Noise Reduction in the Special Care Nursery

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Introduction

Interdisciplinary teams of health care professionals care for newborns who are ill, low birthweight and/or premature in Special Care Nurseries (SCNs) and neonatal intensive care units (NICUs). The high level of activity and monitoring required to treat these newborns results in a noisy environment. Noise can cause stress in neonates, resulting in negative physiological responses that likely interfere with their growth and development. Furthermore, studies have demonstrated numerous benefits associated with the reduction of noise in the SCN/NICU.

Short Term Effects on Neonates:
- Tachycardia[1]
- Desaturations[2]
- Tachypnea and hypoxia[1]
- Increased irritability[2]

Benefits of Noise Reduction on Neonates:
- Improved vital signs[3,4]
- Improved recognition of parents' voices[4]
- Improved sleep[2,4]

Other benefits of noise reduction:
- Improves staff's work satisfaction[5]

In the literature, numerous strategies to reduce the noise in the SCN/NICU environment have been tested. The most effective strategies are structural changes to the unit (e.g. sound absorbing floor and ceiling materials, individual rooms for each neonate). Other promising strategies are a combination of environmental and practice changes (Figure 1).

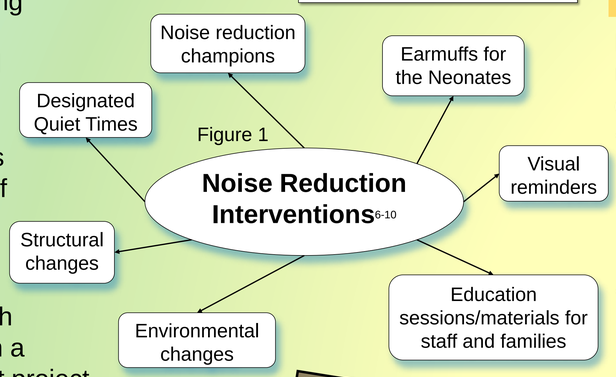
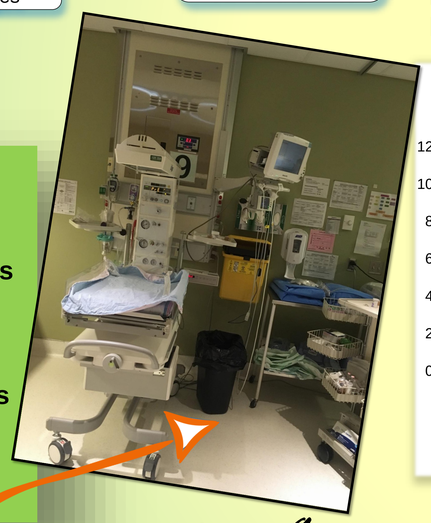


Figure 1

We collaborated with l'Hôpital Montfort on a quality improvement project to determine how to effectively reduce the noise level in their 8-bed SCN.

The aims of this project were to:

1. Determine how SCN staff rate the **current noise level** in the unit.
2. Increase the SCN staff's **awareness** of the effect noise has on neonates and promising noise reduction strategies.
3. Determine **barriers and facilitators** to the implementation of promising strategies to reduce noise from the perspective of SCN staff.



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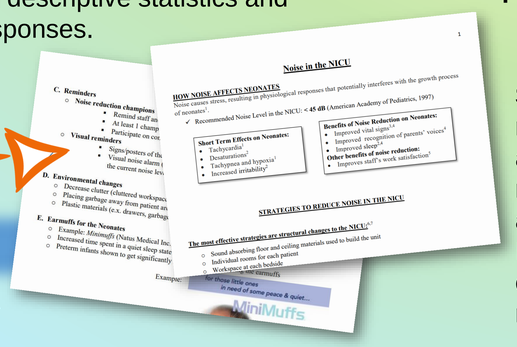
Methods

A two-page handout summarizing the evidence regarding the effect of noise on neonates and effective strategies to reduce noise in the SCN was developed.

