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Adapting and Creating Healing Environments: Lessons Nurses Have Learned From the COVID-19 Pandemic

Debbie D. Gregory, DNP, RN,
Jaynelle F. Stichler, DNS, RN, NEA-BCr, EDAC, FACHE, FAAN, and
Terri Zborowsky, PhD, RN, EDAC, CPXP

The purpose of this article is to discuss how nurse leaders influenced facility design decisions, quickly evaluated the outcomes, and rapidly adapted the environment based on their own observations, assessments, changing regulatory requirements, and the needs of patients, nurses, and the caring workforce. Nurses must validate their clinical voice in the future design of healthcare environments based on the adaptations discovered and instituted during COVID-19. Many lessons were learned and physical adaptations made during the pandemic. While the pandemic spotlighted the emotional and physical stress and strain on nurses, it is important to consider all adaptations made in the physical environment to improve care delivery.

The COVID-19 pandemic has greatly impacted hospitals, nurses and all care providers, and our society as a whole. The eyes of our nation and the world have clearly been on nurses who have "suited up" and gone into battle with an unseen, novel virus claiming the lives of patients and the care providers themselves. The actual care environment and the design of patient rooms and care units were suddenly recognized as inadequate to prevent the spread of the deadly virus. The design was impacting nursing care, and immediate changes were required to adapt acute care patient rooms into intensive care rooms and negative pressure isolation rooms, and to create changes to mechanical systems to exhaust air to the outside of the hospitals. Nurse leaders were quickly involved in identifying alternative sites for care such as triage tents in parking lots, adapting existing space to support nurses and other providers in their care of patients, and creating space for providers to don and doff personal protective equipment (PPE) safely. The purpose of this article is to discuss how nurse leaders influenced facility design decisions, quickly evaluated the outcomes, and rapidly adapted the environment based on their own observations, assessments, changing regulatory requirements, and the needs of patients, nurses, and the caring workforce.

Historically, nursing has a long and rich heritage in health care design. Florence Nightingale was a pioneer in linking the physical environment to the outcome of her patients. Observing the deplorable conditions of the military hospital in Scutari and the mental and emotional status of the soldiers, Florence chronicled her thoughts in *Notes on Nursing* regarding the connections between hygiene, clean water, light, fresh air, and sanitation on the soldier's outcomes.[1,2] Sometime in history, nurses became silent in taking a leadership role and advocating for the importance of the physical environment for patients and families and their own work environment. Florence Nightingale's legacy provides a strong foundation for leading the design of the care and

KEY POINTS

- **This article discusses how nurse leaders influenced facility design decisions, evaluated the outcomes, and rapidly adapted the environment during the recent pandemic.**
- **All environmental adapations made in the physical environment should improve care delivery and evidence based design.**
- **Lessons from the pandemic can be an opportunity to create education, expertise, and advocacy to reinstate the physical design of the healthcare environment into the domain of healthy work environments.**

work environment. Nurses need to reclaim the physical environment as part of the domain of caring.

The science of health care design is a maturing science and continues to validate the observations and changes Florence made to improve the caring environment. Research design principles and the implementation of evidence-based design aligns well with our nursing evidence-based practice and the nursing process. Nurse leaders can create new knowledge and evidence to apply to practice. Nightingale pioneered this practice through environmental alteration, where she put the patient and staff in optimal conditions and created the healthy work environment.

Nurse leaders should engage in all aspects of creating healthy work environments where form follows function. In other words, the physical environment should support nurses to fully function within their abilities to provide quality care to patients. Creating and supporting a healthy work environment is the responsibility of all nurses. This environmental theory or adaptation theory relies on the nurse to give feedback and insight on the physical work environment to carry out the care and clinical workflow to deliver care. We know the physical work environment has the potential of being a barrier to nurses' healthy work lives. Long cluttered hallways, poor documentation areas without regard to ergonomics, inadequate or a lack of respite areas, and challenging unit layouts can all contribute to nurse fatigue, distraction, injury, and work dissatisfaction. The pandemic has brought even more of a focus on the work environment and the impact it has on nurses.

The COVID-19 pandemic has brought about unprecedented stress and strain on nurses. Although nurses are the most trusted profession according to Gallup polls (https://news.gallup.com/poll/328136/ethics-ratings-rise-medical-workers-teachers.aspx), the level of influence and decision-making power in hospitals does not match the public's praise. Health systems are shifting and in a state of chaos. It is time for nurses to lead and drive the change and transformation the health care system desperately needs. Throughout the pandemic, nurses have stepped into a frontline leadership role to help health system employees navigate through this crisis.

