing the "order of the universe" which they hope supports and soothes children dealing with the disorder that cancer presents in their own bodies.

In *Scientific American*, the founder of Kaiser Permanente, Sidney Garfield, noted that there are four categories of patients:

1. Those who visit the doctor thinking they are well, and with whom the doctor agrees;
2. Those who think they are well but are actually ill;
3. Those who think they are ill and are; and
4. The "worried well", or those usually in excellent health who seek reassurance from their doctors.

The last group comprises 30-50% of all patients entering the doctor's office. Garfield's article raises the critical question. "Does medical care make people sick?" Probing further, the author questioned if we are able to teach people to be well when they're not medically sick, and in addition, if we can build a system of well-being to replace our current disease-based medical system? These powerful questions still challenge us to de-stress our healthcare environments.
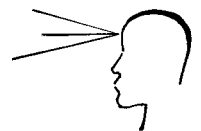
In *The Meaning & Medicine*, Larry Dossey, MD asks, "What does it mean to be a patient? By having endurance, forbearance, perseverance and to wait patiently without complaining. Patients are to do what they are told, without complaint, submitting to whatever health-care experts tell us is good for us. Basically, to be a "good patient", a patient must assume an attitude of helplessness. While the medical profession is telling a patient to be helpless, our bodies are involved in an innate process, which drives us to act when threatened. Thus, our human body is in emotional double blind, because both options – of doing nothing and taking action – contradict each other. The result is often a feeling of utter despair and helplessness. Demanding that people become helpless patients in order to undergo medical treatments is perhaps the greatest blow we can take to our humanness as it completely contradicts our human resilience to overcome illness and traumas of life (Dosey 74-76).

Conclusion

We face many levels of stress in the healthcare environment. Environmental stressors, physical and emotional stress, or stress from a life threatening disease are ever present. These stressors have ramifications to the immune system. There is real evidence that the molecules of emotions are at work transmitting effects of stimuli from the brain directly to the immune system. The patient's attitudes, perceptions, and emotions make a difference in how the immune system functions, and how it will defend the body against the trauma of experience. We now have an overwhelming body of work with conditioning, we have stress-related studies in animals and in humans, we have work showing direct hormone influences on the immune system – all have come together in a new merging of immunology, endocrinology, and neurosciences. We can no longer ignore the human element. We know that experiencing the environment, with all of its complexities, has a direct interrelationship with the immune system, and therefore our health. We still have scientific unknowns and gaps to bridge. However, our grandmothers were correct when they said, "Don't stress yourself out – or you will get sick." An environment that is truly healing must be one in which patients are empowered over stress, and one that provides for and encourages balance of the mind-body. Healing environments mitigate stress and return power to their users, so that they may be empowered to participate in their own journey towards healing.

Wisdom of Biophilia
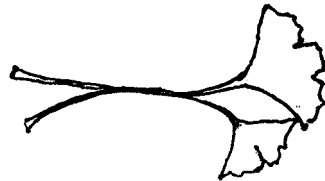
"STUDY NATURE, LOVE NATURE,

STAY CLOSE TO NATURE. IT

WILL NEVER FAIL YOU"

~ Frank Lloyd Wright

Wisdom of Biophilia

*B*IOPHILIA IS DEFINED AS A LOVE of the living world. We seek nature, especially when we don't feel well. Nature can calm us with a beautiful sunset or invigorate us with a spring rain. Both ancient and modern people use nature in healing. Nature has always offered healing places: a sacred spring, a reflective pond, a quiet grove and majestic peaks. For centuries we have sought these sanctuaries in our quest for health and healing.

Hypocrites believed that the vital spirit provided the essence of life and natural healing ability. The word "disease" gets its meaning from "dis," meaning apart and "ease" meaning balance; dis-ease describes a loss of balance and harmony. Designing with nature can restore balance and harmony within the environment.

In this chapter, we explore nature as our guide to balance and harmony. Nature-based designs draw upon the innate intelligence found in nature—when plants turn their leaves to the sun for light, when a bird sits on eggs, and ultimately, when our body knows how to heal itself.

What is it about nature that we find so appealing? Why do we enjoy the natural world? How is nature healing? To address these questions we look to the diverse sciences of biology, chemistry, computer science, environmental psychology and evolutionary anthropology, and neurosciences.

Biophilia—including components of biomimicry, biodiversity, biochemistry and fractals—holds the key to our love affair of nature.

Biophilia seeks to explain our love of nature through our natural evolution. Anthropology looks to our evolution from the African savannah to provide answers to these questions, specifically with prospect (our ability to see into the distance) and refuge (our sense of shelter or enclosure). Biomimicry suggests we look to how nature solves problems naturally. Biological science can provide evidence-based wisdom. Biochemistry addresses the chemical interaction of the natural world. Chemistry can help understand the key solutions of natural interactions between molecules. Biodiversity as seen from environmentalist perspective helps us understand how the natural world works together.

These are exciting diverse disciplines of research that can help contribute real solutions to the complexities of healing environments.

Biophilia has health benefits. Nature has restorative effects such as lowering blood pressure, contributing to a positive emotional state, lowering the levels of stress hormones and boosting energy (Kaplan and Kaplan, 1989).

According to a new study in the American Journal of Preventive Medicine, nature can have an impact on healing.

"Although this is not hard-core medical advice, I think we can advise people to enjoy nature," says Howard Frumkin, MD, the author of the article. "There are a lot of indications that contact with nature, either walking in the wilderness, gardening, or having a pet, makes people feel better, and can minimize the effects of disease. It stands to reason that cancer patients may benefit a lot from some of those kinds of contact."

Nature has the added benefit of reminding people that humankind evolved in concert with nature, and that environmentalism is a necessity, not a luxury. Frumkin compiled research that suggests people can benefit from distinct types of encounters with nature: contact with animals, plants, natural landscapes and the wilderness.

One study, for example, showed that prisoners whose cells faced a prison courtyard made about 25% more sick visits to facility healthcare than did those who had a view of farmland.

"Since we evolved in that environment, it would be surprising we would lose that affinity for it. It does make sense that some of our ancient preferences would still be with us," says Frumkin.

We evolved from the natural world, leaving behind caves and open savannah to move to man-made environments in which we control the elements. Our ancestors honored nature as a ubiquitous force in their lives. Nature provided shelter, clothing, food, light, heat and water.

We have lost touch with the direct effect of nature. We no longer seek these elements from their primary sources. Most of us spend the majority of our lives in a man-made environment. Some of us may even lack access to a window during the major part of our day.

Yet, given the opportunity, we enjoy the sounds of nature—the soft running water, bird-song, the smell of fresh air, the feeling of earth beneath our feet, and the sunshine on our face. We need the nourishment of the living world for our health.

In 1984, renowned evolutionary biologist, E.O. Wilson, Ph.D., said, "The more we know of other forms of life, the more we enjoy and respect other forms of life, the more we enjoy and respect ourselves. Human is exalted not because we are so far above other living creatures, but because knowing them well elevates the very concept of life."

The existence of biophilia suggests human fulfillment of life itself is based on our interpersonal relationship with nature (Keller, 1984). Our intrinsic need for nature is not just in the experience of the natural environment, but the cognitive, emotional, mathematical, scientific and even spiritual dependency.

With the ideals of biophilia in mind, we can create nine categories of our innate need for nature:

1. We value nature for its utilitarian value; it gives us sustenance and security. Nature gives us food, and we build from natural materials.

2. We value nature for its naturalistic value; it gives us pleasure and satisfaction. For example, we absorb sunlight and that decreases stress.

3. We value nature for its ecological value; the study of nature allows us to understand the systems of the natural world. Nature can serve as the "great teacher."

4. We value the aesthetics of nature; the physical beauty of nature astounds us. We value beauty, and the very definition of beauty is derived from nature, from the exquisite sunsets to the symmetrical beauty of the human form. Artists interpret beauty from nature's examples.

5. Nature has a symbolic value; humans translate nature into language, pictographic, icons and other forms of communication, allowing us to communicate across cultures and time.

6. Nature has a humanistic value; we are emotionally attached to nature. We see this in our relationship to domestic animals, as they become our companions and helpmates. We see this when we care for our houseplants.

7. The moralistic value of nature is our feeling ethical responsibility and even reverence for nature. We have feeling of care for nature; we work to preserve various elements and natural systems.

8. Nature can dominate us, and we value that. Man has long been dominant over domestic, however natural disasters such as hurricanes and earthquakes still leave us overwhelmed. Lightning storms fill us with awe.

9. We also value biophobia, the fear of harmful aspects of nature. Such fear evokes a natural motivational avoidance, and contributes to our survival. Avoiding lightning and snakes keeps us alive.

Value of Nature

VALUE	DEFINITION	FUNCTION	EXAMPLE
Utilitarian	Practical & functional materials	Materials for sustenance & Security	Food, medicine, tools & shelter
Naturalistic	Direct interface and access with nature	Physical and mental growth	Sunlight, light cycles, outdoor exploration
Ecological	Scientific study of natural systems & relationships	Sciences, knowledge & understanding of nature	Natural sciences, biology, biochemistry & ecology
Aesthetic	The physical appeal of the beauty of nature	Inspiration, adornment, pleasure & enjoyment	Sunsets, flowers, small furry animals
Symbolic	Metaphoric expressions of the language of nature	Cognitive communication of natural elements	Symbols, icons, pictographs, glyphs
Humanistic	Emotional attachment to nature	Bonding to nature	Pet ownership, gardening, nature outings
Moralistic	Responsibility and concern for nature	Protection, care of nature, natural activist	Participation in groups that care for our earth, sustainability & green design
Dominate	Control and mastery over the natural environment	Material and physical submission over natural elements	Domesticated animals, farming, genetic engineering & waste management
Biophobia	Fear of nature & natural disasters	Avoidance of dangerous elements of nature	Natural disasters, poisonous snakes, large wild animals

(Kellert, 1993)

As we plan and design healthcare facilities, it is important to keep in mind the values we derive from the natural world. As we are mindful of these values, we form a strong bond with nature. This bond is biologically based and is especially important in the medical environment that often seems so harsh and barren of nature.

Incorporating the beauty of nature through aesthetics is a simple task. We can add natural gardens, plants and fish. The symbolic aspect of nature can also be useful. We can incorporate natural materials and organic design. We often forget our natural curiosity, but if we don't we can find ways to define nature within our design; we can add walking paths that identify the species of plants found along the way. We can provide the names of the local birds, and perhaps even provide samples of their calls.

But we also want to be cautious of the fear of some aspects of nature. For example we might want to avoid art that depicts animals that are menacing to some.

Our human value of nature offers many ways to include biophilia in our design.

Designing with nature provides health benefits. According to Baker (2002), "…a growing body of research suggests that this human affinity to nature—plants, animals and landscapes—is something hard-wired into us. Scientists call it 'biophilia'."

E.O. Wilson (1998) popularized the term "biophilia" as, "…the connection that human beings subconsciously seek with the rest of life." Barker reported links between nature—windows with views, companion animals, fish gazing, access to gardens—with positive health impacts.

According to Ornstein and Sobel (1990), "Flooding our brains with rich natural visual stimulation helps us recover from surgery, tolerate pain, manage stress, and attain well-being." They also state, "Pictures of ponds, streams, trees, and other vegetation produce lower levels of arousal and higher alpha brain waves, a brain state associated with wakeful relaxation, than pictures of treeless urban streets."

Longings for nature are therefore more than aesthetic preferences.

Several times a year I give workshops on healing environments. In these I lead "sensitivity exercises" that help listeners identify meaningful elements in their life. In one particular exercise, I ask each person to imagine a special place that they enjoy more than others. I instruct them to list elements of this environment, focusing on factors that impact their senses. About 90% envision this place as an outdoor environment; the remainder describes their place as both indoors and outdoors.

The first time I posed this question, the response truly surprised me—interior designers made up the majority of listeners, and designers make their living from the indoor environment. I have given this workshop to consumers, designers, architects and healthcare administrators—the response is always the same. People intuitively know that nature provides a meaningful and pleasurable part of our lives.
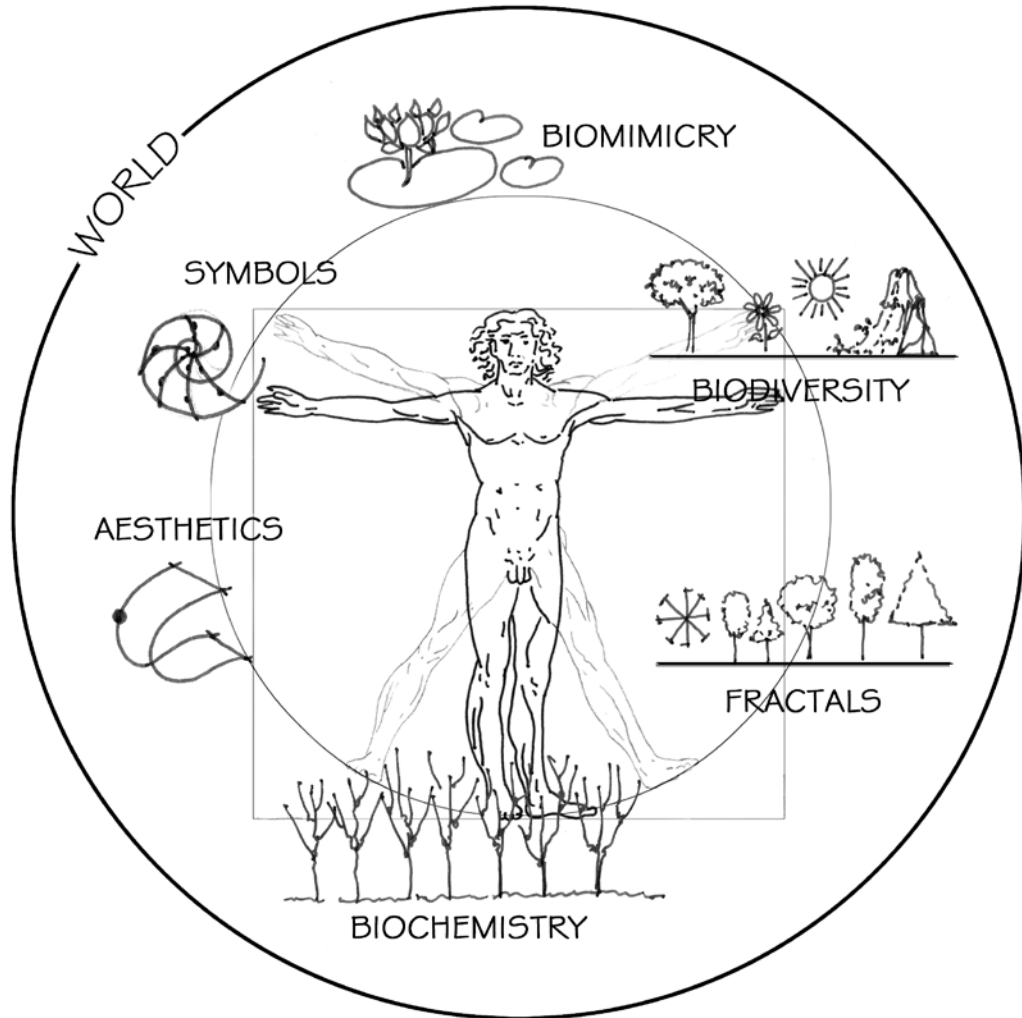
Figure 11-1. Our oneness with the diverse natural world. ILLUSTRATION: Patricia Raimondeau

Biodiversity

We marvel at the diversity of nature, from the ingenious way bees make honeycombs to the manner in which our earth regenerates itself. We derive a great deal of value and pleasure from the diversity of nature. Nature walks—where we observe plants, interesting insects, birds, and water views—fill us with peace. Biodiversity has inspired musicians, painters, sculptors, writers and other artists.

Many cultural groups, such as the Native Americans and Australia's aboriginal people, view themselves as an integral part of the natural world and show respect for other living organisms.

The diversity of nature supports healing. Watching clouds float overhead, gazing out the window at a grove of trees, or seeing a serene sunset brings relaxation and pleasure. Fish gazing and bird watching can be great waiting-room sports. Given a choice, we prefer natural scenes to blank walls and lifeless vistas.

Ornstein and Sobel (1990) report, "What we see affects our recovery when we are stressed. After watching a ten-minute film on the blood and gore of disabling work accidents, viewers responded with increased anxiety, muscle tension, blood pressure and skin conductance. However, if the stress-provoking film was followed by a ten-minute film of nature scenes—trees and water—the recovery from stress on all physiological measures was faster than if they watched a film of an urban scene."

Roger Ulrich (1984) conducted powerful research on patients' response to a room with a view. He reviewed 46 hospital charts of gallbladder-surgery patients. Half of the patients received rooms with a window looking to a small grove of trees, and the other half saw a brown brick wall. Their outcomes differed significantly. Patients with the view of trees spent less time in the hospital, were less upset, and required less pain medication. They also had fewer postoperative complications.

Views do make a difference.

Biomimicry

Nature is a wise teacher. We can look to her to solve many of our challenges in design for healthcare environments. Nature can help us understand the structure of color and how to create memorable color palettes. We only need to observe the natural world to see that nature is a wise teacher.

Artists have captured her beauty on the canvas. Photographers rush to capture her perfect light. Perfumeries seek out the delicate sent of the flower. Architects and designers mimic the natural forms. These elements of the natural world are mimicked to bring us delight.

However, nature can teach us more. Janine Benyus, biologist, shares some of the ways nature can teach us to solve some of healthcare's most complex problems, naturally.

> "Nature runs on sunlight.
> Nature uses only the energy it needs.
> Nature fits form to function.
> Nature recycles everything.
> Nature rewards cooperation.
> Nature banks on diversity.
> Nature demands local expertise.
> Nature curbs excess from within.
> Nature taps the power of limits." *(Benyus, p7)*

I attended a recent lecture presented by Benyus. She suggested we look to nature solve technology and healthcare challenges; we might look to the electric eels to study extended battery life, the sea grouse with expandable skin, to see how we can create elastic materials, to bees to help us prepare for a emergency response system and termites that keep their habitat at 87 degrees naturally.

Our design of High Point Regional Cancer Center captured the philosophy of biomimicry in many diverse ways. Early in the design process, we explored the cancer patient needs to connect with nature. The concept was called, "Journeys and Pathways", in that cancer treatment was a journey, not a dead end road. Nature—with her gentle curves, color palettes, forms and details—became our design inspiration.

The lobby mimicked the natural shore complete with water creatures embedded in the terrazzo flooring. Fiber optic lighting twinkled in the dome overhead, reminiscent of a clear night sky. The delightful reminders of nature were incorporated in every area starting in the lobby, moving to treatment areas with access to natural gardens, radiation oncology incorporating back-lighted photo images of nature.

Biomimicry is not just symbolic. We can incorporate many biomimicry aspects into our design; we can use natural products to help solve complex healthcare issues.

