



Designing the Inpatient Unit Central Core for an Aging RN Workforce. The nurse staff is one of the few constants over the past 30 years. Unfortunately, so are the architecture and design of their work environments. Older nurses (defined as 45 years and above) could benefit from environments that better support their work process, productivity, and health and safety. Addressing their needs is critical given the nursing shortage.

The RN population under the age of 30 dropped from 9 percent of the nursing population in 2000 to 8 percent in 2004.²

The average age of U.S. nurses is among the highest of all occupations in the world—46.8.⁴

Look at photos taken on an acute care patient floor in 1980 and in 2010, and you will notice some differences. Typewriters have been replaced by computers dotting work surfaces in the central core, overhead monitors display patient information and provide real-time views into patient rooms as well. Look into those patient rooms. Many of them, if not all, are now single occupancy rooms. And if you look closely at the nursing staff, you might notice that nearly 25 percent of the nurses in the 1980 photos are still present in 2010.

The entire U.S. workforce, as is the case with nurses, is working longer. In 2008, the Bureau of Labor Statistics reported that, between 1977 and 2007, employment of workers 65 years old and older increased 101 percent, compared to a total employment increase of only 59 percent. A Charter Partners report predicted that the segment of the labor force comprising people aged 55 and older will grow from 13 percent in 2000 to 20 percent in 2020.³

But nursing remains among the job sectors experiencing the most significant aging. The average age of U.S. nurses is among the highest of all occupations in the world—46.8.⁵ The average age in Canada is 45.1 year of age with 22 percent over the age of 54.⁶ By 2012, nurses in their 50s are expected to account for almost one-fourth of the nursing workforce.⁷

Aging workers, in general, face certain physical challenges in the workplace.

- It is more difficult to maintain good posture and balance. We begin to see the decline of physiological functions as early as age 30 with limitations in locomotion, bending, twisting and reaching.
- Seeing or reading up close becomes more difficult, as does reading small print and reading when the contrast between the type and background is poor. Changes also occur in peripheral vision, visual acuity (how exact and clear things appear), and resistance to glare and light.
- Hearing higher-pitched sounds becomes more difficult. This change is often noticed as an inability to hear speech clearly in a noisy environment.⁸
- As workers age, they tend to live with more aches and pains, due to a decrease in muscle strength and an increase in repetitive motions causing musculoskeletal disorders, arthritis, and the like.⁹
- Short-term memory declines with age,¹⁰ making it more difficult to focus when attention must be shifted from one task to another and when the worker is beset by interruptions.

Given the serious nature of caregiving, where errors can have life-threatening consequences, attention to accommodating and supporting the physical and emotional needs of a 45-plus-year-old nursing workforce is critical. However, there are broader implications to a focus on the design of the inpatient unit central nursing core. Considerations for ergonomic design, better lighting, spaces that encourage peer collaboration or concentrated, private work, and efficient patient floor and core unit layouts will improve the work environment for all nurses, whether they are 25 or 55.

Between the years 2001 and 2008, 77 percent of RNs newly employed or returning to the workforce were over the age of 50.¹⁷

An Ongoing Shortage of Nurses

The aging of the nursing workforce is intricately connected with a nursing shortage that has been evident since 1998¹¹ and is expected to continue indefinitely. By 2025, a shortage of 250,000 RNs is expected.¹² As more than half of nurses currently on the job retire by 2020,¹³ the Bureau of Labor Statistics says that more than 1 million new nurses, a 24 percent increase, will be needed to meet the demand in 2016.¹⁴

A slight uptick in nursing employment is occurring now, in part because the nursing shortage of the past decade has created more demand and in part because the recent recession has resulted in nurses staying on the job longer.¹⁵ However, the nurses entering the profession now will not necessarily be younger. In 2009, Dr. Peter Buerhaus reported that most of the post-recession increase has involved RNs over age 50—accounting for 77 percent of the increase seen between 2001 and 2008.¹⁶

