

Culture of Safety and Human Factors

State Office of Rural Health and Texas Hospital Association
Critical Access Hospital Quality Improvement Boot Camp
Summer 2022



Why Patient Safety Matters

- Medical errors are considered the 3rd leading cause of death in the United States
 - Gender, race, age, and socio-economic status affect healthcare
 - 1 in 10 US patients are harmed while in hospital
 - Up to 50% of medical errors are preventable
 - Misdiagnosis and medication are leading causes of error
- Healthcare organizations and professionals have a duty and responsibility to provide safe, reliable, patient-centered care.



Doctor/Patient Dialogue Graphic. Digital Image. 2020.
<https://answers.childrenshospital.org/language-barriers-medical-errors/>.



What is Culture of Safety?

Culture of Safety:

- “The term "safety culture" has been defined by various organizations. Generally, a safety culture is viewed as an **organization's shared perceptions, beliefs, values, and attitudes that combine to create a commitment to safety and an effort to minimize harm** (Weaver et al.). In the simplest of terms, a safety culture is the combination of attitudes and behaviors toward patient safety that are conveyed when walking into a health facility” (ECRI, 2019).
- Weaver, et al, (2013) states “**culture influences one’s motivation to engage in safe behaviors.**”



High Reliability in Healthcare

Joint Commission Center for Transforming Healthcare:

“High reliability means consistent excellence in quality and safety across all services maintained over long periods of time.”



HRO Diagram. Digital Image. (n.d.)
[https://www.dotankdo.com/healthcare/.](https://www.dotankdo.com/healthcare/)



Characteristics of Highly Reliable Organizations

- **Preoccupation with Failure**
 - Standardization
 - Checklists
- **Reluctance to simplify**
 - Human Factors and System Engineering
- **Sensitivity to Operations**
 - Reporting – errors and near misses
 - Fair and Just
- **Deference to Expertise**
 - Team
 - Flexibility
- **Commitment to Resilience**
 - Willingness to learn and grow
 - Health Literacy and Equity and Cultural Competence



Culture of Safety in Organizational Practice

- Acknowledgement of the high-risk nature of healthcare
- Blame-free environment; Just Culture
- Collaboration across ranks and disciplines, including the board
- Organizational commitment of resources



All Hands In Graphic. Digital Image. 2020.
<https://rms.rdale.org/discover/news/article/~board/robb-insdale-middle-news/post/rms-student-affinity-groups>.



Your role in Patient Safety Culture

- To support frontline managers and staff understand quality and safety and collaborate to implement changes
- To support leadership with data collection/interpretation and strategic planning
- Focus on systemic changes through conducting root causes analysis



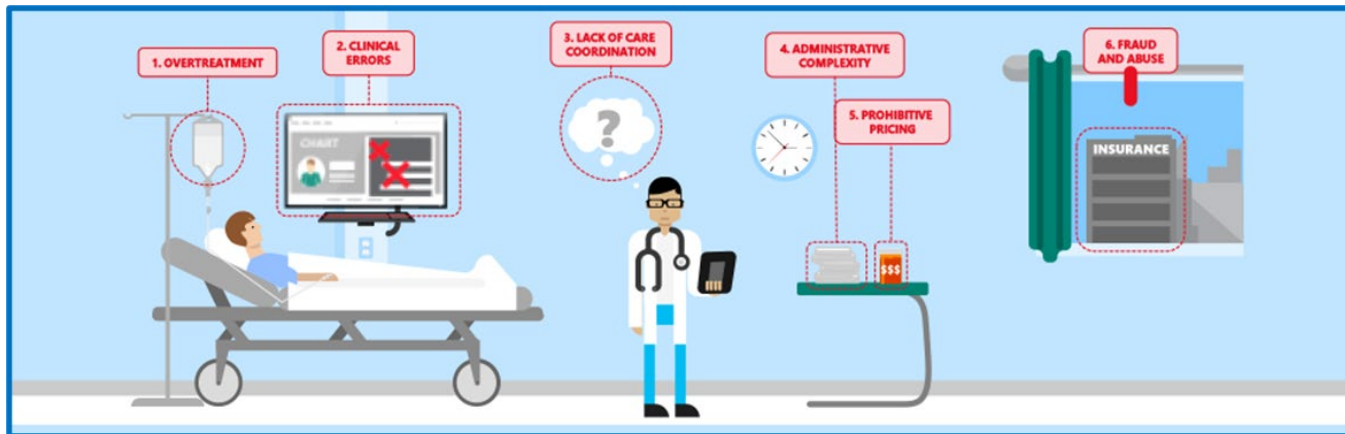
Team Roles Graphic. Digital Image. n.d.
<https://www.proevolution.pro/en/support-for-transformations/change-management/>.