The "Lotus Effect" is a good example of nature teaching us how to solve the infection control issues that are of such concern in the healthcare environment. Lotus plants
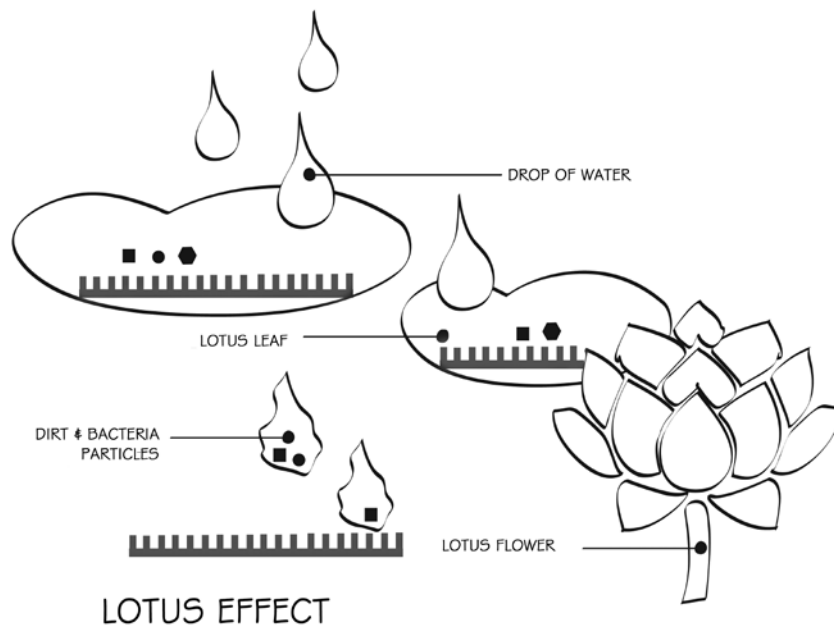
Figure 11-2. Diagram illustrating the self cleaning effects of the Lotus plant.

ILLUSTRATION: Patricia Raimondeau

grow in muddy rivers and lakes, and yet the leaves and flowers remain clean. Botanists wondered why.

In 1975, two botanists, Drs. Barthlott and Neinhuis from the University of Bonn, discovered how the plants did this—they explained the Lotus Effect.

The plant has two unusual physical characteristics: microstructures that repel water and the nanostructures found on top of the microstructures that are made of waxy materials. Wax does not absorb water.

"Lotus plants have super hydrophobic surfaces: water droplets falling onto them bead up and, if the surface slopes slightly, will roll off. As a result, the surfaces stay dry even during a heavy shower. What's more, the droplets pick up small particles of dirt as they roll, so that the lotus leaves are self-cleaning." (Kalaugher, nanotechweb.org)

BASF is currently working on a spray that will retain the lotus effect. Potentially, this material can be easily cleaned without toxic chemicals (Kalaugher, 2002).

Just this year, I have seen numerous new healthcare products, such as textiles, hardware and seating that use nanotechnology to mitigate bacteria on contact. By mimicking nature, we can provide better environments.

Look at the appeal of sparkling water. Why to we enjoy it? The movement on the water's surface indicates abundant oxygen, meaning the water is safe to drink.

Nature is the translator. What is beautiful in nature is actually what is good for us. Can we responsibly bring the beauty of nature into healthcare facilities and help solve complex issues while enjoying the appeal of nature?

Biochemistry

Toxicity, dangerous materials, finishes, glues, adhesives, off gassing, pvc's, toxic cleaning agents, people with sensitivities and allergies are just a few of the chemical challenges faced by healthcare facilities.

We cannot consider a healing environment without considering sustainable green design. In the ideal condition, green design should not have a negative impact on our environment, would use only renewable resources, and all materials would be recycled. In addition, the environment would support health and well-being.

Economic, social and environmental factors often seem to clash in the healthcare environment. However, healthy people are not possible without healthy facilities.

Today, our culture spends 80 to 90 percent of time within the built environment. Often the very building that we seek healing, makes us sick. Building Related Illness, (BRI) is the condition that links diseases such as cancers, respiratory diseases, allergies and asthma

to building environments (Bonda, 2007). Improving the indoor environmental quality improves the health of the patients, family and staff.

The Green Guide for Health Care (GGHC) is an organization that provides a "toolkit" for quantifying and integrating sustainable design for healthcare facilities. The GGHC promotes best-practices within the healthcare environment.

Robin Gunether of Gunether 5 Architects is a healthcare architect. She is also an early pioneer at bridging the challenges of the healthcare environment with sustainability and green design.

Robin says, "I believe that architects and their consultant teams have a responsibility to broker a better relationship between clients, the patient, and the environment. This means introducing alternative energy sources, choosing sustainable sites, introducing connections to nature and then tracking these issues through construction and watching the building's environmental service record, on-going operations, waste overhaul, and such. I'm not suggesting a paper trail, just a more thorough understanding of how hospital organizations 'think.'"

Robin has a new book coming out this year, Sustainable Healthcare Design, which promises to standard for green healthcare design.

Fractals

Observe the beautiful geometry of a single snowflake under a microscope, and then view millions of these beauties in the fields of new fallen snow. Observe a single maple leaf in the fall with its brilliant color and then see that leaf drop to the forest floor with many other leaves partially decomposed and crushed underfoot. What we are observing here and what is the natural beauty and scalability of fractals.

Fractals are the organizational systems of nature, based on geometry and mathematics. Fractal order arises from the interplay of physical and biological dynamic process, and fractal design is the basis of organic architecture.

The term 'organic architecture' was first use by Frank Lloyd Wright who emphasized natural forms and shapes. Today, organic architects such as Frank Gehry, with the help of sophisticated software and computers, have created beautiful complex structures using fractal principals.

Fractal design reaches far beyond a design gimmick; it is an essential foundation of art and design. In healthcare design, fractals can be sensitively employed to create pleasing, elegant, lasting and natural healing environments.
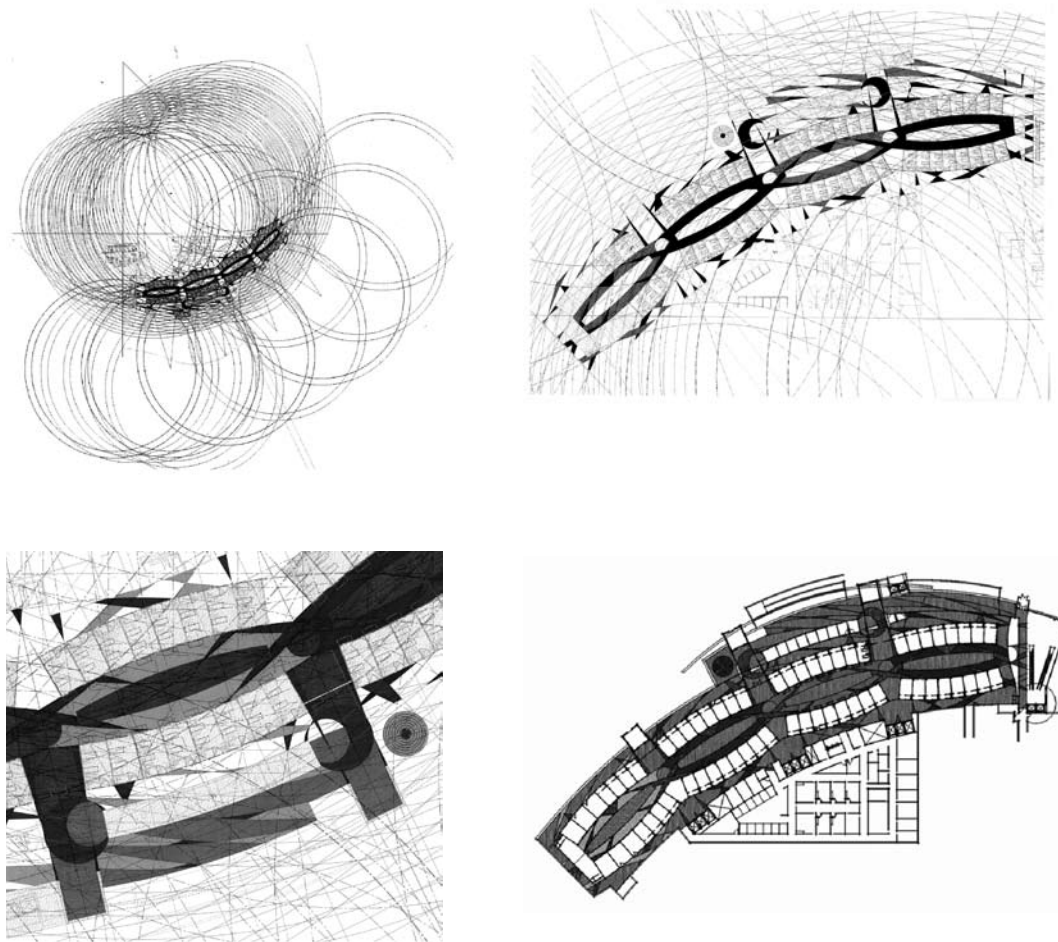
Figure 11-3. Proposed floor patterning for ER One at Washington Hospital, Washington, DC. The four diagrams provide fractal patterning relating the footprint and arch of the building's architecture to form the geometry of the floor patterning. Each diagram illustrates the change of scale, yet the patterning consistently relates to the overall building form. Fractal Design Angela Tilghman

"Fractal order arises from the interplay of physical and biological dynamic process. It is in a sense, a kind of a snapshot of natural events that have occurred in a particular environment over time" (Wise, 2002).

Fractals are nature's patterning. In nature, wind, water, floral and fauna group together. They look similar, but each is different. Scale is an important part of fractals. Fractal designs give a visual perception of what we cannot totally see, such as small branch from a tree expressing the great oak tree.

The mathematics of fractals is rooted in Euclidean geometry, a power-law relationship that represents the pure points, lines planes and solids. However, nature does not obey our mathematical order. Instead natural fractals occupy space between dimensionalities such as clouds, ripples on the pond or the outline of trees on the horizon. Perceptual research finds most people visually prefer fractal forms, more than grids and checkerboards (Wise 2002).

According to Wise, (2002), "This innate preference for lower fractal dimensionally may also underlie the finding by interiors researcher Patricia Roddemann that in general, the "busier" floral wallpaper pattern become, the less people like them."

Organic design has long been the cornerstone of healthcare design practice. Long before I knew about fractals and the principles of designing with nature, our interiors embraced natural forms, shapes, curves and patterning intuitively. Today, we now plan for the patient experience with organic pathways that aid in wayfinding, curved walls and bulkheads and natural patterning.

One of my favorite fractal designs was the one we developed for ER One, the nation's emergency preparedness center for the Washington DC area. The architects, HKS Dallas, developed a beautiful curved footprint for the site. Our interiors team took the footprint's outer walls and extended them until we found the point that they converged. From this point, we were able to find arcs from points of the exterior wall, which related to the buildings gentle curve. We continue to develop the arcs, and this formed a seemingly abstract organic form directly related to the building's architectural form. We developed an organic floor pattern to be executed in terrazzo that will sublimely tie the building's form to nature. *(See Figure 11-3.)*

Ancient Natural Philosophies

Ancient cultures of Chinese, Sanskrit, aboriginal populations and our own Native Americans have long integrated nature into healing.

The philosophy of Feng Shui seeks to balance the cycle of natural elements for a nourishing environment. Water evaporates and it rains down to nourish the wood ele-

ments—trees and vegetation. We cut trees and use wood to feed fires. Fire is energy at the center of the Earth; when Earth expels this energy, it reduces matter to ash creating more earth. Earth produces minerals to create metal. Minerals from metal elements contribute to mineral water, and the cycle continues.

Although we live in a man-made environment, cues taken from Feng Shui may successfully balance natural and man-made environments to create healing environments.

The Zen philosophy stresses the relationship between people and nature. According to Lee (2002), "Ideally, we should constantly be in touch with our outdoor surroundings, the changing face of nature, and the simple pleasures and experiences provided by the wind, sun and rain."

Zen gardens provide a place of solitude and relaxation where the body, mind and spirit can achieve harmony. The Zen garden has three main components: a ladle and water for cleansing, a lantern symbolizing the guiding light along life's pathway, and stepping stones providing a pathway through which the energy of Chi may pass. Healing environments may incorporate Zen's simplicity and symbols.

Native Americans stressed development of the inner life, which was seen reflected in the natural world. "When the clouds of devastation drop fire, we will be with you." "A pair of golden eagles flew over, and again the children's grandfather felt good." "The snake children looked at each other with excitement." "Remember the spider." "Fear is his tool." "Mole has tunnels that will take you where you want to go," "Transform yourself into an otter and slide through those tunnels." These quotes are part of ritualistic storytelling essential to Native American culture.

Nature, spirituality and healing are inseparable in this culture. The events of the natural world spoke to inner healing processes for the person. Telling of a burning fire on the mountain, tells of the person who is in agony. With awareness comes helps alleviate the agony. Rain comes to quench the fire. These natural events are seen as related. The fire and the rain were messages about the internal healing process. Such healing concepts are consistent in the Native American healing process (Mehl-Madrona, 2003).

The aboriginal people of Australia are also one with nature in all aspects of life. Again like the Native Americans, health is not taken out of their spirituality and nature context. In April of 2006, I visited Australia representing Austrade of the Australian Embassy. My responsibility was to visit artists and art communities to see what might be imported to the United States. I found the Australian art typically to be very Western—with the exception of the highly complex and beautiful Aboriginal art.

Each painting told a story of family, relationships, spirituality and healing all within the context of the natural world. What strikes me in both of these cultures is that the human experience is not in nature but recognized as nature.

An art and art program provides the designer with an opportunity to symbolically integrate nature into the healthcare environment. The arts can be a positive distraction for the stressful places in healthcare environments.

Roger Ulrich did a research study on the use of art in a cardiac intensive care to determine if art with a view of nature had a positive impact on medical outcomes. Artwork with views of nature was shown to one group, versus no artwork for the control group. The results indicated that there was less anxiety and lower doses of pain medication with those exposed to the artwork of nature. The study further showed that patient had less favorable outcomes against the control group that was shown abstract art with strong rectangular forms (Ulrich, 1993).

I am continually surprised just how much inappropriate art is used in major medical centers. I have seen not only abstract art but art that looks violent, angry and confusing. Art should be careful selected to be pleasant, friendly and consisting of nature scenes. Art should not contain any forms of violence or perceived violence. Violent water, a threatening sky, dark woods, a lonely house—these are subjective matters that should be avoided. Even an image of a big dog sleeping in the sun can generate fear. This caution does not mean that art should be bland and boring.

A good example of a successful art program is one of our recently completed projects based on the Potomac River. The Potomac River hospital took its name from the neighboring river that could be seen from campus. The entire art program focused on the nature of the river, relating it to the architecture, wayfinding program and the interior design.

Art and sculpture became meaningful landmarks. In order for art to be meaningful landmarks, they must be strong and familiar icons. This enables the visitor to identify with the subject matter.

When art is located in such a way that identifies a story or communicates a theme it further strengthens the bond. Unique themes tell different stories for each floor. Themed art must relate to needs of the occupants. This approach intuitively provides a different meaning to each floor. Diversifying art by floor avoids confusion as to what floor the visitor is on.

Potomac Hospital's art program portrays familiar landmarks of the region. For example, the theme for intensive-care/critical-care floor reflects the nature of the river, using artwork, sculpture, and design elements to support the designed environment. Nature along the banks of the Potomac River provided an appropriate and soothing background for the sickest of patients.

The oncology floor embraced the "four-seasons" theme, which symbolically expresses transition, journey and hope. The medical surgical floor used building elements found on the banks of the Potomac—bridges, buildings and lighthouses. The main floor of public space provided a colorful and upbeat theme of boats. The pediatric department followed a life-under-the-river theme with a sunken ship and underwater creatures that identified children's rooms, signage, and wayfinding cues. Each floor uniquely created a sense of place that the visitor could identify with.

The art program comes together on a long corridor connecting the existing and new building. A graphic wall illustrates the story of the Potomac River on a 60' wall map, colorfully illustrating the art, nature and history of the river. This introduces the visitor to the delightful art and journey they would find within the building. Everyone remembers this major landmark. It provides a strong connection with the community landmark, helps make sense of the pathways of the building, provides information as well as delights with positive distractions.

The Cycles of Nature

Nature has a constant cycle—tides, day and night, seasons. Seasonal cycles indicate change; we change our wardrobes, our social and religious activities. Most of us notice the sun's cycle, although we no longer depend on it to dictate our day's activities. Our man-made environment inures us to the sun's position in the sky, and the moon's phase attracts the notice of few. Our relationship with the cycles of nature is weak, and we are losing our connection with our natural world.

Healing environments can incorporate cycles of nature. Patients need to see out windows and observe what direction they face. Patients and staff need access to outdoor areas, and they should be encouraged to engage in outdoor activities. To embrace nature, our designs should change seasonally, incorporating the colors, foods, smells and sounds of the season. Design makes best use of the sun's direction. Put the breakfast areas in rooms with eastern exposure so that visitors can enjoy the morning sun.

By rekindling our relationship with the cycles of nature we can promote mental and physical well being—and a healing environment.

Sunlight

Sunlight boosts our emotions and moods. We enjoy the feel of it even when we know that harmful rays cause cellular damage. According to Liberman (1992), "The decreased exposure to sunlight causes a high incident of irritability, fatigue, illness, insomnia, depression, alcoholism, and suicide. Interestingly, it has been found that in Finland more children are conceived during the months of June and July, when the sun shines approximately 20 hours per day, than during the winter months" (Liberman, 1992).

As sunlight passes from the eye to the brain, it affects the entire body—from the spine to the pituitary gland, which depends on light for growth. All color is light, light is energy, and energy affects every cell of the body. For centuries, scientists have known that people depend on sun for physical wellbeing. The sun catalyzes many metabolic processes, and when we lack exposure to sunlight, some metabolic pathways sit dormant, reducing our ability to burn fat and toxins.

The research of photobiologist John Otts suggests that only light containing the full wavelength spectrum of natural sunlight can maintain health. He contends that poor light poses a serious threat (Liberman, 1992).

Most healthcare environments rely entirely on artificial light, cutting us off from sun and seasons and separating us from natural cycles. Medical facilities often evolve over years, adding layers of buildings to already dense building masses. This creates a tomb-like quality—people working in center cores never see natural light or outside elements.

Healing designs maximize daylight exposure. Northern facilities need to be particularly attentive to this need. An important consideration for all facilities considers a natural light plan early in the initial design process. Updating master plans should also keep the need for natural light in mind.

Respite areas need to be considered and be included to accommodate staff who must work in areas that lack exposure to natural light. Designs should include cafeterias with windows and provide the best possible views.

