

Social Media as a Tool to Influence Design: An Informal Survey of Parents' Experiences in NICUs, and the Resulting Design Innovations

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Mindy F. Goodroe, Principal, HKS Inc, has shaped the human experience through innovative design and planning leadership. Her work represents over 10 million square feet and more than 2 billion dollars in domestic and international projects, ranging from luxury resorts in Mexico to medical cities in the Middle East. A licensed architect with 18 years' experience, her passion is creating inspiring places where people work, play and heal. As the Practice Leader of HKS's Atlanta Health studio, she has designed projects for renowned healthcare systems such as Children's Healthcare of Atlanta, Emory University Hospital and Piedmont Healthcare.

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Emily N. Johnson joined HKS Inc. as the firm's 2017-2018 Healthcare Design Fellow. She earned her Master of Science in Advanced Architectural Design from Washington University in St. Louis, where she currently is the Visiting Research Fellow for the Center of Health Research and Design. Her research on designing for individuals with PTSD was published in the 19th edition (Nov. 2017) of the American Institute of Architects' Academy of Architecture for Health Academy Journal. Emily strives to enhance the pediatric healing process through planning, design and research.

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Abstract

Private patient rooms are progressively becoming the norm in the design of neonatal intensive care units (NICUs). Increased infection control, reduced noise, greater privacy for families and neonates' improved ability to maintain circadian rhythms in a single room environment are among the benefits cited for private NICU rooms.

This paper will outline changing trends in NICU design and evidence that supports an ongoing shift from traditional open NICU bays towards the private room model. While many new NICUs are being built with private rooms, it remains a matter of debate as to whether this design improves the experience of patients, their families and providers in the NICU. To gain perspective on this issue from a wide variety of users, a NICU design and planning team utilized data from a survey distributed via a social networking platform; the survey examined parents' experiences in the NICU and their opinions of private rooms versus open bays. Responses to the survey informed innovative NICU designs under construction at two facilities, illustrating social media can be an effective tool for gathering user input on healthcare designs.

Keywords:

NICU, Social Media, Survey, Family-Centered Design, Private Rooms

Category:

Experience

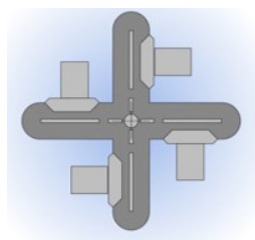
Introduction

Neonatal Intensive Care Units (NICUs) serve some of the most fragile hospital patients, who have unique needs regarding acoustics, lighting and privacy. To better meet these needs, NICU design is evolving towards a private room model. The Facilities Guidelines Institute (2014), which sets standards and recommendations for healthcare environments, has yet to endorse that all NICUs be designed with private rooms, as the benefits of this design remain a matter of debate. To further this debate, a design team used survey data gathered via social media to assess current NICU designs and develop new iterations.

History and Current Debate

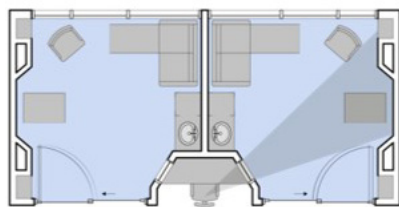
NICU designs originated with the open ward layout, in which several neonates were housed in a space focused primarily on patient survival, with scant attention paid to the environment of care's effect on patients or their families. As more was learned about the roles of sensory stimulation and parental involvement in neonatal development, designs transitioned to more controlled environments that allowed for greater family participation in care (Dunn, MacMillan-York and Robson, 2016). (See Figure 1.)

Figure 1: Evolution of the Neonatal Intensive Care Unit



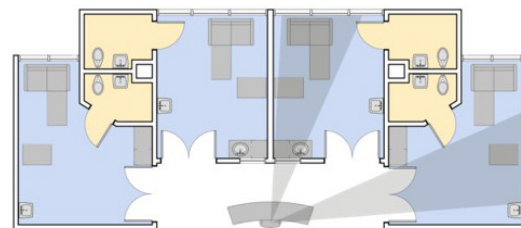
Open Bay, Pinwheel Design

The pinwheel layout, a modification of the open ward design, furthered the open modular plan to include partitions and headwalls; thus, providing more privacy for families than previously available. Parent accommodations were kept separate from the NICU. It was common for one to two private rooms to be provided on the unit for transitional care.



Single Family Room

The single-family room has the ability to provide parents/families with increased confidentiality and more privacy. Research has shown designing the healing environment to include privacy increases family involvement in patient care.



