Increasing Daily Reading to Infants by Parents in the NICU: A Pilot Program of Reach out and Read (ROR) at Boston Medical Center

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Background: Premature infants are exposed to less language in-utero and after birth than term infants but language exposure is essential for normal language development. Language delay is common among premature infants, but infants who hear more words during their NICU stay have better neurodevelopmental outcomes at 18 months of age. Reading to infants is one way to increase language exposure and might also foster increased parent-infant interaction.

SMART Aim: To increase the percent of infants who are read to at least once every other day (from the time they reach physiologic stability until discharge home) from 0% to 75% by December 1, 2015.

Setting: The NICU and level II neonatal nursery in an urban public hospital in Boston, MA with an annual delivery volume of approximately 2700/year, 15 NICU beds, and 6 level II beds. Currently the NICU is an open bay unit, but the NICU will soon be moving to a 50% single family room unit (planned for December, 2015).

Mechanisms: There are many socioeconomic and NICU-environmental barriers to parent contact and reading in the NICU; drivers of our “pre-change” environment and practice are outlined in Figure 1.

Methods: We began by conducting a retrospective chart review to determine demographic characteristics, primary language, baseline visitation patterns, and reading activity for infants born at < 37 weeks who were admitted to the NICU from 10/1-11/30/2014 and remained in the NICU for at least 7 days. This data informed our aim statement and planning. The staff prepared for this initiative completing an online and/or in-person ROR training program. Our pilot program started on 7/7/15. We initially planned to roll out ROR only for infants born after our start date, but quickly found that once we started the staff wanted all the infants in the NICU to be enrolled. Thus, our parent presence data cannot be clearly separated into “before” and “after” based on DOB. Using ROR methodology, we provided parents with in-person anticipatory guidance regarding the benefits of reading to their infants and gave them free books. Infants were eligible for participation upon reaching physiologic stability. Daily reading was tracked using bedside calendars; we distinguished between readings done by parents & those done by staff. Parental presence in the NICU was tracked as recorded in the EMR. Brief surveys are planned to evaluate parental and nursing experiences with this program, but have not yet been completed.

Measures: Our primary outcome is the percent of infants who are read to by their parents at least once every other day from enrollment in ROR until discharge home; our secondary outcome is the average number of times (per patient) mothers and/or fathers are present in the NICU per LOS day. This data was obtained by chart review where we recorded the total number of times either parent were recorded as being “at the bedside”, “active in care”, or “holding” and divided the sum by the patient’s LOS.

Data/Results: From 7/6/2015 to 8/20/2015, 25 families were enrolled in ROR in the NICU; 72% were enrolled by physicians, 28% were enrolled by nurses. Two infants were in state custody at the time of enrollment and their parents were not involved. The average age at enrollment was 21 ± 22 days and the average length of participation was 18 ± 13 days. Families were given an average of 2.5 ± 0.9 books in a total of 4 languages (96% received at least one book in English, 4% only received books in French, and 48% received bilingual books where the second language was Spanish in 58%, French in 25%, and Vietnamese in 17%). Prior to enrolling in ROR, none of the infants had been read to. After launching ROR, infants were read to a total of 0.61 ± 0.48 times per day; if restricted only to their parents, they were read to 0.44 ± 0.53 times per day. The
percent of infants read to at least once every other day was 63%; the percent read to at least once every other day by their parents was 50%.