Augusta Medical Center in Fishersville, Virginia, lies in the Shenandoah Valley. It recently opened a new hospital—the dining room has the best view in the house. Architect Joe Parimucha fought to get dining rooms out of the basement and up on the roof. Traditional medical facilities locate the cafeteria in the basement because of its proximity to loading docks, kitchens, and storage areas. Parimucha initiated a study to split the services between the basement kitchen and the roof dining room. The facility found they needed only three additional staff to accommodate the change. Parimucha believed that the benefits to health and morale outweighed the cost of the additional staff, and this proved correct. The hospital

administrator reported a decreased turnover rate in cafeteria staff and improved employee satisfaction, especially for employees working in areas without windows.

Designing with Plants and Flowers

The relationship with plants is a powerful connection with life. Venolia and Dadd (1988) state that caring for plants "…releases us from our mental ruts, physical tensions, and sense of alienation; we become meaningful to our plants' flourishing, as they do to ours." Healing environments should incorporate this flexible tool.

Green plants effectively purify the environment, absorbing carbon dioxide and releasing oxygen. They release moisture, preventing aridity. Plants filter toxins and other pollutants caused by cigarette smoke and chemical cleaners.

States Whatley and Donaldson, (2002), "The best purifying plants to include in your space are gerberas, moth orchids, tulips, cyclamens, chrysanthemums, peace lilies, areca palms, spider plants, bamboo palms, and rubber plants."

The more we seal up our buildings to save energy, the staler the air becomes. Airtight buildings with double-glazed and inoperable windows provide difficult environments. Healing environments require high-quality air.

Designing with plants is one of the easiest ways to support healing in a man-made environment. They accent any design or style. Budgeted in building-maintenance operations, one of my clients uses a florist to keep major fresh arrangements in a few areas of the hospital. The building engineer, Carl Ackerman of Potomac Hospital, reviews the budget each year but never touches the plant budget. He reports that the flower arrangements receive more compliments than any other amenity, saying, "No they are not necessary, but people notice that we care."

The Garden

A garden can bring all natural elements together allowing us to interact directly with nature. A garden is a green or colorful living space. So varying in color, size, shape, and location, those seeking to design a healing environment find that gardens provide a versatile tool.

My husband and I had a unique opportunity to spend a day with Clare Cooper Marcus while she searched the Washington, DC area for healing gardens. A professor of landscape architecture at the University of California, Berkley, she is also the principal of Healing Landscapes. She was recovering from a life-threatening disease while in the midst of writing her book, "Healing Gardens." We discovered that few healthcare facilities offered gardens, and of those gardens, fewer still had appropriate amenities.

Marcus, (1999) states, "Gardens can be healing and restorative via a number of mechanisms. The most obvious is the aesthetic of nature; that is, creating a beautiful verdant place that will be a powerful enticement to go outdoors. Being outdoors in a natural or quasi-natural setting, experiencing sunlight, viewing trees and listening to the sounds of water or birdsong—the combination of these and other elements that make up a garden can have a measurable stress-reducing benefit."

She lists some benefits that gardens bring to healthcare facilities:

❖ Stress reduction for visitors and staff

❖ Reduction of depression, especially when connected with physical activity

❖ Higher quality of life

❖ Reduction of pain

❖ Improved wayfinding

❖ Reduction in provider cost, i.e., less use of medication and shorter lengths of stay

❖ Increased patient mobility

❖ Increased patient satisfaction

❖ Increased staff job satisfaction

Natural Finish Materials

Finish materials and furnishings can introduce elements of nature and promote a healing environment. Wood is a favored element; people love wood. In selecting furniture for offices, people will primarily select wood over any other material. Most even prefer fake wood over materials like plastics, metals, glass, and even luxury stone materials.

Wood floors with the linear planks can provide an expansive look. Used on ceilings, wood creates interest and a cozy feeling. We often combine a light-color floor, like maple, with dark cherry insets. This creates a light, airy space that sparkles with color and warmth. Today we use vinyl floors printed and embossed with a layer that emulates wood. Practical and beautiful, patients prefer these over carpet or standard vinyl floors.

Real wood is most appreciated in areas that we touch, such as hand railings, furniture and wall details. When real wood is not practical for maintenance and durability reasons, furniture and wall details can incorporate small wood accents. Wood furniture with laminate or stone tops is beautiful and durable. Wood handrails can be used with acrovyn (high impact vinyl) bull-nose bumper guards.

Elements from trees, especially leaves, make wonderful decorative motifs for floor, ceiling and wall design. Armstrong and USG both offer wonderful ceiling tiles with leaf patterns. Natural icons provide a calming and interesting point-of-focus, especially for patients in a compromised position, such as an exam table, procedure table or dentist chair.

Healing Nature of Water

One cannot discuss the healing aspect of nature without water. Water makes up 71% the earth. Life simply cannot exist without water. Our bodies are made up of 75% water. Our survival is dependant on having accesses to water. Wars have been fought over access to water; civilizations have grown up and crumbled because of the source of water. Water is essential to life. We think of water in nature as being rivers, lakes and ponds, but it is also rain, ice and snow. Rain droplets mixed with sunshine give us a rainbow, the symbol of hope. Water infiltrates the ground and it gives us wells and springs (Bracht, 2004).

Water has been linked with cleanliness and good hygiene since the time Hypocrites, who took medicine to a science by linking good hygine to the prevention of disease. The word hygiene takes the name from the goddess Hygiea 770 BC. Water is considered a purifier in most religions. Today, water, washing of hands, cleanliness and scrubbing before a medical procedure is still a critical prevention of infection and disease.

Baths, spas and medicinal healing have long linked water with healing. From prehistory's healing springs to modern day health spas, water and cleanliness has improved general health conditions. (Croutier, 1994) Today medical spas are undergoing a revival as people are not only seeking alternative health practices but also reaching for solace that the spa experience can provide. Spa in the true sense implies a balancing of the mind, body and spirit through the interaction with the water. Spas are popping up all over from shopping centers, beauty salons, cruise ships and hotel chains. You can even purchase one at your favorite "Home Depot".

Is this popular fad, or does the spa water truly have value? The well-balanced health provides a holistic program, not just pampering. This is similar to the early Aesculapius Centers. Why do spas work, a French physician Deslois-Paoli replied: We really don't know. There are two principle hypotheses. One is the effect of the waters themselves; the other is admittedly the psychosomatic effect." (Croutier, p169).

Water is an element of nature that also delights. We are attracted to the sound of water, the gentle trickle, bubbling or waves lapping at the shore. It is said to have a calming effect and feeling of regeneration of the spirit. Biophilia at work—we are just attracted to water—for this reason water features have often been a focal point of healthcare facilities.

Designing with nature, biophilic designs are an important consideration for healthcare facilities. They are powerful and appreciated by the patient, staff and families. As we have seen, strong evidence suggests we like to have nature around us. Our challenge is to design using biophilic design features that satisfy our love of nature—and thereby supporting the healing process.

Emotion and Spirit

"YOUR SOUL ISN'T IN YOUR BODY,

YOUR BODY IS IN YOUR SOUL."

~ Alan Wattse
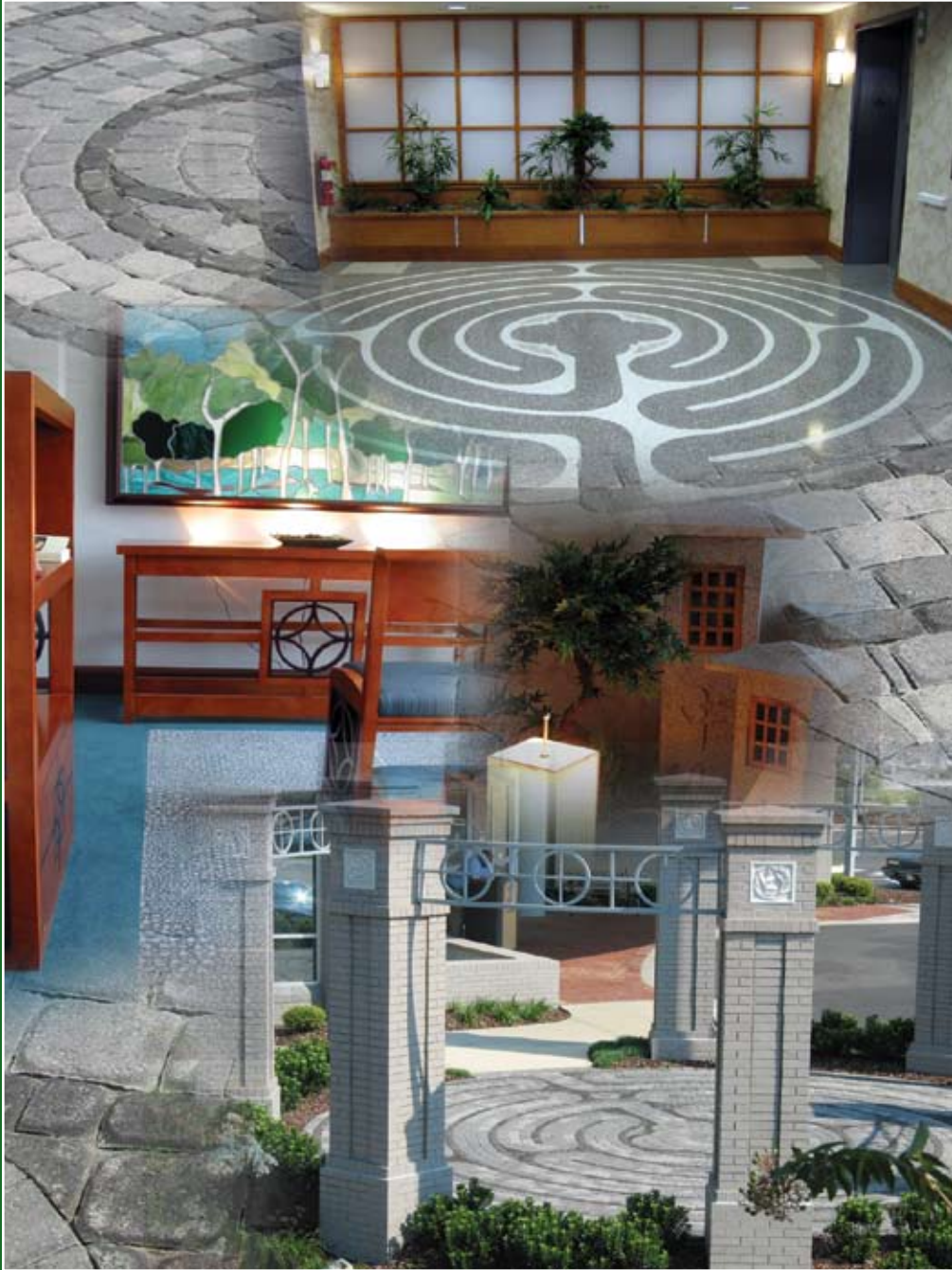
Emotion and Spirit

*T*HE HEALING PROCESSES FOR THE BODY, MIND, AND SPIRIT ultimately blend together to form sacred space. As we have illustrated in previous chapters, healing environments are far more than just places; they are emotional experiences, and they affect our spirit. This chapter addresses a common need of human-kind — finding spiritual meaning in a distressful environment. In any unfamiliar situation, people carry with them certain degrees of worry and fear. They may experience depression, emptiness, boredom, stress, or a need for feverish activities, such as pacing and eating to occupy their time. People using medical facilities experience altered priorities, which cause changes in attention span, communication skills, and cognitive abilities. Many people's lives change dramatically in the midst of this environment; patients, their families, and other visitors may find themselves questioning their very existence, their purpose, their past, and their future.

For most of us, the realization of our own mortality and uneasiness arises each time we enter a medical facility, and time spent within these environments can force us to face — or even question — our spiritual beliefs. The healthcare environment, used by sick, injured, or dying people, compels us to see the breakdown of health, and our sense of empathy demands that we confront our own mortality. We search for meaning (consciously or unconsciously), and our response to these emotions is integral to the healing process.

Facing Mortality

We perceive the existence of medical environments as a threat to our mortality. Within them, even healthy visitors are confronted with the breakdown of health. Seeing the sick and injured, witnessing their life-altering events, and even the surroundings are continual reminders of our own mortality. It is within these medical environments that we are faced with some of life's most difficult conflicts and are confronted with questions that even modern medicine cannot answer. Most include the "why me" questions like "why is my father dying; why was my child born with a deformed heart; why do I have cancer; why was my child taken away from me; why is my beloved trapped inside his body with a spinal cord injury?" Our culture and western medicine have a difficult time dealing with these questions, and when we are confronted with this entropy, we seek emotional and spiritual comfort. For many, this spiritual nourishment comes from religious faith, personal philosophy, ethnic traditions, supportive relationships, and the peace we find in nature.

Dr. Carl Hammerschlag, a physician who spent most of his professional practice working with Native Americans, describes our modern culture as one in which our spirit has been stolen from us. "Without faith in a believable ethic, we suffer. The theft of spiritual meaning destroys us at every level — the individual, the family, the neighborhood, the culture, the nation, and the fate of the world. The theft of the spirit disables us physically and emotionally" (Hammerschlag 25). In today's culture, we need to ask, "Who inspires us?" Have elements of image, technology, science, and possessions become our sustenance? Dr. Hammerschlag says, "We must reinvest our ceremonies and symbols with life-giving, healthful meaning. That is how we can make sense of our lives" (Hammerschlag, p25).

Spiritual Healing

Throughout most of man's evolution, spirituality and healing were one. All major religions treated the mind, body, and soul as a singular entity to be healed, and it is only within the last hundred years that medicine separated spirituality from healing. The 'body as a machine' model began with René Descartes, the seventeenth century philosopher who declared the body and mind as separate entities that had nothing to do with each other. In Descartes' time, only a few shared his theories. With the advancements of the industrial revolution and technology, however, the decapitation of the head (mind) from the body became complete. The separation continues today with science and medicine having little to do with spirituality and the soul.

There is a major consumer movement that is turning to complimentary medicines (including spirituality, prayer, and mediation) for help and assistance not found in tradi-

tional medicine. This begs the question, "Can spirituality support healing?" And, if so, can healing be restored to include the wholeness of the mind, body, and spirit? People are looking to reclaim their spirituality. In 1992, only three medical schools in the United States offered classes in spirituality; today there are more than eighty — with many making them a requirement for physicians.

In his book, *The Dancing Healers*, Dr. Carl Hammerschlag states that there is no doubt that healing is achieved more successfully when a patient trusts his or her practitioner and shares the same cultural beliefs. Young Indian people are coming back to reservations and communities of their ancestors. They are learning their languages, songs, and traditions. They are learning how to get connected with who they are, historically and spiritually. All of us need to do the same" (p17).

Value of spirituality in healing to the general consumer population was clearly illustrated in a recent conference in Washington, D.C. called "The Journey of the Soul." The conference focused on life's spiritual paths and healing, including end-of-life challenges. More than 2,300 people attended the conference, a sold-out event with 500 people on a waiting list. The conference clearly cited that the need for spiritual peace is essential to the dying; dealing with pain is secondary. Bernie Siegel, the keynote speaker, left attendees with three useful tools for our spiritual journeys. First, live our own, true self-life; second, spend more time with the people we love; and third, remember that the things we see for the last time can be more beautiful than the first time we see them. "It often takes the threat of death to make people stop and listen…it is our own mortality that helps us live. The spiritual needs cannot be overlooked, when we know our path we can keep on going" (Siegal). Our spiritual needs are real, and an appropriate healing environment is a part of the soul's journey. Design, as Dr. Siegal advocates, can inspire and ensure, that the last things we see are truly beautiful.

Spiritual Challenges

How do we nourish the spirit in healthcare facilities? How do we find the sacred amid the buzzers, monitors, tubes, paging systems, and the non-personal hustle and bustle of the medical world? Finding a spiritual source in medical institutions is difficult, but it is desperately needed.

Today's medicine focuses exclusively on the body — not the mind, and certainly not the spirit. Even the medicine of psychology is separated. For healing to truly begin, the spirit must first be nourished. Through my personal struggle to define my own spiritual healing theories and observations, I have found the first obstacle to be that spirituality is hard

to describe and even more difficult to prove. Also challenging is the fact that our culture defines spirituality and religion as synonymous. Even so, the challenge to nourish the spirit remains essential.

At "The Journey of the Soul" conference, a distinguished panel made up of a chaplain, a hospice nurse, and an oncologist were asked to summarize what people needed most when facing the end of life. They answered: Listen, Love, Hope, and Amazing Grace. These make up the spiritual nourishment that people — and patients — are seeking.

- ❖ **LISTEN.** The chaplain told a story of how we avoid people in pain and suffering. We feel awkward talking about death and feel unable to offer help. After the chaplain's own traumatic loss of his wife and daughter in a car/train accident, people would walk on the other side of the street rather than address his loss. Not knowing how to talk about the incident, his dearest friends stopped calling. We need our relationships the most in times of suffering and loss. Just listening can generate healing. People need to listen and be attentive to the suffering of others.

- ❖ **LOVE.** Love is one of our greatest spiritual nourishments. However, this specific kind of love does not come in a bottle and cannot be dispensed in the pharmacy. It also isn't the romantic feeling poetically expressed in greeting cards. Rather, spiritual love is caring, empathy, action, and compassion. Even when we can't think of the 'right words' in times of loss or difficulty, we can do things for others to express love. I personally saw this in my own family as we struggled to cope with the loss of my father. Some people immediately helped make arrangements, others worked feverishly to fix items around the house, others set up prayer groups, still others rekindled wonderful memories of him, and some of us just hugged and cried together. All of these actions are personal expressions of love — and all of them are essential.

- ❖ **HOPE.** Hope is the nourishment that allows us to go on, to deal with our suffering and losses. To hope is to believe that there is a "light at the end of the tunnel" and that that light isn't a train coming towards us. I believe that medical institutions and caregivers are often reluctant to give us this nourishment, perhaps afraid to offer hope fearing they will be 'wrong'. However, we must remember that dying is the easy part, since it happens in just a quick moment. Living happens the rest of the time.

❖ **"AMAZING GRACE".** Nourishment from the Absolute — our Amazing Grace — and our God can be our greatest source of peace. We all have different views of God, from the benevolent Man sitting somewhere up in heaven, to some universal unity of the cosmos. Whatever our faith and beliefs, our relationship with our God is paramount. A dear, wonderful friend of my family is a hospice chaplain who told the story of a man suffering the last anguishing stages of cancer. His body having shriveled to less than 60 pounds, he was in terrible, continual pain that no amount of medication could ease. He did not have a clergy relationship, and he refused to talk to my friend. With the chaplain's persistence, however, the patient finally consented to talk. He told the priest that God had no use for him; he was surely condemned for his great sins, and thus he was terrified to die. With the priest's kind and skillful work, the patient was finally able to talk about his anguish in Vietnam, and in particular, how he killed women and children. The priest was able to bridge a relationship with the dying man and his God, and finally, with his belief in forgiveness restored, the man was able to die in peace. Through his spiritual journey, this man found healing that no traditional medicine could provide.

