

# Planning the Private-Room NICU

— *an idea whose time has come*

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Non-institutional finishes, like fabric partitions and faux-wood flooring, absorb sound and increase comfort to family members and staff. Unique indirect overhead lighting treatments offer more flexibility to accommodate proper neonate sleep patterns. Technological innovation has made these finishes timeless, durable, code compliant and easily maintained.

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**N**eonatal Intensive Care Unit (NICU) design has rapidly evolved over the past few years due to the influence of evidence-based design, best practice medicine and advances in technology.

Whereas only a few years ago, most hospitals placed neonates in 8-, 10- or even 12-pod units, today, the overwhelming majority of hospitals recognize the benefits of private-room NICU design for neonatal development, reduced interruption of sleep cycles, improved safety and improved family satisfaction.

With advances in communications technology — in particular, staff communications systems, electronic charting, the ability to link neonate monitors with staff communication systems, and staff locators —hospital decision makers have become more comfortable with moving toward the private-room model. With the design of NICUs changing so rapidly, the planning process has taken on much more significance — very often supplementing an educational process in bringing these decision makers up the learning curve on changing technologies.

Rainbow Babies & Children's Hospital in Cleveland, Ohio, was a leader in this movement. A decade ago, Rainbow Babies was one of the first hospitals to embrace a private room model for their Level II transitional care nursery.

In 2006, Rainbow Babies was ranked by *US News & World Report* as the fourth best children's hospital in the nation. In 2007, *Child Magazine* included Rainbow Babies in the top five children's hospitals, specifically crediting Rainbow's NICU with the best survival rates and longest follow-up clinic for tracking the development and outcomes of premature infants well into adulthood.

Rainbow Babies' Level III nursery is one of 16 NICUs in the United States designated by the National Institutes of Health as a Neonatal Research Center. Rainbow Babies—and its parent system, University Hospitals—is currently undergoing a ten-year, billion-dollar system-wide capital redevelopment process. The company recently worked closely with clinical staff and completed a comprehensive feasibility study to

provide a road map for the “next generation” of NICU environments at Rainbow’s renowned facility.

### The Decision-Making Process

Planning a NICU requires obtaining consensus among a diverse group of stakeholders. Of course, it is important to talk to the family members of these tiniest of patients, as well as a core team comprised of the leaders and staff members from the departments and programs involved with neonatal care: hospital, departmental and program administrators; clinicians, including physicians and nurses; and ancillary staff, including respiratory therapists, who are a key component of neonatal care.

Ideally, experienced NICU architects/planners should be involved at this stage to guide the planning process to provide the latest information on design trends and their contribution to improved clinical outcomes.

The process should begin with an analysis of the projected number of patients, average length of stay, and acuity level to identify the number of units. Solicit staff input regarding their needs, with particular attention to the issue of centralization versus decentralization of nursing stations and substations, need for care team collaboration space, and need for bedside electronic charting, as this is one of the areas most impacted by moving to a private-room NICU model.

The question of centralization vs. decentralization, in particular, is a significant issue for NICUs. One of the potential disadvantages of the private-room model with decentralized nursing substations is a feeling of isolation among the members of the care team.

The other primary concern in migrating to a single-room configuration is the time needed for staff to move from one room to the next. These few seconds do not mean quite as much to adult and adolescent patients in critical care, but to neonates, these precious seconds lost in staff transit can be very serious for critically-ill babies.

In order to lessen the impact on staff performance in both of these areas, planning is critical to minimize footsteps in every process as well as develop touch points for more efficient coverage. Many hospitals that adopt the private-room model provide for a central team collaboration space in addition to decentralized nursing substations.

For example, in planning for its 12-bed Level II NICU, Capital Health System, in Hopewell Township, NJ, elected to supplement bedside charting with a central nursing station with good visibility into all private rooms. It is interesting to note that the health system initially did not want private rooms for all beds,

but as they reviewed the existing research, the clinicians came to believe wholeheartedly in this care model.

With the advent of electronic charting, many hospitals include bedside computer stations to enable immediate access to the patient’s chart for the care team, as well as ‘real-time’ access to information. Additional technologies — hand-held, remote, and desktop displays — provide physicians, nurses, social workers, pharmacists, and respiratory therapists with instant access anywhere. Given this rapid, constant and high-stressed nature of neonatal critical care, many hospitals are also providing spaces for staff to reflect, renew and refresh themselves.

### Family Input into Design

Increasingly, hospitals are involving family members in the planning process to gain firsthand knowledge of their experiences, both good and bad, and learn what families value in terms of support space, such as in-room sleeping arrangements and sibling accommodations including play space.

Family input can be solicited in a number of ways. A hospital might conduct a family focus group, conduct individual interviews, or provide questionnaires to current and former patients’ families during the early planning phase. A few family representatives might be invited to attend design team meetings at the start of each major planning and design phase to comment on proposed plans. Plans might also be posted in the hospital for comment.



