

Creating a Healing Environment in the ICU

LEARNING OBJECTIVES

Renee Rubert L. Dianne Long Melissa L. Hutchinson

Upon completion of this chapter, the reader will be able to:

1. Describe the issues associated with the critical care environment and optimal patient outcomes.
2. Discuss strategies that can facilitate healing environments for the critically ill patient.
3. Discuss the philosophy of family visitation policies in intensive care units.
4. Explain healing modalities that can be integrated into nursing interventions.
5. List optimal patient outcomes that may be achieved through creation of an evidence-based healing ICU environment.

While a nurse or nursing unit can possess impeccable critical care skills and knowledge, those are not the only factors that influence patient recovery. This chapter focuses on the intensive care environment, examining how it can influence physiologic measures and the holistic needs of the patient and family. Other modalities (e.g., spirituality and prayer) that may enhance a healing environment for the patient are described in Chapter 9.

Many designs of critical care units provide a cold and sterile environment in which to receive specialized care. This design fails to humanize the experience for the critical care patient and family. The term “critical care unit” invokes images of very ill patients surrounded by the latest in biomedical equipment, monitoring devices, and code carts. These images alone can raise feelings of anxiety and levels of stress in patients and families alike. The lack of foresight in designing critical care programs that encompass a pleasing physical design, integrate family presence, and offer complementary therapies leaves critical care patients and their families with less than an optimal environment in which to heal.

The concept of environmental influences on healing has been known since Florence Nightingale (1970), a nursing leader, cared for soldiers of the Crimean War. New generations of critical care units are being designed to promote healing in a humanistic manner that can meet the holistic needs of patients and their families.

ANCIENT PERSPECTIVE

The interaction between humans and the different environments in which they are placed has long been known. More than 2000 years ago, the ancient Roman physician Galen recognized the healing aspect that an environment could provide. He understood the consequences of unclean conditions; thanks to his health philosophy, he had the highest survival rate among all physicians who treated the gladiators (Percy, 1985). Florence Nightingale was also famed for her focus on sanitation and other aspects of the environment that contribute to the health and healing of the patients. She was not only a leader in improving sanitation and ventilation, but was also instrumental in bringing forth the body-and-mind connection. She understood that the environment played a central role in a patient’s healing of body and mind. Nightingale went on to

influence the healthcare environment by varying the patient's visual perspective, utilizing color and natural light more effectively, and eliminating excessive noise. This early nursing leader was passionate about the nurse's role to create a milieu that would give a patient the best opportunity to heal.

Until recently, the primary strategies employed in the design of critical care units were based on the medical needs of the patients and the convenience of the provider; the architectural designs were mainly utilitarian and family visits were restricted. The utilitarian designs of the past created an ambience that dehumanized the patient's experience. Recent studies have supported Nightingale's practices from a century ago; the environment plays a significant role in the overall healthcare experience and healing process. Historically patients were placed in an open ward in beds that lined the walls. This design allowed for many patients to receive nursing care from a minimal number of nursing staff. Lack of privacy and exposure to repulsive sights and odors were some of the detractors of this type of design (Fontaine, Briggs, & Pope-Smith, 2001).

Intensive care units (ICUs) lacked aesthetic appeal and had a sterile ambience, with little visual interest being incorporated into their design. Even today, with the many advancements that have been attained in biomedical equipment and monitoring in critical care units, the same issues considered by Nightingale of air quality, color, light, view, and noise are still of concern.

Stepping into the 21st century and utilizing Nightingale's concept, today's healing environment encompasses a patient-centered approach including a pleasing physical setting and a supportive organizational culture (Malkin, 2003). There is a resurgence of interest by healthcare designers and providers in, and a demand by patients and families for, healthcare facilities that incorporate the ambience of healing into the architecture, artwork, and philosophy. Stichler (2001), in her review of related research, reports that patients experience positive outcomes when the environment incorporates natural light, elements of nature, peaceful colors, soothing sounds, pleasant views, and an overall pleasing aesthetic essence.

PSYCHOLOGICAL AND PHYSIOLOGICAL CONNECTION OF THE HEALING PHENOMENON

Psychoneuroimmunology refers to the physiologic response of the body to psychological and environmental stressors (Starkweather, Witek-Janusek, & Mathews, 2005). This stress response is initiated by the hypothalamus releasing corticotrophin-releasing factor (CRF). The CRF stimulates the pituitary gland to release a number of stress hormones, such as adrenocorticotrophic hormone (ACTH). This hormone, in turn, stimulates the release of cortisol from the adrenal cortex and the release of aldosterone from the adrenal medulla. Cortisol, a glucocorticoid, stimulates the release of glucose from glycogen in the liver.

Aldosterone, a mineralocorticoid, acts to retain sodium and water. Both of these hormones cause an increased blood pressure in the ICU patient (Lusk & Lash, 2005). Furthermore, cortisol depresses phagocytosis, which can affect healing.

Psychoneuroimmunology research demonstrates that emotions influence immunological functioning and that too much stress has a negative impact on the functioning of the body's immune system. Recent research suggests that the immune system can be enhanced or suppressed by external stimuli and that the brain reacts to external stimuli at an unconscious level (Malkin, 2003). The physiological affects of stress negatively affect patients' ability to heal. Creating physical environments that support families' and patients' psychological well-being, by contrast, can produce a positive impact on therapeutic outcomes, reduce stressors, and improve staff performance and morale (Lusk & Lash, 2005; Malkin).

Information received through our five senses evokes physiological and emotional responses of anxiety or serenity (Mazer, 2002). Creating a healing environment within the chaos of a critical care setting might sound daunting, but the potential benefits are well worth the effort.