Single Family Room with Toilet

The single family room with toilet expanded the privacy by providing the parents/family a private bathroom within the care environment, increasing satisfaction of new mothers.

NICU design has progressed, with increasing levels of environmental control and family privacy, from the open ward to the pod design to the pinwheel layout to the private family room (Shahheidari and Homer, 2012). In the pod design, neonatal incubators were grouped together by cubicle curtains or walls; this design offered staff good visibility and proximity to patients while providing families some privacy and limited accommodations within the space. It was common for one or two parent/infant rooms to be included on the unit to give families private spaces to bond with their infants and learn to care for them independently before being discharged from the hospital. The pinwheel layout included partitions and headwalls to give families yet more privacy than the earlier pod design. Sleeping accommodations and other amenities for parents often were provided, but these were kept separate from the patient care area of the NICU.

Private NICU rooms, also known as single family rooms (SFRs), provide the most control over the individual environment of care and are believed to provide better outcomes for patients and a better experience for family members. Along with these benefits, SFRs present perceived challenges, including increased construction cost, added costs for training and new staff communication methods, limited socialization opportunities among families, increased staffing levels and difficulties for staff in responding quickly to emergencies.

Facilities with space and budgetary concerns often house a hybrid configuration of both SFRs and open bays. Despite the work of multiple researchers in the past several years, more evidence is needed to support requiring SFRs in all facilities under all conditions.

Given the current debate, a team of designers sought to propose a new iteration of NICU designs that alleviate the purported disadvantages of offering only SFRs. The team reviewed literature on SFRs and used survey data to determine which design features family members consider most important and whether SFRs improve their NICU experience.

Review

The team's literature review focused on studies concerning the relationship between the built environment and infant development.

Research indicates the relationship between family and baby is established and develops differently in the SFR environment. A study done by Lester, et al. (2014) showed a correlation between maternal involvement and improved medical and neurodevelopmental outcomes in neonates hospitalized in SFRs. Extended parental presence in SFRs improves preterm infant outcomes, as determined by studies in which the length of stay was decreased in NICUs with single family room configurations compared to open NICUs (Carter, Carter, and Bennett, 2008; Ortenstrand, et al., 2010). SFRs encourage more intimate interactions between parent and child, such as kangaroo care or breastfeeding, and give parents the opportunity to observe their baby's temperature, rest and comfort in a private, safe environment. Research has shown that healing environments designed to include privacy for patients and families increase family involvement in patient care. The sensory environment plays an important role in the development of preterm infants. Noise and light can over-stimulate neonates, causing adverse effects to heart rate, blood pressure, oxygenation, weight gain,

pain levels and brain development (Lickliter, 2011). Krueger, Horesh, and Crosland (2012) found that infants carried to term have advantages over preterm infants because maternal abdomen and uterine tissues attenuate decibel levels and filter out most high-frequency sounds. Physiologically, newborns are predisposed to respond positively to their mother's voice, smell and touch. Providing an environment in which the mother feels comfortable to interact with the newborn is essential to a newborn's development.

Informal Survey Conducted via Social Media

Many hospitals have Patient and Family Advisory Councils (PFACs) comprised of people who have spent time in the hospital facility. Often during a design project, the design team will meet with the hospital's PFAC to learn what council believes constitutes a comfortable healing space. While these meetings can produce valuable input, this method of obtaining user feedback is limited in several ways: individual experiences are based on the existing facility (which may not include specific design features, like SFRs), meetings can be difficult to arrange, not everyone can attend PFAC meetings and not everyone is comfortable expressing opinions freely in a public meeting setting.

In this study, a design team used the findings from an informal survey distributed via Facebook to overcome the limitations of relying solely on PFAC input. In 2013, a medical planner created an informal, 10-question survey on the site SurveyMonkey to collect information about the experiences and design preferences of families whose children had been cared for in a variety of NICU environments. The survey was visible to 1500 of the planner's Facebook friends and their respective social networks. The 90 respondents (25 of whom the medical planner knew personally) represented over 70 NICUs in 29 states and three countries.

The survey explored family members' experiences in the NICU and their preferences for SFRs or open bays. Of the 90 respondents, 56% of the patients and families received care in an open bay configuration, 22% received care in private rooms and 22% experienced a combination of the two configurations.

Seventy-seven percent indicated they would have preferred a private room over an open bay, citing the desire for privacy, rooming-in, skin-to-skin contact, breastfeeding, one-on-one consultations with staff, a quieter environment and reduced exposure to other struggling babies.