Another factor will result in aging nurses working into what had been considered their retirement years: Nursing schools are having difficulty finding enough instructors to meet the demand of nursing students.¹⁸ Almost two-thirds of the nursing schools responding to a survey by the American Association of Critical-Care Nurses (AACN) listed faculty shortages as a reason for not accepting all qualified applicants into their programs.¹⁹

To help fill the demand, nursing programs are tapping into the employed nursing population. Almost half of Indiana's nursing programs are taught by adjunct professors, practicing nurses who are working part-time as instructors, according to the Indiana Nursing Workforce Development Coalition.²⁰

Jan Cecil is one of those part-time faculty nurses. A practicing registered nurse in Michigan for 30 years, she continues to work and also teach part-time in two Michigan nursing schools. Cecil says that many of her students are training for a second career, and, as a result, are older. In the hospital where she is coordinator of the obstetric/pediatric unit, Cecil says that few nurses are retiring. "Even those who were planning to retire have put those plans aside for now."²¹

Physical Challenges and Injuries Among Nurses

Where does all this lead? For one, to a nursing population that is older and will remain that way for some time to come. For another, to a nursing population that has worked for decades in one of the most physically challenging jobs and has accumulated aches, pains, and stress. The years can take their toll: Nursing is the occupation with the largest number of work-related overextension injuries, the kind that result from lifting too much weight, reaching too far, or running too fast. More than manufacturing or coal mining! Nurses experience 318 injuries for every 10,000 employees.²² Nursing is also number one in back injuries and number two in nonfatal, work-related injuries.²³

More than 12 of every 100 hospital nurses, and more than 17 of every 100 nursing home nurses, are affected by ergonomic injuries, and 38 percent of all nurses suffer back injuries on the job.²⁴

Lifting patients, standing over patients in awkward positions, and walking long distances every day on hard floors are contributing factors to these injuries. And many of the patients that nurses care for are heavier and more acutely ill.²⁵ But another major factor is inadequate staffing; when fewer nurses are on the job, the nurse who is working will often try to perform tasks that should be done by more than one person.²⁶

Nurses are at high risk for developing cumulative trauma disorders (CTDs), many of which result from improper computer use, according to a 2009 article on nurses and computer workstations.²⁷ The authors pointed out that many nurses are now working at computer workstations in environments that were never designed to accommodate computer use. They note that “some clinical settings have been retrofitted and have improper counter heights, old equipment, inadequate workspace, improper lighting, and limited capacity for redesign.”²⁸

What Do Nurses Want?

Perhaps not as much as they deserve. Nursing is demanding work—physically, mentally, and emotionally. But necessity is the mother of invention, and no one is better at work-arounds than nurses. Dedicated to their patients, they have a tendency to make do with what they have and adjust a less-than-workable environment to suit their needs.

Human factors and ergonomic solutions need to be evaluated carefully to provide the appropriate solutions for the multitasking nature of nurses' work process. For the most part nurses do not think about making adjustments to work surfaces, chairs, monitors, keyboards, shelves or drawers. Consideration for passive ergonomic solutions that provide support for active multitasking should be a primary criterion for designing the central core area.²⁹

While they make do, nurses are not necessarily happy with their working conditions. In a recent University of Michigan survey, 75 percent of nurse respondents said that poor working conditions interfere with their ability to offer the best possible patient care—which is their major concern.³⁰ They also believe that the image of their profession is damaged in part because their working conditions are substandard.

The implications of all these trends are daunting. As the nursing workforce continues to age, the potential for injury and absenteeism also increases, resulting in increased costs, an even further reduced workforce, and increased stress, reduced productivity, burnout, and job dissatisfaction.³¹ Eighty-eight percent of nurses surveyed said that their decision to stay in the profession is influenced by health and safety concerns.³²

Organizations that can retain their aging nursing staff and continue to recruit nurses—including the 45-plus age group—will be best suited to succeed in the near-term years with their challenges to the nursing workforce. An effective nurse retention and recruitment strategy can depend heavily upon creating a work environment that is conducive to effective patient care and job satisfaction and accounts for the physical and emotional nature of nursing.³³

Assessing Current Inpatient Unit Central Core Design

The central core is the heart of a nurse's work environment. Medications, linens, patient charts, and computers all reside here. It may also include a break room and consultation space. The core is the crossroads where nurses, physicians, and other healthcare providers meet. The design of the nurse care station within the central core has a significant impact on the nurse's daily experience.