PHYSICAL ENVIRONMENT

Environmental Noise

Unnecessary noise, or noise that creates an expectation in the mind, is that which hurts a patient . . . Such unnecessary noises undoubtedly induced or aggravated delirium in many cases. (Nightingale, 1970, p. 25)

Noise is one of the most insidious environmental stressors found in the hospital environment. In the critical care unit, where patients require more frequent and more intensive monitoring, noise can be the most pervasive stressor. On any ward, noxious noises can include the hum of medical equipment; bubbling of chest tubes; staff conversations; pagers and intercom systems; ringing of telephones; opening and closing of doors, cabinets, and supply carts; and even the clattering sounds from the wheels of a passing cart. The critical care unit, with the advent of new technologies and increased monitoring equipment, adds even more auditory stimuli—the buzzing and beeping of alarms and strange noises that the specialized monitoring equipment can produce (Pettersson, 2000). These unfamiliar and unexpected noises can startle anyone, but especially a patient already stressed from a physiological strain. A constant barrage of unexpected noises has physiological manifestations as well, such as interrupted sleep. (Sleep disturbances in the ICU are discussed in Chapter 5.) It is not surprising that noise is one of the most frequently cited complaints from critical care patients and their families (Stein-Parbury & McKinley, 2000).

Not only does the chaotic environment of a critical care setting induce stress, but it can also affect patients' perception of sleep quality. Topf, Bookman, and Arand's (1996) study of critical care sounds found that individuals who were subjected to critical care sounds perceived their sleep quality less positively than individuals who roomed in quieter environments. Topf and Thompson (2001) found that the hospital environmental noises negatively influenced the quality of sleep by interacting with patients' other stressors and that noise-induced stress is very subjective, noting that what is stressful to one individual may be comforting to another.

Designing a critical care environment that supports a healing atmosphere by reducing ambient noises takes into consideration many design elements, such as flooring, ceiling material, and doors and nursing station placement (Mazer, 2002). Mazer recommends utilizing sound absorbent carpeting, acoustic ceilings, and floor tiles in heavy-traffic areas. Petterson (2000) suggests creating mini-workstations throughout the unit to reduce noise from conversations by dispersing staff away from a central station, where escalating voices can often be heard over the basal sound level of the unit.

Other design proposals include small bedside televisions with a pillow speaker or headphones (Kahn et al., 1998), earplugs or noise-canceling headsets, or therapeutic sounds either through small machines or a centralized "music" station. Even simple actions such as closing the patient's door and having single-occupancy rooms can provide relief (Topf & Thompson, 2001). Attention should also be given to noises that can be significantly reduced through judicious equipment purchases, such as purchasing delivery carts with rubber wheels, because they are quieter (Mazer, 2002).

Biomedical testing of patient care equipment for noise impact and development of maintenance programs that review quieter operation of equipment and machinery are also recommended to decrease noise levels (Mazer, 2002). A study of noise in a neonatal intensive care unit (ICU) showed that even modest modifications reduced noise by 50% (Walsh-Sukys, Reitenbach, Hudson-Bar, & DePompei, 2001). Modification of the unit included installation of acoustical material in monitor bays, carpet that was installed in high-traffic areas, weather stripping that was added to doors and drawers, metal trashcans that were replaced by rubber cans, and covers that were placed over incubators. Other research suggests that reducing noise levels can influence patient outcomes in other ways, such as nurses being less likely to make errors when they are less distracted by extraneous noise (Mazer).

When designing a new ICU from "scratch," engineers can utilize the abundance of research and knowledge for implementing an aesthetically pleasing and healing environment. Because many ICUs that are in operation today were originally

designed for ease of cleaning and convenience of staff, the characteristics that make up a healing environment were not considered. To redesign an active ward in a logical manner, it is important first to assess the current noise pollution and then to develop an auditory environmental standard. Mazer recommends evaluating the decibel level at different locations and different times of the day. Kahn et al. (1998) propose formulating and implementing an official policy that addresses noise standards and leads to the continued reduction of ambient noise in the ICU.

Petterson (2000) conducted a survey of the medical critical care staffs' perception of noise levels at Henry Ford Hospital and compared the results with baseline decibel readings on the medical ICU. Although the decibel reading and staffs' perception of noise were found to be correlated, staff members were unaware of the types and times of noise. Kahn et al. (1998) measured the noise level in two ICUs. They found a peak noise level of 80 decibels and almost 50% of noxious noise generated in the ICU was created by human behavior.

Given that human behavior is one of the greatest contributors to offensive sound, the generation of unnecessary noise can be abated with modification of staffs' behavior. Most important is the education of nursing and medical staff on the effects of their behaviors on the noise level and pollution in the critical care unit (Kahn et al., 1998). Creating a culture among the staff that fosters a healing environment includes encouraging behaviors that decrease unnecessary noise, such as keeping hallway conversations low, especially at night; avoiding over-the-bed conversations; turning pagers to vibrate; avoiding the use of overhead paging; turning off unused biomedical equipment; and modifying or repairing unnecessarily loud equipment (Petterson, 2000). Along with facilitating staff behaviors that decrease unnecessary and noxious noises, therapeutic sounds can be introduced, such as music, heartbeat sounds (especially in the neonatal ICU), pleasant sounds from nature like ocean waves and rain showers, or even "white noise" that lightly stimulates the hearing receptors, making other background noises less obvious.

Environmental Light

Second to their need for fresh air is their need for light . . . it is not only light but direct sunlight . . . the usefulness of light in treating the disease is all important. (Nightingale, 1970, pp. 47–48)

Light, like sound, can have both positive and negative influences on the human body and mind. All living things need light to exist, and light contrasted with darkness guides the tempo of the body's 24-hour circadian rhythm. Providing natural light or full-spectrum light is the best choice. One study involving school children and the effects of standard cool-

white fluorescent lighting and full-spectrum light showed that the children in the classroom with full-spectrum lighting had academic and behavioral improvement one month after installation of this lighting. The report also stated that classrooms with the cool-white fluorescent lighting had more children with hyperactivity, irritability, fatigue, and attention problems. Furthermore, full-spectrum light produces less reaction to cortisol and ACTH stress hormones. Full-spectrum light is best derived from natural daylight and can be achieved through windows, skylights, and atriums; however, full-spectrum lighting fixtures are a reasonable alternative if natural daylight is not available (Mazer, 2002; Starkweather et al., 2005).

