



## KEY POINT SUMMARY

### OBJECTIVES

The objective of this study was to identify and categorize safety hazards in the CVOR that could potentially prevent an adverse patient safety event.

### DESIGN IMPLICATIONS

The implications for design include:

- Decentralization of supplies in close proximity to operating rooms
- Standardization of workspaces
- Provision of adequate storage in the operating room
- Clearance between entry/ exit points and wall fixtures like sinks
  - Use of sound-absorbing materials for floors and ceiling
- Temperature control in the operating room

## Using human factors engineering to improve patient safety in the cardiovascular operating room

Gurses, A. P., Martinez, E. A., Bauer, L., Kim, G., Lubomski, L. H., Marsteller, J. A., ... & Thompson, D. 2012 | *Work*. Volume 41, Pages 1801-1804

### Key Concepts/Context

Cardiac surgery, despite technological and medical advances, involves high risks related to adverse events and medical errors that occur in the operating room. The Systems Engineering Initiative for Patient Safety (SEIPS) model was used to guide the research – focusing on the different variables (providers, physical environment, tools and technologies, tasks, organization) in the care environment and the impact of their interaction on patient outcomes. Observations of procedures in the operating rooms, interviews with care providers and photographs helped in the identification of 55 safety hazards in the cardiovascular operating room (CVOR) work system.

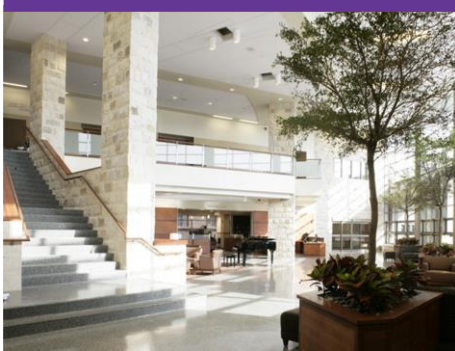
### Methods

A qualitative study involving observations, interviews and photographs was conducted at five hospitals. The research team consisting of a human factors engineer, a nurse, a cardiac anesthesiologist and a health services researcher collected data over 2.5 days. Twenty cardiac surgeries were observed, 84 care providers were interviewed, and 327 photographs were taken. A three-level classification was developed and NVivo 8© was used to code the data.

### Findings

The study identified 55 types of hazards associated with the CVOR work system. The physical environment-related hazards identified were:

- Layout: The ICU, the central supplies and the lab area were very far from the operating room.
- Standardization: The workspaces in different operating rooms were not standardized.



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- Proximity: The equipment and supplies were beyond reach of the care providers.
- Storage: The workspace was always cluttered because of poor configuration, inadequate storage and inefficient organization of the tools, equipment, furniture and cables.
- Space: Inadequate space between door to room and the scrub sinks.
- Noise levels were high.
- Room temperature was sub-optimal.
- Lighting issues were noted.

Other non-design hazards pertained to non-compliance with evidence-based guidelines, problems with the use of tools and technology, practice variations, poor teamwork, and the hierarchical nature of the work culture.

### Limitations

The authors do not identify any limitations to their study. Although observations were conducted at five different hospitals, the authors do not categorize the identified hazards by hospital. A brief description of the physical design of each CVOR would have been helpful to relate adequately to the identified hazards.

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