Listening, hoping, loving, and having access to our God can all fuel our spiritual nourishment, which can heal us, even when a cure is not possible. In our designs, we must provide a climate in which these rituals of life can happen.

Chaplaincy Programs

The Healthcare Chaplaincy does sacred work, bridging the gap between science and spirituality. Chaplains are integral members of healthcare teams, making daily rounds and being available 24 hours a day to provide pastoral care for patients, family, and staff. The chaplains provide counsel for people of all faiths and cultural backgrounds, and they also offer objective crisis intervention and spiritual support. It is often the chaplains that transform hospitals into sacred spaces by their abilities to listen and offer support.

In addition, they are often advocates for "healing environments," by requesting components to support both human and spiritual elements such as a labyrinth, water features, grieving rooms, and private consult rooms.

The Hospice Chaplaincy provides spiritual end-of-life care for the dying. This is typically the final sacred healing journey on which we embark. "The journey of dying, a journey each of us will make one day, warrants a heightened awareness of a person's mortality.

Normal life has been replaced by an ever-changing uncertainty as the illness proceeds and symptoms management takes on more complexity. Our patients and their families need answers. They also need relief from the physical, emotional and spiritual complexities that seem to assault them on a daily basis" (Binkewicz p17).

Hospice care can take place in a specially designed unit within a hospital, a freestanding hospice building, or at home. A number of years ago, I was trained and practiced as a hospice volunteer to help patients and their families cope with the dying process. In addition, my father and mother-in-law were both hospice patients. These experiences taught me a great deal. I found the hospice programs to be truly wonderful experiences for the patients and their families, as care was focused on healing qualities of comfort, not on the medical model of curing, which is prevalent in most facilities. Compared to the general practices in other units, I found that the care that was offered in the facility's hospice unit was remarkably different. For example, when my mother-in law asked for a second pillow in the ICU unit, to make breathing a little easier, she could not have one. But in the hospice unit, she could have as many as she wanted.

The dying process can be viewed with patience as a natural cycle of life, or it can be feared with trepidation. It is in this area that the hospice chaplain can help comfort and offer insight to the unanswerable questions. "Questions about one's relationship with God arise in the mind of the patients and their families. A gifted pastor can facilitate a discussion or dialogue about the relationship of the Creator with His creation and understanding of pain and suffering, of death and the dying process and of the issue of life after death. Dying is a profound rite of passage. The process takes us through mysterious and often uncharted territory" (Binkewicz, p19). The end-of-life journey should be free of pain, loneliness, anger, and confusion. Hospice care can provide the comfort, peace, and spiritual connection that provide meaning to the journey.

Celebration of Life

Life is measured not by the number of breaths we take, but by our breathtaking moments. A life of despair and hopelessness can be painfully long; a life of contribution, celebration and hope, on the other hand, is never long enough. Life itself is the very essence of spirituality. It is a precious, and often fragile, gift. In most healthcare facilities, however, where the primary focus seems to be illness, the breakdown of health, and the search for a cure, there is little room for celebration of life. This is especially true when we consider the curative role of medicine. Today, though, we are seeing a shift toward a modality of wellness, with a focus on well-being and wholeness.

Birthing and hospice are two areas of healthcare that have attempted to break away from a curative model to one that embraces life. Begun as "grassroots movements" within communities, both have attempted to change the medical establishment from the consumer level upward. The women's movement pushed to restore childbirth to a natural non-medical life event, while the hospice movement worked to return dignity to the dying process. Birth and death are natural expressions of life — all cultures and religions mark these events with rituals, and there is much we can learn about life and the human spirit from these two very powerful movements.

The environments of a birthing center and a hospice center have much in common. They often look non-medical and non-institutional, and some are actually beautiful, warm, and supportive environments. In addition, the attitude of these centers is different from that of other areas in a medical facility. On a recent visit to a friend in a hospital's typical medical surgical unit, I felt a need for a break. But not wishing to leave my friend for long, I asked a nurse where I might find a cup of coffee. She gave me directions down the long path to the cafeteria, but then she remembered that it was currently closed and that I would have to go to the vending area next to the emergency room. After a moment, she finally recalled that the birthing center offered a free coffee bar, and she suggested that I sneak in to get coffee there. This experience brought the question to mind: Why can't the same amenities be available to all patients and their visitors?

We have come a long way in the last decade in changing the attitude of healing, but we still have a great challenge ahead of us.

Spirituality and Religion

All major religions include healing in their practices, ranging from blessings and purifications to exorcisms. The discussion of the sacredness of place reaches into my own belief system and experiences. I am neither a mystic healer nor a member of a religious order, sect, or cult. I grew up in a prayerful Roman Catholic home, and I was educated in Catholic schools. Later, it was my work as a hospice volunteer and with hospital chaplaincy that expanded my understanding of spiritual diversity and people's relationships with the Divine — especially when their lives are threatened. In spite of the differences in religions, practices, and faiths, I have learned that people share surprisingly similar needs when they or loved ones are faced with illness, death, or life-threatening experiences. In times of illness, we do not seek out religion, but rather an interpersonal experience with the Divine. Even those without religious affiliation or beliefs seek inner peace in times of illness or chaos. The remainder of this chapter will focus on the quest for this sacred place, not the religious experience.

Human Need for the Sacred

Healing and spirituality have long been linked together. In times of illness, we often look to the Divine for comfort, guidance, and even miracles. And thankfully, all major world religions link healing with spiritual intervention. Surviving a "life threatening" disease is often linked to a "spiritual journey," pilgrimage, and miracles. Before we investigate what makes a place sacred, we must first look at the human need for the sacred, peace, solace, emotional comfort, and a relationship with the Divine. Most religions assist people finding fulfillment of these needs.

I have observed that people with great faith in their religious convictions find comfort and healing from their religions and spiritual caregivers. I have also seen people, who are without set belief systems, suffering in isolation, conflict, and confusion in dealing with death and illness. This is also true for individuals who have lived a life in opposition to their belief systems or feel guilt for rejecting the religions of their families. The healing environment seeks to provide comfort for all suffering. Elisabeth Kubler-Ross finds that "man has not basically changed. Death is still a fearful, frightening happening, and the fear of death is a universal fear even if we think we have mastered it on many levels." (Kubler–Ross, 1997).

Pilgrimage & the Sacred Journey

Dealing with a life-threatening illness becomes a journey, and a spiritual one for many people. Journeys like this resemble spiritual pilgrimages, embarking to the unknown and far away places where one can make sense of illness and seek a cure. These places often include sacred buildings and monuments, which have been designed and used for centuries to allow for processions. Both the procession and pilgrimage focus on the "sacredness" of the healing journey. This becomes more apparent when the sacred site serves as a meeting point between the human and the divine.

In ancient Greek times, people sought the god called Asklepios and journeyed to his temples for health and healing, The European baths offered cures by "taking of the water." Today medical centers, rehabilitation hospitals, and cancer centers, provide environments for the sacred journeys seeking health and a cure. We look to both God and modern science to provide the "miracle" (Humphrey & Vitebsky, 2003).

Today we see modern evidence of sacred journeys - bikers converge annually at the Vietnam Veterans Memorial in Washington, D.C. New York city tourists offer tears and prayers as they gape into the hole where the "Twin Towers" once stood prior to 9/11. The sick still journey to sacred destinations such as Lourdes to participate in the pilgrimages, which they hope may lead to healing. Religious rituals, such as pilgrimages to religious sites,

still remain vibrant activities in the modern world. Today's pilgrims combine traditional motives such as seeking a cure for physical or spiritual problems. Sacred Tourism is a growing industry. Today's sacred journey brings together anthropological and interdisciplinary perspectives. The traditional practice of a pilgrimage is to provide healing and an antidote to stress in an increasingly secular world. The sacred journey (or traditional pilgrimage) still remains a potent force and spiritual quest in healing.

Recently, my family embarked on a healing journey of our own with my mother, who was seeking a better quality of life with Parkinson's Disease. Medicine had given her all it could, and still she could not walk across the room, hold a cup to drink, or dress herself. It was more painful that she could no longer just visit with her family or even go to church. She made the decision to have a deep brain stimulation surgery, which has the potential to regain movement.

For a woman of 83, this was a dangerous surgery with no guarantees. However, she felt that her quality of life was no longer worth living, and she embraced the opportunity. The night before her surgery, my brothers, his children, and I gathered to accompany her on her sacred pilgrimage. We journeyed from her home in Indiana to the University of Chicago. We found the "sacred healing place" tucked in a crowded city campus of various medical buildings. We accompanied her through the pre-surgical rituals of modern medicine. She carefully followed the prescribed fasting and other pre-surgery regulations. We supported her and prayed with her for a successful journey and positive outcome. Today she is back on her feet, walking to church, and even being able to dance.

Yesterday on her continued journey, I accompanied her on her six-month post-surgical visit. Her neurologist physician was beaming with pride with her successful journey, calling her "his poster child." On the way out the door, Mom, grateful for his skills, reminded him that "prayer also had a lot to do with it." Her pilgrimage to the University of Chicago was a sacred journey in search of health. Every day, pilgrims make their way to the University of Chicago hospital and other such institutions seeking healing that modern medicine can provide for these patients and their families, they are embarking on a life-altering experience.

Most administrators within medical institutions fail to recognize that the medical buildings are, by the nature of the services they provide, sacred places. The patients and families that are seeking health and wholeness are on a pilgrimage to the unknown. They will leave the comfort of their own homes to embark on this journey. They may (or may not) find a cure, and they are willing to take the risks of pain, separation of family, disfigurement, and possibly death. They will meet healers, such as doctors, nurses and therapists, they will encounter strange rituals such as infusion and radiation therapy, and some will undergo the pain of surgery. Others may set aside their daily activities in their lives in search of health.

The institutions and designers of these establishments must understand that the entire facility and the site on which the buildings are placed become, together, a "sacred place." The experiential journey requires more than just a "meditation" room. Designers of medical institutions must support these spiritual needs.

Prayer & Meditation

Americans believe in prayer. On June 24, 1996, *Time* magazine reported that 82% of the U.S. population believed that prayer heals. In April of 1997, *U.S.A. Weekend* reported that 77% percent of the American population believes in God's intervention in curing serious illness. In the same issue, it was reported that 83% of women and 73% of men believe that spiritual faith has personally helped them to heal. It was further reported that two-thirds of the population believe that physicians should acknowledge and discuss their own spiritual faith during treatment. Today, spirituality for health is gaining a greater level of acceptance, with a particular focus on prayer (Shealy, 1999).

"Speech is a mind song – a cognitive thought, an expression that is processed by the brain before being articulated. Prayer is a heart song; it comes from the passion of the moment and is expressed without being judged as acceptable or worthy by the mind. The truth is always closer to the heart song; the heart knows things that the mind never even thought of because it has not yet become broken by doubt" (Hammerschlag, p30).

In *Healing Words*, Dr. Larry Dossey spent great effort in researching the scientific proof of the effectiveness of prayer and meditation. His books provide significant data of the efficacy of prayer, complete with charts and double blind studies. He confirms what major religions and ancient beliefs have known for centuries: even when prayers are not answered in the manner requested — like cures — healing and peace are always available. Prayer and meditation are comforting; they have positive physiological effect on our body's immune system. It impacts our peptides (the molecules of our emotions), and it increases the endorphins that support our immune system.

We often think of prayer as an offering of hope, a way to cope, or a means of reaching an inner peace or creating a sense of well-being. There is now a body of scientific research, however, that substantiates the value and power of prayer. In *The Biology of Success*, Dr. Robert Arnot shares many examples of these studies. "Of the three hundred studies on spirituality in scientific journals, the National Institute of Health Research found that 75 percent showed that religion and prayer have a positive effect on health" (Arnot, 193-201). Studies show that the success of people who were prayed for actually have better outcomes — including less medication and less heart failure — than those who were not. Dr. Arnot

further cites a Dartmouth Medical School study, which found that, out of 234 heart surgery patients, the ones that described themselves as very religious were three times more likely to recover than those who were not. This research found that more time spent in religious activities correlated with more overall happiness and satisfaction.

Prayer is good for us; it can counteract stress, lower heart rate and breathing, slow brain waves, and relax muscles. It can also provide a model of self-improvement and give guidance in actively changing. Morning mediation can allow one to plan the day, noon prayers help assess how one is doing, and evening prayers allow one to reflect on the day, to be thankful for the day's events, and to think about how to do better the next day.

Prayer or meditation, however, does not come easily for everyone, especially if one is in emotional or physical pain, angry, or full of rage. Because these emotions are common to visitors and patients dealing with medical events, the need for prayer and meditation is even more critical at these times. A spiritually supportive environment can help. The sacred space is a quiet place where family can gather and comfort each other, where elements of nature can distract, or where a tranquil garden can offer some peace.

Additionally, being prayed for makes us feel love and in communion with the one offering the prayers. It is a positive benefit for both the one being prayed for and the one praying. Our intent is not to expound on the value of prayer and meditation as this is already well documented. Our role here is to prepare an environment to be conducive to prayer, therefore allowing and encouraging prayer to happen. This does not mean simply providing more chapels and meditation rooms, but rather, finding ways to encourage prayer in some of the more difficult places like emergency and intensive care departments.

Evidence for Prayer

Is there evidence that prayer is a successful health intervention, or that prayer can cure human maladies? "Dr. William Nolen, his book Healing: A Doctor in Search of a Miracle stated that healers can cure 70 percent of individuals – a statistic that appears far better than the average drug" (Shealy, p38). Prayer appears to be as good as most medicine. It offers promise in that it fulfills the basic laws of nature, one of which is that life itself is sacred.

Dr. Larry Dossey says that "Evidence is abundant for an intrinsic, positive effect of prayer not only in humans, but in mice, chicks, enzymes, fungi, yeast, bacteria and cells of various sorts. We cannot dismiss these outcomes as being due to suggestion or placebo effect, since these so called lower forms of life do not think in any conventional sense and are presumably not susceptible to suggestion." Dossey believes that the effect of prayer is directly linked to our relationship to the Absolute and can help find answers to the great questions of life. He cites controlled experimental trials on healing and found evidence that prayer healed as the

"intentional influence of one or more people upon another living system without utilizing known physical means of intervention" in 131 controlled trials (Dossey, 1993).

Science continues to argue against the effects of prayer. However, as scientist and mystics continue to differ, prayer not only continues, but it also deepens. Prayer continues for the remission of pain and suffering, returning us to health, balance, and resolution of many issues that personally test our lives as well as their meaning. The "proof of prayer" is not as important as the fact that prayer bridges our relationship to the Divine.

How do we encourage prayer when we are so emotionally overwhelmed, we cannot stop crying long enough to think of prayer? How do we pray when we are so absorbed in each blip on a monitor, hoping it won't be the last? Often we need assistance — prayer tools, so to speak — to help us pray. All major religions have created these tools for us and may include rosary beads, prayer beads, and inspirational reading material. When the mind and body are stuck in an emotional void, these tools can assist us in reaching a prayerful state. Our healing environments must include access to these important aids to prayer.

An ancient walking path, the labyrinth, has been successfully used to assist the heart in finding prayer when the mind just can't get there. The labyrinth has a beginning and an end, but the path to reaching the center is unclear until one walks it. A labyrinth is different from a maze in that a maze tries to trick the walker. A labyrinth is like life itself, a journey on the path, often not knowing where it is going, but with the belief that it will lead us to the center. The action of simply walking the labyrinth is comforting, and it usually induces meditation and the prayerful state. One of the earliest labyrinths was found in ancient Greece, and one of the most frequently copied labyrinths is in the mosaic floor of the Chartres Cathedral in France.

To assist patients and their families in meditation, especially in difficult times, a labyrinth has become a useful and popular tool in many medical facilities. Thinking is not required to walk a labyrinth; however, one must remain alert to stay on the path. This action is a combination of reduced mental activity and heightened awareness, which make the labyrinth a walking meditation or prayer. It is a symbol that represents our passage through time and experience, with its many turns reflecting the journey of life, which involves change and transition, rites of passage, and the cycles of nature. A single path that leads unerringly to the center, the labyrinth shows us that no time or effort is ever wasted if we stay on the path. Every step, however circuitous, takes us closer to the center and we know reaching it

is assured. More than reaching a destination or "doing" something, the labyrinth is about just being and the journey to integrate the body, mind, and spirit into one harmonious whole.

In fact, labyrinths have been so successful in bringing the mind, body, and spirit together, I consider them an essential component of every healthcare facility. As few facilities have an extra space to dedicate to a labyrinth, finding an appropriate location for a large walking labyrinth is often a challenge (Simpson, 2002).
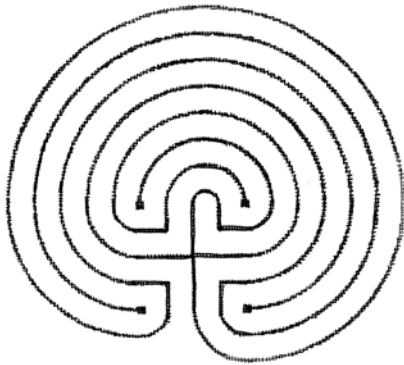
Figure 12-1. Cretan Labyrinth: The oldest form of the labyrinth dating back to at least 1,500 BC. It was first found in ancient Greece on the island of Crete.
ILLUSTRATION: Patricia Raimondeau
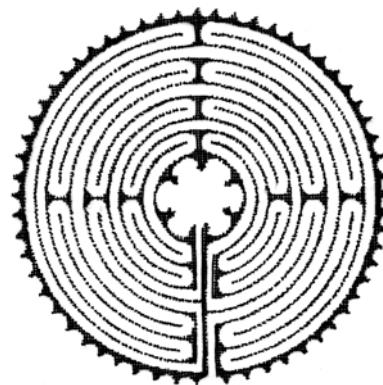
Figure 12-2. Chartres Labyrinth: 13th century AD, this labyrinth is named for the Chartres Cathedral in France. It is a Christian form with four arms of a cross and a six petal rose in the center which is a symbol representing the Virgin Mary.
ILLUSTRATION: Patricia Raimondeau
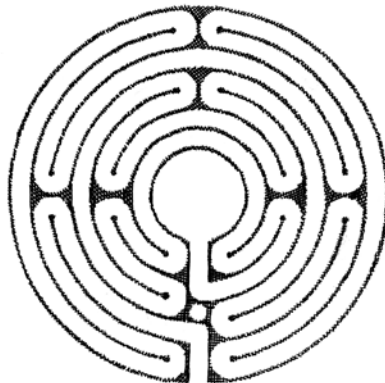
Figure 12-3. Labyrinth Variations: Most labyrinths are variations of this design. Preferences are made on personal choice and aesthetics. All labyrinths function on the same principles leading the participant to the center without any decisions, tricks or cognitive skills required.
ILLUSTRATION: Patricia Raimondeau

Healing Waters

Water, as a spiritual element of healing, has long been central to civilization and survival. Ancients worshiped it. Wars have been fought over it. It is incorporated into numerous religious rites and rituals. Water cleanses, purifies, and aids in comfort. It has many manifestations, from violent storms to calm ponds reflecting light and every color. A powerful force in our natural environment, water can consume or rejuvenate. It is no wonder that water carries such a spiritual nature.