Light has healing properties, and light therapy has been instituted as part of the treatment plans of many diseases. Many forms of light exist, and a variety of therapies that use light are being studied. Photodynamic therapy is being tested at the Baylor Research Foundation in the treatment of viruses, and light therapy is being used to treat seasonal affective disorder and insomnia (Starkweather et al., 2005). Ulrich and Zimring (2004) report that climate and sunlight not only direct circadian rhythms, but can also influence a patient's length of stay. One study of unipolar and bipolar disorder patients demonstrated a decreased length of stay of 3.67 days when patients were assigned a brighter room.

The critical care unit is typically bright and devoid of full-spectrum light, instead featuring primarily harsh artificial lighting. Many ICUs are designed without windows or position the patient's bed in such a manner that it does not allow a view of the window. Artificial lighting is predominately fluorescent and produces visual fatigue and headaches (Fontaine et al., 2001). Although light is a vital element of a healing environment, continuous light disrupts the natural circadian cycle and contributes to drops in melatonin levels. If the light is intense, the person can even experience a total cessation of melatonin production. Melatonin, a hormone that is released in response to darkness, is produced in the pineal gland in the eye. Even small doses of light can disrupt its production. Melatonin helps facilitate sleep, and decreased levels can cause impairment in sleep patterns, which can then lead to delirium in critically ill patients (Fontaine et al.). Without the influences of day and night, the human body's natural circadian rhythms are disturbed, which can result in disorientation, delirium, or even ICU psychosis, which may lengthen or jeopardize a patient's recovery (Starkweather et al., 2005). Studies have shown that decreasing noise and turning the lights down decrease patients' anxiety, which with other factors decreases the incidence of delirium.

Many critical care clinicians fear that reduced light will compromise patient care, but that view has not been supported

by the research. One study on reducing light and sound in neonatal ICUs by Walsh-Sukys and colleagues (2001) found that modest changes, such as turning off fluorescent lights, covering incubators, and installing low-level patient-centered lighting, did not adversely affect patient safety but did increase staff satisfaction. When selecting lighting options in critical care units, a variety of characteristics must be considered: technical lighting needs, soft lighting for relaxing, and night lighting, as well as the location, intensity, and controllability of the lighting. Available lighting options are nearly endless, thanks to changing technology, miniaturization of components and systems, and the wide variety of lighting choices available. Meeting the lighting needs of patients and caregivers is not the difficult challenge it has been in the past.

Color in the Environment

Little as we know about the way in which [we are] affected by form, by color, and by light, we do know this—that they all have an actual physical effect . . . People say the effect is only on the mind. It is no such thing. The effect is on the body, too . . . Variety of form and brilliancy of color in the objects presented to patients are actual means of recovery. (Nightingale, 1970, pp. 33–34)

The relationship between light and color dictates that neither can exist without the other. In fact, light and color enhance each other's life and energy. There are seven colors in the visible spectrum of light: red, orange, yellow, green, blue, indigo, and violet; all of these colors are present in visible light.

The energy of color is derived from light, and that energy evokes both psychological and physiological responses in the body (Starkweather et al., 2005). The response of the body and mind to color is influenced by cortical activation, the autonomic nervous system, and hormone activation. Color evokes emotional responses that produce feelings of serenity or agitation that can aggravate or alleviate stress (see **Table 3-1** for the human's responses to color). Color can also affect an individual's emotional state, inducing cheerfulness, agitation, or calmness (Starkweather et al.). Nightingale reportedly used brilliantly colored flowers as a therapy for recovery. Over the centuries, various cultures have used color for its healing powers. Ancient Egyptians designed chambers to produce a ray of prism light used for healing the sick. In Indian culture, each color is assigned to various energy centers of the body. Color has electromagnetic energy that can influence healing in similar ways to sunlight. The field of chromotherapy uses color as a therapeutic tool in the treatment of various disorders (Fontaine et al., 2001). Science is in the beginning stage of investigating color's healing nature. Color by design can be used to supplement the existing light in patient rooms and contribute to the healing milieu.

TABLE 3-1 Human Response to Color

Color	Common Association	Nature Symbol
Red	High energy, passion, excitement raised blood pressure	Earth
Orange	Emotional expression, warmth	Sunset
Yellow	Optimism, clarity, intellect, mood enhancement, excitement, aging	Sun
Green	Healing, nurturing, unconditional love	Growth
Blue	Relaxation, serenity, loyalty, calming, healing	Sky and ocean
Indigo	Meditation, spirituality	Sunset
Violet	Spirituality, stress reducer, feeling of inner calmness	Violet flower

Sources: Friedrich, 1999; Naughton, 2003.

The Society of Critical Care Medicine recommends using calming colors that promote rest in critical care units (Fontaine et al., 2001). Blues, greens, and violet are appropriate, because they have healing and calming influences and are stress-reducing colors. Reds, orange, and yellow colors should be avoided, because they induce excitement, increase blood pressure, and can cause fatigue (Starkweather et al., 2005). Many studies have concluded that cool colors have a tendency to calm, whereas warm colors excite. As another technique for using color in the environment, Stichler (2001) suggests creating painted ceilings for patients to view while they are lying in bed.

Environmental Landscape

That they [patients] should be able, without raising themselves or turning in bed, to see out a window from their beds, to see sky and sunlight at least, if you can show them nothing else, I assert to be, if not of the very first importance for recovery, at least something very near to it. (Nightingale, 1970, p. 48)

Staring at the same four walls can have just as deleterious a consequence on a patient's recovery as the chaotic environment produced in the critical care environment. Creating a healing milieu in the critical care environment necessitates that clear consideration be given to the design of the environmental landscape as well as the feelings and emotions of the individual enmeshed in that environment. A revolutionary study by Ulrich (1984) found that postsurgical patients recovered more quickly when exposed to a window view than did those without this view, suggesting that changing the

healthcare landscape reduces stress and has a positive effect on medical outcomes, including speed of recovery, and reductions in length of stay and cost.