Releasing Time to Care (RTC) initiatives from NHS Institute for Innovation and Improvement in England have expanded throughout Europe, Canada, the United States and other international locations. The goal of RTC is to decrease nurses' time searching for supplies and medications, reduce interruptions, reduce unnecessary steps, increase decision making from the bottom up, and increase staff satisfaction and retention. The new work processes that help nurses improve patient care and achieve the RTC goals need to be supported by a central core area design that can quickly adapt as process improvement initiatives evolve over time.³⁴

But while many things have changed in the practice and administration of patient care—technology and patient acuity among them—the design of the nurse care central core hasn't changed much in the last half-century.³⁵ Traditional unit designs too often limit visibility, increase the nurse's isolation, and increase the distances a nurse must walk—all factors that work against efficient and collaborative nursing care.³⁶ In part this may be due to the fact that priority is given to the design of areas in which patients, families, and guests—a hospital's customers—reside. Funding the redesign of staff work areas, including cores, is farther down on the list.

However, the nursing shortage, the high costs of work-related injury and of replacing a nurse (estimated to cost between \$90,000 to \$145,000), and the tragic costs of medical errors are resulting in more recognition of the importance workplace design has on the quality of care and satisfaction of staff.

The Joint Commission recommends more collaborative work among nurses, doctors, and support staff. As healthcare delivery continues to become a more interdisciplinary effort, nurses, doctors, respiratory therapists, pharmacists, nutritionists, even clergy need a place in which they can interact effectively. But the central core and nurses' station—the obvious areas for this kind of interaction—are usually not equipped for that kind of effort.³⁷ In addition, nurses must multitask more or less constantly, and they are bombarded with interruptions and noise distractions. One study of six nursing stations in a number of different facilities found that, in all configurations and during all shifts, noise exceeded the recommended decibel levels.³⁸

Making the central core flexible, adaptable and supportive is a benefit for any staff, but it can help to respond to some of the specific issues associated with an aging workforce. For example, nursing is not a linear process, and nurses have to deal with a high level of interruption. In one study, RNs experienced 43 different interruptions during a 10-hour work period.³⁹ This level of distraction would not be easy for any worker to handle, but

older nurses may find it even more difficult to maintain focus as they move from caring for one patient to dealing with an interruption to retrieving medications to consulting with a physician to dealing with another interruption. A central core unit design that enables change with minimal construction and downtime could help to alleviate things that impede productivity, such as distraction, and to reinforce better ways of delivering care.

Hospitals are also at many different stages of their transition from paper documentation to electronic medical records. Even within one hospital the work process and technology implementation can differ from one unit to the next. Considering the average age of a nurse there is also variation in the acceptance and understanding of how technology is fully utilized.

“We’re getting to a point now,” says Julie Sless, Vice President Herman Miller Canada, “where we have to design the spaces to be flexible and modular so that the physical environment can change and not become a barrier to new work process. If we don’t provide the opportunity for workplace change, staff injury rates and absenteeism will continue to increase in addition to the risk of error.”⁴⁰ Improvements that reduce injuries, stress, and fatigue; standardized designs that create replicated layouts and organization of supplies and storage make it easier for staff to find things; and lighting and color coding solutions that make charts and labels easier to read and identify would all be helpful, not only for the aging nursing staff, but for all nurses in general.⁴¹

Approaches to Central Core Design

Making a central core more efficient and comfortable for the nursing staff is important for many reasons. But here is one: a time-and-motion study of nurses published the following assessment of how these nurses spend their time.

