

THE HOLISTIC NICU

Designing an Environment for Every Aspect
of the Patient's Development

By Jeffrey S. Monzu, AIA, NCARB



The nurse's station and patient rooms at Nebraska Medical Center's Hixson-Lied Neonatal Intensive Care Unit.

A neonatal intensive care unit can be designed to advance a premature or sick patient's health and development, and to support the crucial roles of family members and caregivers. The Nebraska Medical Center's Hixson-Lied Neonatal Intensive Care Unit accomplished just that: a state-of-the-art healthcare environment that is sensitive to both family needs and medical necessity. To that end, key members of the design team included nurses who work in the unit, and a family whose child had been a patient at the hospital's previous NICU.

The sibling play area incorporates the unit's 'nature' theme featuring a lifelike tree.

Following are examples of the important design considerations of a neonatal intensive care environment.

Ease of Access

Private rooms with three walls and an open side balance family privacy with visibility and access for nurses and caregivers, who may at times work with two or three patients. Each room's family space contains amenities such as televisions and DVD players. These allow parents to view educational and demonstrational information without leaving their new family member.

Two main nurses' stations each serve 17 patient rooms (34 total beds), which are designed with "zones" for caregivers, family and patient. This way, everyone can do his job without getting in each other's way. For instance, environmental services personnel have plenty of room to clean or remove trash, while nurses can travel easily along the path from their workstation to the isolette charting station. A curtain can close off the family area for privacy or sleeping.

Central Nurse's Station

The central nurse's station comprises two pods, which each cover 17 beds. These stations are built with walls that are sealed top and bottom. The butt-glazed glass uses no vertical frames, so nurses have a complete line of vision to all the baby stations from this center room.

The glass also is laminated, which gives it very high acoustic ratings. That way, the nurses can close the station doors and have a meeting or conversation without that noise escaping out to the care area.



Acoustics

The nurse's station wasn't the only area that needed special acoustic attention. Part of the overall plan was to diminish as much noise or vibration transference to the NICU as possible — including noises that are so imperceptible that they are difficult to detect.

One of this NICU design's biggest challenges was to diminish the noise generated from helicopters landing on the pad on the adjacent building. Although the medical center desired windows on the unit to ensure access to natural lighting cycles, they were concerned about the helicopter noise. This was solved by using window units with triple-pane glass and precisely located air gaps that would limit the transmission of sound to the interior.

Another acoustic challenge came from the mechanical floor located directly above the NICU, which con-

tains all the air-handling units for surgery, emergency diagnostics and the NICU. This made vibration transfer a significant problem.

To help identify and minimize these problems, designers brought in acoustic engineers to consult on the project. They analyzed the impact of helicopters, the way the perimeter walls were built around the NICU, and the construction of the wall that separated the nursery unit from the staff area. Ultimately, they made three major recommendations:

- Use of a concrete isolation pad, placed underneath the air handlers in the mechanical room. The pad was a significant cost item but was necessary to achieve the sound level goals.
- How and where to run ductwork to eliminate vibrations and turbulence.
- Use of acoustic material for

Below: The floor plan of the Nebraska Medical Center's Hixson-Lied Neonatal Intensive Care Unit. Right: An isometric of one pod.



ceilings, walls and floors to control sound and keep decibel levels low.

Additionally, designers installed decibel meters around the unit. Silent alarms are connected to signs in the ceiling that say "Quiet Please" when the alarms are triggered. These remind the staff and families that whatever they are doing has reached a decibel level that is unacceptable for the unit.

Lighting

A variety of lighting was designed for the NICU for two reasons: first, to create a home-like lighting environment for family members and the infant; and second, to light each area for medical use and optimal developmental conditions.

Lamps and nightlights provide a comfortable touch for family, but they are supplemented by technical lighting. Each room contains indirect fluorescent covers that provide the ambient room light. They are dimmable to provide a range of lighting options. Nurses' work areas both in and out of the room feature lights with a very tight throw and recessed bulbs. These create direct areas of light where the nurses can complete charting or computer work.

Care was taken in room design to ensure infants' eyes were not exposed to direct bulb light. All light provided is indirect or has recessed bulbs.

The design includes light showers within the nurses' work and break areas. Light showers are areas with light levels of 200 foot-candles or more. These are intended to reset the circadian rhythms of those who work primarily on the night shift and improve alertness levels, thus improving patient and staff safety.

Family Support Areas

Family members are an important part of any NICU. At the unit in Hixson-Lied Center, additional areas allow families to get away from the bedside and the stressful care environment.

A family lounge within the unit has a TV, kitchenette, computer, and laundry facilities. It encourages interaction with other parents, so families in similar situations can support each other.

A sibling play area provides newborns' siblings with a safe place to play near the unit. Adhering to the building's "nature" theme, the play area features a tree made to appear real. It is attached to a structural column so that the leaf canopy drapes over the room. Above that is a fiber

optic star field and bug lights. The play area encourages the family to be involved with their older children, and gives the youngsters a place that makes them feel welcome in the unit.

Directly adjacent to the unit is an exterior roof garden. This small outdoor area, meant for patients and their families, is enhanced by plantings and a garden. It contains a plaza, a fish pond and a waterfall; here, families can enjoy a relaxing outdoor environment without leaving the building.

In an NICU, people go through some of the worst and best times of their lives; anxiety is usually at a high level. Building design plays an important role in creating the best environment possible to help caregivers nurse sick patients back to health and alleviate the anxiety experienced by their families. ■



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