Turner (2001) cites Ernesto Machado's experience during his father's hospitalization in a cancer care center. Machado spent many hours in a windowless waiting area, where he was appalled by the water-stained ceiling and the lack of a pleasant view. This experience inspired him to develop a product that would simulate a window view. This "virtual window" for healthcare facilities actually looks like a window. It can be installed in the wall or ceiling and brings the healing power of water and nature into the stressful hospital environment.

Air Quality

The first essential to the patient, without which all the rest that you can do for him is nothing . . . keep the air he breathes as pure as the external air. (Nightingale, 1970, p. 8)

The human sense of smell is inexorably linked with the environments in which people live. The information received through the senses evokes physiological responses and feelings. Scents stimulate the olfactory system and can trigger an immediate response (Buckle, 2001). The sense of smell is more intertwined in the memory and emotions than any of the other senses (Chu & Downes, 2000). Indeed, the sheer thought of a smell can trigger a memory or reaction (Buckle). The sense of smell stimulates reactions and actions at both subconscious and conscious levels.

The effect of an odor triggering memories embedded deep within the human mind and spirit is known as the Proust phenomenon. The phenomenon is named after the French author, who eloquently described how the smell of tea-soaked cake lifted him from a gloomy frame of mind to the pleasant state of happy childhood feelings (Chu & Downes, 2000). Buckle goes on to state not only that perception of odor evokes memories of happiness and sadness, but also that specific odors can alert us to the danger of fire, stimulate our appetite, and arouse our desire for the opposite sex. Another example of the Proust effect is the unbounded role the sense of smell plays in bonding between a new mother and her infant. New mothers unconsciously nuzzle their infants, breathing in their babies'

smell, which helps in sealing the mother–baby bond (Buckle, 2001). In turn, newborns use their sense of smell to find the mother’s breast. In the past, healthcare providers used their sense of smell to assist in diagnosing different illnesses. *Pseudomonas aeruginosa* bacteria, for example, smells like a musty wine cellar; typhoid smells like baking bread (Mazer, 2005).

The sense of smell plays a significant role in how humans perceive and react to environments in which they are placed. The basic medicinal smells of a hospital environment evoke strong reactions without even considering the potential for additional noxious odors. Just the “hospital smell” can produce anxiety and increase heart rate and respiration, let alone the reactions to the smell of blood, vomit, feces, and infections.

Controlling the many and varied stress-producing smells in the critical care setting can be a daunting task. One key is designing critical care units to provide good air quality and ventilation as well as single private rooms that assist in eliminating the variety of odors a roommate may emit (Malkin, 2003). Other suggestions include removing offensive odors from the immediate environment as quickly as possible and providing other, more pleasant odors to supercede the noxious ones, such as vanilla, lavender, and mint. **Table 3-2** describes additional effects of aromatherapy.

Liberalizing Family Visitation

In addition to the effects of the physical environment on a healing environment in the critical care setting, social support is a key element of the social milieu. Social support includes emotional and instrumental support provided by family and friends that is influential in a critical care patient’s recovery (Tullmann & Dracup, 2000). Family should be considered crucial members of the healthcare team, because the family can provide the patient with the emotional support needed for recovery (Fontaine, Briggs, & Pope-Smith, 2001). Lack of a social network and inadequate social support are associated with a decrease of an individual’s overall well-being (Tullmann & Dracup).

Liberalizing family visitation for the critically ill is an emerging concept in providing a holistic approach to healing. Historically, hospitals had restrictive visiting policies limiting family visits. Over time, many hospital floors have liberalized visiting policies. Nevertheless, many ICUs maintain restrictive visiting policies (Berwick & Kotagal, 2004). Rationales cited for such strict visiting policies in the critical care environment, though not supported by research, focus on concerns about increased physiological stress for the patients, interference with patient care, and mental fatigue of the family.

The concern that visits from family increase physiological stress in the critically ill is unfounded; in fact, empirical literature demonstrates just the opposite effect (Berwick & Kotagal, 2004). Whereas nursing visits frequently increase physiological

TABLE 3-2 Aromatherapy

Essential Oil	Properties
Chamomile	Promotes relaxation and calming
Lemon balm	Reduces anxiety and depression
Orange blossom	Reduces anxiety and depression
Sweet orange	Used for relaxation during induction of anesthesia and post-anesthesia recovery
Mandarin	Reduces stress
Rose	Reduces stress
Sweet marjoram	Reduces stress
Lavender	Promotes peaceful mood and a sense of calm
	Promotes healing of wounds and cell rejuvenation
	Aids in relief of insomnia
	Antiseptic
	Stimulates the immune system
Geranium	Reduces stress and promotes healing
Eucalyptus	Promotes healing of slow-healing wounds
Sandalwood	Promotes healing of wounds
Tea tree	Promotes healing of wounds
	Antiseptic
	Stimulates the immune system
Jasmine and rosemary	Psychologically stimulating
	Increase beta waves and alertness
Peppermint	Relieves upset stomach and headache
	Psychologically stimulating

Sources: Avis, 1999; Buckle, 2001; Flemming, 2000; Ro, Ha, Kim, & Yeom, 2002.

parameters, patients are often calmer and demonstrate decreases in blood pressure, pulse, and intracranial pressure with family visits (Berwick & Kotagal). Open visiting hours may not be appropriate for all patients, of course, and there may be times when families may be asked to leave or the unit is closed, such as during procedures or emergencies (Berwick & Kotagal).

Family presence during procedures and emergencies is now being advocated. Family members can provide the spiritual and emotional support to patients in an unfamiliar situation, and they can help give meaning and understanding of the experience of illness for the patient. Allowing the patient to control his or her own visiting hours is imperative to a healing environment (Berwick & Kotagal, 2004).

