



## KEY POINT SUMMARY

### OBJECTIVES

The objective of this study was to measure the perspectives of healthcare providers on the effects of family-centered design on job function, patient safety, and personal well-being in a new children's hospital.

## Does patient-centered design guarantee patient safety? Using human factors engineering to find a balance between provider and patient needs

France, D. J., Throop, P., Walczyk, B., Allen, L., Parekh, A. D., Parsons, A., ... & Deshpande, J. K. 2005 | *Journal of Patient Safety*. Volume 1, Issue 3, Pages 145-153

### Key Concepts/Context

According to the authors, "human factors engineering is the study of human beings and their interaction with products, environment, and equipment", and that over the years it has evolved from systems-centered to user-centered to socially-centered care. These principles were not taken into consideration during the design process of a new children's hospital whose design was based on family-centered care. This study examined the views of the staff regarding the impact of the design on their work, patient safety, and staff health. The survey findings indicate that certain aspects of the physical environment were rated high but so were the adverse effects on staff health.

### Methods

The methodology involved administering a survey to evaluate the perceptions of providers in the context of human factors engineering principles. In 2004, an academic medical center moved from its existing children's unit to an eight-story, 206-inpatient bed free-standing children's hospital. The design team included (in addition to members of the architecture, construction, and engineering teams) consultants, clinical staff, support, staff, administrators, patients, families, and donors. The 270 survey respondents included clinical faculty and staff from the neonatal intensive care unit (NICU), Pediatric critical care unit (PCCU), perioperative services, and medical and surgical acute care units. Frequency analysis and t-tests were carried out for the quantitative section of the survey and content analysis was conducted on the qualitative portion of the survey.



### DESIGN IMPLICATIONS

Specific aspects of the physical design have not been examined in this study making it a challenge to draw conclusive implications. Staff responses in the survey indicated stress and fatigue (both mental and physical fatigue) had increased, interruptions were higher, and team communication, patient monitoring and social interaction had decreased in the new hospital. More studies are required to assess if these aspects of staff health are associated with the decentralized units and private patient rooms in the NICU and PCCU.

### Findings

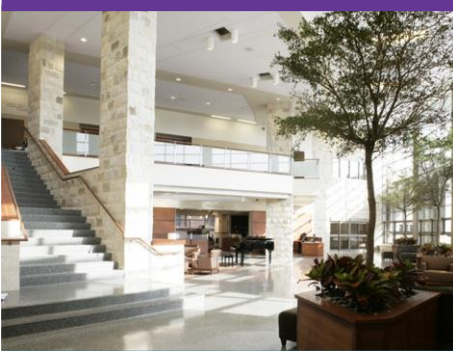
Analysis of the survey responses showed the following results:

- The new hospital was rated to be better than the old one by 87% of the respondents.
- Documentation and organization of charts (90%), availability of computers (89%) and equipment (70%), and lighting levels (80%) were rated as high.
- The immediate workspace was rated to be adequate by 65% of the respondents.
- The noise levels and distance walked were reported to be excessively high by over 60% of the PCCU respondents.
- More NICU respondents than PCCU respondents considered unit design as adversely affecting patient monitoring and social interaction.
- More PCCU respondents than NICU respondents perceived noise in their unit to be louder and interruptions to be more frequent.
- Respondents from the NICU and the acute care and surgical floors wanted improved access, in terms of location, to medical supplies.
- Over 80% of the respondents rated information flow, patient flow, and overall efficiency to be moderate to highly efficient.
- Mental and physical fatigue at the end of the day was reported by 83% of the respondents.
- Team communication, patient monitoring, and social interaction among staff were considered to be limited by over 60% of NICU and PCCU respondents.
- High levels of stress and high rates of interruptions were reported by 65% of NICU and 80% of PCCU respondents.
- More NICU respondents than PCCU respondents rated their stress load to be between high and very high.

### Limitations

The authors point out the limitations of their study as:

- Staff members of all clinical areas were not surveyed.
- The relationship between survey results and patient outcomes was not studied.



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- The relationship between safety issues in the NICU and PCCU and higher incident reports was not examined.

Other limitations of this study include:

- A similar survey administered in the old unit would have provided more perspective and rigor to this research even though this was not intended to be a comparative study.
- Although design changes were mostly implemented in the NICU and PCCU, responses from staff of other departments were analyzed as well.

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