

Background

- Human fetuses have the ability to hear sounds as early as 24 weeks gestation¹.
- In utero, fetuses are exposed to their mother's voice as the most consistent and prominent sensory input².
- The modern NICU exposes newborn infants to auditory sensory input which is different than a fetus of the same gestational age and includes only 2-5% language³



- Preterm infants have delays in speech and language and this altered environment may contribute to their delay.
- Little is known about the audio environment in the single family room NICU model.



Objective

To compare the sound environment of preterm (PT) infants cared for in an open bay NICU with an single family room NICU

Hypothesis

Infants cared for in the SFR will have more language exposure and less monitor and other noise.

Materials & Methods

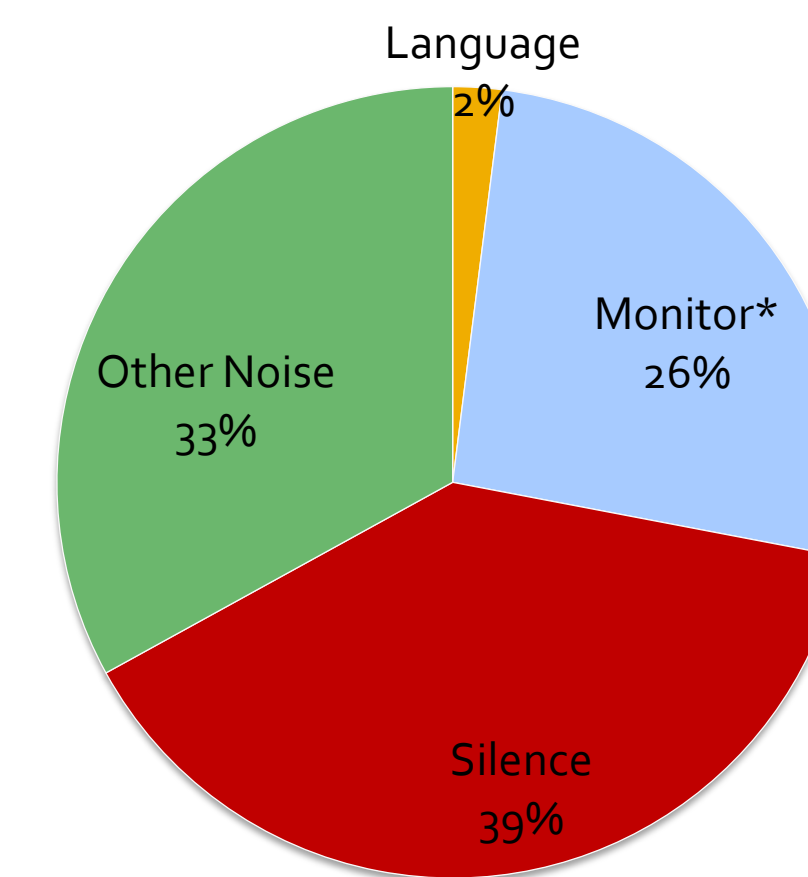


- Prospective cohort study, infants <1250
- Vest fitted and infant recorded for 16 hours using Digital Language Processor at 32 weeks
- Analyze all recordings using LENA™ and ADEX software
- NICU Sound Definitions:
 - **Language:** Adult voices, child vocalizations
 - **Monitor:** Electronic alarms
 - **Noise:** Noise from CPAP, isolette
- Statistical Methods
 - Negative binomial regression
 - Linear regression.

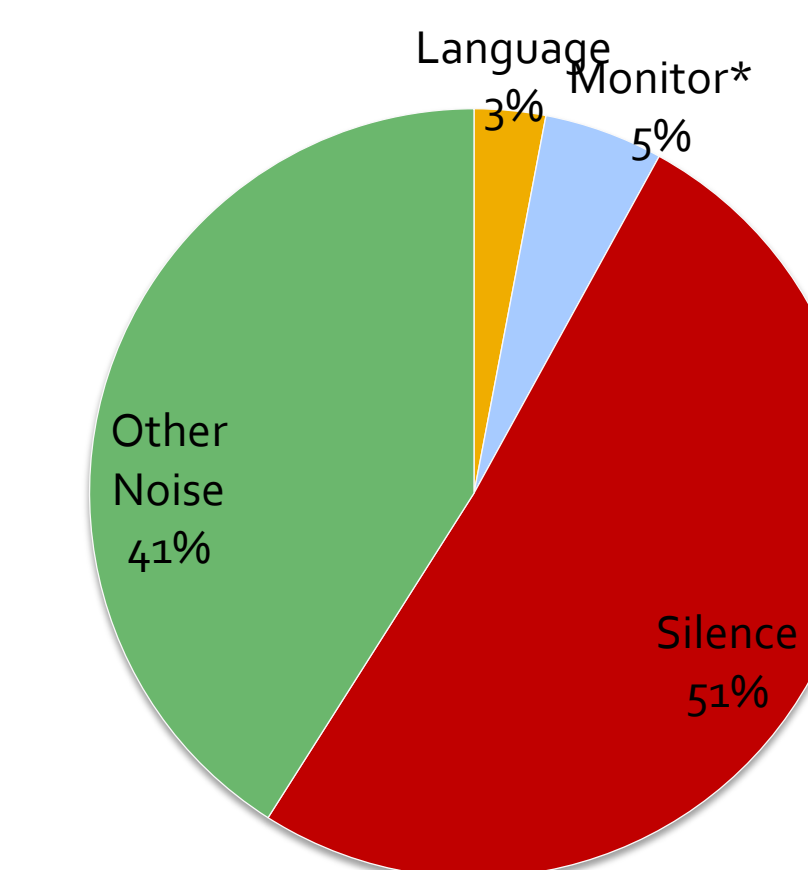
Results

Demographics	Open Bay (n=35)	Single family (n=46)
Males n,%	15 (42)	24 (52)
Gestational age, w	27 ± 2	27 ± 2
BW, g	896 ± 195	912 ± 239

Open Bay NICU Sounds



Single family room NICU Sounds



Results

Variable	Open Bay (n=35)	Single Family (n=46)
Mean Hourly Adult Word Count	195 (SD 543)	224 (SD 606)
Mean Hourly Conversational Turns	1.4 (SD 4.2)	1.9 (SD 5.6)
Mean Hourly Child Vocalization count	6.7 (SD 11.8)	8.4 (SD 17)

Conclusions

- Preterm Infants are exposed to significantly decreased monitor noise and increased silence in the single family room NICU compared to the open bay NICU.
- Percentage of time that infants are exposed to any kind of language is still quite low (2-5%) in the single family room NICU despite the increased access by parents. This percentage does not differ significantly from the open bay NICU.
- The adult word counts in the single family room NICU were higher, however did not achieve significance.

References

1. Birnholz, *Science*, 1983
2. Querleu & Renard, *Bull Acad Natl Med* 1981
3. Caskey, *Pediatrics*, 2011