

# Human Factors in Healthcare

by Capella Healthcare



## WHAT'S COVERED

This lesson will discuss human factors in healthcare. Specifically, this lesson will cover:

1. Human Errors
2. Human Factors

*"We cannot change the human condition, but we can change the conditions under which humans work."*  
James Reason (2000)

## 1. Human Errors

Healthcare professionals are among the most highly trained, driven, and conscientious professionals. Despite their commitment to delivering the best care possible, they can be set up for errors by poorly designed medical devices, uncoordinated care processes, and fragmented systems. Too often, these systems are designed in a way that does not account for how people actually interact with their work environment.

Human beings have limited attention spans and perform worse when they are fatigued. We cannot multitask, and we are forgetful. When we are required to go beyond these capabilities, errors can occur. In fact, research shows that human errors are responsible for 80-90% of errors. Urging clinicians to "try harder" or "be more careful" will not prevent these errors. To reduce or prevent such harms, the healthcare environment must be designed with human limitations and abilities in mind.

Experts classify human errors into three categories:

1. Knowledge-based (errors caused by lack of experience or knowledge)
2. Rule-based (applying the wrong rule or misinterpreting available data)
3. Skill-based (caused by attention and memory failures, as well as omissions)

Physical conditions can negatively affect human performance and have been shown to make people more prone to error. Noise levels, distractions, equipment design, the complexity and number of steps involved in the task, and even culture contribute to errors.

Cognition plays a factor in how we process the information available to us. We acquire information from the world around us, interpret and make sense of it, and then respond to it. Errors can occur throughout this process.

Because humans are not machines, we are unreliable and unpredictable, and our ability to process

information is limited by the capacity of our working memory. However, we are also very creative, imaginative, and flexible in our thinking. This is useful when something unexpected happens and we need to adapt to the changing needs of the patient.

Humans can be distracted, which can be a strength and a weakness. This quality helps us notice when something uncommon is happening. We excel at identifying and responding to situations quickly and adapting to new situations and information. However, our ability to be distracted inclines us to error because we may miss key aspects of a task or situation. For instance, a nurse is in the midst of receiving a telephone medication order when a colleague interrupts with a question. She inadvertently writes the wrong dosage on the order.

Our brain has the ability to cause us to misperceive a situation thereby contributing to an error. Despite our best intentions, the fact that we can misperceive a situation is one of the key reasons that our decisions or actions can be flawed, resulting in making "stupid" mistakes despite experience level, intelligence, motivation, or diligence. In the healthcare setting, these errors can lead to patient harm.

## 2. Human Factors

The following table lists some factors that are likely to trigger error. (Seshia et al., 2018).

Examples of error-catalyzing factors across the continuum of care
<b>Organization- or team-related factors</b> <ol style="list-style-type: none"><li>1. Unhealthy cultures</li><li>2. Poor communication (written, verbal) including silo mentality within or between one or more levels of care</li><li>3. Inadequate resources especially staffing or equipment (includes access to drugs, equipment, and tests)</li><li>4. Time and energy spent gaining access to needed services (beds, tests, etc.) because of system inefficiencies or culture</li><li>5. Failure of organization or team to promote and practice person- and family-centered health care and informed shared decision making</li><li>6. Failure to seek an independent reliable opinion (outside view) when the situation warrants it</li></ol>
<b>Individual-related factors (some are secondary to upstream organizational factors)</b> <ol style="list-style-type: none"><li>1. Suboptimal communication with others in the system</li><li>2. Knowledge-experience-skill set<ol style="list-style-type: none"><li>a. Knowledge-deficit, inexperience, or poor skill sets related to level of training or poor continuing education</li><li>b. Specific knowledge deficits concerning probability estimates</li><li>c. Inexperience/knowledge-deficit related to novel situation (has not encountered situation before; experts in the field are not exempt)</li><li>d. Poor skills (especially surgical, emergency procedures, etc.)</li></ol></li><li>3. Unpredictable and changing situation (e.g., critically ill patients, unexpected adverse events during surgery, and equipment malfunction)</li></ol>