- A questionnaire with 19 items was developed and included questions about demographics (4), the information handout (1), sources and levels of noise (6), strategies for noise reduction (2) and barriers and facilitators to implementation of the strategies (6). A mix of Likert scales, closed and open ended written responses were used.
- Envelopes containing one handout and one questionnaire (40 French and 10 English) were distributed to SCN staff by their manager.
- Responses to the questionnaire were entered into an excel spreadsheet and summarized by using descriptive statistics and content analysis for the open-ended responses.

Handout



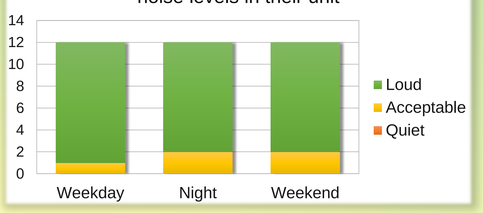
Preliminary Results

12 surveys were completed and returned within the first nine days (24 % response rate). The majority of respondents were female (92%) and had worked in the SCN at the Montfort between 1-10 years (Table 1), and rated the noise level in the SCN as loud (Figure 2).

Table 1: Sample characteristics (N=12)

Characteristic	N (%)
Role in the SCN	
Registered nurse	11 (92%)
Respiratory therapist	1 (8%)
Work frequency	
Full-time	4 (33%)
Part-time	4 (33%)
Occasional	3 (25%)
Years' experience	
< 1 year	2(17%)
1-5 years	5(42%)
6-10 years	5 (42%)
>10 years	0 (0%)

Figure 2: SCN staff's ratings of current noise levels in their unit



Noise reduction strategies that are most likely to be effective:

- Education sessions for staff & family, quiet times, earmuffs for neonates and changes to how the unit runs (Figure 4).
- The majority of staff learned at least some new information from the handout (Figure 5).

- The noise is highest during change of shifts (in morning and evenings), visiting hours and admissions.
- The top three sources of noise are monitors/alarms, visitors and personnel.
- The unit's loudest areas are the nursing station and the sinks/towel dispensers (Figure 3).

