Improving Family Centered Care in a Single Family Room NICU

Rainbow Babies & Children’s Hospital

Approach to Design:

• Influenced by Family Centered Care and Collaborative Practice

• Family Centered Care- family representative team member, included on site visits and decisions

• Collaborative Care Model- All members give input and are valued

• Team makes decisions collaboratively
  – Not just give suggestions
Learning from the Past

• Transition to Home Unit - 1993
• Developed idea of families “nesting” with their baby before discharge.
• Used office dividers to create private space for families.

Building on Successes

• Horvitz Tower - 1997
• Mixture of singles and doubles
• Organizing features:
  • 3 pods per floor
  • Each room:
    • Staff space
    • Baby space
    • Family space
University Hospitals Vision 2010

• Major projects include:
  • New Cancer Hospital
  • New NICU at Rainbow Babies & Children’s Hospital
  • New Center for Emergency for Medicine
  • Suburban Medical Center

Site Challenges:
• No available land on campus to expand.
• Renovated an existing 40 year old space which most recently housed research laboratories.
• Relocated 21 clinical programs, and 14 major research laboratories as enabling projects, creating MAJOR disruptions.
• Sacrificed immediate adjacency to labor and delivery to gain sufficient square footage for single room design.
Clinical Challenges:

- Committed to providing family centered care in a single room model
- **Challenge**: maintain same professional staffing ratio and budget!
- Ensure that staff have adequate work space within a limited footprint

Process:

- First step for architects: educate team about reiterative process followed in design- that they will be questioned repeatedly each time in higher level of detail.
- Clinical Team:
  Identify main goals and inform decision making process when conflicts found:
  - Patient safety
  - Family Centered Care
  - Developmentally supportive environment
  - Green Initiatives
Focus on Core Mission:

• To Heal
  – Developmental focused care
  – High technology provided
  – Safety features in design- adequate space, similar layout in each room
  – Provision for future electronic health record and integration with alarm systems on every piece of equipment

• To Teach
  – Integrated spaces for education of staff and families

• To Discover
  – Pebbles Project
  – Provision for clinical research
Existing NICU

- 38 Neonatal Spaces based 6 baby bays of XX sf each
- No isolation facility
- Procedure room 150sf
- Family Space outside the unit

Existing Transitional Care Nursery
RBC Level 4
Existing Transitional Care Nursery
RBC Level 4

• 46 Transitional Care Spaces in single rooms
• Rooms are XXsf Plus washroom
• No isolation facility

• Family Space outside the unit
Existing Transitional Care Nursery
RBC Level 4

Design of New NICU
Program

- 38 Neonatal Spaces based on single room model of care in 4 pods
- 30 Single Rooms at minimum of 220sf
- 3 of the Single Rooms for isolation
- 2 double rooms for non-related children
- 2 double rooms for twins
- Procedure room at 400sf
- 2 Family Lounges
- 6 ‘surge’ rooms to increase capacity to 44 beds

A Model of Parental Stress

- Anxiety over Critically ill Baby
- Stress of the ICU environment
- Loss of Parent role
- Individual Susceptibility to stress
• Guiding Principles
  • Families as partners in care
  • Customized environment
  • Multi-level lighting / controls
  • Day / night cycled environment
  • Reduced sound
  • Importance of safety, infection control, hand washing, HVAC
  • Technology / information / communication systems

• Guiding Principles
• Caregiver Expectations
  • Superior visibility of babies, families and colleagues
  • State-of-the-art monitoring and communication devices
  • Adequate training in the new unit prior to first patient
  • Efficient; immediate access to equipment, supplies
  • Dedicated 'Teaming Zones'
  • Procedure Room on Unit
  • Adequate support and respite areas
**Guiding Principles**
- Family as partner in care – expectations and education
  - “Nursery-like” environment
  - Theming and wayfinding
  - Communication and information
  - Adherence to infection control measures
  - Sensitivity to developmental needs of infant
  - Nutritional needs, including breastfeeding focus
  - Well defined family zone; personalization; privacy

**Focus Group Outcome**

**Family Concerns**
- Security of staff’s presence
- Trust in technology
- Information overload
- Isolation
- Need to be present at all times
- Communication with outside world
- Family normalcy

**Solutions**
- Pod configuration and sight lines
- Orientation and education
- Care binder
- Family dining/lounge
- Proximate support spaces
- Connectivity
- Sibling engagement spaces
**Staffing Impact of Single Room NICU**

**Challenge:**
- *No clinical FTEs to be added*

**Solution:**
- *Maximize efficiencies, site lines, footsteps*
- *Enhance Support infrastructure:*
  - Social Services, Central Supply, Dietary, Environmental Services,
- *Unparalleled Investment in Technology*
- *Extended staff training period- each RN 24 hours of education on systems before 1st patient day*

**Foster Collaboration –**

*Caregiver Stations* which are open, approachable

*Strong site lines:* Visibility provides sense of security

*Standing or seated options* accommodate work preferences
• Support Medical Learners

• Teaching space within pod, separate from room
• Adequate office space
• On-Call rooms on Unit
• Locker spaces
• Large meeting / conference room

Research Projects to Inform the Design of Single Room NICUs
Research Projects:

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<th>Project</th>
<th>Responsible Person</th>
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</thead>
<tbody>
<tr>
<td>1. Finances- upfront vs operational costs.</td>
<td>K Lockhart, P Depompei, A Reitenbach, K Lakota</td>
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<td>2. LOS and Growth</td>
<td>Paula Forsythe</td>
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<td>3. Sound</td>
<td>Walsh</td>
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<td>4. Light</td>
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<td>5. Staff Surveys</td>
<td>Deakins Deutsche</td>
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<td>6. Parental Surveys Press Ganey Scores</td>
<td>Blatz Moroney</td>
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<td>7. Safety: Infection, Medication Errors</td>
<td>Lewis</td>
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<td>8. Distances Traveled</td>
<td>Walsh Charge Nurses</td>
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Sound Comparisons:

- Design standards call for a baseline sound level of ≤ 45 dB in health care environments to reduce stress, promote sleep and improve caregiver communication.
- It is thought that designs of modern systems and optimal use of sound absorbing materials will permit this level to be achieved.
- There are few data that evaluate the ability of current designs and materials to achieve these goals.
Methods:

- Short term ambient sound monitoring was performed prior to occupancy in the new unit and after the move in the empty old unit.
- An industrial engineer collected data using a Larson-Davis noise dosimeter.
- Dosimeters logged in the “A” weighted scale with a 5dB doubling rate and slow response.
- Maximum peaks were measured on the “C” weighted scale.

Unoccupied Old NICU

Unmodified 6 bed bay

57 dB

Modified 6 bed bay

48 dB
Unoccupied New NICU

Butterfly POD - Room 12 (inside Isolette)
May 8, 2009 Monitoring

46 dB

Unoccupied New NICU

Outside Incubator

Inside Incubator

45 dB
Occupied New NICU Twin Rm

60dB

Occupied New NICU Single Rm

55dB
Conclusions:

• Ambient noise was reduced from an average of 58 DB to 49 dB by post build modifications in our old NICU.

• Significant cycling variation was seen presumably related to HVAC.

• In the new NICU ambient noise was 46dB outside the incubator with HVAC artifact, but this was reduced to 45.5 dB in the incubator without HVAC variation.

Conclusions:

• In the occupied new unit, sound guidelines were met.

• As in previous studies, staff and patients significantly contributed to sound.

• Even in new units, ongoing education about the role of personnel in noise pollution will continue to be needed.
Thank You.