Nicu Lighting Design: Responding to the Diverse Lighting Needs of NICU Users

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This paper focuses on two factors that affect the design of the NICU project. First, it researches circadian day/night cycle lighting for the spaces serving the infant patients, their families, and the hospital staff second. It researches and model possible daylighting strategies for the space along with any supplemental electric lighting as required. Research has shown that babies should not be in direct contact with any light source so as to develop best in a dark space. However, the parents need daylight or daylight simulation that stimulates a natural circadian rhythm. This paper provides iterations exploring different techniques based on our research and models of the iterations which then are compared to reach a conclusion.

The hospitals must be very careful when introducing the sunlight to the patient rooms. The designers, therefore, are only placing any new solar fiber-optic units over the area where the parent/sitter and not directly over the baby’s bed. It is now the practice in NICUs that the baby’s beds are covered with a thick blanket, which should be expected in this facility. Thus minimizing the impact on the baby’s eyes and help with the visitor and hospital worker.

Melatonin levels in premature vs. full-term babies

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**Melatonin in Premature vs. Full-term Babies**

The feedback the researchers got from the Portland Healthcare Facility regarding was that the above design moves were too expensive. The researchers will suggest individual moves that could be made to improve the existing conditions, giving the healthcare facilities the option to choose what moves to implement.

- Wall wash behind the nurses stations.
- Raise the hallway ceilings.
- Controlable task lighting for nurses’ desks.
- Fiber optics but only for rooms with no windows.
- Color change for hallway and desk areas.

**NICU LIGHTING DESIGN**

responding to the diverse lighting needs of NICU users

Rachel Brounse and Nattis Maan and Corey Griffin – PSU
Mark Elliott – SRG
Zach Suchuba - LUMA

SRG is redesigning a NICU (Neonatal Intensive Care Unit) for a major healthcare provider in the Portland, OR metro area. This is an intensive care unit for babies born prematurely and up to 6 months of age. The space is in an existing hospital and has previously been used as an NICU. For the last several years it was being used as overflow office space, but now is being remodeled and re-commissioned as an NICU. The healthcare provider who owns the hospital recently realized that this could be a value-added service for their business model.

Unlike pediatric and adult patient care rooms which do require exterior windows for daylight and views, NICU rooms do not have the same requirement. Currently, there are no specific applicable codes requiring natural daylight within the NICU patient rooms other than a general reference of “access to natural light.” However, in the last few years, codes have changed to recommend natural light as a way of speeding up recovery and creating a more inviting space for visitors as well as patients. The existing NICU unit, has little available natural light to patient care areas and no natural light to staff work areas. Of the 15 existing NICU patient rooms only six have exterior windows. The challenges in developing a life cycle explored and the implications for future designs are discussed.

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The day is divided into three episodes according to the type of non-visual effect that applies to each one.

- **Visual effects:**
  - Stimulates the melatonin production cycle.
- **Non-visual effects:**
  - Sleep disruption.
- **Slow changes:**
  - Temperature change.

The eye develops in near total darkness - requires it Further. the immature eye of even 36-0 weeks infants has an underdeveloped ability to accommodate to light. A reasonable rule of thumb when designing a space that has to work for many infants is to make red darkness possible for the infant at any time with an ability to add light of variable levels for observation and care. M Kathleen Philbin, PhD, RN, PhD1, Circadian rhythms are present in the womb and affected by the maternal melatonin but outside the womb the brain can established them not before 3 months of age and for preterms it means corrected age. This is a validated confirmation to Heidi’s recommendation on dimming of lighting in NICUs rather than establishing circadian rhythms of lighting before the brain is ready to collect the environmental input.' Dr. San Goddard.

The NICU is an intensive care unit for babies born prematurely and up to 6 months of age. The space is in an existing hospital and has several variable levels for observation and care. M. Kathleen Philbin, RN, PhD. The feedback the researchers got from the Portland Healthcare Facility regarding was that the above design moves were too expensive. The researchers will suggest individual moves that could be made to improve the existing conditions, giving the healthcare facilities the option to choose what moves to implement.

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