Therefore, our discussion of sacred places within healing environments would not be complete unless it addresses the healing properties of water. Sanctified as the source of life, water is the common thread in all creation theories. Many civilizations assume that life began in the sea. The use of water in Christian Baptism has its roots in Egyptian rituals, Greek catharsis, Shinto, Confucian, and Hindu customs of bathing. During Easter, water is blessed for baptism and is prepared for the task of renewing souls. The sacredness of "life-giving waters" begins with legends of wells and springs, and it is sometimes associated with miracles. Even today, we hear about living waters that heal the sick, rejuvenate the old, and restore sight, as in the miracles of Lourdes, France. Although we no longer seek Ponce de Leon's "fountain of youth," water is still a powerful healing metaphor and water elements are a welcome relief in the medical environment as they attract, soothe, and provide relaxation. (Croutier, 1992)

Rites & Rituals

Rituals, rites, and symbolism are at the core of our cultures. Rituals often act as bridges between culture and religion. Christmas does not hold the same magic to non-Christians as it does for those who believe it marks the birth of Christ, yet the ritual of celebration still provides meaning to our lives. It marks our milestones, defines our heritage, stamps us as individuals, and, most importantly, adds richness to our lives. Without rituals, our lives lose depth, and individual significance becomes blurred. We learn our rituals from childhood, from our parents and families at birthday celebrations, christenings, bar mitzvahs, family holidays and many other rites of passage. It is this type of symbol that makes up our reality and stays with us forever. The core of our culture demands that we set aside our feelings, emotions, and gut reactions, and instead, explain everything in terms of proven realities.

We have become hesitant to just believe in general, to express ourselves emotionally and symbolically, as our cognitive mind argues that this is outside scientific description of reality. Dr. Carl A. Hammerschlag summarizes this conflict when he writes: "by cutting ourselves off in this way [spiritually], we make it more difficult to deal with the disparity between our

wishes and our realities" (p27). In this conflict, our rituals become mechanical, repetitive behaviors that leave us feeling empty and craving the nourishment that they once brought us. "It is through ritual that we separate our ordinary selves from our extraordinary possibilities to create the sacred time necessary to address important questions with the attention they deserve." Rituals can guide us through crises by keeping us in touch with our spiritual nature. "With such guidance, it becomes possible to see in new ways, to keep growing, to become the heroes of our own lives, to turn trauma into enlightenment, to clean up the garbage that burdens us — in short, to be free to live in truth."

As a Catholic, at the start of Lent each year on Ash Wednesday, I ritually receive ashes on my forehead while hearing the words, "Thou are dust and to dust thou will return." This was an important ritual for me, reminding me of my own mortality. A season of atonement and repentance, Lent became a time for me to reflect on my life's journey and where it was taking me. It forced me to stop, if even for a moment, to take stock of my life and reflect on what was really important. Most major faiths have similar rituals, such as Islamic Ramadan, and Yom Kippur, the Jewish Day of Atonement.

Our lives are full of rituals, like celebrating births, marriages, and funerals. In this country, we are also exposed to a multitude of diverse rituals from many ethnic backgrounds and religions. However, in our hour of greatest need, the medical environment often fails to honor our deepest human feelings and to respect our need for rituals and spiritual connectedness. Often, medical personnel are uncomfortable with religious rites taking place in the emergency room, intensive care units, or even in patient bedrooms, yet these marks of passage can provide a link to inner peace for patients and their families when medicine has nothing to offer.

In some cultures, such as Native American and eastern cultures, the ill often view healing and spiritual rituals as synonymous since, to them, healing depends on belief. Traditional western medicine honors only the curative model where the disease is an entity that has some external cause that must be removed. Traditional medicine also has rituals, although these rituals are exclusive of spiritual ties. Many are associated with hygienic properties (like scrubbing) and the color white (as in facial masks and surgical gowns). Every disease entity has an associated medical protocol. Any medicine works better if you believe, as proven by the placebo effect. "Even chemicals and surgery have a very different effect if you receive them with acceptance and trust instead of fear. The biochemistry of the human body varies greatly with emotions; fear and anxiety impede healing, and the body chemicals associated with positive feeling facilitate it" (Achiterberg, p4).

A healing environment must honor spiritual beliefs and allow for emotional expression of cultural and spiritual rituals. As a hospice patient in the final stages of leukemia, my

mother-in-law was admitted to the emergency room to have a breathing tube inserted to make her more comfortable. In our spiritual need, we called our priest to administer Last Rites and to provide spiritual comfort. My husband, father-in-law, the priest, and I gathered together around her stretcher with only the cubical curtain separating us from other emergency room patients, creating our own chapel for one of the most important moments in the life of my family. The doctors were uncomfortable with our presence, and allowed us no privacy in these final moments of our loved one's life. In the brief moments it took to administer Last Rites, we were rudely interrupted with invasive procedures and discussions as if none of us were there. When the priest finally asked the doctor to leave us briefly to our prayers and good-byes, the doctor objected, insisting loudly that "she could die!" But what better time to die than with family and clergy at her side? It is essential that our medical environments accommodate our spiritual, as well as medical, rituals.

Often, spiritual rituals employ a rich array of symbols that engage all of our senses. Such symbols include the use of incense, bells, chants, music, icons, stain glass, prayer wheels, vestments, prayer shawls, rugs, statuary, special foods, communion, and the laying on of hands. Through our senses, spirituality reaches us at our core of humanness (See Chapters 5, 6, 7 and 8). Our spiritual symbolism, regardless of religion or culture, seeks to provide symbols that assist us in prayer and meditation, calming, comforting, and moving us from the secular to the sacred world. These same rituals and symbols can also provide stress relief, but they are often overlooked or considered unimportant in the healing process.

Sacred Symbolism

These forms express themselves in forms that evoke meaning, inner beauty, and spiritual truth. Throughout history, architects have created multiple meanings in sacred buildings. The most outward and obvious form was for the masses, and the hidden meaning was meant for the profound. It was feared if the masses found the true meaning of the spiritual connection, it would be abused.

Today, we are still seeking the true meaning of the symbols that were built into architectural masterpieces. Before architecture, people worshipped the natural elements of the stars, planets, earth, animals, and plants. These symbols were included in later, more industrial environments.

Sacred places also used geometric shapes and proportion to describe symbolism. Mystical mathematics created sacred geometry. "Numerology of planetary cycles infiltrated early megalithic monuments and subsequently architecture until it became inextricably integrated with the sacred. The number and the god became one" (Mann, 19). The "golden

mean," *phi*, was born, which is the sacred proportion found in nature. It is seen as the growth pattern and form of many natural elements, including the nautilus shell and the lotus flower. Plato and Pythagoras used phi for the proportions of Greek temples. The "Tree of Life" is another symbol that is often used in healthcare facilities. The tree has been recognized as sacred, with roots digging deep into the earth and branches stretching high into the sky, ultimately bridging humanity with the Divine.

The Egyptians used numbers in their sacred buildings to communicate spiritual concepts through proportion and numbers. Egyptian sacred buildings portrayed the creation of the universe through the use of the previously-mentioned "golden mean" (phi). Their hieroglyphic language uses symbols to communicate meaning.

The "vesica" is two interpenetrating circles symbolizing the womb, femininity, the Virgin Mary, and the moon. The double cube was added to the vesica to signify the fourfold nature of the physical world. Sacred shapes can be inscribed within a circle for a deeper meaning. The pentangle symbolizes the human form with outstretched arms. The symbolic Hebrew "six-sided" star is an intersection of two equilateral triangles, representing the four elements
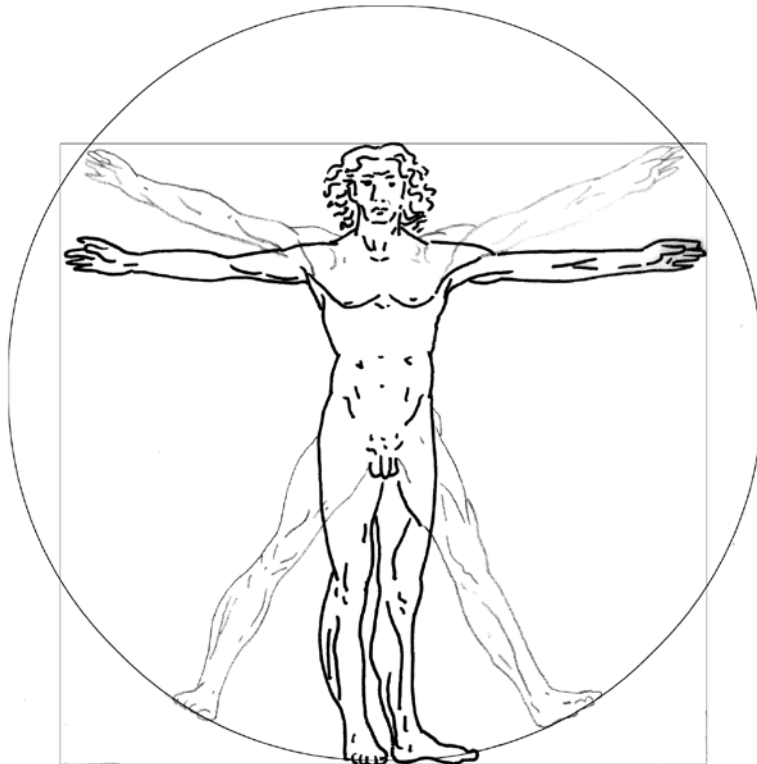
Figure12-4. Sketch based on Leonardo da Vinci's Virtuous Man. This figure illustrates the perfection of the human form, another example of the sacred square and circle. The circle's circumferences is the same at the square's perimeter, thus square the circle. The human form is the fusion of the earth (square) and the heaven (circle) (Mann, 2002)   ILLUSTRATION: Patricia Raimondeau

pointing upward (indicating the ascent of spirit) and downward (indicating the decent of matter). Numerous cultures have also used the "cross" in spiritual symbolism, including the Egyptian ankh, the Delphic cross, and the Christian cross. (Mann,2002)

The circle and the square are perhaps the most developed of sacred symbols, and they predominate all other symbols. The square is a product of the human mind; it does not exist in nature. The circle is godlike, with no beginning and no end. Thus, the relationship of the circle and square is the human relationship with the Divine. Leonardo da Vinci's "Vitruivus Man" is an example of this relationship. The human form is grounded where the circle and square converge. The perimeter of the circle is the same dimension as the square, thereby squaring the circle. This drawing of ideal proportions of the human body is considered the "Canon of Proportions" and is also used internationally as an icon of human potential.

In Sanskrit, the word for circle is "mandala." Circle shapes are found in nature as well as man-made symbols and forms in sacred architecture. Hindu and Buddhism mark a circle around themselves to represent sacred space during meditation. The circle represents the horizon and their location within the circle represents the center of the world. The cosmic center is the yogi's personal meditation circle. The sacred mandala symbolically represents the spiritual center of the world with spoke extensions reaching to the universe (Wright, 2007). They evoke the natural world as well as the spiritual world. This geometry appears in the earliest megaliths, rock tombs, and stone circles such as Stonehenge, to burial mounds and classical temples. Mandala shapes extended from Tibet, to the Aztecs, to Byzantines Christian times. The Buddhist stupa and Islamic mosque are circular. The mosque, which is the sacred building of Islam, reflects the cosmos. Mecca is the place where heaven and earth meet, and therefore all Moslem prayers and sacred places must face in the direction of Mecca. Symbolism is integral to Islamic sacred space due to the belief that symbols of numbers, lines, colors, and shapes awaken the soul with their expression.

A prime example of the sacred circle is the rose window. The rose is a powerful symbol evoking soul, the wheel, the cosmos, the sun, and love. The rose window adds the alchemy of glass and color that emits profound effects. The component of light passing through the colored glass transforms and is believed by many to heal. In addition to the glass, sacred geometry of the window creates underlying meaning to the form, color, translucence, and a spiritual story. When one observes the interplay of these elements, the shapes seem to move and shift in an angular sensation that seems to come alive. Observing the window in meditation can create a powerful energizing experience that cannot be explained in an evidence-based science.

Why is symbolism so important to sacred space? Symbolism adds memory of meaning to the experience. Memory can be a trained art. An individual can use images from places to remember those places and preserve the meaning of things. Symbolism, such as the effects of the rose windows, convey the spiritual experience for the believers. Symbolism tells stories, conveys messages, educates, and communicates easily in a non-verbal manner. When symbols of forms and shapes are used, it is humanity that gives symbolic meaning to sacred art and thus creates the sacred place. (Mann, 1993)
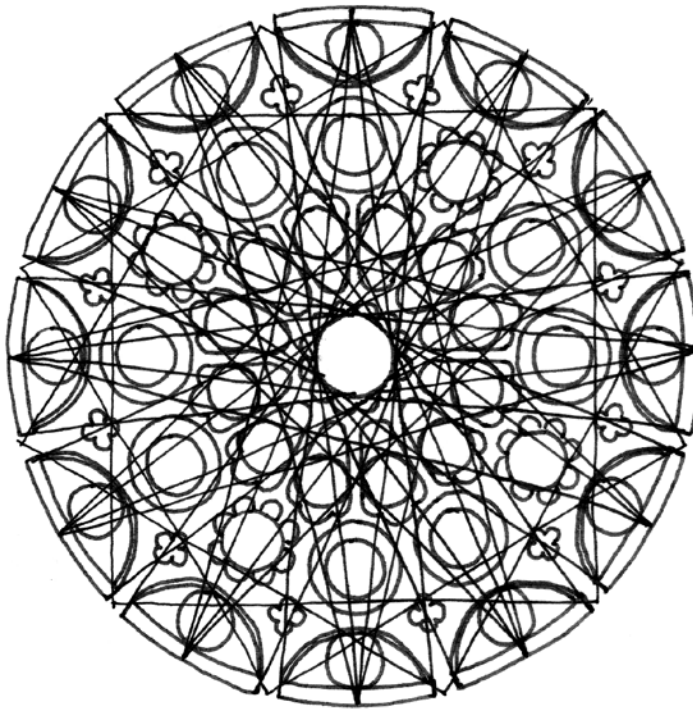
Figure12-5. Rose Window, Chartres South Rose Window is an example of sacred geometry. The motif of the square and the circle and the converging lines define the center medallions thus enclosing the quatrefoil which symbolize Christ (Mann, 2002) ILLUSTRATION: Patricia Raimondeau

Sacred Places

Typically, we think of sacred places as special places like churches, temples, mosques, synagogues, and shrines. Chapels and meditation rooms are standard to most healthcare facilities. In the American culture, we often have many diverse cultures worshipping and praying in the same room, and therefore we strive to create multi-denominational spaces. Some of these spaces are quiet rooms where families can gather together to comfort and support each other in their times of need, and others are beautiful chapels, with stained glass, and are large enough to support multi-denominational services. Some are beautifully designed and truly inspirational. Yet these rooms are often relegated to obscure areas of the facility or considered amenities, only provided if there is room left over.

As discussed earlier, the sacred place is the entire medical environment, including the parking lot, emergency room, ICU, patient rooms, x-ray department, cafeteria, and waiting rooms. The fact is, one room cannot satisfy the multitude of cultural and spiritual needs of a community. Therefore, in addition to chapel areas, accessible consultation quiet rooms should be provided near trauma spaces, emergency rooms, surgical waiting rooms, and intensive/critical care units. These spaces are necessary for people being confronted with difficult medical issues, confusing decisions on matters of death, or even the emotional issue of potential organ donation. None of these issues should be discussed in public space and view. In addition, quiet grieving areas where people can be free to cry or scream or ask difficult questions are equally necessary. Again, these areas should be accessible to trauma areas. Meditation rooms/chapels and consultation quiet rooms should not share the same space. The consultation room is for family members to discuss issues and with medical staff while the meditation room/chapel is a quiet room for prayer and religious services. This special area should offer services on a regular schedule to support the primary faiths applicable to the region or community. It should also be able to accommodate more obscure faiths that might also have occasions to use it.

What Makes a Place Sacred?

In the creation of sacred space, people arrange the materials that are provided by nature to create places which they can encounter the Divine. The space is designed so that it is different from the secular space. In this way, religious thought is conveyed. Typically it is the religious goal to unite the individual with the religious godhead. This is mirrored in the structure as the space itself invites the worshiper into the sacred building (Humphrey, 2003).

Evidence of sacred buildings and the sacred place reaches into every culture. Buildings and monuments awaken our consciousness of the connection between man and God, and they provide the link between earth and heaven that heals the spirit. Healing and place are inseparable. Wilbert Gesler, a cultural geographer, looked into elements on what constitutes a sacred healing place. Gesler selected three sacred healing places for a case study: Epidauros the Asclepius Sanctuary, Bath Mineral Springs, and Lourdes, France.

In all three sacred places, people went to them seeking healing, each place embraced nature (specifically water) as central to the healing process, and each used rituals and spiritual symbolism in the healing process. Gesler cited each healing sanctuary as beautiful in a serene location, and requiring a journey with a sense of arrival. Also, each site has sacred buildings that were constructed on the sacred site to support the healing process. Buildings such as temples, theaters, baths, housing, food services, and entertainment made up the sanctuary. Finally, each site provided a social framework for the healers and the healed (Gesler, 2003).

Gesler identified four aspects of what constitutes a sacred place:

❖ Nature – Biophilia and the belief that nature heals
❖ Built Structure – The power of the designed space
❖ Symbolic – The spiritual attachment of meaning to form
❖ Social – The social support and relationship of the healers.

These four powerful elements are important inclusions for a healing environment.

Personal chapels, sacred spaces, altars, spiritual corners, and mediation rooms are regaining popularity within people's homes. More than a new design opportunity, these areas reflect the individual's needs to stop and reflect on what is important, to reconnect with spirituality, and to seek balance in life. Places become sacred because of what happens within them, not because the space has been labeled a chapel or a building has been identified as a church. When we are gathered at a bedside in prayer the night before surgery, we have created there a sacred place. If we stand in a garden or on the edge of a lake in mediation or prayer, we have created there a sacred place. There is much we can do to create sacred places that support spiritual activities. Listed below are some elements for spiritual consideration that might be incorporated in sacred places.

Checklist for a Sacred Place:

✔ Provide an environment supportive of spiritual nourishment. It must acknowledge that spiritual needs are real and important to healing.

✔ A space should acknowledge spiritual diversity; all beliefs need to be supported and all religious rites should be easily accessed.

✔ The sacred space should be rich in symbols, incorporating those of nature, the sacred circle, the relationship to the Divine, and the connection to heaven or the cosmos.

✔ Create meaning in all of the design.