Figure 3: When is Noise Loudest

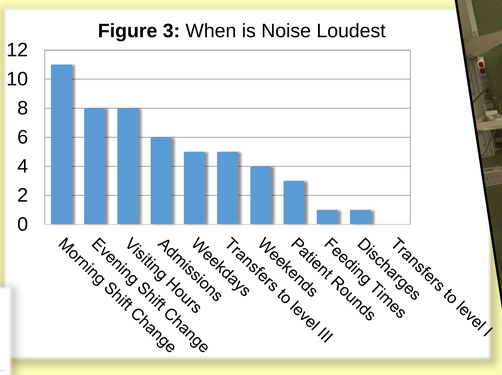


Figure 5: Effectiveness of the handout in increasing the SCN staff's knowledge

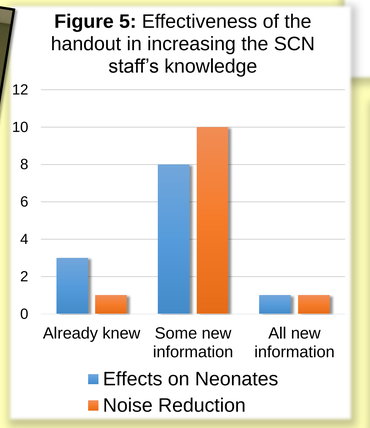


Figure 4: Which Noise Reduction Intervention would be most Effective

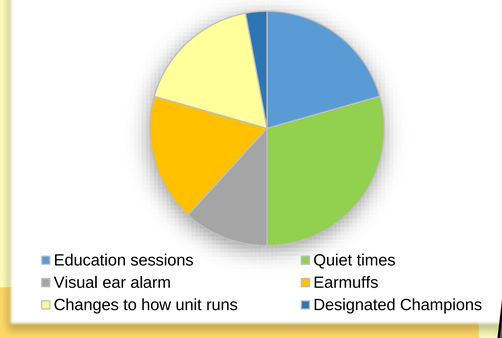


Table 2: Top Interventions Suggested by SCN Staff

	Barriers	Facilitators
Education sessions for staff and family	• No time • Difficult to teach everyone since there is frequent patient turnover	• Reserve time • Offer sessions to all members of interdisciplinary teams • Handout for parents included with the information that they receive
Quiet Times	• Does not work during an emergency	• Have a separate room for unstable babies who are admitted
Earmuffs for neonates	• More education needed: questions arise about the cost and how they work	• Have several washable and reusable pairs for the unit
Changes to how the unit runs	• Limited space therefore difficult to reorganize	• Put more effort into moving equipment gently in order to make less noise.

The last choices from the staff were **designated champions** and **visual ear alarms.**

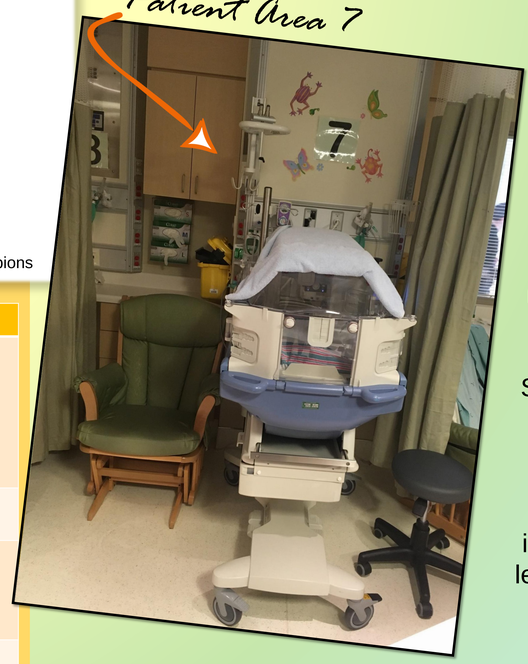
Structural changes that are most recommended by staff are sound absorbing materials, individual patient rooms and separate rooms for activities.
Many respondents recommended an expansion of the unit rather than a renovation of the existing space.

Discussion

The preliminary findings from this cross-sectional survey indicate that the staff consider the noise level in their 8-bed SCN to be consistently loud. Similar to other studies, respondents indicated that the noise levels are loudest during shift changes, when visitors are present and during admissions[6,7]. The loudest noise sources were identified as the monitors/alarms and visitors and staff talking. The majority of respondents replied that they learned at least some new information from the handout. This preliminary finding, together with most respondents' identification of education sessions as being the most likely strategy to reduce noise indicates that staff education sessions should likely be implemented. According to respondents, education sessions should reach out to all providers and be provided when there is sufficient coverage in the unit to facilitate attendance. Designated quiet times were also identified as likely to be effective. An initial designated quiet time of 1-2 hours/day is more likely to be successful if scheduled at a time that is different from shift changes, rounds and when most visitors are present.

Both human and environmental factors are necessary to effectively reduce noise levels in the SCN/NICU9. Some respondents identified the small size of the SCN as a barrier to implementing environmental changes (e.g. noise from sinks/towel dispensers; moving equipment). According to these preliminary findings, staff identify an expansion of the SCN as an important facilitator for noise reduction strategies. Given that structural changes to units are known to be the most effective noise reduction strategies6, when the opportunity to renovate the unit arises, expansion of the size of the SCN should be considered.

Workspace



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Data collection is ongoing and therefore these preliminary findings are limited by a low response rate (24%). Final results will contribute valuable information from front-line SCN providers about how to successfully implement specific evidence-based noise-reduction interventions. Future plans include monitoring the noise levels in the SCN before and after implementation of the selected interventions.

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References

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