Parental presence in the NICU was evaluated for the entire hospital course of patients born during two time periods: our pre-intervention time period (10/1-11/30/2014) and just before or during the launch of ROR in the NICU (5/1-7/30/15). Demographic characteristics and parent presence data was collected on a cohort of 49 infants: 21 prior to implementation of ROR, and 28 after. The cohort had the following characteristics: mean GA was 32.6 ±3.1 weeks, and mean birth weight was 1850 ±630 grams; 52% were African American, 14% Hispanic, 20% white, and 14% Asian; primary languages spoken included English (55%), Spanish (16%), Haitian Creole (14%), and Portuguese Creole (6%), Vietnamese (6%), and Other (3%); all infants were covered by Medicaid insurance. Mothers were present in the NICU an average of 1.7 ±1.0 times/LOS day and fathers were in the NICU an average of 0.49 ±0.7 times/LOS day over the course of their infants’ hospitalization. 73% of mothers and 16% of fathers were present in the NICU an average at least once per day. There was a small increase in average episodes of mothers and/or fathers being present in the NICU with their infants in the cohort of infants born or still present in the NICU during the launching of ROR (Figures 2-4).

Discussion/Conclusions: We have established baseline population data to inform our effort to increase reading in the NICU. Our data confirm that infants were not being read to, but that the parents visit often enough to aim for 75% of infants being read to at least once every other day by their parents. In order to serve our population, books in many languages are required. The launching of the reading program has been enthusiastically received by staff and parents alike, but it is too early to say if it will have a significant impact on the frequency of parents being present in the NICU.
Figure 1: Mechanisms

**Primary Aims**

Overall Project Goal:
To increase the percent of infants who are read to at least every other day (from enrollment in ROR to discharge home) from 0% to 75% by December 1, 2015.

Outcome Measures:
- Percent of infants who are read to (ideally by their parents) at least once every other day from enrollment in ROR until discharge home.

Balancing Measures:
1. Complaints from parents regarding discomfort or distress regarding inability to visit.
2. Episodes of discomfort caused by parental illiteracy.

**Primary Drivers**

- Limited access to transportation
- Complicating social factors (substance abuse/rehabilitation programs, incarceration, homelessness, etc.)
- Limited bedside space and lack of comfortable overnight accommodations
- Restrictive visitation policy that prohibits visits by siblings under 14 years of age
- Lack of parental knowledge regarding benefit of language exposure for young infants
- Process Measure: Percent of eligible infants whose parents receive anticipatory guidance as part of enrollment in ROR
- Limited staff time to discuss benefits of reading to infants
- Limited parental and NICU funds
- Process Measure: Number of books provided to each infant during their hospitalization
- Lack of books in parents’ native language
- Process Measure: Percent of infants’ families provided with books in their native language
- Protective overtures by staff perceived as restrictive to parental involvement

**Secondary Drivers**

Reach out and Read in the NICU Driver Diagram

1. Encourage parents to visit and read to their infants every day.
2. Move to new NICU in November 2015; new 22 bed NICU will have 10 private family rooms and a comfortable parent overnight room.
3. Revise visitation policy to allow visits by healthy siblings regardless of age following move to new NICU.

**Potential Change Concepts**

1. Educate the staff regarding the risks of sensory deprivation and the importance of language exposure in subsequent brain and language development.
2. Train a subset of staff to specifically educate parents on the importance of talking, singing, and reading to infants.

1. Partner with Reach out and Read in Massachusetts and First Books to obtain low-cost books.
2. Purchase books in English and in parents’ native language.
3. Encourage staff to encourage parents to read to their infants as special role they play in infants’ NICU experience.
**Figure 2: Mothers’ Presence in the NICU**

![Graph showing mothers' presence in the NICU]

*Mean episodic per LOS Day*

- **Mother and Infant Together per LOS Day**
- **First Infant enrolled in ROR**
- **Sequentially Born Infants**

**Figure 3: Fathers’ Presence in the NICU**

![Graph showing fathers’ presence in the NICU]

*Mean Episode per LOS Day*

- **Father and Infant Together per LOS Day**
- **First Infant enrolled in ROR**
- **Sequentially Born Infants**

**Figure 4: Sum of Parents’ Presence in the NICU**

![Graph showing sum of parents' presence in the NICU]

*Mean episode per LOS Day*

- **Parents and Infant Together per LOS Day**
- **Sequentially Born Infants**
- **First Infant enrolled in ROR**