✔ Many find peace and a close spiritual connection with nature. Include access to nature, enabling all to find peace in gardens, water features, patios, windows, and access to light.

✔ Consider art and sculpture the focuses on the sacred such as the "Tree of Life."

✔ Seek the advise of the chaplain and understand the needs of the chaplaincy program.

✔ Foster an attitude that validates and supports the spiritual needs of patients and family.

✔ Develop special places for privacy, prayer, and meditation, and make sure people know how to find them.

✔ Provide access to spiritual tools and include them in the emergency room as well as meditation rooms. Respect an individual's need to bring icons and/or other spiritual elements into his/her space, and respect the sacredness of those objects.

✔ Develop and provide a spiritual program consisting of prayer, the reading of scripture, workshops on spiritual topics, spiritual networks, and involvement with the chaplaincy. Provide appropriate places for meditative exercises like yoga and Tai Chi. Promote programs to staff, patients, and visitors.

✔ Provide a diversity of sacred spaces for prayer and meditation, such as quiet gardens, water features, a walking labyrinth, a meditation room, a grieving room, and a consultation area.

✔ Consider the special needs of the hospice patient and his/her need for sacred space and spiritual support.

Checklist for a Sacred Place:

✔ Celebrate life. Develop an arts and culture program that might include live entertainment like concerts, clowns, dance, and seasonal music which reflects the beliefs and spiritual needs of the community. Develop and provide areas for celebration of birthdays, holidays, religious holy days, and cultural events.

✔ Support patients' families, allowing for individual spiritual needs to be expressed.

✔ Design for the healing journey and understand the experience of the healing process. Sacred place should not be relegated to the chapel or worship space only. The entire facility should embrace the sacred.

A place designed to support spirit can soften the dehumanizing effect of technology while focusing on the wholeness of life. A truly sacred space looks beyond medical requirements. Healing environments will not eliminate the fact that we are all mortal. They can, however, improve quality of life, even when challenged by mortality. When designing a sacred space, it is important to remember the writings of Dr. Victor Frankl in *Man's Search for Meaning*: "Man is not destroyed by the suffering; he is destroyed by suffering without meaning" (Frankl, 1962).

Our healing environments must provide for those sacred moments that are so meaningful, even in the most difficult times. Do we need churches (as specifically designed chapels) or meditation rooms for prayer and our devotion to our God? Years ago, my young daughter posed a very similar question to me. "Mom," she asked, "is it wrong if I feel closer to God in the woods than I do in church?" She talked about feeling of being one with nature, how everything was perfect for her on the back of her horse, the beauty of a single leaf, and the reflection in a mud puddle. She told me she could feel the presence of God in all these things. God is a very personal experience. That afternoon we shared a very special spiritual encounter that did not take place in a church or monastery, or with clergy, but with an 11-year-old girl and her mom in their kitchen. Spirituality is anywhere we look for it, and it can be found in every nook and cranny of our lives. Knowing this is key to creating truly healing spaces.

The scientific evidence to prove the value of sacred space will need to be addressed in the future as the arguments between science and spirituality continue. However, we do know that most Americans rely on prayer for healing, and they have a belief in the Absolute. We also know that most value life. Without a doubt, healthcare facilities need to address the

need for sacred space. Sacred space is rarely discussed in the contexts of design of health-care environments, because it is often thought that, by providing a chapel and chaplaincy program, the spiritual needs for the facility are already met. It is the premise of this chapter that spiritual needs of the patients and families extend far beyond the worship space. The central core of this chapter and for that matter, this entire book, is that all healing spaces are sacred and "place matters."

Experiential Design

"THE MOST BEAUTIFUL THING WE CAN

EXPERIENCE IS THE MYSTERIOUS. IT IS THE

SOURCE OF ALL TRUE ART AND SCIENCE.

HE WHO CAN NO LONGER PAUSE TO

WONDER AND STAND RAPT IN AWE IS AS

GOOD AS DEAD: HIS EYES ARE CLOSED."

~ Albert Einstein

Experiential Design

*A*S ILLUSTRATED THROUGHOUT THIS BOOK, healing environments are far more involved than simply places that look good, or are warm and fuzzy, or even focus on providing spaces that promote security and well-being. Adding a water garden or labyrinth does not create one. Even adding evidence from research does not create a healing environment. However, we often do recognize the "aha…" when we are experiencing a healing environment. We do know that they holistically embrace the body, mind and spirit. They somehow feel supportive – they feel good. What is happening here?

In the first edition, I concluded with my first introduction to the power of a healing environment with a residential client that taught me the healing power of the environment. Lucy became entombed in her home, following her husband's tragic death. Leaving her home exactly as it was before her death she pulled the drapery and withdrew. She further withdrew following a heart attach, which forced her to quit her nursing practice. She was waiting to die.

She came to me, asking for help with new window treatments. We started with the windows, and totally redesigned her home to let in the sunshine, nature – and life. We brought in arts and crafts that she loved adding new lighting and life. A transformation was occurring. Her home was being transformed from a tomb to a nurturing nest. Her life also began to change; she started inviting friends in again, started volunteering and traveled to visit her children. Her children started to come again to a happier place and a happier

mom. I couldn't believe what I was seeing. Nearly thirty years ago, Lucy started me on my quest for healing environments.

The challenge to use evidence-base design became an additional quest about twenty years ago. I presented interior finish boards to a hospital board of directors focusing on a balanced palette of both warm and cool colors referencing how this palette appeared comfortable and compatible in nature. A board member stood up, shaking his finger at me saying, "don't you ever use this "California" stuff at our hospital unless you have the proof." I continue to search for that "proof" in my work.

Today I am still on these quest – how can an environments heal, how can we prove it and even more importantly, how can design create the experience that contributes to the wellness transformation? In my previous book, I defined "Healing Environments" in terms of a holistic place supporting the body, mind & spirit. Today we have multi-disciplined evidence to recognize this, as presented in this book. Many individuals, organizations, and institutions are defining "healing environments" which is now becoming a cultural movement. As much evidence that we secure, healing environments, like healing itself remains illusive. I believe that "healing environments" have come of age, and we are about to enter a very exciting phase, where the "power of place" will be recognized as a major contributor to health and healing. As we witness healing environments transform health and healthcare systems, we will need to accelerate the design process (Huelet, 2003).

Do Healing Environments Exist?

Healing environments have always existed from spiritual sanctuaries to grandma's kitchen; they are not a new idea. However, in our modern western culture, the concept of healing environment as a product of design recently occurred as the brainchild of Wayne Ruga at the Symposium for Healthcare Design in 1988. The Journal of Health Care Interior Design (1989) reports that the mission of the Symposium that year was "to challenge us to create health-care settings that support healing and promote well-being, and that we, as design professionals, will be able to respond positively and knowledgeably". Today, that mission has expanded — to advance the state of life-enhancing environmental design by demonstrating the value of design in improving health and the quality of life. Ruga continues to advance the concept of design as a factor in healing and wellness.

Ruga brought healthcare designers, facility administrators, physicians, clinicians, and industry partners together to explore new ways to design healthcare facilities to support this mission which provided a new approach in healthcare design. He initiated an annual symposium which presented innovative approaches, some traditional and others which are more radical and controversial.

The Healthcare Design symposiums and outgrowth groups have flourished and grown. Today, the Center for Health Design, one such outgrowth of the early symposium, collaborates with major institutions and individuals to undertake research projects in healthcare design. Some of the most significant projects have included work with the Picker Institute to research patient-satisfaction studies relating to designed environments and evidence-based design. The center is also the originator of the "Pebble Projects", which has provided a significant contribution to evidence supporting a variety of components of healing environment within healthcare facilities. The Planetree Model is an early concept of "patient-focused" care which included components of healing environment design. See chapter Three, The Gift of Healers. Still other research projects, like one with Johns Hopkins, determine what data exists to study how patient outcomes are affected by the environment. The Center for Health Design, and other research projects have provided healthcare facility designers with new tools to support long-held theories that design impacts patients' ability to heal. These "evidence-based" tools allow designers and facilities to cite references concerning positive outcomes that their designs might offer.

New organizations such as AAHID, the American Academy of Healthcare Interior Designers and ACHA, the American College of Healthcare Architects have recently formed in recognition of the importance of credentials for those individuals designing healthcare facilities. These professionals strongly recommend that the design of healthcare address healing environments with the evidence. However, the most remarkable event that I see in this proliferation of "healing environments" is the diversity of scientific, clinical, spiritual, economic, architecture and cultural disciplines addressing this subject with passion and a sense of urgency. There is an exciting "cross-pollination" of thought, hypothesis and research happening in these fields that will ultimately provide evidence and guidance for the healing place.

Today, if we "Goggle" healing environment, there are more than 2,150,000 websites, each uniquely addressing an approach, concept, practice and examples of healing environments. We see architecture and the neurosciences working together to determine how the environment affects the brain to generate emotion, linking the experience of the environment to specific neurons. Biochemists are working together with interior designers to develop less toxic materials, and clinical research working with designers to mitigate hospital acquired infection linking the experience of the physical environment to health outcomes. Environmental psychology is addressing how individual experiences respond to space. Spiritual leaders are linking health to faith, manifested in experiential pilgrimages. Topics in nature, such as biophilia, biodiversity, Biomimicry link the benefits of experiencing nature with healing. The design of healing environments is no longer an applied art, the sole responsibility of the architect and designer. This is truly a multi-disciplined experiential approach to healthcare design.

The Healing Experience

It is not just in healthcare that we are seeing the evidence for the experience. The works of Pine and Gilbert suggest that our culture is moving from a service economy to an experience economy in that our culture is seeking more meaningful experiences in, business, recreation, most all areas of our business economy as well as the healthcare environment. Their work in defining what is an experiential economy and why it addresses the needs of our current culture represents the same criteria in healthcare experiential environments.

The world economy is moving from a service economy to experience economy. Why — because it is a new source of value. Companies are finding if they engage their customers in a memorable way, customers come back and will pay a premium for the experience they enjoy. The economic drivers of culture have grown from the agrarian culture offering commodities to the industrial revolution providing goods for consumption, on to the service economy providing services with the goods and now to the experiential economy providing
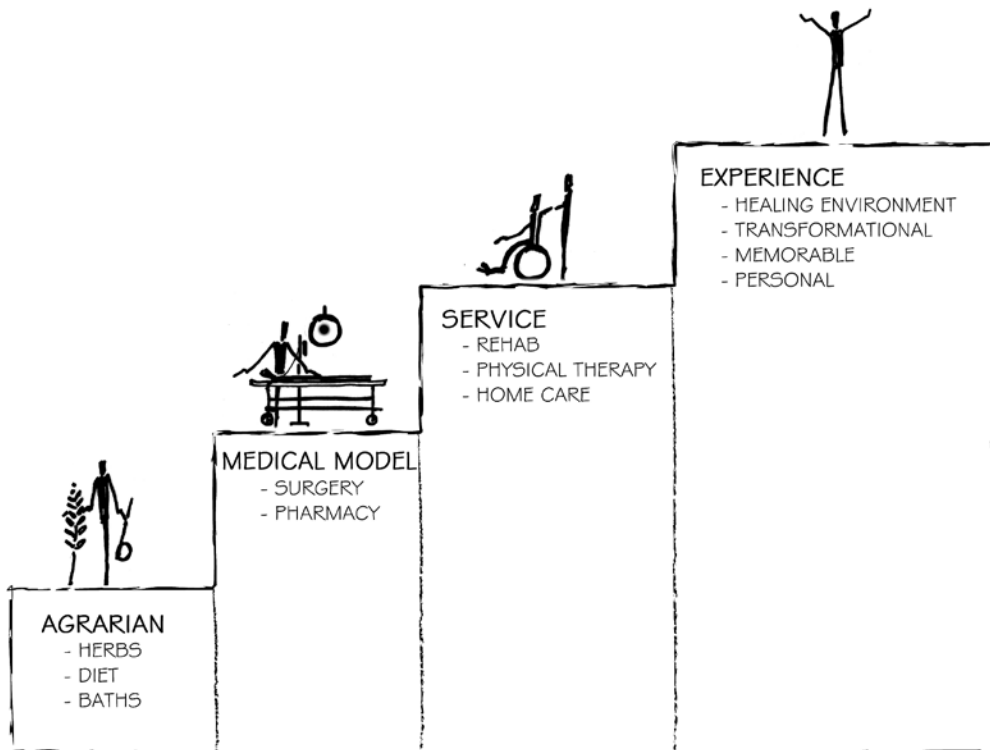
Figure 13-1. Experiential Environment: This experiential model illustrates four economic levels found in healthcare. Today we are moving away from the service level to the experiential level where patients' expectations exceed both the medical model and service levels of care. I

ILLUSTRATION: Patricia Raimondeau

a positive experience with the goods and services. "The newly identified offering of experiences occurs whenever a company intentionally uses services as the stage and goods as props to engage an individual. Just as people have cut back on goods to spend more money on services, now they scrutinize the time and money they spend on services to make way for more memorable and more highly valued – experiences." (Pine and Gilmore, p.11)

What Makes a Memorable Experience?

Consider the "Experience Exercise" described in Chapter One. The exercise asks you to describe a pleasurable place in terms of sensations, emotions, thoughts and people that have contributed to your personal and memorable enrichment of the place you visited. These are the vary elements that create the experience that will be remembered throughout our lives. These are elements to include in healing environments. Healing environments are experiential. Yes, healthcare commodities, such as medication and diagnostics are still provided. Care services such as nursing, and various caregivers provide medical attention. But what are the memories that you will take home with you? Will your healing journey be a memorable transition from illness to health filled with kind caregiver, a nurturing place with the comforts of nature, helpful information and support to sustain you during your recovery? Or will your journey be filled with fear, trepidation, confusion, discomfort and separation anxiety from your love ones? It is the place that creates the experience and it is the experiences that create the emotions and memories that move beyond the place to transcend the transformation into health and wellness (Gallagher, 1993).

Experiences can be staged to produce positive outcomes. This is the power of place. It may be helpful to consider the place as a "stage" where the healing journey will take place where the patients will be engaged. A patient can be engaged in a number of ways either actively or passively. A passive participation includes observation such a viewing a garden, a view from a window, or art, who experience the event as an observer. At the other end of the spectrum is the active participant, where the patient actively engages in the event, such as walking a labyrinth or participation in pet therapy.

There is another dimension of the experience which includes the level of connection that unites the patient with the event. This forms a bond of environmental relationship with the experience which ranges from absorption to immersion. Patients viewing a video wall watching images and sound morph their way through delightful images, are absorbed as they watch from a distance. On the other hand, patients sitting in the lobby, listening and watching a musician finger the keyboard on a piano performance can become immersed in

the performance. Blending these experiential interactivities can evoke feelings of entertainment, education, escape and estheticism to achieve a uniquely personal experience. (Pine and Gilmore, p199) Working with the dimensions of active and passive participation as well as absorption and immersion can present an opportunity stage a memorable experience, while producing a smile, and crate positive distraction and perhaps a joyful moment.
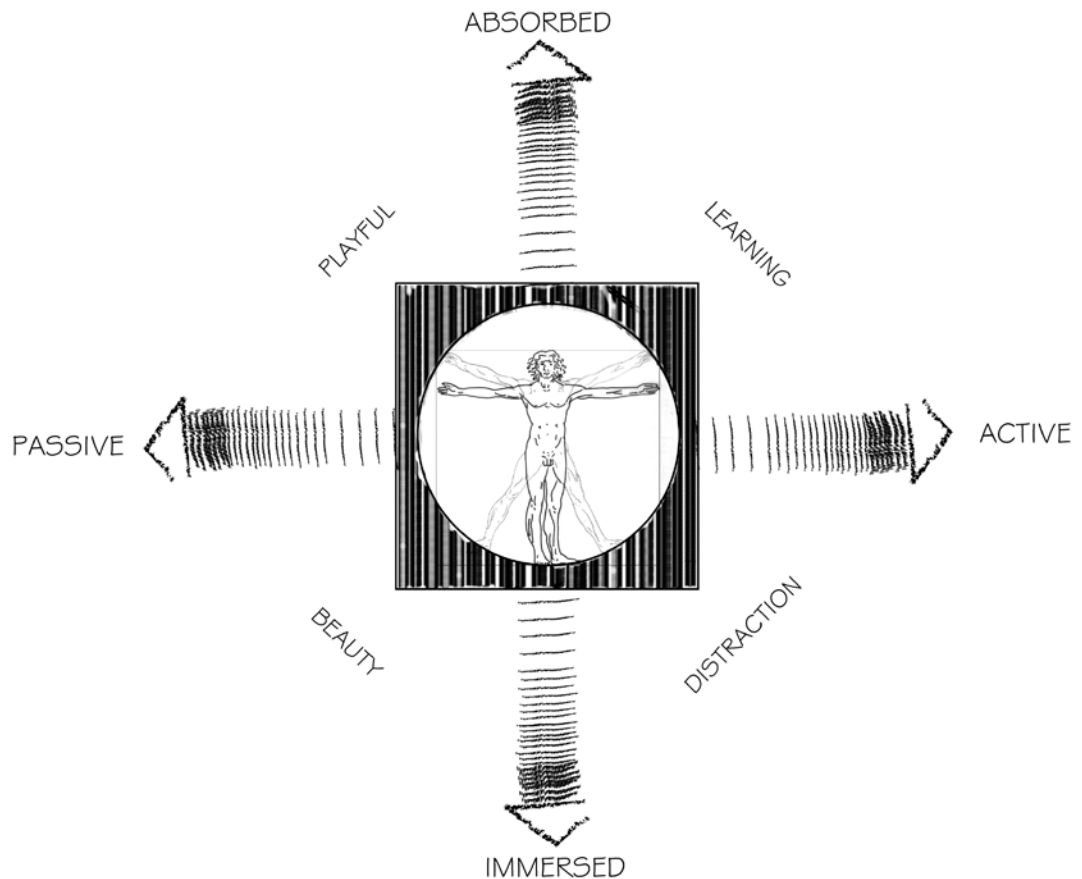
Figure 13-2. Engaging the Experience: Meaningful experiences require engagement from active to passive and from absorption to immersion levels of participation. As an individual moves through these phases, memorable experiences can be realized. ILLUSTRATION: Patricia Raimondeau

Design the Experience

The most memorable and richest experiences are those which include elements of education, entertainment, escape and estheticism. Consider the following in the design a healing experience:

❖ The beauty of the experience does matter; it is what first attracts the patient into the experience. The experience needs to look inviting to become a participant. The image and the atmosphere must be inviting and attractive to the senses. Example – A beautiful water feature, may attract a visitor.

❖ Once the beauty attracts the patient to the experience, the design needs to provide the "escape" or positive distraction to allow the participant to focus on a pleasurable diversion rather than the medical component of their visit. The greater the participation and immersion, the more memorable the experience. A fish aquarium, may attract the patient, engage and provide a positive distraction.