Human Factors Definition

Johns Hopkins Medicine Institute for Patient Safety and Quality:

- “...the focus of human factors, a scientific discipline that 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 things right and hard to do things wrong.” When errors do occur, they are less likely to lead to patient harm.”



Medical Errors Consequences. Digital Image. 2017. <https://cloudblogs.microsoft.com/industry-blog/health/2017/03/28/diagnosing-healthcare-spending-the-top-6-ways-to-increase-efficiency-in-healthcare/>.



Human Factors

- How do humans interact with their work environment?
- Often, hospital equipment, procedures, processes, and layout do not account for this unique interaction – which can lead to unintended medical errors.

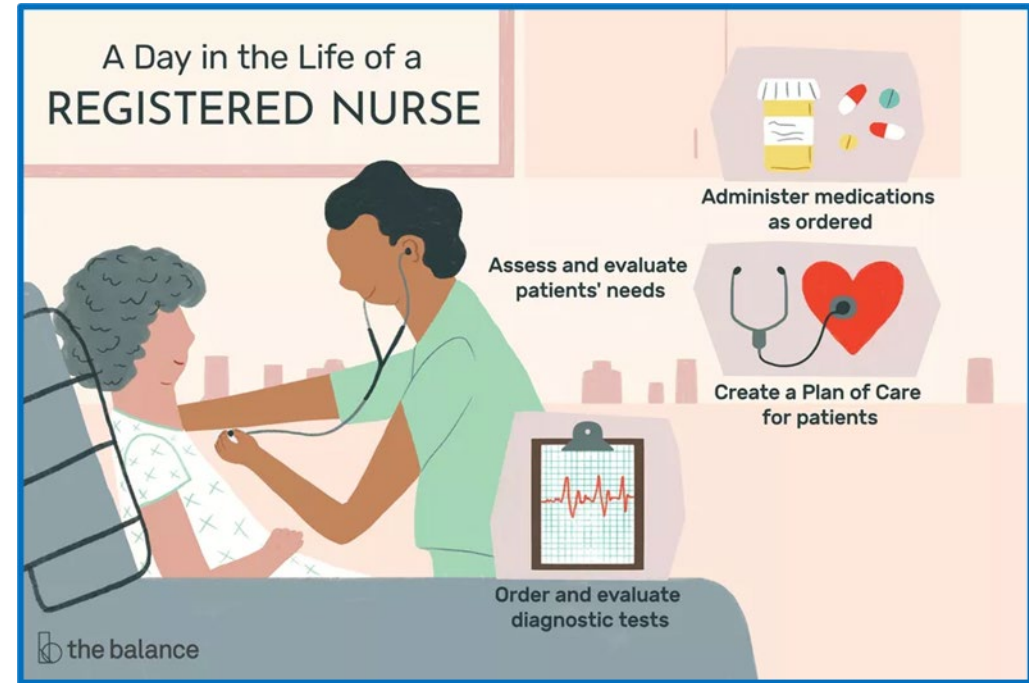


Nurse working with Doctor looking on. Graphic Digital Image. 2021.
<https://www.healthstream.com/resource/blog/work-life-balance-in-a-nursing-career>.