What Patients and Families Need and Want

When embarking on creating a healing environment through physical design and cultural change, it is imperative to inves-

tigate how patients and families perceive their critical care experiences. It is equally important to research what causes stress for patients and families and which stressors of a critical care experience patients and families need reduced to feel safe and secure during their stay. Patients need to feel that they have some sense of control over the environment so as to reduce their stress. Empowering patients by giving them control over temperature, lighting, privacy, visitation, and the type and volume of music decreases stress and improves healing. Rollins (2004) reports that patients were more satisfied with their care, slept better, had lower blood pressure, and were less likely to be readmitted when hospitals took measures to reduce the hospital environmental stressors.

HEALING MEASURES

Therapeutic Sounds/Music Therapy

In addition to designing critical care units and rooms to create an atmosphere that is conducive to healing, there are other healing measures to consider. Therapeutic sound is one example, demonstrating that not all sounds affect patients negatively (Chlan, 2000). In fact, some sounds can soothe and calm. Certain rhythmic patterns of music have anxiolytic effects on human psychophysiology (Chlan). Music therapy, which is classified as a noninvasive nursing intervention, is used as an adjunct to medical therapies. Music, when used as relaxation therapy, has an even rhythm that duplicates the normal pulse beat of humans, is nonsyncopated, and is lyric free. Music as therapy can be used to harmonize with or to bring back in sync the body's own rhythms.

Entrainment occurs when two elements become synchronized with one another and vibrate at the same sound frequency. Entrainment with relaxing music and the body's rhythms induces a decrease in pulse rate, respiratory rate, metabolic rate, oxygen consumption, and blood pressure (Chlan, 2000).

Studies support the effect of entrainment in the critical care population. Chlan (2000) studied the effects of music on mechanically ventilated patient in the ICU. Although there were many uncontrolled variables and the study was small, Chlan revealed that heart rate, respiratory rate, and anxiety level could be positively influenced by adjunctive music therapy. In a 2001 study of mechanically ventilated Chinese patients and the efficacy of music therapy in decreasing anxiety, Wong, Lopeez-Nahas, and Molassiotis (2001) could not replicate the decreased physiological responses found in Chlan's (2000) report. Their inability to replicate results could be related to the small sample size in both studies. Incorporation of music therapy into the plan of care can also decrease a patient's perception of pain. A study at a Swedish hospital of 60 female patients undergoing gynecological laparoscopic surgery revealed that patients required less pain medication with music therapy (Ikonomidou,

Rehnstrom, & Naesh, 2004). Further discussion of the effects of music therapy appears in Chapter 9.

A complement to traditional music therapy is the use of psychoacoustic therapy as a noninvasive nursing intervention. Psychoacoustic therapy comprises harmonies of therapeutic tones (Stichler, 2001). Sounds of nature—such as birds, water, rain, and waves—integrated with soft classical music can also reduce the anxiety of family and visitors in critical care waiting areas. Whether therapeutic sounds are utilized as a therapy to synchronize body rhythms or to provide a distraction, they can be a meaningful stimulus that can alleviate boredom and produce harmony (Chlan, 2000). When employing music as a nursing intervention, it is important to recognize that not all music can produce an anxiolytic effect. Listening to music evokes emotions and feelings that are rooted in an individual's past experiences and personal preferences. More often than not, soothing and calm music produces the desired anxiolytic results (Wong et al., 2001). When providing music listening as a therapy, the patient's cultural, geographic, economic, religious, and educational characteristics and—most importantly—reaction to the therapy must be considered. It is essential to give the patient a sense of control and respect his or her personal music preferences—for example, by having family bring in CDs—when feasible to optimize music therapy.

Art for Healing

Thoughtful art is another healing measure that can introduce light, color, and nature into an environment. Artwork in the ICU has not been considered an important element of the essence of a healing environment until recently. Naughton (2003) notes that a trigger effect is produced when art enhances the body-and-mind connection. Appropriate therapeutic art evokes positive thoughts, which increases the feeling of wellness. Many hospitals have artwork in the corridors and entrances; however, artwork has been frequently neglected or placed haphazardly in patients' rooms (Naughton). In the past, art was not considered an important element to the design of the critical care patient room. However, as the conscious design of critical care patient rooms has moved toward the creation of a healing environment, artwork, light, and color have been recognized as integral elements.

Artwork in patient rooms should produce a restful, calm feeling for patients and families. Some hospitals have art programs that can be changed at will by the patients as well as patient artwork. A peaceful nature scene is superlative in inducing feelings of calm and safety (Stichler, 2001). Roger Ulrich, director of the Center for Health System and Design in the College of Architecture at Texas A & M University, pioneered the innovative field of evidence-based design. Ulrich, Linden, and Etinge (1993), in their landmark study on the effect of

nature and abstract pictures on patients recovering from open-heart surgery, found that patients who viewed nature scenes had decreased lengths of stay, had lower blood pressure readings, and required less pain medication. These researchers also suggested that patients who viewed artwork of a brick wall instead of nature recovered more slowly. Clearly, not all art has a positive influence on patients' healing and stress reduction.

Friedrich (1999) suggests that art for therapeutic purposes should be positive and should depict identifiable images; these images include caring human faces, people displaying gestures of nurturing, and calming sunny nature scenes with green vegetation instead of brown or orange landscapes. Specifically, patient rooms absent of a window view can benefit from artwork that depicts the essence of nature, color, and light (Stichler, 2001). Artwork that depicts chaotic impressions, ambiguity, and abstract pictures should be avoided, because these forms may make the patient feel more ill than if no art is present.

Aromatherapy

Another healing measure that employs one of the human senses for healing is aromatherapy. The sense of smell can be harnessed to induce a healing atmosphere within the body, mind, and spirit. Aromatherapy and the use of essential oils for healing ailments have been practiced for many centuries. Clinical aromatherapy is the therapeutic use of essential oils to promote relaxation and healing (Buckle, 2001). Pleasant fragrances and essential oils can elevate mood, alleviate symptoms of stress, and perhaps help in healing difficult wounds and ulcers of diabetic patients. Nurses have been involved in the enhancement of caring for patients with aromatherapy and touch since the beginning of nursing. Nightingale used essential oils to anoint the foreheads of those wounded during the Crimean War (Buckle). Aromatherapy was one of six complementary therapies instituted at Columbia-Presbyterian Medical Center's Complementary Care Center to enhance the patient's healing experience (Whitworth, Burkhardt, & Oz, 1998).