Nine percent did not prefer a private room, citing reduced staff access and visibility, limited interaction with other parents, increased guilt in leaving the unit and increased feelings of isolation. These findings validated the need for the NICU design to respond to the perceived disadvantages of the SFR layout.

Discussion and Considerations for Practice

The design team incorporated knowledge gathered from the survey in the design of NICUs at two facilities that feature SFRs. The square footage (DGSF) of Facility A's project, a 72-bed NICU addition, was 70% of Facility B's project, an 80-bed NICU addition, demonstrating the survey

results are applicable to projects of different scopes and budgets. At this writing, both projects are under construction; they will be studied upon completion to determine if the design interventions improve the families' and providers' experiences with the SFR configurations.

Facility A's project is expected to be completed in early 2018. This project includes 36 NICU level II beds, which require a staffing ratio of one nurse for every three patients, and 36 NICU level III beds, which require a staffing ratio of either 1:1 or 1:2.

Originally, the program for Facility A called for a hybrid care model with SFRs and open bays for both level II and level III patients. Ultimately, the team developed a configuration that divided the NICU into two floors of 36 rooms, distributed into pods comprised of six SFRs each. (See Figure 3.)

Figure 3: Facility A



Elements of the design aimed to alleviate perceived disadvantages of SFR

Staff Considerations

1 Six room pod configuration promotes collaboration and mentoring

Acoustical Considerations

2 Staff work areas were centralized in the plan to minimize noise in unit

Desire for Socialization

3 Family socialization space allocated in each pod

4 Common family lounge and respite space shared within unit

Privacy and Normalcy

5 Route to room has minimal views into patient rooms promoting privacy

Key

- Public
- Patient
- Support
- Visibility

Each pod of six SFRs is supported by three decentralized nurse stations. This configuration accommodates the staffing ratios for level II and level III patients, optimizes the amount of daylight each SFR receives and provides space near the patient rooms for family socialization. Nursing staff at the facility have hypothesized this layout will address several of the perceived operational disadvantages of SFRs. It is believed the design will:

- Provide staff with readily available assistance in times of patient need.
- Encourage mentoring of less-experienced nurses within the six-bed pods.
- Provide an excellent line of sight to each patient, allowing nurses to react quickly in emergencies.
- Reduce noise levels associated with central nurse stations.
- Reduce staff walking distances, improving workflow and increasing nurses' time with patients.

Facility B's 80-bed addition is scheduled for completion in 2020. Facility B expanded the scope of this project to include relocating the post-partum unit closer to the NICU, in direct response to survey results that showed the proximity of the NICU to the post-partum unit can significantly influence the experience of care for post-partum patients. Several survey respondents—particularly those who had undergone Cesarean sections—described difficulties accessing the NICU from the post-partum unit at the hospital where they received care, due to long travel distances. In addition to placing the post-partum unit and NICU closer together, Facility B is building SFRs that include toilet rooms and the clearances necessary for both post-partum beds and neonatal incubators.

Figure 4: Facility B



Elements of the design aimed to alleviate perceived disadvantages of SFR

Staff Considerations

1 Multi-level lounge to allow for increased socialization between units

2 Improved peer to peer visibility in neighborhoods by eliminating walls

and utilizing glass partitions where possible

Flexibility

3 Family toilets and showers in each room

4 Rooms sized to accommodate dad as well as post-partum mom

Privacy and Normalcy

5 Family socialization space in each neighborhood as well as a multi-level hospitality suite and educational space shared between two floors