- 35.3 percent was spent on documentation
- 20.6 percent was spent on care coordination

These two tasks are performed within the core area. Less than one-fifth of the nurses’ time was spent on patient care activities typically performed outside of the central core area. The largest proportion of nurses’ time—38.6 percent—was spent within the central care station area, compared with less than one-third in the patient room. The article concludes that the core area is the primary location for activities related to documentation and care coordination.⁴²

A more efficiently arranged core area could increase the amount time nurses are available to spend with their patients. A medical/surgical unit’s team at a Florida hospital reorganized and rearranged the entire patient floor, including the core unit, to cut down on time away from patients and become more efficient in general. One of the results: an increase in 30 minutes of a nurse’s time, per admission, to spend at the bedside.⁴³ Nurses who are closer to their patients feel they provide better care.⁴⁴

A central core design—one that would be supportive of all nurses, and an older nurse workforce in particular—would include solutions to address the following issues.

- The heavy physical demands of the profession, including maintaining balance while lifting and shifting, extensive walking and standing, and the high incidence of musculoskeletal injuries that nurses suffer. Locating supplies and equipment at heights that alleviate awkward reaching or bending and distributing supplies throughout a unit are approaches for minimizing the risk of injury and reducing walking distances.
- The importance of adequate visual cues and lighting—and not just to compensate for the reductions in visual acuity associated with aging. These elements are also necessary because of the small print on medication vials and bottles, the need to switch back and forth between reading a computer screen and reading a physician's handwritten instructions, and the need to be able to find tools, charts, and papers easily.
- Distracting noise levels and interruptions. Lower noise levels have been linked with a number of positive effects on staff, including reduced perceived work demands, increased workplace social support, improved quality of care for patients, and better speech intelligibility⁴⁵
- The need to reduce stress and fatigue—problems that plague nursing staffs, especially when nurses must work 12-hour shifts. Providing healing environments and levels of privacy for uninterrupted work is important for all nurses. But for aging nurses, who live with more aches and pains than younger nurses, a quiet place to recover is critical.
- Supporting the need for staff mentoring, collaboration, social interaction, and teamwork.

Efforts have been and are being made to improve the central core and to make it a more effective and supportive working environment for nurses. In general, design of central core areas has taken one of three forms: centralized, decentralized, and hybrid approaches. Here is how each of these addresses the needs we have identified.

Centralized Design. Centralized cores, the most traditional design, were intended to house most of the staff in one complete central area on the patient floor. As a result, the largest number of people is concentrated in the core footprint. Today, many centralized stations function differently—as information centers that facilitate traffic control among different units, according to healthcare architect Todd Robinson.⁴⁶

Benefits of the centralized core design include reduced noise levels in patient care areas and increased opportunities for caregiver teamwork and collaboration.

The primary disadvantage to this approach is the distance that the design creates between nurses and their patients. The time-and-motion study of how nurses in the medical/surgical units of 36 hospitals spent their time found that about 30 percent was spent in patient rooms and just under 40 percent spent at the nurses' station.⁴⁷

A centralized core can increase the number of steps a nurse must take every day—back and forth between patient rooms and the core—and can lead to increased fatigue and musculoskeletal stress if the unit is not designed to facilitate quick access to supplies, medications and the technology required for quality patient care. The travel paths also increase the chances for distracting interruptions, increasing the likelihood that information, files, medications, and papers will be forgotten, lost, or mislaid.

Noise levels within the centralized core, where the nurses will be doing much of their work, are high and interruptions are frequent because of the large numbers of people present and the high levels of activity.

Decentralized Design. The decentralized core design was made possible by advances in technology—mobile phones, laptop computers—that untie the strings that kept nurses returning to the centralized stations.⁴⁸ So rather than having one large nurses' station on a floor, a mini-station or alcove is used as a docking station and services a few patient rooms. Here nurses use cell phones and other devices to communicate.

The decentralized design puts nurses closer to their patients. As private patient rooms have become the norm, decentralized cores help to cluster nurses in closer proximity to their patient assignments. It can reduce the amount of walking the nurse must do on any given day, which can result in less fatigue. It reduces the congestion—and thus, noise and interruptions—that typify a large, centralized core.