EXAMPLES OF NURSES LEADING IN CRISIS

Sarah Francis, MSN, RN, NEA-BC, EDAC, served on the alternative care location task force for Atrium Health System in North Carolina. She helped evaluate potential health care sites in the Charlotte area, including a former nursing school building, an existing ambulatory care clinic, and potential tent set-up sites. Francis agrees nurses are trained to lead in this capacity. She credits the staff for coming up with innovation solutions such as a grab-and-go grocery store set-up in the cafeteria for employees to use, delivered meals for staff and nurses on carts to the floor, and the use of video baby monitors.[3]

Karin Henderson, Executive Director of Strategic Management, was asked to transform an existing vacated women's hospital into an intensive care unit facility. In 4 weeks, an interdisciplinary team transformed a former maternity unit to meet the needs of patients with COVID-19. The focus on the transformation included safety, infection prevention, respiratory therapy, and negative pressure rooms. Henderson encouraged and empowered frontline leaders and staff to contribute to the design of this new surge unit.[4]

Nurses at University of Texas (UT) Southwestern Medical Center identified dozens of ways to reduce the risk of COVID-19 exposure.[5] Intravenous (IV) pumps and ventilator control panels were moved outside patients' rooms for nurses to monitor the devices and the patient without nurses going inside the room. Extending the IV pole and long tubing into the hallway was a solution created by nurses. Designating a nurse as a runner allowed nurses to avoid making multiple trips in and out of patients' rooms.

Two nurses in Sao Carlos, Brazil, filled 2 latex gloves with warm water and tied them around the hand of a patient with COVID-19 who was isolated without family present. People have called it "Hands of Love" or the "Hand of God."[6]

FLORENCE NIGHTINGALE'S ENVIRONMENTAL ADAPTATION THEORY

As asserted by Florence Nightingale's Environmental Adaptation Theory, the nurses in the previous examples adapted and transformed their work environment to create the best healing space possible for their patients.[7,8]

Nightingale was aware of the impact of the built environment based on her direct observations of the patients in the care environment. All her reflections were from her acute observations, the surrounding environment, and the deplorable conditions present. Her model can be viewed as a systems model focused on the client in the center, surrounded by aspects of the environment which should be all in balance. When one component is out of alignment or balance, the client/patient will experience stress or "dis-ease." To bring the order back into alignment/balance, an adaptation must be made. Environmental alteration is the vehicle in which the transformation or change takes place. These changes place the patient in the best possible condition for nature to act, therefore facilitating the laws of nature.[8] Nightingale blended a mixture of theoretical and clinical experiences as part of her practice. The environment is the umbrella concept in the Nightingale theory of nursing. She adamantly believed the environment could be altered in such a

manner as to improve conditions allowing natural laws to facilitate healing.

Nightingale also developed polar graphs to help document her observations showing how deplorable environments led to poor health and disease during the Crimean War. She was able to reveal how solders were dying from infection at a much greater rate than from their battle wounds. Her documentation and use of data caused the government to expand their funding of hospitals to improve conditions.

Nightingale's definition of the environment includes anything, through manipulation, that assists in putting the individual in the best possible condition for nature to act.[1] The environment has internal and external components. Nightingale was concerned about elements entering the body such as food, water, and medication. Other concerns were ambient elements such as ventilation, light, noise control, visual stimulation, and room temperature. Nightingale strongly advocated for ventilation as 1 of the most important elements to promote healing. In a critical analysis of Nightingale's theory, researchers describe how Nightingale considered the environment as an essential tool in the healing process with the components of the internal and external elements critical to optimal outcomes.[9] The authors continue to describe Nightingale's belief that health goes beyond the absence of disease.

EVIDENCE-BASED DESIGN—TODAY'S MODERN "NURSING NOTES"

An emerging body of science aligns with Nightingale's theory and links the design of the physical environment to staff and patient safety, well-being, and other outcomes. It is important for health care professionals, particularly nurses, to understand how evidence-based design supports and creates healthy work environments. In their landmark study in the paper "The Role of the Physical Environment in the Hospital of the 21st Center: A Once-in-a Lifetime Opportunity," Ulrich and Zimring[10] clearly documented and linked the physical environment to patient and staff outcomes. Their study showed how evidence-based health care designs promote environments and are not only efficient, but also therapeutic. Efficient design based on evidence and research findings enhance patients' experiences and staff efficiency, improve family involvement, and are restorative for staff. The Nursing Institute for Healthcare Design (NIHD) was formed to support nurses in developing best practices and evidence-based design for health care. NIHD inspires and educates nurses about health care design and construction. NIHD provides resources, best practices, and current trends to continually adapt the environment to improve outcomes.