Key

Public

Patient

Support

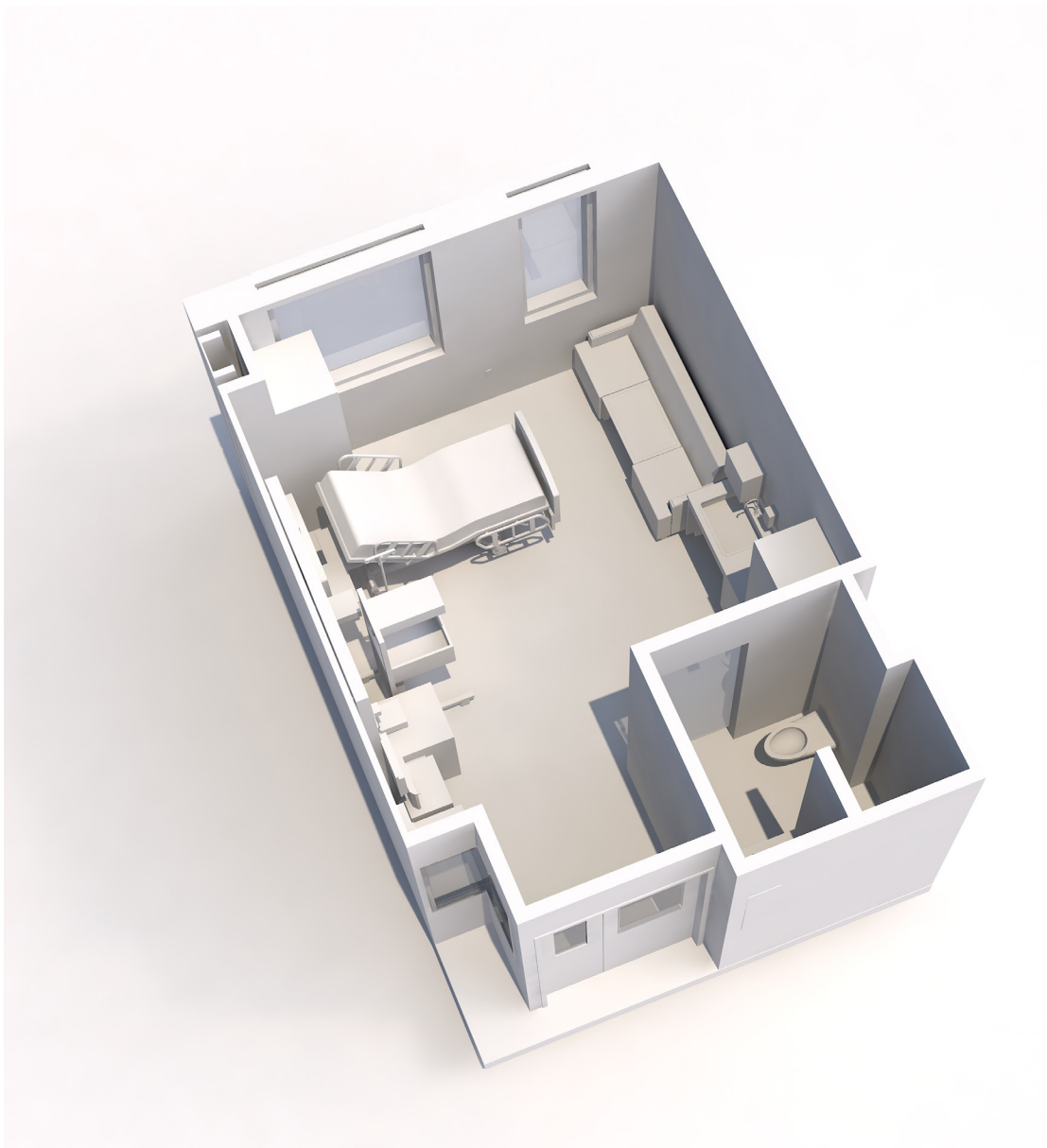
Visibility

Considerations for Future Research

In their survey responses, several patients revealed that being separated from their babies the first few days post-C-section impacted their hospital stays in a profoundly negative way. The design of the SFRs at Facility B will give the hospital the flexibility to care for post-partum patients in the same rooms as their newborns, should the hospital choose to do so in the future. While this model of care would affect NICU staffing, the benefits of mother-baby contact and providing positive patient experiences may balance out the operational changes needed to allow mothers to recover and receive treatment in the same rooms as their children.

Figure 5: Facility B Single Family NICU Room

The room will give the hospital the flexibility to care for post partum patients in the same rooms as their newborns.



This study demonstrated social media can be useful for gaining vital user input on healthcare designs. Sites like Facebook, Instagram and Twitter provide direct lines of communication to a broad spectrum of users who can be targeted for input on a variety of specific design features.

Limitations of this investigation include sample size bias, as the informal survey was available only to the medical planner's Facebook friends and their respective Facebook networks. While the survey was not formal in nature, its wide reach and the candid responses it prompted provided valuable insights into a variety of NICU environments and experiences—insights that may positively impact the healing environment for patients, families and staff at each facility discussed in this paper. These insights may also prove instrumental in spurring the next evolution of NICU design and operations. As these projects indicate, the accessibility to users afforded by social media can lead to revolutionary innovations in healthcare design.

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