4. Failure to seek an independent reliable opinion (outside view) when the situation warrants it
5. Time and concentration factors
  - a. Haste (because of resource limitations or because an individual has the time but hurries through each specific task)
  - b. Work overload, often associated with inadequate staffing: both result in time constraints for each specific task
  - c. Interruptions or distractions during task (self-created or caused by others)
6. Cognitive-affective
  - a. Impact of biases on judgment and decision making
  - b. Sleep deprivation/fatigue
  - c. Adverse exogenous (related to the environment) and endogenous (individual-specific) psychological state; latter includes dysphoria, personal life stressors, and burnout
  - d. The impaired individual
  - e. Violations of safe practices
  - f. Cognitive overload: usually an end result of a combination of several factors listed in this table
7. Failure to adequately communicate with patients and their caregivers or engage in informed shared decision making

#### **Patient-related factors**

1. Communication challenges (e.g., language barrier and cognitive dysfunction)
2. Adherence (incorporates compliance and concordance)
3. Cognitive-affective biases (plus) of patients and caregivers that influence personal health care decisions
4. Biases of systems, organizations, and health care providers against those who are economically disadvantaged or are from minority groups, or because of patient's history. Biases may also be related to age, gender, and patient's medical or psychological state (e.g., obesity and psychiatric or psychological disorders)

Typically, several factors co-occur. These factors create holes in the "Swiss cheese" and may cause holes to align in several successive layers of defense. We refer to these phenomena as "breaching of the cognitive-affective gates" (discussed in the text). Authors' compilation from several references cited in the text. The list is not meant to be all-inclusive.

These human factors often occur simultaneously and are all common in healthcare. Decisions can be influenced by a myriad of emotions created by workplace cultures, the nature of the task, and internal or external psychological factors affecting healthcare providers. Chronic high-stress situations, exposure to adverse influences, and excessive work hours can compromise decision making and lead to burnout. Patient-related factors are also important. The contribution of psychological factors to safety often goes unnoticed. Measures to mitigate the effects of the factors can improve patient safety.

"Human factors are a human-centered science using tools and methods to enhance the understanding around human behavior, cognition, and physical capabilities and limitations, and applying this knowledge to designing systems in support of these capabilities," according to Erin Lawler, human factors engineer at The Joint Commission. (The Joint Commission (2015). Human Factors in Patient Safety Systems Analysis. The Source, Vol 13, Issue 4). Human factors science attempts to understand how humans perform under different circumstances. It aims to help people do their best work, improve resilience and overall system performance, and minimize errors. Human factors-based solutions make it "easy to do the right thing right the first time."

When errors do occur, they are less likely to end in harm.

Human factors, therefore, examine the relationship between humans and the systems within which they interact by focusing on improving efficiency, creativity, productivity, and job satisfaction, with the goal of minimizing errors. A failure to apply the principles of human factors is a key aspect of most adverse events. All healthcare workers need to understand human factors principles. These are important considerations to recognize because they are reminders that making errors is all but inevitable. Reason described "error" as the failure of a planned action to achieve its intended outcome or a deviation between what was actually done and what should have been done.

In its broadest sense, human factors incorporate human-machine and human-human interactions such as communication, teamwork, and organizational culture. Human Factor engineering seeks to identify and promote the best fit between people and the world they live and work in, especially regarding technology and physical design features in the work environment. You will find further elaboration of this concept in the Human Factors Engineering section to come.

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## Support

If you are struggling with a concept or terminology in the course, you may contact **[RiskManagementSupport@capella.edu](mailto:RiskManagementSupport@capella.edu)** for assistance.

If you are having technical issues, please contact **[learningcoach@sophia.org](mailto:learningcoach@sophia.org)**.