For example, during planning for the 12,000-square-foot NICU replacement at The Nemours / Alfred I. duPont Hospital for Children (AIDHC) in Wilmington, Del., families were involved at several stages of the design, and staff spent time with them soliciting family feedback about their experience while they were in the existing NICU caring for their babies.

At AIDHC, many of the babies are among the most acutely ill. As it is not a birthing hospital, neonates are transported there from hospitals throughout Delaware, Pennsylvania and Maryland. Similar to the Capital Health System project, duPont was not initially interested in redeveloping their NICU in single-room configuration.

The project had been delayed, during which time the family feedback and benchmarking research illustrated the increased benefits of single rooms over the traditional pod configuration. The NICU was redeveloped into a state-of-the-art Level II/III neonatal services with 14 neonate bassinets in private rooms. A central “reception/command center” provides a single location for patient information.

### Roadmap for Site Visits

Because there have been so many advances in NICU design recently, it is good to plan site visits to other NICUs to tour the facilities and talk with administrators, clinicians and families about their experiences, which are invaluable to the planning and design process.

To get the most out of these visits, plan ahead. Identify tour participants from the core design team who represent a variety of skill sets, including administrators, clinicians and ancillary staff. If the architects/planners/interior designers are already on board, they should accompany the owner on the site visits so they can hear firsthand the reactions of the core design team.

Give each participant on the tour an assignment in advance. For example, the individual assigned to assess technology should be prepared to ask questions and record answers related to staff communication, staff tracking, infant security and electronic charting systems, etc.

The team member assigned to assess the impact of the design on nursing should be prepared to ask questions related to staffing ratios, response times,



recruitment and retention, etc. The person assigned to materials should be prepared to ask about the institution's experience with carpet versus hard flooring, wall materials, how these are cleaned and maintained, etc. Be sure to assign a participant to document the tour in photographs. Incorporating the findings and "lessons learned" through these site visits at early stages of the design process contributes significantly to a successful design phase.

### Test Driving the Design and Mock-Ups

While building a new children's hospital from the ground up is every NICU Manager's dream, most often NICUs are the result of renovations of existing facilities due to the need to maintain critical adjacencies to labor and delivery facilities. During conceptual design, architects frequently develop "test fits" – sample floor plans of potential layouts – to determine if a particular facility is appropriate for the renovated NICU. The approved configuration is then developed into a schematic plan.

For example, the architect prepared a project feasibility study for the new Level III NICU at Rainbow Babies & Children's Hospital. This study explored required infant capacity, room quantities and sizes, and desired inter and intra-departmental adjacencies. Utilizing this information, the team developed a series of test-fit plans and project cost estimates for various locations within Rainbow's facilities.

The project's architect was ultimately engaged to proceed with program validation, architectural planning and design and construction documents. The interior design team has worked in close collaboration with the architects on the theming concepts and interior design of the unit. The 30,000 square-foot unit will provide a 40-bed family-centered private room Level III NICU.

When the design of a new NICU represents a departure from the model used in the existing unit, a mock-up is invaluable for gaining staff and family input and ensuring that the final design meets users' needs. There is no substitute for seeing, touching and moving through a space. In the author's experience, mock-ups often result in additional positive changes to the design as it progresses.

A mock-up can be employed as early as the schematic design phase, when the room has been sized and designers are starting to lay out functional elements. More often a mock up is done during the


design development phase where actual materials and equipment have been selected.

In hospital room design, but perhaps most importantly in NICU design, it is really important for staff to understand how the room is zoned to provide adequate caregiver work space, infant care space, and family space. The mock-up continues to evolve as the design progresses, becoming more detailed as the locations of switches, medical gases, monitor, electronic charting station, etc., are determined. As materials are selected, be sure to invite environmental services staff to test durability and ease of maintenance using the manufacturers' recommended methods and products.

### Impact of NICU Design on Staffing Levels

Although the overwhelming majority of hospitals are adopting the private-room NICU model, some administrative, nursing and medical staff are hesitant to adopt this model — or reject it altogether — due to the aforementioned staff efficiency (isolation, required footsteps, etc.) as well as building constraints such as increased square footage requirements or inadequate window wall for rooms. For these reasons, some institutions are still adopting the pod configuration for their NICUs.

Even in cases where the private room model cannot be adopted, elements to incorporate privacy, new parent education and training, reflection, and consultation can provide many of the same benefits. For example, at Kennedy Health System in Washington Township, N.J., a pod configuration was selected due to space constraints. In this 10,800 square-foot, 15-bed NICU project, space was provided for a family overnight/transition room, isolation room and a family waiting area with internet access.

The private-room NICU is a design model whose time has come. With careful planning and appropriate use of today's communication technology, this model provides high-quality care for newborns, a nurturing experience for families, and an efficient, team-oriented work environment for clinical staff. 

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