In the 1940s, there was a renaissance of the practice of aromatherapy, after a French chemist used the essential oil of lavender to avoid an inevitable amputation of his arm once gas gangrene set in after a severe burn. Essential oils were used during the Indo-China War to heal wounds when antibiotics were not available. In the last decade, alternative and complementary therapies have been added to the arsenal of allopathic treatment modalities (Buckle, 2001).

Each essential oil has a distinct fragrance and chemistry that induce a variety of physiological and psychological responses that affect relaxation, healing, and general well-being. Essential oils are inhaled or diluted and applied to the skin through lotions/bath oils, colognes, compresses, and mists. Most essential oils are not safe for ingestion, with the exception

of peppermint (Wheeler-Robins, 1999). Essential oils are derived from aromatic plants through a process of steam distillation or cold compression (Buckle, 2001). Lavender is the most popular essential oil and is widely available. It requires 150 pounds of lavender—compared to 3000 pounds of rose—to produce just an ounce of essential oil (Wheeler-Robins).

Many studies suggest that essential oils and aromatherapy are plausible alternatives for complementary treatments for asthma, skin disorders, and wounds as well as for inducing relaxation and relieving anxiety. However, safety and efficacy are the two major concerns when considering the integration of clinical aromatherapy as an adjunct to traditional nursing practice. Another issue is the scarcity of rigorously designed research studies on the efficacy of clinical aromatherapy. The evidence thus far suggests that the use of aromatherapy has relatively few side effects; however, a few studies report contact dermatitis, cellulitis, stomatitis, or burning at the site of application (Wheeler-Robins, 1999). According to Wheeler-Robins (1999), some of these reported side effects are conditions that are purported to receive relief with aromatherapy. Avis (1999) reports other adverse effects of aromatherapy, such as headaches, tinnitus, vertigo, nausea, and even epilepsy in patients with familial history. Therefore, caution should be instituted when incorporating aromatherapy into the treatment plans of patients with these conditions, as well as in patients with allergies, atopic skin, or sensitive skin (Wheeler-Robins). One sensible precaution may be to determine whether the aromatherapy can be applied directly to the skin or whether it should be diluted. Aromatherapy should be individualized and carefully assessed for effect. Wheeler-Robins recommended that individuals receive appropriate training before engaging in the art of aromatherapy.

Another issue to consider is the length of use, as the olfactory neurons become sensitized to the scent, so that, over time, less concentration is required to detect the scent (Avis, 1999). Consequently, Avis discourages using a particular essential oil for more than three weeks because continuous use diminishes the effects of aromatherapy and increases the risk of side effects. Avis goes on to recommend against the capricious use of essential oils in vaporizers on nursing units, because this therapy will affect all present on the ward, including nurses, physicians, and visitors.

Ro, Ha, Kim, and Yeom's (2002) study demonstrated that the use of aromatherapy led to a notable decrease in pruritus scores on patients undergoing hemodialysis. In the study, neither the control group nor the experimental group showed significant changes in skin pH. However, the experimental group demonstrated improved hydration of the stratum corneum. These researchers' Complementary Care Center uses complementary modalities such as aromatherapy to provide a holistic approach toward treatment of cardiac surgery patients,

which encompasses the body, mind, and spirit. Garbee and Beare (2001) described aromatherapy as one possible complementary therapy in postoperative pain control. Flemming (2000) reported evidence that aromatherapy massage provides patients with a transient reduction in anxiety. Because the use of aromatherapy and other complementary modalities have become increasingly popular as an adjunct to the traditional allopathic medicine modalities, these measures are filtering in to the critical care setting (Fontaine, Briggs, & Pope-Smith, 2001).

The Benefits of a Healing Environment

Incorporating elements that produce a healing environment is not only good for patients, but also a good business strategy for healthcare providers to sustain or gain a competitive edge (Naughton, 2003). The cultivation of a healing environment improves the healing experience for patients and families while simultaneously boosting the bottom line for healthcare providers by decreasing length of stays, improving patient outcomes, increasing family and staff satisfaction, decreasing staff turnover, and attracting new patients and competent staff.

A healing environment can still be created in areas where the environment cannot be physically changed or modified.

Critical care nurses and other personnel can make an environment toxic or healing based on their behavior. A nurse's attitude toward patients and others influences the overall environment in the ICU (Almost, 2006). Shattell, Hogan, and Thomas (2005) demonstrated that day-to-day human-to-human contact made patients feel more secure with their surroundings and environment. Human-to-human contact refers to being present and engaged with the patient and family.

RECOMMENDATIONS FOR CREATING A HEALING ENVIRONMENT

The ICU setting has the potential to afford patients the best possible opportunity to heal if key stress-reducing elements are incorporated into its physical design. Such elements may reduce noise, offer privacy, add full-spectrum lighting, and assimilate color. As well as considering the physical design, a critical program that integrates the family and other healing measures is essential to the milieu of a healing environment. Key elements that reduce stress and provide the patient with a sense of some control are listed in **Box 3-1**. **Table 3-3** compares the traditional and healing environments in the critical care environment.