Decentralized cores can take the form of nursing support centers. Placed between patient rooms, each support center can be configured to provide for all aspects of patient care. In one Florida hospital, each of four nursing support centers on a floor includes an automated pharmaceutical dispensing station, charting/work area, soiled linen holding area, storage space for bar-coded medical supplies that can be scanned as they are dispensed, clinical work space, and nourishment storage. Each center occupies an area the size of two patient rooms.⁴⁹ This kind of design can dramatically reduce the distances a nurse has to walk on a given shift and also keeps noise and distractions to a minimum. And it allows nurses to monitor their patients more easily, which can improve their ability to care for their patients better.

But the decentralized station has some drawbacks, too. Decentralized stations lack a central meeting place, so consultations among caregivers tend to take place in hallways and other make-do spaces. Travel distances can increase if supplies are not quickly accessed. Nurses can also feel isolated and do not benefit from the social interaction required to relieve stress. Hallway meetings compete with other noises on the patient floor and—just as is the case with centralized stations—can contribute to interruptions and distractions. Finally, the decentralized design does not always support peer collaboration, learning, and mentoring.

Hybrid Design. The so-called hybrid design combines the attributes of both centralized and decentralized cores. The hybrid approach is taken most often in new construction, where limits to a completely new design are not present.

By definition, there is no one model of a hybrid central core design, because each is created with the goal of meeting as many needs of a specific facility or department as possible. Hybrid cores are often designed for intensive care units and other critical care areas, where the nursing staff needs to have ready access, and perhaps visual contact, with very sick patients.⁵⁰

One example of the forms a hybrid approach can take is the Jersey Shore University Medical Center in Neptune, New Jersey. Its 36-bed floors were divided to create three clusters of 12 patient rooms, with each cluster organized around its own nurse care station. The design team called these clusters "nursing neighborhoods," and each was set up as a self-sufficient unit able to accommodate eight nurses or up to 15 caregivers. The arrangement cuts down walking and searching time by placing all essential tools and technologies within easy reach and near the patients. The arrangement also helped to foster a sense of community among caregivers, allowing for teamwork and support.⁵¹

Because of its specificity, a hybrid central core can be designed to meet all of the needs of an aging workforce. To make that happen, it's important that nurses have the opportunity to voice their needs to architects and designers, so that the focus is not solely on patient care, but also on sustaining and supporting the nurses.

The Future for Aging Nurses

It is worth repeating a number of challenges—realities—that aging workers face.

- It is more difficult to maintain good posture and balance. We begin to see the decline of physiological functions as early as age 30 with limitations in locomotion, bending, twisting and reaching.
- Seeing or reading up close becomes more difficult, as does reading small print and reading when the contrast between the type and background is poor. Changes also occur in peripheral vision, visual acuity (how exact and clear things appear), and resistance to glare and light.
- Hearing higher-pitched sounds becomes more difficult. This change is often noticed as an inability to hear speech clearly in a noisy environment.⁵²
- As workers age, they tend to live with more aches and pains, due to a decrease in muscle strength and an increase in repetitive motions causing musculoskeletal disorders, arthritis, and the like.⁵³
- Short-term memory declines with age,⁵⁴ making it more difficult to focus when attention must be shifted from one task to another and when the worker is beset by interruptions.

As healthcare organizations look to redesign or construct new facilities, paying particular attention to environments that better address the realities of an aging workforce will improve the safety and effectiveness of the nurses' work environment. Central core design can positively influence the satisfaction and performance of the entire clinical staff. Approaches can vary, from large centralized designs to smaller satellite areas throughout a patient unit, but each approach should be measured in terms of its potential to better support the nursing staff. Each approach should also have flexible and adaptable architectural elements so that change can take place quickly and cost effectively to respond to changing work process.

Inpatient unit and emergency department central core design can also influence the success of a healthcare organization's recruitment and retention goals. It is clear that

the nursing shortage and the aging nursing workforce are reaching critical mass. The types of environments in which nurses work can be a significant and strategic tool for attracting and keeping top talent. Retaining the best nurses, keeping them free from injury and stress-related absences, and providing a supportive and continuously adaptable work environment for them will have an enormous and positive impact on a hospital's bottom line.

Notes

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