

# Improving Healthcare Practice Through the Implementation of Human Factors and Ergonomics Principles

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**Objective:** Present a collection of papers focusing on improving healthcare practice through the implementation of human factors and ergonomics principles that were presented at the International Ergonomics Association (IEA) 2021 international conference.

**Background:** The mission of the IEA is to elaborate and advance ergonomics science and practice and to expand its scope of application.

**Method:** We reviewed papers that were submitted for presentation at the IEA 2021 international conference and focused on improving healthcare practice through the implementation of human factors and ergonomics principles.

**Results:** The eight papers that are included in this special issue cover varied aspects of human factors application and implementation.

**Conclusion:** This special issue provides clear evidence that the science of human factors is relevant and is continuing to grow and so is its implementation in healthcare.

**Application:** This special issue offers a selection of applied works, providing a wide scope of human factors guidelines, methods, and theories in healthcare work environments.

**Keywords:** Human systems integration, Health care/health systems, Patient safety, methods and skills, Communication and teamwork in health care

## INTRODUCTION TO THE SPECIAL ISSUE

Healthcare has been relatively slow to adopt human factors principles to design and improve processes, procedures, tools, and work environments. After two decades, the recommendations from the seminal report “To Err is Human” (Kohn et al., 2000) are still germane to

our field. Healthcare is in desperate need of the application of human factors to reduce use errors and improve reliability as it was used successfully in various industries. However, we still find a relatively small number of human factors practitioners within healthcare organizations.

The International Ergonomics Association (IEA) 2021 international conference was an opportunity to bring together researchers and practitioners to demonstrate and discuss how human factors tools and methods can be implemented to improve safety and quality of work. This special issue offers a selection of applied works that were presented in this meeting, providing a wide scope of human factors guidelines, methods, and theories in healthcare work environments.

The eight papers that are presented in this special issue cover varied aspects of human factors application and implementation. The recent trend in the adoption of information systems in healthcare work environments introduces various new challenges. Several papers in this issue studied challenges related to implementation of these systems from a human factors perspective.

Mörike and colleagues report that work-arounds and shadow systems highlight limitations of hospital information systems in catering systemic and local needs. They suggest customizing human–computer interfaces to support efficient search, access, and exchange of relevant data to mitigate these shortcomings. (Mörike, et al., 2022).

Salwei and colleagues report how the use of human factors principles in the design process of a clinical decision support technology improves its usability. However, their study also found that the system use was low and that the design process should continue after the implementation. (Salwei, et al., 2022).

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## HUMAN FACTORS

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Wooldridge and colleagues (Wooldridge et al., 2022) used a sociotechnical systems approach to investigate and identify complex interactions between work system barriers and facilitators for an educational virtual reality tool that educates clinicians on the content of a pediatric code cart.

Catchpole and colleagues (Catchpole et al., 2022) used a narrative review approach to discuss challenges and lessons-learned from the implementation of robotic-assisted surgery tools in surgical work systems. The authors provide practical approaches for teamwork training, task design, and workplace management to improve future implementations.

Wust and colleagues studied the role of patients and their care partners in closing communication and coordination gaps by acting as knowledge brokers during their visit to the ED. (Wust, et al., 2022).

Ahmadi and colleagues used eye-tracking technology to assess nurses' mental workload in an intensive care unit. They employed ocular metrics in a naturalistic study to measure the nurses' mental workload in various work conditions. (Ahmadi, et al., 2022).

Cha and colleagues (Cha et al., 2022) used proximity sensors and voice recorders to investigate surgical teams' nontechnical skills such as communication. In their paper, they provide preliminary evidence that support the efficacy of using Sensor-based measures of communication, speech, and proximity to train machine learning algorithms that may predict surgeons' nontechnical skills.

Lazaro and colleagues (Lazaro et al., 2022) document the design and evaluation of a mobile health application for seizure management. The paper documents a case study that illustrates the importance of using user-centered design methods to improve usability of digital tools.

The papers included in this special issue provide clear evidence that the science of human factors is relevant and is continuing to grow and so is its implementation in healthcare. It is our expectation that the scholarly work in this area as well as its translation to practice will have a profound impact on healthcare quality and patient safety. We hope that the papers presented in this special issue will provide a valuable

addition to the body of knowledge and inform research and practice alike, encouraging further studies and dissemination of human factors in healthcare.

## KEY POINTS

- Human factors practitioners within healthcare organizations are improving healthcare practice through the implementation of human factors and ergonomics principles.
- The eight papers that are presented in this special issue provide clear evidence that the science of human factors is relevant and is continuing to grow and so is its implementation in healthcare.
- This special issue offers a selection of applied works, providing a wide scope of human factors guidelines, methods, and theories in healthcare work environments.

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