Box 3-1

Strategies for Promoting a Healing Environment in the ICU

Physical Environment

- Reduce environmental stress caused by noise, offensive light, and odor
- Establish an official policy on noise standards and evaluate noise levels
- Use a mini-workstation to disperse staff
- Use sound-absorbent materials such as acoustical ceilings and carpeting in high-traffic areas
- Construct single rooms with televisions with headphones
- Test equipment for noise impact and implement a maintenance program
- Use natural light when possible
- Provide full-spectrum light
- Provide periods of low light for sleep
- Position the patient to appreciate the view
- Utilize calming color schemes such as blues, greens, and violet
- Incorporate nature and artwork

Social Environment

- Create a family friendly program

- Include the family in the plan of care
- Establish a liberal visiting policy
- Offer options to give the patient control over temperature, lighting, music, visitors, and privacy
- Design the area to accommodate families

Healing Measures

- Therapeutic music
- Psychoacoustic therapy
- Nature sounds
- Therapeutic artwork
- Aromatherapy

Other Concepts

- Pet therapy
- Performing arts
- Hypnosis
- Prayer and guided imagery
- Therapeutic touch
- Yoga and reiki
- Unit and organizational culture
- Architectural design

Source: Stichler, 2001.

TABLE 3-3 The Critical Care Environment

Traditional	Healing
Physical Environment	
Designs are utilitarian/sterile ambiance	Incorporates color and architectural interest
Lack visual interest or esthetic appeal	Designs are based on patient's needs
Noisy and chaotic	Designed to limit noise with carpet and acoustical tiles
Limits natural light or window view	Full-spectrum lighting
	Incorporates natural light
Limits privacy and family presence	Private rooms and family welcoming
Limits patient's control	Offers option to give patient control over light, temperature, and visiting
Restrictive visiting policy	Liberalized visiting policy
Social Environment	
Passive role for patient and family	Holistic with active involvement of patient and family
Healing Measures	
Allopathic	Integrates complementary therapy
Symptomatic treatment	Incorporates body, mind, and spirit
Lacks connection between patient's experience and treatment plan	Connects patient's experience and treatment through music, art, and aromatherapy

Sources: Kahn et al., 1998; Berwick & Kotagal, 2004; Petterson, 2000; Stichler, 2001.

Nurses can help ensure attainment of optimal patient outcomes such as those listed in **Box 3-2** through the use of evidence-based interventions.

SUMMARY

A mounting body of research suggests that humanizing the environment in which medical and nursing care is provided improves healing and the healing process for patients, families, and providers. Meeting the challenges of reducing environmental stressors in the critical care unit will potentially avert the adverse effects of being a patient in the ICU and reduce staff stress.

Box 3-2

Optimal Patient Outcomes

- Decreased environmental noise
- Increased air quality
- Implementation of open/unrestricted family visitation
- Physical comfort in expected range
- Decreased signs and symptoms of stress

CASE STUDY

A 56-year-old homeless male was admitted to a large Veterans Administration teaching hospital with chest pain and possible myocardial ischemia during the early hours of the morning. The patient states that he has been living on the streets for several years and has no family. He denies taking any routine medication, but admits having chest pain on occasion. The patient was transferred from the emergency department (ED) to the critical care unit (CCU) and then taken to the cardiac catheterization lab later that day for evaluation of coronary artery disease. He was determined to have multivessel disease, which necessitated an immediate coronary artery bypass graft (CABG). The patient underwent a four-vessel bypass and was transferred to postoperative care in the 18-bed ICU and placed in a 2-bed ICU bay. Over the course of the first two postoperative days, the following assessment is made by the nurse:

Postoperative day 1: The patient did well and was extubated early in the morning. During the day he appeared to be anxious at times but overall he was alert, oriented, and cooperative with care. During the night, he had higher pain levels and appeared increasingly restless. He stated his restlessness was probably due to his unfamiliar surroundings and the strange noises of the busy unit.

Postoperative day 2: During the morning nurse's assessment, it was discovered that the patient consumed approximately one pint of vodka each day (there was no notation of alcohol consumption on the ED note or admission assessment). In reviewing the previous shift's assessment and care, the nurse noted that the patient's pain had been difficult to control throughout the night. Additionally, the other patient in his two-bed ICU bay suffered a code and expired after an extended resuscitation attempt, adding to his agitation.

The nurse noted the following major problems:

- Alcohol dependence with late identification (post-op)
- Pain management issues
- Anxiety
- Overstimulation throughout the patient's hospital stay
- Minimal change in lighting due to increased activity overnight
- Loud unit noises
- Hospital and unit odors

CRITICAL THINKING QUESTIONS

1. What is the top priority for this patient now?
2. What activities could help improve his recovery and aid in decreasing his anxiety level?
3. What strategies should the nurse implement to provide a healing environment for the patient?
4. Use the Synergy Model to develop a plan of care for this patient. The grid is provided to help you organize your thinking to include all patient characteristics.

Synergy Model to Develop a Plan of Care

SYNERGY MODEL	Patient Characteristics	Subjective and Objective Data	Evidence-based Interventions	Outcomes
	Resiliency			
	Vulnerability			
	Stability			
	Complexity			
	Resource Availability			
	Participation in Care			
	Participation in Decision Making			
	Predictability			

Online Resources

Institute for Healthcare Improvement, Patient Centered Care, and the Planetree Model:

www.ihl.org

Guideline for ICU Design:

www.sccm.org/professional_resources/guidelines/table_of_contents/documents/ICU_design.pdf

Healing by Design:

www.muhc-healing.mcgill.ca/english/speakers/hamilton_pl.html

The Pebble Project:

<http://www.healthdesign.org/research/pebble/>

Agency for Healthcare Research and Quality (AHRQ)

The Effect of Health Care Working Conditions on Patient Safety. Evidence Report/Technology Assessment: Number 74. AHRQ Publication No. 03-E024, 2003:

<http://www.ahrq.gov/clinic/epcsums/worksum.htm>

Smith J., & Crawford, L.