❖ The learning component establishes the bonding with the experience. It requires active participation of the participant to learn from the experience and the outcome of this engagement is patient empowerment. Education may come in the form of interactive videos, describing recommending surgical procedures or child life activities that teach children through play activities, medical procedures the child may encounter.

❖ The playful component of the experience provides the pleasure. Typically the component is passive, in that the patient does not have to do anything but smile and enjoy. This is the opportunity to make the healthcare environment more fun, pleasurable and enjoyable. Can you imagine a healthcare environment where we asked our patients at their dismissal if they enjoyed their stay? Entertainment examples in healthcare come in visiting clowns, animal therapy, and piano concerts.

Themed Environments are Experiential

Themed environments can contribute to a positive experience in a medical space. You may question the validity of themed environments for healthcare facilities. It may be appropriate for Starbucks, Barnes & Noble and Disney World, but hospital and medical institutions are serious business. To this I answer, serious business is just the right environment to create the scripted experience that is so necessary in these difficult healthcare places. Take the case where our client who requested a spa like space, where women felt pampered, and one could envision a big fluffy white terry cloth robe hung in each room. Or a children's hospital to reflect the pride of their town, or a hospital build on the shores of our nation's river, exhibiting a unique identity to the community. Not exactly "Disney-esq" but none the less a scripted participatory story is a "themed" design (Spector, 1995).

Designing a themed space for a healing environment needs to be a natural story for both the functional medical protocol as well as the community of users. For example in the case with "Spa" theme for the women's center we used "fusion" artifacts, of a shoji screen, Japanese lanterns, Zen gardens natural materials, Asian styled furnishings all supported the functional women's suite as well appealed to the female culture of the area. The theme must alter the patient's sense of reality, allowing the women to feel a sense of pampering, not being institutionalized. The successful themed space alters the users sense of time, space and matter. Altering these can alleviate the boredom while waiting, stress of the medical place and confusion of medical procedures. Unifying time, space and matter through design provide an altered yet natural sense of reality, the ultimate in positive distractions (Capodagdy, 1998).

Themes that saturate the environment support the experience. In the marketing world it is called "branding". Putting a fish tank in the center of the waiting room, may be a positive distraction, but does not create a experience. In the case of Potomac Hospital, taking her name from the Potomac River and the ability to see from the hospital immerses their visitors in a relationship to the river. All elements from the logo with the "wave", the themed art work relating to the river, organic design, color palette all support the relationship to the river as well as the Potomac Hospital Brand. Components of the theme appear subtly and cohesively throughout the hospital to reinforce the visitor experience.

Eliminate Negative Experiences

We all know there are many challenges and negative experience that are part of healthcare environments. Cancer centers treat the terrible disease of cancer; rehabilitation facilities treat the disabilities from strokes, head trauma and spinal cord injuries. Medical facilities treat the most negative experiences of life.

How then can we eliminate the negative experiences from these environments? Design cannot eliminate the disease, but can alter the experience the hospital guest will have as they journey through the facility and personally embark on their own healing journey. Design can eliminate things that diminish, contradict or distract from the negative experience. Medical equipment, as discussed in chapter two is one of our greatest challenges to eliminate the negative experience. (*Refer to Chapter 2, Dealing with Equipment*) Scripting the experience must go beyond the design of the envelope but also address the equipment, and culture of the institution.

Artifacts to support the Experience

Artifacts and memorabilia are important components in the experiential environment. A place devoid of artifacts is a space without meaning. Healthcare institutions are overwhelmingly empty of artifacts and memorabilia. No other professionally designed building used by the public is so empty of artifacts. Yes, they can harbor bacteria, need to be cleaned; they can get broken or even stolen, so why use them? Artifacts and memorabilia provide a lasting meaning to support the experience. "Memorabilia are a way to socialize the experience, to transmit parts of it to others." (B. Pine and J. Gilmore 1999 p. 57)

People collect, purchase, respond emotionally to memorabilia as a tangible component of the experience. Artifacts can also provide meaningful landmarks, reduce stress and provide positive distractions.

Artifacts are especially important in senior living and other areas where deinstitutionalization is important. In assisted living, dementia care, and nursing homes, "memory boxes" that house personal artifacts of the resident provides meaningful identity of highlights of their life and mark their room or apartment. Antiques and reproduction of antiques provide the spice to senior living public space. These artifacts not only add warmth and ambience of the room, but can actually trigger memories for desired the function of the area. For example, religious articles in a worship space support the spiritual function. Cracker and food tins add charm and remembrance to kitchen and dining spaces. Hospitals would benefit in adding artifacts similar to hotels and resorts. Artifacts such as mirrors, sculptural art, dimensional art, craft, and vases, all support a more hospitable and welcoming environment.

In some of our sports medicine facilities we used three-dimensional hands holding a piece of sports equipment, such as golf clubs, basket ball, baseball mitt and glove and even skis. In the hydro therapy space we used snorkeling fins, goggles and masks. These artifacts took the "medicinal" component out of the sports medicine facility. Patients loved it, the artifacts supported the function and left them smiling.

Engaging the Senses Support the Experience

"The more effectively an experience engages the senses, the more memorable it will be" (Pine and Gilmore, p59) The sound of music playing on the lobby piano, or piped in parking lots, the smell of fresh brewed coffee as you enter the waiting room, the visual delights of art, fish and water features, the comfortable furnishings and the accesses to comfort food provide simple cues that can heighten the positive experience. See chapter five on the senses. The five sensing design can provide both the animate and inanimate cues to the experience, support the positive and reducing the negative sensual elements of the healing environment. The sensual experience must take care to stimulate with overwhelming (Huelet, 2003).

The Experience Model Can Lead to Transformation

If healing environments are experiential, how do we move from the service model to the experiential in healthcare delivery? The current healthcare model is providing medical services with little attention to the individual. The experiential model relies on individual customization for the whole patient, family and staff. "The experiences we have affect who we are, what we can accomplish. Human beings have always sought out new and exciting experiences to learn and grow, develop and improve, mend and reform" Experiences can be transformational. (Pine and Gilmore, p163).

What is it that we are asking of healing environments? Yes, we want them to be holistic, for the body, mind and spirt; we also want them to be a positive healing experience, and finally we want them to be transformational. People want far more than medical services, pharmaceuticals or even a healing experience – people want to be well. They are ultimately seeking transformation from sickness or injury to wellness and wholeness.

As critical as the "experience" is to the healing environment, it is not the final outcome. When the positive experience is carefully crafted, scripted for the desired outcome, designed to engage the senses, customized for the individual, filled with family, friends and caring staff, supported with artifacts, spaces that provide comfort and embrace the spirit, the experience becomes transformational and healing is possible. It is this life-transforming experience that the hospital patient is truly seeking.

The environment, as powerful as "place" as it is, it cannot create health, transformations cannot be forced, delivered or prescribed. Changes in health begins from within the individual and with the right set of experiences, caregivers can help guide the patient through a healing transformation (Gallagher).
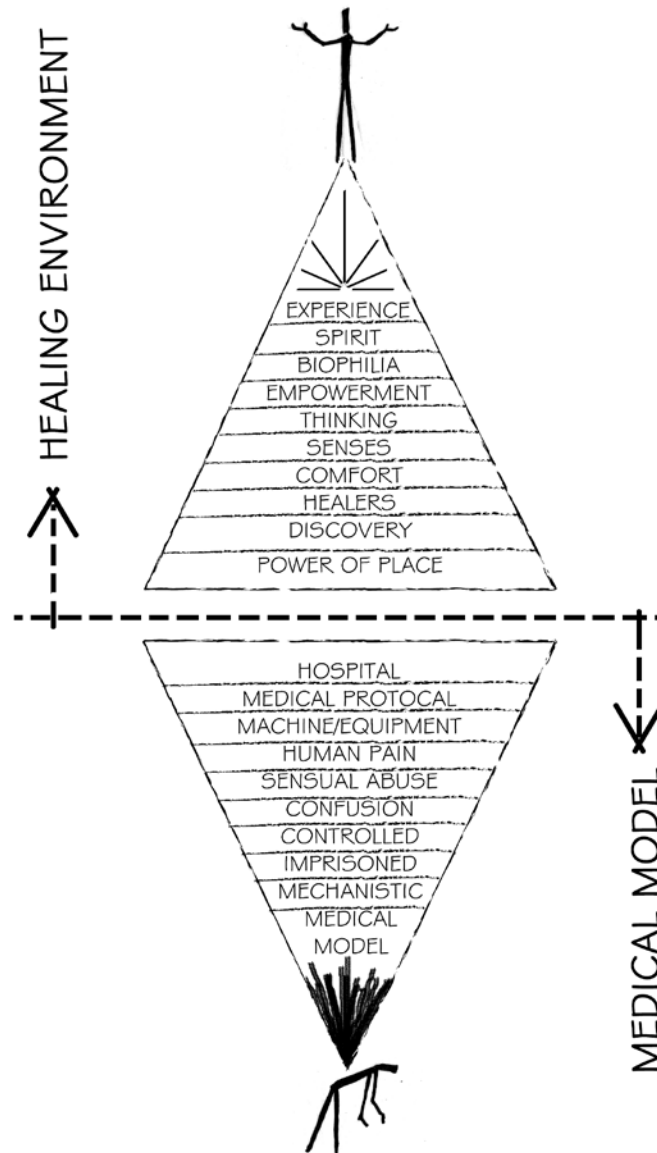
Figure 13-3. The healing environment moves from the mechanistic model of "curing", where weight was borne by the patient to the healing model. This model integrates; place, change, comfort, senses, thinking, empowerment, biophilia and the experience. The healing environment model supports the patient.

iLLUSTRATION: Patricia Raimondeau

MeadowView — Experiential Design Case Study

MeadowView Dementia Care, the memory care village is the brain child of Michael Pietrzak MD, an emergency medicine specialist and former director of the International Brain Injury Association. Dr. Pietrzak is one of those rare visionaries who have linked environmental factors with brain health. He conceived and built these models of care based on the concept of experiential design to sustain the highest level of cognitive functioning for dementia patients by providing environments that are culturally and emotionally relevant to dementia residents. "A lot of times local things that have been part of people's lives for many years will have much more of an emotional connection, emotional memories are much stronger than cognitive memories". Currently we have deigned and built two of these facilities with Dr. Pietrzak. His organization plans to build several more of these facilities based on these early successes. The model consists of memorable experiences for the residents on holistic levels of living; the individual, the family and the community.

Figure 13-4. The plan illustrates the total community environment within a safe place. Four different neighborhoods with residents' apartments form the perimeter surrounding the social "townscape". The town center offers many social destinations with familiar landmarks from their community.

ILLUSTRATION: Patricia Raimondeau

MeadowView focused on these three levels throughout their levels of care and programs. They are designed to resemble a small local town, complete with individual private rooms, set in diverse neighborhoods, with access to public town square for social functions and activities. Residents can enjoy individual, family and community activities in a safe, stimulating and memorable setting. These carefully planned environments strive to keep

stress and frustration of dementia to a minimum while providing residents with the stimulation of life's everyday experience within the setting you would typically find these activities. For example, church services are conducted in a chapel that looks like a worship space, not the activity room that converts to a chapel on Sunday mornings.

The first facility was designed in Cedar Rapids, Iowa. It was designed around activities, icons, and landmarks of Cedar Rapids. We developed the atrium as the town square with familiar landmarks, such as a clock tower, Kinnick sports stadium, typical local stores, post office and a favorite band shell for entertainment. We created familiar destinations the residents could relate to on a personal level.

Familiarity with landmarks is only one part of the experience. The design and programs carefully integrates five sensing components such as aroma therapy linking appropriate smells with the specific location and activity. The aroma of fresh baked chocolate chip cookies greets upon entering the facility has become a hallmark of MeadowView. Aroma plays with the sense of taste as favorite destinations. The ice cream parlor is a fun social space that delights the palette as well. Engaging residents through activities of diverse textures are part of Montessori programs such as shopping for cooking and baking items in the Grocery Store. Diverse textures are used to specifically identify each of the four neighborhoods. Change in textures provides a prime identifier for the four distinct neighborhoods. Ivy Lane uses white stone, dark green carpet and rich ivy and plants as artifacts. The Rustic Ridge neighborhood has rough sawn cedar shutters, stucco and American artifacts create the second neighborhood. The Red Cottage neighborhood has crisp white bricks, red shutters, dark red carpet and front porch memorabilia. The fourth neighborhood has rich terra cotta stucco rust carpet and accented with facades of charming brick. The textures, color and memorabilia support the identity of unique neighborhood to help each resident find their way home.

The sounds make the facility come alive, especially the sounds of nature. The animals, specifically the birds, that are always chirping giving life to the experiential environment. I even witnessed the village cat pounce on an artificial feathered bird.

Color and contrast are critical design tools to support function. White toilets are always contrasted with dark colors to easily identify them. Toilets are plentiful in the town square located where residents can easily see and identify them. Designed as "outhouses" with the crescent moon consistently painted in bright yellow against a red door easily remind the resident where the important facility is.

Artifacts, memorabilia and antiques from the 1930's -1940's are prominent in the design, trying to link the resident back to the years they best remember. We never know what element will provide the connection, but be it a remembered tune, familiar artifact, a powerful aroma when that connection is realized, the experience is rich.

Meadowview's experiential design is good for more than the residents, staff enjoy the lighthearted playful environment as well. It has been best received by the resident's families and children. Children enjoy coming, chasing the cat, playing in the pickup truck and safely free to explore the town square. Families are more involved, which is ultimately good for the residents to stay connected to their families. "The planning and design team has an even higher goals than creating a haven for residents, visitors and staff, however. It is hoped that this design, coupled with the facility's programming, will decrease resident's rate of decline by providing them with relevant stimuli and engagement.

While the idea is untested, some scientific evidence shows it could work." M Pietrzak p. 6 No Place Like Home   Meadowview is perusing academic research to develop independent studies of this model. Dr. Pietrzak feels that a number of Alzheimer's and dementia care outcomes could be measured to determine the design's success in areas such as the amount of sleep, antianxiety, antipsychotic and the use of main medication comparing Meadowview with the traditional dementia care facility. Antidotal and observations of MeadowView do show some indication of success. Staff members report that residents have become acclimated to the new space in less time than anticipated.

MeadowView is a unique environment, designed and built to focus entirely on the experiences of the residents, visitors and staff. It is a themed environment recreating the local community from perspective of the individual, family and community. The environment touches cognitively challenged individuals through the design for the five senses. Charming destinations are meaning places that have been enriched by the programs, activities and memorabilia. The outcomes promise to have measurable therapeutic benefits. However, even before the data can be collected, analyzed, measured and documented, benefits can already been seen and experienced. MeadowView is charming, engages the residents as well as their families. Families visit more at MeadowView than the corporation's other typical dementia care facilities. Families have even offered that they felt less guilt in placing their loved one in such a entertaining environment. Experiential design is the new frontier in the design and economy industries as consumers are savoring the memorable experience as they expect more and are willing to pay more for the experience.

It is my belief and hope that the concepts of "Experiential Design" will prove to provide memorable experience and improve the quality of life in all areas of healthcare.

What's The Proof?

Included in this book are ideas, observations, evidence, checklist, guides, case studies and recommendations to assist in understanding the value of healing environments. This second edition of Healing Environments seeks to validate the crucial role that design of place plays in healthcare setting. Each chapter while focusing on design for the body, mind and spirit offers evidence to support the validity of such observations. Some of the evidence is now accepted as standard protocol in the profession, other areas are quantum leap suggestions, while still others are still personal observations. This work is not an attempt to be an academic document of evidence based design, but a close look at the evidence for healing environments to seriously consider the value of place in relationship to the healing process.

I continue my personal and professional journey to understand why people heal and the power of an environment that can both harm and heal. It is evident in both the arts and sciences to see diverse professions of medicine, biology, chemistry, neurosciences, religion, anthropology, environmental psychology and design engaging in investigation and research to find a more healthful world. Healing and medical environments have long been burdened with the weight of the advancements of medicine, technology, codes and protocols while ignoring the human miseries of the people they serve. I propose that we focus on holistic healing environment principles that form building blocks to reach health transformation. We can all be partners in this healing process. Both the arts and the sciences desperately need each other to bring about the transformational model of healing.

Currently, we do not have all of the "proof" to substantiate all of our observations, however, there is a new direction in design which embraces evidence and research. Like DiVinci's curiosity suggested, the very nature of design wants to prove its value, our clients are demanding it, and the end users are assuming it to be true. While design has typically not been associated with research and evidence in the past, design is now partnering with diverse partners in science. This is proving to be enlightening for both the arts as well the sciences. While research continues, data gathered, literature searches mount, we must all continue our vigilance of our intuition to observe what appears to work and not work, as this is the beginning source of all evidence. We must continue to ask the questions as well as pose questions.

Evidence-based design for healing environments is growing and continuing to validate our observations and design intuition. Research will continue to expand and reveal more

secrets about healing and the power of place further identifying what we know, and what we don't know. Medicine is beginning to broaden the medical model to include a more holistic approach to healing. Design is also in the infancy of moving from the "decorative arts" model to a transformational model of experiential design. Healing environments can only be achieved by blending the holistic model of healing with the transformational model of design. Evidence-based design is in its infancy with a promising future. The door has been opened, and we can never go back. Both design and medicine are healing arts, and we are now finding a cross pollination of evidence to support this. The healing environment is a powerful place and when supported by evidence it can be achieved by any of us who have the love and care for humanity.

Evidence-Based Research on Healing Environments

Thomas T.H. Wan, Ph.D.

""FORMERLY, WHEN RELIGION WAS STRONG AND

SCIENCE WEAK, MEN MISTOOK MAGIC FOR MEDICINE.

NOW SCIENCE IS STRONG AND RELIGION WEAK, MEN

MISTAKE MEDICINE FOR MAGIC."

~ Thomas Szasz

Evidence-Based Research on Healing Environments

*I*N RECENT YEARS THERE HAS BEEN AN EXPLOSION of evidence-based medicine/practice, as the direct result of several factors: the aging of the population, rising patient and professional expectations, the proliferation of new information technologies, the growth of disease management modeling, and the demand for better healing environments[1]. Massive amounts of clinical and administrative data have been gathered. Little has been done, however, to build the relational databases that can generate information for improving health care processes and outcomes. Such systematic information is needed to build a repertory of knowledge for the use of policy decision makers, providers, administrators, facility designers, researchers, and patients. Evidence-based knowledge gives users a competitive edge in making policy, clinical, administrative, and constructional decisions that improve personal and public health[2]. Furthermore, through using the ten principles in the design of facilities environmental improvement will be facilitated by the knowledge gained from best-practice modeling of the determinants and the consequences of managerial interventions or design strategies.