Systems Engineering Definition

- System: “...a set of components that interact to accomplish a common goal.”
- System Engineering: “...the design of the overall system...effectively designing and integrating the components of a system proactively...”



RN working with a patient in the healthcare system. Digital Image. 2019.
<https://www.thebalancecareers.com/registered-nurse-526062>.



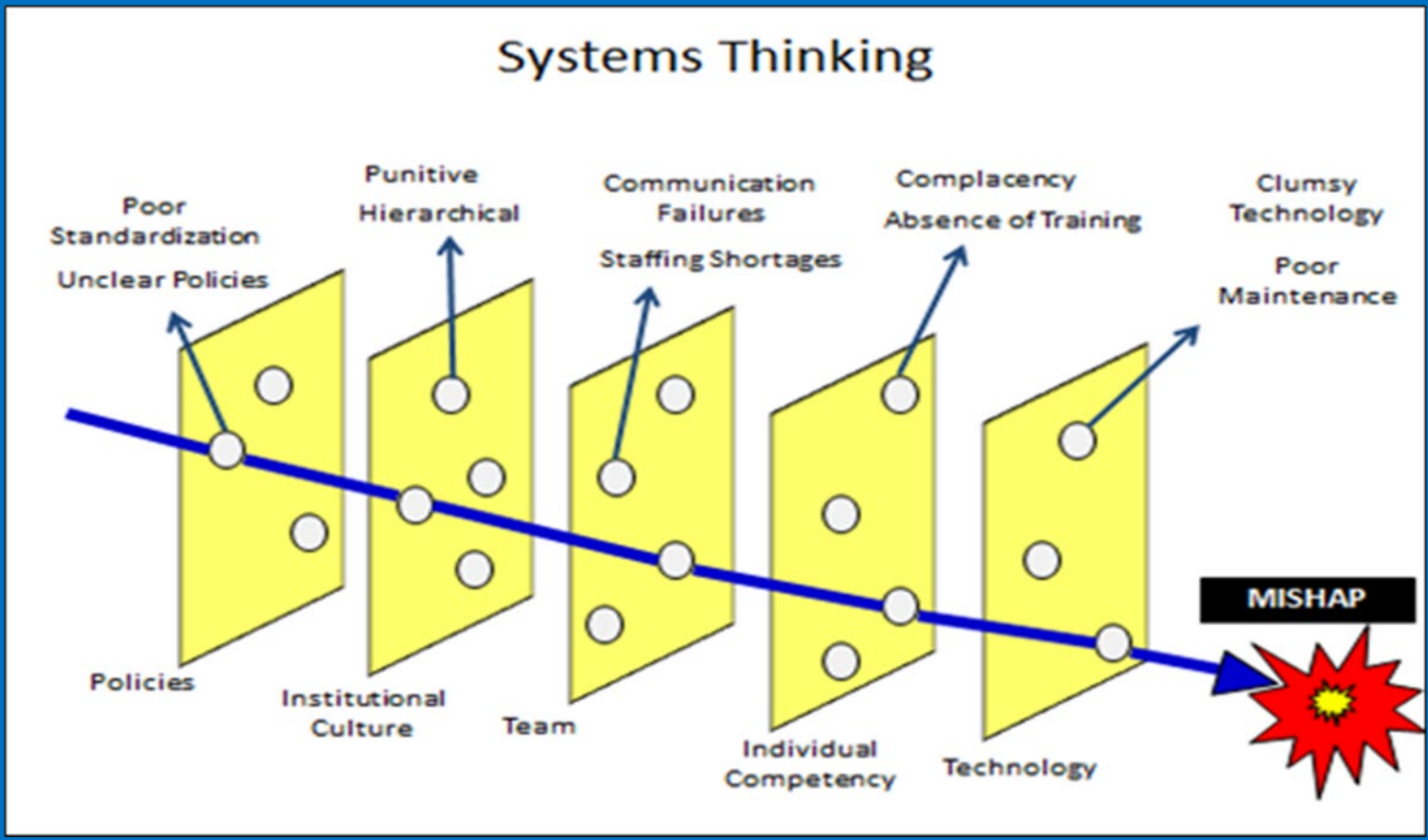
Intensive Care Unit



Nurse working in ICU. Digital Image. 2021.
<https://www.abc.net.au/news/2021-09-19/ballarat-covid-delta-outbreak-victoria-small-towns-worried/100471902>.