Report of findings from the practice and professional issues survey Spring 2003. *National Council of State Boards of Nursing*, 2004 (15):

http://www.ncsbn.org/pdfs/RB15_S03PPI_ESforWeb.pdf

REFERENCES

- Almost, J. (2006). Conflict within nursing work environments: Concept analysis. *Journal of Advanced Nursing*, 53(4), 444–453.
- Avis, A. (1999). Aromatherapy in practice. *Nursing Standards*, 13(24), 14–15.
- Berwick, D., & Kotagal, M. (2004). Restricted visiting hours in ICUs: Time to change. *Journal of the American Medical Association*, 292(6), 736–737.
- Buckle, J. (2001). Aromatherapy and diabetes. *Diabetes Spectrum*, 14(3), 124–126.
- Chlan, L. (2000). Music therapy as a nursing intervention for patients supported by mechanical ventilation. *AACN Clinical Issues Advanced Practice in Acute Critical Care*, 11(1), 128–138.
- Chu, S., & Downes, J. (2000). Odor-evoked autobiographical memories: Psychological investigations of Proustian phenomena. *Chemical Senses*, 29, 111–116.
- Flemming, K. (2000). Review: Aromatherapy massage is associated with small, transient reductions on anxiety. *British Medical Journal*, 3(4), 118–120.
- Fontaine, K., Briggs, L., & Pope-Smith, B. (2001). Designing humanistic critical environments. *Critical Care Nursing Quarterly*, 24(3), 21–34.
- Friedrich, M. (1999). The arts of healing. *Journal of the American Medical Association*, 281(19), 1779–1781.
- Garbee, D., & Beare, P. (2001). Creating a positive surgical experience for patients. *Association of periOperative Registered Nurses Journal*, 74(3), 333–337.
- Ikonomidou, E., Rehnstrom, A., & Naesh, O. (2004). Effect of music on vital signs and postoperative pain. *Association of periOperative Registered Nurses Journal*, 80(2), 269–278.
- Kahn, D. M., Cook, T. E., Carlisle, C. C., Nelson, D. L., Kramer, N. R., & Millman, R. P. (1998). Identification and modification of environmental noise in an ICU setting. *Chest*, 114(2), 535–561.
- Lusk, B., & Lash, A. A. (2005). The stress response, psychoneuroimmunology, and stress among ICU patients. *Dimensions of Critical Care Nursing*, 24(2), 25–31.
- Malkin, J. (2003). The business case for creating a healing environment. *Business Briefing: Hospital Engineering and Facilities Management*, 1–5.
- Mazer, S. (2002). Sound advice. *Health Facilities Management*, 15(5), 24–27.
- Mazer, S. (2005). *Sense*. Retrieved from <http://www.healinghealth.com/default.php>
- Naughton, C. (2003). Prescription: Art. *Contract*, 45(9), 84–86.
- Nightingale, F. (1970). *Notes on nursing*. United Kingdom: Brandon/Systems Press.
- Pearcy, L. (1985). Galen: A biographical sketch. Retrieved April 30, 2005, from <http://course.edasu.edu/horan/ced522readings/galen/dreams/galenbio.htm>
- Petterson, M. (2000). Reduced noise levels in ICU promote rest and healing. *Critical Care Nurse*, 20(5), 104.
- Ro, Y., Ha, H., Kim, C., & Yeom, H. (2002). The effects of aromatherapy on pruritus in patients undergoing hemodialysis. *Dermatology Nursing*, 14(4), 231–234.
- Rollins, J. (2004). Evidence-based hospital design improves health care outcomes for patient and families. *Pediatric Nursing*, 30(4), 338–342.
- Shattell, M., Hogan, B., & Thomas, S. P. (2005). It's the people that make the environment good or bad: The patient's experience of the acute care hospital environment. *AACN Clinical Issues*, 16(2), 159–169.
- Starkweather, A., Witek-Janusek, L., & Mathews, H. L. (2005). Applying the psychoneuroimmunology framework to nursing research. *Journal of Neuroscience Nursing*, 37(1), 56–62.
- Stein-Parbury, J., & McKinley, S. (2000). Patients' experience of being in the intensive care unit: A select literature review. *American Journal of Critical Care*, 9(1), 20–27.
- Stichler, J. (2001). Creating healing environments in critical care units. *Critical Care Nursing Quarterly*, 24(3), 1–20.
- Topf, M., Bookman, M., & Arand, D. (1996). Effects of critical care unit noise on the subjective quality of sleep. *Journal of Advanced Nursing*, 24, 545–551.
- Topf, M., & Thompson, S. (2001). Interactive relationship between hospital patients' noise-induced stress and other stress with sleep. *Heart & Lung*, 30(4), 237–242.
- Tullmann, D., & Dracup, K. (2000). Creating a healing environment for the elders. *AACN Clinical Issues*, 11(1), 34–50.
- Turner, M. (2001). Virtual windows brighten rooms without a view. *Houston Business Journal*. Retrieved February 22, 2005, from <http://houston.bizjournals.com/houston/stories/2001/9/24/focus.1.html>
- Ulrich, R. (1984). View through a window may influence recovery from surgery. *Science*, 224(4647), 420–421.
- Ulrich, R., Linden, O., & Etinge, J. (1993). Effects of exposure to nature and abstract pictures on patients recovering from open heart surgery. *Psychophysiology*, 30, 37–43.
- Ulrich, R., & Zimring, C. (2004). The role of the physical environment in the hospital of the 21st century: Once-in-a-lifetime opportunity. Report to the Center of Health Design for designing the 21st Century Hospital Project. Retrieved February 22, 2005, from http://www.healthdesign.org/research/reports/pdfs/role_physical_env.pdf
- Walsh-Sukys, M., Reitenbach, A., Hudson-Bar, D., & DePompei, P. (2001). Reducing light and sound in the neonatal intensive care unit: An evaluation of patient safety, staff satisfaction and costs. *Journal of Perinatology*, 21, 230–235.
- Wheeler-Robins, J. L. (1999). The science and art of aromatherapy. *Journal of Holistic Nursing*, 17(1), 9–16.
- Whitworth, J., Burkhardt, A., & Oz, M. (1998). Complementary therapy and cardiac surgery. *Journal of Cardiovascular Nursing*, 12(4), 87–94.
- Wong, H. L., Lopez-Nahas, V., & Molassiotis, A. (2001). Effect of music therapy on anxiety in ventilator-dependent patients. *Heart & Lung*, 30(5), 376–387.

