



## KEY POINT SUMMARY

### OBJECTIVES

This study explored  
(1) the sound level distribution around the radiant warmer bed;  
(2) the NICU sound level distribution in relation to weekdays, weekends, and the hour of the day; and  
(3) the peak noise frequency with the associated events in an NICU in Southern Taiwan.

## Noise and Related Events in Neonatal Intensive Care Unit

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### Key Concepts/Context

Noise contributes to environmental stress to premature infants, who often spend long periods of time in neonatal intensive care units (NICU). Some research indicates that noise contributes to higher incidences of hearing loss, as well as cardiovascular, respirator, endocrine, and behavioral deficits. Some of the noise might be reduced by studying different aspects of NICU settings (i.e., wards, personnel, equipment, and procedures).

### Methods

Researchers conducted two surveys on noise distribution and peak noise in a university hospital in Southern Taiwan in two areas of a NICU without isolated doors (14 beds near the nurse station and 6 beds 15 meters away from the nurse station) to test the (1) sound level distribution around the radiant warmer bed; (2) sound level distribution in relation to weekdays, weekends, and the hour of the day; and (3) peak noise frequency with the associated events.

### Findings

The researchers found that, although the mean noise level in Area B (15 meters away from the nurse station) was consistently less (61.4 dBA) than the noise level in Area A (closer to the nurse station, 62.0 dBA), the noise was greater than 59 dBA in both areas for 70% of the observed time. The findings also showed that peak noises ( $\geq 65$ dBA) occurred more than 100 times per hour on average. Further, human-related factors (i.e., conversations, bumping carts or equipment, closing trash can lids, caregiving activities, telephone/pager/broadcasting) accounted for 90% of the peak noise; while nonhuman noise sources (i.e., monitor alarms) accounted for 9.2% of the total peak noise ( $M = 68.5$  dBA, max = 81.0dBA).



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## Limitations

One limitation was the study design; case studies are inherently ungeneralizable.

## Design Implications

According to this article, designers should target the major sources of noise: personnel, procedures, and alarms. A noise-warning system with a signal light may assist with staff's behavioral modification by raising awareness to noise level and sources. Selecting equipment based on noise production (i.e., stainless steel carts and trash cans versus molded plastic or rubber bumper guards) and lower-level personal pager alarms can reduce noise associated with NICU activity. Scheduled maintenance for equipment (i.e., cart wheels) can also minimize noise production. As the primary source of noise, the nurse station should be carefully located and designed to mitigate noise and transmission.