



KEY POINT SUMMARY

OBJECTIVES

The objective of this paper was to present a summary of evidence pertaining to risks to patient safety and interventions contributing to the reduction of perioperative risks and human error in cardiac surgery.

Patient safety in the cardiac operating room: Human factors and teamwork. A scientific statement from the American Heart Association

Wahr, J.A., Prager, R.L., Abernathy, J.H., Martinez, E.A., Salas, E., Seifert, P.C., Nussmeier, N.A. 2013 | *Circulation*. Volume 128, Issue 10, Pages 1139-1169

Key Concepts/Context

The cardiac surgical operating room is a complex environment, where patient lives are saved or considerably improved with the help of sophisticated equipment and skilled personnel. Although outcomes are improving, adverse events still occur, many of which are preventable. This statement is the result of a review of literature that presented evidence on patient safety and interventions that worked in enhancing patient safety in the cardiac OR. The review found the following physical environment features critical to patient safety in the OR: size and layout of OR, traffic in OR, and noise.

Methods

The methodology involved the review of articles that focused on human, environmental, and cultural aspects impacting teamwork and communication in the cardiac surgical environment. The review also included relevant papers on other surgical disciplines. The cognitive psychology literature was also searched to review articles that discussed effective and ineffective communication. The summary is organized by communication, teams, the physical work environment, and organizational culture.

Findings

With regard to the physical environment, the findings were as follows:

- Space and design/ size and layout
 - In small ORs, equipment clutter can cause disruptions in the workflow; in large ORs, staff members may have to travel longer distances.



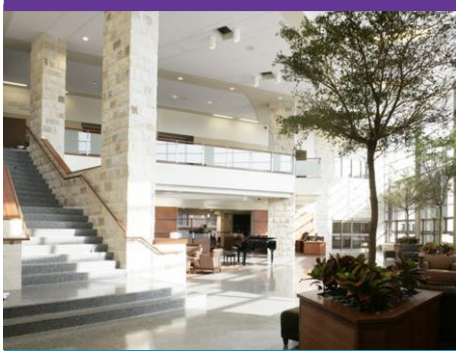
DESIGN IMPLICATIONS

The authors recommend the testing of room designs and layouts for the OR in real time and in simulation laboratories to avoid design errors and before deciding on an optimal OR layout.

Some design implications that are inferred from this review:

Overhead booms in ORs would address the issue of cables and cords on the floor to a large extent.

- ORs are also places where slips, trips, and falls occur because of cords and cables, low-profile equipment, supplies, and mats.
- Personnel and traffic
 - The movement of personnel in and out of an OR creates a potential for distractions and infections.
 - Increase in traffic implies that doors are opened more often, which:
 - Decreases the efficacy of the ventilation system in filtering contaminants
 - Increases bacterial counts when the OR air and the corridor air mix
 - The more people in the OR the higher the microbiological count in the same OR.
- Noise
 - Noise levels in ORs are very high – exceeding norms set by OSHA and NIOSH.
 - Sounds that contribute to high noise in the OR include sounds generated by OR traffic, conversations, alarms, and sometimes music.
 - High noise levels in the OR can affect patient outcomes.
 - High noise levels can affect the hearing of staff and patients.
 - The use of music in the OR is associated with the reduction of stress and improving the performance of some OR staff. However, in some studies, some OR members complain that music hinders the ability to communicate.
- Optimal OR
 - Improvements in physical environment are associated with reduced stress and fatigue in staff, improved patient safety, better outcomes, and healthcare quality improvements.
 - An optimal OR would include the following design features:
 - Standardized location for the head of the table and room-handedness
 - Adequate space for movement of staff and equipment
 - Ensured line of sight to the patient for all staff members at all times
 - Other design features with regard to an optimal OR that emerged during the review:
 - Organizing the flow of ORs so that equipment, cords, and cables do not clog pathways
 - Installing ceiling-mounted booms, particularly in areas of high traffic
 - The set-up of the equipment should be consistent with the sterile field, OR table, Mayo stands, anesthesia equipment, and perfusion set-up.



The Center for Health Design: Moving Healthcare Forward

The Center for Health Design advances best practices and empowers healthcare leaders with quality research that demonstrates the value of design to improve health outcomes, patient experience of care, and provider/staff satisfaction and performance.

Learn more at
www.healthdesign.org

- The sterile core and patient-entry doors should be located away from swinging booms.
- OR doors should be located so that the sterile surgical field is not affected by the work zone traffic.

Other findings of the review pertained to nontechnical skills of healthcare professionals and the impact on patient safety, teamwork, communication within and between teams (including cooperation, coordination, cognition, coaching, and conflict resolution), interventions to reduce errors (including team training and time-outs, checklists, briefings, and debriefings), human factor issues pertaining to number of personnel in OR and equipment issues (inept design, training, maintenance, etc.), culture (organizational and safety), and behavior that adversely affects safety (rigid hierarchical, professionalism, and disruptiveness).

Limitations

The authors indicate in the initial part of their paper that the focus of this review required them to exclude other areas of research.

One other limitation of the study is that the authors do not identify the means of literature search or the criteria included and excluded during search process.

The Knowledge Repository is provided with the funding support of:



Additional key point summaries provided by:



RESEARCH DESIGN
connections