Systems Engineering and Systems Thinking



Quick – Say the color, not the word

Pink

Yellow

blue

Orange

Black

green

Purple

Yellow

red

Orange

Blue

Red

Purple

Black

Yellow

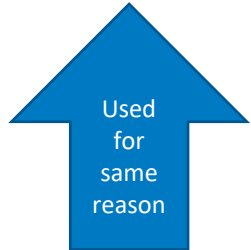
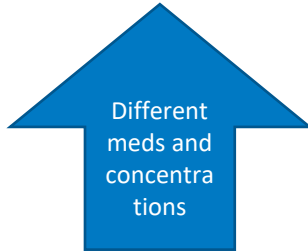
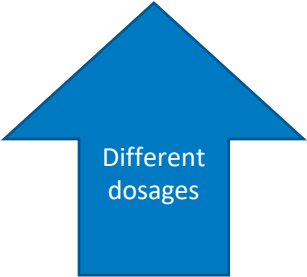


We see...what we expect to see

According to research at Cambridge University, it doesn't matter in what order the letters in a word are, the only important thing is that the first and last letter be at the right place. The rest can be a total mess and you can still read it without a problem. This is because the human mind does not read every letter by itself, but the word as a whole.



What do you see?



Putting it together

- **Positive:**

- Pattern identification, anticipation of outcomes, critical thinking

- **Negative:**

- Limitations of memory, time-constraints, multi tasking, ergonomics, sequencing, location of supplies

- **External factors:**

- noise, distractions/interruptions, task design, environmental conditions, practice norms

- **Internal factors:**

- fatigue, stress, anxiety, depression



But consider this...

- Research shows humans:
 - make 35,000 decisions *everyday!*
 - experience 3-6 errors every hour in “normal” conditions
 - can experience 11-15 errors per hour in “stressful, emergent, or unusual” conditions



Putting it together

- Apply human behavior, abilities, limitations, and other characteristics to design tools, equipment tasks, jobs, and environment for productive, safe, and effective human use.
- Designing systems to better “fit” the people in the system.
- “Fit”: “...system components are designed such that the people in the system can perform with a low probability of error, injury, illness, or stress and a high probability of productivity, quality, safety, and job satisfaction...”



Examples of Errors

- A bag of epidural pain medicine is administered through PIV line – IV bag and epidural bag looked the same AND the epidural bag had the functional ability to be connected to PIV catheter hub.
- Babies in NICU were given full dose heparin instead of low dose flushes – the two vials were identical and stocked next to each other in the automated dispensers at point of care.
- Patient experiences cardiac arrest; when code team arrives, they can not physically connect the defibrillator pads to the defibrillator itself – Multiple brands of defibrillators exist and differ in physical appearance. Hospitals may have various versions of defibrillators throughout house.



Examples/Ideas for Improvement

Exhibit 1 Examples of human factors and systems engineering (HF/SE) approaches to improving patient safety