IMPLICATIONS FROM PRACTICE: COVID-19 ADAPTATIONS

Nurses must validate their clinical voice in the future design of health care environments based on the adaptations discovered and instituted during COVID-19. Many lessons were learned and physical adaptations made during the pandemic. Although the pandemic spotlighted the emotional and physical stress and strain on nurses, it is important to consider all adaptations made in the physical environment to improve care delivery. The following is an environmental checklist:

Entry/Exit

- Consider creating separate clean and contaminated entry and exits.
- Wayfinding and signage are important to manage for staff and patient flow.
- Create one-way flow to and from critical areas such as the entry, lobby, access to the emergency department, imaging, and clinics—anywhere patients may be screened.
- Consider location of handwashing and sanitations stations at all entries and exits.
- Temperature screening and badging for those entering the facility.

Public and Family Waiting Areas

- Create flexible waiting area furniture layouts to allow people to be spaced out appropriately during a pandemic.
- Size the waiting areas to be able to separate people either individually or in small family groupings when needed.
- Consider how barriers might be used in these areas, for example, how might you locate large sheets of plastic or Plexiglass to help separate individuals.
- Plan how family members will be able to get food and water, for example through a hospital-based application food-on-demand service.

Dining

- Size the dining area to be able to separate people either individually or in small family groupings when needed.
- Consider how barriers might be used in these areas, for example, how might you locate large sheets of plastic or Plexiglass to help separate individuals.

Patient Rooms

- Consider the use of private rooms whenever possible.

- Consider how many patient rooms should be designed to be an airborne infectious isolation (AII) room on each floor and/or if you would like to dedicate one unit to use as an AII unit in a pandemic situation.
- Consider how best to accommodate isolation supplies, for each patient room and for adequate storage on each unit.
- Consider monitoring patients with equipment outside the room using an extension for IV tubing and ventilator tubing, and/or extension cords for equipment.
- Team nursing was the care delivery model instituted during COVID to assist with decreasing the exposure of contamination by staff.

Patient Units

- Separate learning and development and cancer treatment—Due to the compromised nature of both newborn and prematurely born babies, and people who are immunosuppressed due to cancer treatment, it is advisable to have separate entries to these services during a pandemic of this nature. This includes not sharing lobbies, waiting areas, elevators, or other amenities.

Diagnostic Areas

- Consider the path to bring patients here from a clinic exam room, the emergency department, or the inpatient units, minimizing cross traffic as much as possible.
- Discuss the need to have an AII diagnostic room/rooms.
- As with any department consider what is needed for PPE storage needs, both outside of each room and in the department in general.

Operating Rooms

- Consider the path to bring patients here from the emergency department or the inpatient units, minimizing cross traffic as much as possible.
- Discuss the need to be able convert each patient space (post-anesthesia care unit, prep, or holding area) into a private space with separated air handling.
- Discuss how many of these patient spaces need to be AII rooms.
- As with any department consider what is needed for PPE storage needs, both outside of each room and in the department in general.

Emergency Department

- Consider one-way flow to and from the emergency department—or anywhere patients may be screened.
- Consider location of handwashing and sanitation stations at all entry and exits locations.
- Discuss the need to be able convert each patient space to be private.
- Discuss how many of these patient spaces need to be AII rooms.
- As with any department consider what is needed for PPE storage needs, both outside of each room and in the department in general.

Communication

- Staff placed large photos of themselves to help connect and make care more personal. Mask and face shields depersonalized the caregiver.
- FaceTime for staff, patient, and family can be used to improve communication.
- Baby monitors can be used to facilitate communication.
- Nurses can write on the glass to communicate with staff and patients.

Parking Lot and Alternative Care Sites

- Create a masterplan for adjacent or offsite testing, patient care, and surge planning.

Respite Areas

The notion of respite areas has become one of the most critical needs during the pandemic. Nurse resilience and well-being have been compromised during COVID-19. No one could have predicted the effect of the patient volume, loss of life, and staff safety issues during the pandemic. Although caregiver wellness has been a subject in the past, a fresh discussion is necessary by nurse leaders and some industry standards should be instituted.