Healing Environment & Informatics Research

The concept of a healing environment has traditionally been defined in terms of clinical skill and technological resources. As both patients and their healthcare providers expand the concept of healing and how and where it takes place, there is a greater emphasis on other aspects of the environment -- namely, aesthetic, ergonomic, and safety factors that help create a safe healing environment. A recent study comparing twelve Planetree affiliates twelve months prior to and 12 to 24 months following implementation of the Planetree model of care, found significant average increases in overall patient satisfaction, willingness to recommend the healthcare facility to family and friends, and likelihood of returning to the facility, Saba says. The Planetree model of care has also been associated with fewer medical errors and lower nosocomial infection rates. Many facilities that have adopted patient-centered methodologies report this concept nearly pays for itself in the first year of operation.

Informatics is a general term that describes the process of data warehousing and data mining [3]. Healthcare informatics research is a scientific endeavor that applies information science, computer technology, and statistical modeling techniques to develop decision support systems for improving both health service organizations' performance and patient care outcomes (see Figure 1).

The philosophical foundation of informatics is the commitment to knowledge-based or evidence-based decision-making. Decisions that previously had relied on guesswork or instinct now can be aided by data-driven reference points that clarify thoughts and process. That transformation can perhaps best be explained through real life applications of informatics. In health-related sciences, such examples fall into these groups, which are not mutually exclusive: medical events, creation/ support of infrastructure, and education.

The healthcare facility design is usually the first line of response to medical needs. Informatics, by identifying efficacious mechanisms for integrating the body, mind, and spirit into a healing environment and leading to analysis, can avoid potentially adverse consequences of design effects on the healing processes and outcomes. An example of that potential can be seen in the response to the 2001 bioterrorism attacks. During September 2001, anthrax spores were traced to postal facilities in Trenton, New Jersey and Brentwood, Washington. Epidemiologists faced a daunting task: the New Jersey facility was 281, 387 square feet, staffed by 250 workers per shift and processed over 2 million items of mail per day [5]. Informatics helped identify the individuals who may have been exposed to anthrax, monitored the screening process, and recorded who received antibiotics and distribution of known cases and known deaths. In addition, informatics guided the recommendations for follow-up procedures [3]. Authorities had a visual representation of the anthrax threat available (using GIS software), which assisted the criminal investigations [5].
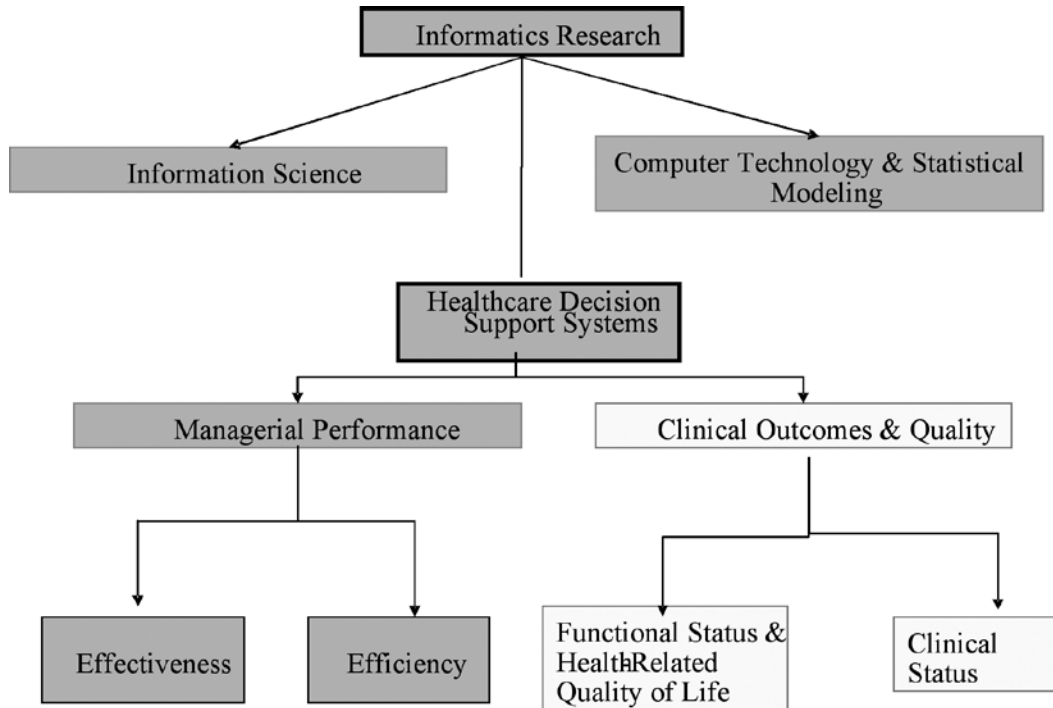
Figure14-1. Healthcare Informatics Research   ILLUSTRATION: Thomas T.H. Wan

Source: Adopted from T.T.H. Wan's "Health Informatics Research," published in the Journal of Medical Systems, 2006 [4]*.*

In exploring the important role that data can play in responding to a range of sentinel events, one development has been to identify means of recognizing "clusters" of infectious diseases in acute care facilities. For example, victims of bioterrorism may exhibit short-term, generic symptoms like respiratory irritations before their condition deteriorates, but such indicators may be ignored by health services. Informatics can provide the ability to recognize a "signal" of impending catastrophe over the "noise" of regular operations [5].

Informatics can also be used by the chronically ill via information and communication technology (ICT). Using an ICT system, the chronically ill can monitor their health (blood pressure, sugar levels, etc) at home while participating in a telemedicine videophone consultation with a qualified health professional. The system, which reduces health care costs, is described as "a patient-managed Home Telecare System with integrated clinical signs monitoring, automated scheduling and medication reminders, as well as access to health education and daily logs" [6]. Similar systems exist for the elderly (ARAMIS) and for people with HIV/AIDS (CHESS) [7].

Besides identifying medical events, informatics can now guide the development of infrastructure. Constructional and administrative datasets are being merged into a single database that is used to assess the quality of facility design and healing environment, and to analyze the use and cost of the diffusion of new medical technology, the consequences of health policy changes, access to care (inference), small-area variations, and the care of special populations [8]. Recently, the clinical data were merged with the Survey of Integrated Healthcare Systems data, compiled by the Dorenfest Information System, Inc., to analyze the effects of informatic integration on efficiency and on the quality of care [9,10]. An astonishing result is that informatic integration is associated with better health care outcomes.

Informatics can also assist with education in health care. Exploring that possibility, a recent medical conference featured delegates from 18 different countries who sought the advice of medical professionals on the role of informatics in their practices [11]. It was explained that informatics is efficient for rapid retrieval of information, scheduling appointments and monitoring repeat prescriptions [11]. Some members of the panels also utilize informatic technology to develop evidence-based medical care, though the busy practitioner environment often leads to having that development completed outside the office.

Evidence-based research on healing environment is also being developed in the United States. It would be an ambitious attempt to provide timely, convenient access to information resources for health care practitioners in identifying the beneficial effects of an holistic approach to facility design and healing environment. Several research questions were raised by investigators. They include the following:

1. What are the Effects of Hospital Building Design on
    Patient Care Outcomes?

2. What are the Effects of Hospital Culture on Patient
    Care Outcomes?

3. What are the Effects of Healing Environments on
    Patient Care Outcomes?

4. What are the Effects of the Process of Healthcare
    Delivery on Patient Care Outcomes?

5. What are the Effects of Holistic Approaches to Healing
    Environment on Patient Care Outcomes?

6. Can healing environments mitigate patient stress and improve outcomes?

Health professionals who have previously read journal articles or textbooks for information can now find empirical evidences or data from the Internet without being overwhelmed by superfluous information. Helpful web links include the following:

❖ SurgiCenteronline

❖ Topics in Advanced Practice Nursing eJournal

❖ The Center for Health Design (www.healthdesign.org)

❖ Inform Design (www.informdesign.net)

❖ The US Green Building Council (www.usgb.org)

❖ Planetree (www.planetree.org)

❖ Association of Healing Healthcare Association (www.healinghealthcareassoc.org).

Analytical Strategies In Healing Environment and Informatics Research

Healthcare informatics research is a systematic process of compiling, analyzing, and simulating data to produce verified and replicated findings from observed facts or phenomena. The analytical strategies include: 1) the formulation of a data warehouse for exploration, 2) data mining, 3) the application of confirmatory statistical analysis, 4) simulation via an interface with computer and information system technologies, and 5) translational research (see Figure 2).

Data warehousing is the systematic structuring of data within a theoretically informed framework shared by the disciplinary focus, to produce useful information for exploration. Analysts extract from multiple sources, build a relational database that is constantly maintained and updated, and classify and populate the study variables uniformly under a nosological or classification system.

Data mining is the use of a myriad of exploratory and confirmatory statistical techniques to translate masses of raw data into valuable information for decision makers. Benefits of data mining are observed in: 1) understanding the patterns of care or services; 2) identifying causal paths or root causes for problems in service delivery; 3) profiling the best practice models, 4) establishing benchmarks for continuous performance enhancement; and 5) differentiating the mechanisms for achieving high performance in a healthcare delivery system.

Simulation and optimization methods should play an important role in healing environmental research on outcomes of care. Researchers should build interfaces between analytical modeling and operations research. Graphics-user interface (GUI) presentations
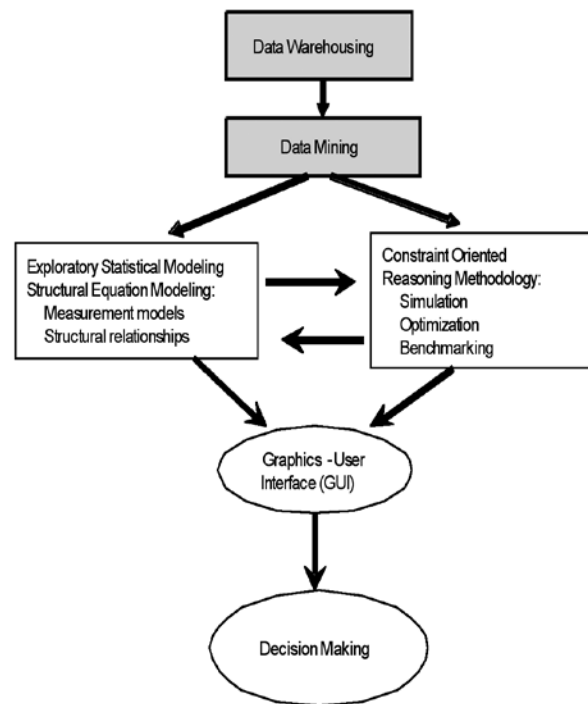
Figure14-2. Analytical Strategies   ILLUSTRATION: Thomas T.H. Wan

Source: Adopted from T.T.H. Wan's "Health Informatics Research," published in the Journal of Medical Systems, 2006 [4].

should be developed, so that simulated results can guide clinical and constructional decision making.

Translational research plays an important role in converting scientific knowledge into routine practices in the design and evaluation of healing environment. With the aide of informatics research, practitioners, healthcare executives, and facility designers can rely on evidence-based knowledge to improve the efficacy and effectiveness of healing environment design.

The most important use of information and communication technology is to enhance the healing environmental infrastructure so that the quality of patient care will be improved and sustained. The Committee on the Crossing the Quality Chasm, Next Steps toward a New Health Care System strongly advocates at the point of care, the clinician and patient review the results from the scorecard together and then use scientific knowledge to decide together on continuing care [12].

Significance Of Healing Environment Research

The health care system is changing to one in which good evidence is both available and actually used to stimulate effective performance by health care providers and facility designers. That inevitable transformation is reflected in the institutionalization of healing environment and informatics research as a specialization or profession. The health care system's performance can benefit thereby from the best work in integrating multi-disciplinary perspectives to generate evidence-based knowledge and decision support modeling. Thus both the quality of patient care and healing environment can be improved.

Research by Dr. Roger Urlich confirms that visual exposure to plant settings has produced significant recovery from stress within five minutes while enhancing productivity by twelve percent [13,14}. Another study conducted by the faculty of Washington State University verifies that once exposed to plant settings, test persons demonstrated more positive emotions such as happiness, friendliness and assertiveness and less negative emotions such as sadness and fear. Interior plants offer employees a much needed touch of humanity while stimulating a more productive environment. Systematic research, employing randomized trials, on the impact of healing environment has yet to be conducted.

There is no formal interdisciplinary training program for healing environment and informatics research in the United States. National data on quality improvement suggest that a significant amount of investments will be needed to build a solid infrastructure of healing environment and informatics research. Furthermore, a severe shortage of empirical knowledge on the efficacy and effectiveness of healing environment is well documented in a series of reports [15-17].

The Recommendations To Health Professions

Health professions should retool their skills and develop a strong sense of understanding of the impact of healing environments on patient care outcomes. That will aid the efforts to improve patient safety, reduce costs, and enhance both the effectiveness and the quality of health care. In programs educating health services administrators, establishing an interdisciplinary training and research in informatics and improvement in healing environments should result in a framework at both the pre-doctoral and post-doctoral levels. The formation of partnerships with leaders in the health care industry who may want to shape the research and educational agendas will yield fruitful results.

To summarize: healing environment research is an interdisciplinary field that draws upon knowledge from information, cognitive, management, architecture, interior design, and health care sciences. The field of evidence-based healing environment and informat-

ics is defined as the study of information science applications within the context of health care environments to compile, manage, and process data and knowledge for designing quality healthcare environment and improving positive impacts of integrating the design for enhancing the body, mind, and spirit in a therapeutic environment. Although the establishment of empirical research on healing environment is timely, we believe that the future of healthcare management will rely on informatics research and development [18-20]. The important step forward is to promote research activities with massive clinical and administrative data on healing environments, under the auspices of foundations and governmental agencies. That is the necessary step toward achieving better understanding of environmental effects on healing processes. It can also offer practitioners and architectural designers evidence-based decision support. The health care system will then deal more effectively with medical care needs, infrastructure support, and the exploration of informatic research on healing environments.

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RESOURCES

Evidence Based Design and Healing Environment	Website
Academy of Neuroscience for Architecture	www.anfarch.org
The Advisory Board Company	www.advisoryboardcompany.com
Air Quality Science	www.aqs.com
American Academy of Architecture for Health	www.aia.org/aah_default
American Cancer Institute	www.healthline.com
American Cancer Society	www.cancer.org
American College of Healthcare Architects.	www.healtharchitects.org
American Hospital Association	www.aha.org
American Society for Healthcare Engineers	www.ashe.org
American Academy of Healthcare Interior Designers	www.aahid.org
American Journal of Nursing (Nurse Assoc.)	www.nursingworld.com
American Journal of Nursing	www.ajnonline.com
American Journal on Nursing	www.nursingcenter.com
American Institute of Architects	www.aia.org
American Institute for Cancer Research	www.aicr.org
American National Standards Institute (ANSI)	www.ansi.org
American Society of Interior Designers	www.asid.org
American Society for Testing and Materials (ASTM)	www.astm.org
Americans with Disabilities Act (ADA)	www.ada.gov
Architecture & Neuroscience	www.architecture-mind.com
American Obesity Association	www.obesity.org
American Psychological Association (APA)	www.apa.org
Alzheimer's Association	www.alz.org
Association of Professional Chaplains	www.professionalchaplains.org
Association of Healing Healthcare Advocates	www.healinghealthcareassoc.org
Biomimicry Guild	www.biomimicryguild.com
Biomimicry Institute	www.biomimicryinstitute.org
Biophilia Nature Association	www.biophilia.net
British Autogenic Society	www.autogenic-therapy.org.uk
Building Owners and Managers Association (BOMA)	www.boma.org
Building Research Information	www.tandf.co.uk
Carpet and Rug Institute	www.carpet-rug.org

Evidence Based Design and Healing Environment	Website
Center for Health Design	www.healthdesign.org
Center for the Built Environment	www.cbe.berkley.edu
Centers for Disease Control	www.cdc.gov
Coalition for Health Environments Research. (CHER)	www.healthdesign.org/CHER
Complementary Medicine Association	www.the-cma.org.uk/
Council for Healing	www.councilforhealing.org
Cornell University Ergonomics	http://ergo.human.cornell.edu
Cognitive Psychology	www.humboldt.edu
Delta Society for Animal Research	www.deltasociety.org
Design for Aging	www.aia.org/dfa_default
Environmental & Behavior	www.sagepub.com
Environmental Psychology	www.personal.umich.edu
Evidence-Based Design	www.healthdesign.org
Facilities Care Publications	www.facilitycare.com
Facilities Management Publications Healthcare Construction and Operations	www.healthcarefacility.net
Foundation for Therapeutic Clowning	www.caringclowns.org
Green Guide for Health Care	www.gghc.org
Health Facilities Management	www.hfmmagazine.com
Healthcare Design Publications	www.healthcaredesignmagazine.com
Healthcare Building Ideas Publications	www.healthcarebuildingideas.com
Healthcare Without Harm	www.noharm.org/us
Health Insurance Portability Act (HIPPA)	www.cms.hhs.gov/HIPAAGenInfo/Downloads/ HIPAALaw.pdf
Healthy Building Network	www.healthybuilding.net
Illuminating Engineering Society of North America	www.iesna.org
Inform Design	www.informedesign.umn.edu
Institute on Aging and Environment, School of Architecture and Urban Planning, University of Wisconsin	www.uwm.edu/Dept/IAE/
Institute for Family-Centered Care	www.familycenteredcare.org
Institute for Music and Neurological Function	www.bethabe.org
International Interior Design Association	www.iida.org
International Facility Management Association (IFMA)	www.ifma.org
International Snoezelen Association	www.snoezelen.org isna.?????
Journal of the American Medical Association	http://jama.ama-assn.org

Evidence Based Design and Healing Environment	Website
Journal of Environmental Psychology	http://ees.elsevier.com/jevp
Modern Healthcare Publications	www.modernhealthcare.com
Medical Spa Association	www.medicalspaassociation.org
Montessori Association	www.montessori.org
Montessori Based Dementia Programming	www.myersresearch.org
Mozart Effect	www.mozarteffect.com
Medscapes	www.medscape.com
Nanotechnology website	www.Nanotechweb.org
National Association for Holistic Aromatherapy	www.naha.org
National Cancer Institute	www.cancer.gov
National Center for Infectious Diseases	www.cdc.gov/ncid
National Institute of Building Sciences	www.nibs.org
National Institutes of Health (NIH)	www.nih.gov
National Academies Press	www.nap.edu
League for the Hard of Hearing	www.lhh.org/index.html
Peoples Medical Society	www.peoplesmed.org
Pebble Projects	www.healthdesign.org/research/pebble/
Planetree, Putting the patient first	www.Planetree.org
Pacer Center for Children with Disabilities	www.Pacer.org
Research Design Connections	www.researchdesignconnections.com
Society for Environmental Graphic Designers	www.segd.org
Sage Publications	www.sagepublications.com
Second Nature	www.secondnature.org
Third Place Concepts	oldenbur@uwf.edu
US Environmental Protection Agency	www.epa.gov/ebtpages/air.html
US Green Building Council (USGBC)	www.usgbc.org
Wayfinding Place	www.wayfindingplace.org

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