

let's talk about  
LIGHT & HEALTH

# Out of the womb: Lighting up the NICU

## GUEST SPEAKER



### Robert White, MD

Director since 1981  
Regional Newborn Program at Beacon Children's Hospital

Dr. White has a primary interest in advancing structural and operational strategies to provide the optimal NICU environment of care for babies, families, and caregivers. He has written many papers and co-founded the Consensus Committee to Establish Recommended Standards for Newborn ICU Design, the Gravens Conference on the Physical and Developmental Environment of the Newborn, and the International Newborn Brain Conference.

## EPISODE HIGHLIGHTS

### Q How have NICUs changed over the years?

#### THEN

- ⊗ Big wards (10-15 babies)
- ⊗ Go to another ward to talk with parents
- ⊗ Limited 15-minute visitation
- ⊗ Brightly lit from overhead
- ⊗ No windows
- ⊗ Noisy / crowded

#### NOW

- ✓ Private room for mom and baby
- ✓ Immediate communication with parents
- ✓ Parents can be with baby 24/7
- ✓ Indirect lighting
- ✓ Access to daylight
- ✓ Minimal audio alarms; alerts go to nurses cell phones

### Q Do babies have circadian rhythms?

Circadian rhythms develop in utero and are well established by birth due to receiving circadian signals from the mother. After birth, the baby must adjust to new, external cues including day/night cycles provided by lighting and maternal breast milk.

### Q Why should you timestamp breastmilk?

After birth, a baby's circadian cues need to be received elsewhere to establish day/night patterns. Maternal hormones such as melatonin and cortisol as well as nutrients such as protein, fat, and minerals are excreted into breast milk with a circadian cycle, suggesting that mother's milk should be given according to the time of day or night it was expressed.

### Q When is the development of the eye's connection to the circadian clock?

The connection to the circadian clock is developed in the third trimester. Sensitivity to light and dark is developed sooner than the visual capability that we associate with seeing faces and making out images.

### Q Can exposure to bright light at a newborn's eyes be damaging?

No, using indirect light at modest levels during the daytime does not damage the retina or interfere with normal sleep cycles.

## let's talk about LIGHT & HEALTH

# Out of the womb: Lighting up the NICU

### Q Describe the design ideas behind Beacon Children's Hospital.



Photo credit: ZGF Architects

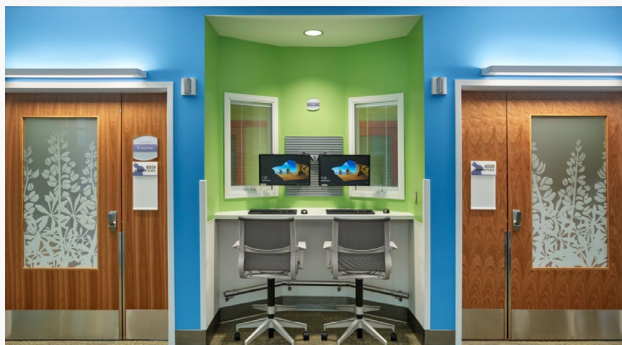
From the moment of getting to the hospital, visitors can tell their experience will be different than that of a typical hospital. Throughout the hospital, there are bright, colorful areas with minimal sounds and alarms. The carpeted hallways create a closer feel to home and reduce noise. The central atrium brings in daylight to community areas and patient rooms. There's also access to outdoor balconies for families that don't want to leave the hospital.

### Q How do you create 24/7 lighting in the hospital to meet the needs of the different users?

For mothers and babies: Layers of light include indirect lighting using multiple luminaires plus daylight for a baby and mother's circadian needs. Lights can be dimmed or turned off at night. A procedure light can be used for visibility when putting in an IV or catheter. Having a say in the design, parents preferred bright colored walls which helps with general overall psychological well-being. Colored lights controlled by the family provide also provide a personalized touch.



For day-shift and night-shift nurses: Hallway and nurses station lighting provide circadian-effective levels during the day while dimming and turning off layers at night to avoid circadian disruption. All patient rooms have exterior and interior windows, allowing more daylight to be brought into the core of the building.



### Q What is ultraviolet (UV-A) lighting used for?

Even though the NICU is the cleanest place in the hospital, there's still contamination any time the area gets used, and typical chemical cleaning only happens ever 8-12 hours. Contamination is an issue because nosocomial infection is a serious problem for pre-term babies. When in use over the sinks and work counters, UV-A sources significantly lowered bacterial contamination.

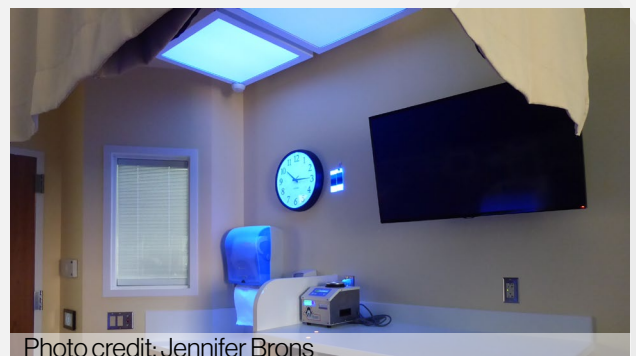


Photo credit: Jennifer Brons