Many health care settings have created respite rooms for their nurses, whereas others blame space issues or budget issues for opting out of respite space. The pandemic has necessitated the need for nurses to work in highly stressful physical and emotional environments. Research has shown restorative spaces improve clinician well-being and resilience (Nejati et al, 2016).[11] With nursing burnout at an all-time high, staff agree respite spaces must include ample daylight and a view to the outside, and should be separated from the nurses' station and staff lounge.[11] The American Nurses Association recently launched 2 important initiatives, Healthy Nurse Healthy Nation[12] and the Well-Being Initiative,[13] to provide resources and support to nurses across the United States. A curated list of ideas for creating restorative spaces and practices can be seen in Table 1. Developing a culture of well-being

Table 1. Restorative Spaces and Practices for Nurses Post COVID

Spaces	Description	Comments
Wellness room *Lavender room* *Zen den* *Tranquility room* *Watson room*	These restorative spaces can be customized to the staff and area. These are elements used in these types of spaces: • Diffusers • Light dimmers • Blankets • Massage chair • Pillows • Sound machine • Integrative therapies • Mindfulness exercises • Virtual reality (travel to the beach or favorite place) • Music therapy • Yoga • Adult coloring • Watson caritas cards • Soundproof walls • No talk zones • No electronics zone • Resources: Brene Brown, Amy Edmondson, Liz Jazwiec, Cy Wakeman Due to COVID protocols, items should be easily cleanable or disposable to mitigate spread of pathogens	Operationalizing the practice of nurses requesting respite is an important guiding principle that needs to be formalized. Supporting this model requires a caring culture and support from leadership. Concepts for supporting these models include: • As Soon As Possible (ASAP) team • Wellness task force • Critical incident stress management team • Resiliency in Stressful Events Team (RISE) • Chaplains • Social workers • Therapy animals • Employee Assistance Programs • Behavioral health support • Include night shift and outpatient staff
Practices		
Code lavender	A term used when the caregiver is overtaxed and needs respite	The password code lavender allows management or administrative staff to step in for 15 minutes while the RN steps away

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Table 1. (continued)

Spaces	Description	Comments
Wellness cart or care cart	Cart stocked with items to distribute around the units to nurses and support staff Volunteers or assigned leaders can distribute	Favorite items include: • Gum or candy • Snacks • Packaged nuts • Coffee gift cards • Aroma therapy • Worry stones • Prayer request • Granola bars • Chocolate • Tea and hot chocolate • Hand massages
Stress relief kits	Kits made and distributed to staff as a gift or for a break during their shift	Ideas to include: • Stress relief ball • Single aromatherapy packet • Candy
Wellness rounds	A wellness consult service or leadership rounds to assess the mental health and well-being of staff	This would be a leadership initiative
Community partnerships	Local businesses/restaurants donate gift care and services	Community outreach
Caregiver wellness research tool	Helps to understand how better to design for nurses	American Nurses Association Well-Being Initiative and Healthy Nurse Healthy Nation
Education and training	• Resiliency training • Mindfulness training	American Nurses Association Well-Being Initiative and Healthy Nurse Healthy Nation
Additional resources	• On-site childcare • Alternative lodging • Meals delivered to caregivers at work	

Note: Budgets often do not prioritize these practices. Foundation funding or grants could be a source for funding these spaces.
Table adapted by Debbie Gregory, DNP, RN (Gregory, 2021).

starts with leadership and is vital to the success of these practices.

CONCLUSION

The Year of the Nurse and the COVID-19 pandemic collided with unprecedented timing. Nurse leaders and staff nurses have been challenged on many levels. Lessons from the pandemic and the traumatized nursing workforce can be an opportunity to create education, expertise, advocacy to reinstate the physical design of the health care environment into the domain of healthy work environments. In one of the first articles addressing nurse leader competencies, Stichler,[14] described the health care executive competencies necessary to lead in health care facility design, including communication and relationship building, knowledge of the health care environment, business skills, professionalism, and leadership. Nurse leaders must continue efforts to influence the design of the work environment, which will enhance and affect the nurse and the patient.

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Debbie D. Gregory, DNP, RN, is senior clinical consultant at Smith, Seckman, Reid, Inc., in Nashville, Tennessee. She can be reached at dgregory@ssr-inc.com. Jaynelle F. Stichler, DNS, RN, NEA-BCr, EDAC, FACHE, FAAN, is founding co-editor emerita of *HERD Journal*, research consultant at Caster Institute for Nursing Excellence, Sharp HealthCare, in [San Diego, CA], and professor emerita at the School of Nursing, San Diego State University, San Diego, California. Terri Zborowsky, PhD, RN, EDAC, CPXP, is design researcher at HGA in [Minneapolis, MN].

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