



## KEY POINT SUMMARY

### OBJECTIVES

To describe how pre-design inquiry methods can help develop models for healthcare providers to better understand human-centered designs and their efficacy in reducing infections in a neonatal intensive care unit.

## Human factors considerations in designing for infection prevention and control in neonatal care – findings from a pre-design inquiry

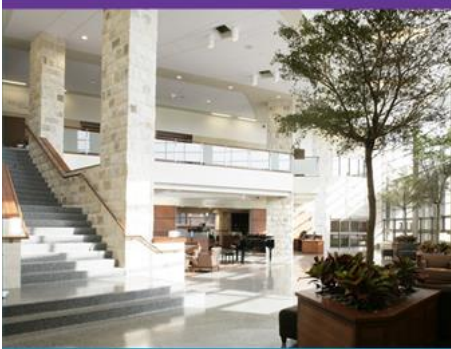
*Trudel, C., Cobb, S., Momtahan, K., Brintnell, J., Mitchell, A. 2018 / Ergonomics, Volume 61, Issue 1, Pages 169-184*

### Key Concepts/Context

As healthcare environments are being more frequently redesigned to improve patient experiences and provider operations, it becomes increasingly important that healthcare providers themselves understand how these new designs are intended to be utilized. Giving healthcare providers a deeper understanding of the functions and purposes underlying important healthcare design decisions could help reduce potential operational errors or staff frustrations. Neonatal intensive care units (NICUs) provide care to patient populations who can be particularly vulnerable to healthcare-associated infections (HAIs). This possibility makes it even more important for staff to fully understand how specific designs and procedures in these facilities should be used to best uphold infection prevention and control (IPAC) protocols. By understanding where staff members encounter confusion with new designs, designers themselves can better communicate the purposes behind certain designs and how procedures could be adapted around them.

### Methods

The authors conducted a literature review to outline the context of NICU operations and designs as well as emergent themes concerning staff difficulties with proper HAI prevention procedures. The authors then performed field observations, which involved 81 healthcare workers from a wide variety of professional backgrounds within a university hospital's NICU, and discussed their observations with staff representatives for feedback and further analysis. A novel framework



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based on both previous research and new findings was finally developed to provide recommendations for future best practices within NICUs.

## Findings

Thematic analysis of all data gathered during field observations and interviews with the NICU healthcare workers revealed a noticeable disparity between recommended NICU operational guidelines and staff understanding of said guidelines. Staff members voiced concerns regarding time constraints, crowding, work pacing, overall workload, and lack of staff within the NICU – all of which were in line with the studies' novel field observations and previous studies. The novel NICU workflow proposed in this article was formulated around the idea that the staffs' observed perception and execution of recommended practices were undermined by the physical design of their healthcare environment.

## Limitations

The authors note that they had no formalized training in hand hygiene practices, observation methods, or other clinical knowledge relevant to the field of NICU management. This study was conducted in a single NICU environment, which faced specific constraints both financially and structurally; thus the field observation results and resulting guidelines for future practices may not be generally applicable to all NICU environments. The authors also note that their method of taking field observation notes manually may not have accurately reflected the actual pace of the NICU environment.

## Design Implications

Healthcare designers could consider several factors to help healthcare providers maintain an environment aligned with best infection prevention and control practices, such as: considering the location, quantity, and overall design of hand sanitizing stations; considering pre-existing staff workflows and how they conform to the physical environment; and how the environment could be reconfigured to minimize crowding, and strategically locate high-touch surfaces. Communicating new design implementations and their purposes with staff is paramount to maximizing positive outcomes.

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