Safety issue	HF/SE approach	Examples
Patient safety events and near misses	HF classification frameworks and methods for analyzing system factors that contribute to the events and near misses	Human Factors Analysis and Classification System (HFACS) (note 21)
Medication safety	Human-centered design of medication processes, such as prescription and administration	HF design principles and HF methods for safer design of order-prescribing interfaces (note 16) and code cart medication drawer (note 25)
Health care-associated infections	Analysis of system factors that contribute to the infections	Identification of work-system barriers and facilitators to adherence to contact isolation for patients with suspected or confirmed <i>Clostridium difficile</i> infection (note 17)
Patient falls	HF design of work systems for reducing inpatient falls	Human-centered design of fall prevention toolkit (note 19)
Patient identification	Human-centered design of identification armband	HF design of armband for improving patient identification by reducing number of visual scans required (note 20)
Patient safety in primary care	Work system analysis for patient safety	Efforts to counteract the “information chaos” experienced by primary care physicians that can lead to patient safety events (note 30)
Patient safety in home care	HF/SE analysis of medical devices and information technologies used in the home	Analysis of usability and system integration of hemodialysis technology (note 32) and infusion pump (note 33); HF design of consumer health information technologies for home use (note 31)
Patient safety in care transitions	Process analysis of transitions between hospital and home (note 37)	Description of transition process and safety vulnerabilities over multiple phases of care, especially for older adults (note 36)

SOURCE Authors' analysis. NOTE Note numbers in parentheses refer to references at the end of the article.

From: Carayon, P., Wooldridge, A., Hose, B.-Z., Salwei, M., & Benneyan, J. (2018). Challenges And Opportunities For Improving Patient Safety Through Human Factors And Systems Engineering. *Health Affairs*, 37(11), 1862–1869. <https://doi.org/10.1377/hlthaff.2018.0723>.



Culture of Safety Resources

- Institute for Healthcare Improvement – [Leading a Culture of Safety: A Blueprint for Success](#)
- Joint Commission Resources – [Patient Safety Initiative: Hospital Executive and Physician Leadership Strategies](#)
- [HealthCatalyst: A Framework for High-Reliability Organizations in Healthcare](#)
- [National Steering Committee for Patient Safety: National Action Plan to Advance Patient Safety](#)
 - Safer Together Report
 - Self-Assessment Tool
 - Implementation Resource Guide
- [Institute for Healthcare Improvement \(IHI\)](#)
- [Agency for Healthcare Research and Quality \(AHRQ\)](#)
- [ECRI Institute](#)



Human Factors Resources

- Video -- Human Factors and Systems Safety Engineering in Healthcare (Terry Fairbanks, Director of the National Center for Human Factors in Healthcare): <https://www.youtube.com/watch?v=5B3CYLye6vc>
- Article -- [Patient Safety: The Role of Human Factors and Systems Engineering](#)
- [Armstrong Institute Center for Health Care Human Factors at John Hopkins](#)
- [National Center For Human Factors In Healthcare at MedStar Health](#)



The other side of safety and errors

- Staff!
 - Supporting staff after an event
 - What resources are available?
 - Sometimes the hardest part of Patient Safety
- Second Victim
- Moral Injury



Supporting RN Staff Graphic. Digital Image. 2020.
<https://www.symplr.com/blog/the-most-important-element-of-patient-safety-is-usually-the-hardest-to-achieve>.



Where to start?

- Acknowledge we are all human!
- Identify and understand where you are now and where you would like to be – strategic planning
- Be open to new ideas, new ways of thinking, and new ways of doing things



Resources

- Connor, J., Madhavan, S., Mokashi, M., Amanuel, H., Johnson, N. R., Pace, L. E., & Bartz, D. (2020). Health risks and outcomes that disproportionately affect women during the Covid-19 pandemic: A review. *Social Science & Medicine*, 266, 113364. <https://doi.org/10.1016/j.socscimed.2020.113364>.
- Culture of Safety. Patient Safety Network. (2019, September 7). <https://psnet.ahrq.gov/primer/culture-safety>.
- Culture of Safety: An Overview. ECRI. (2019, October 28). <https://www.ecri.org/components/HRC/Pages/RiskQual21.aspx>.
- Gulati, M. (2021). Unconscious Bias in the Workplace. *Presentation, Texas Hospital Association*.
- High Reliability. Patient Safety Network. (2019, September 7). <https://psnet.ahrq.gov/primer/high-reliability>.
- Human Factors Engineering. Patient Safety Network. (2019, September 7). <https://psnet.ahrq.gov/primer/human-factors-engineering>.
- Krevat, S. and Miller, K. (2022). Demonstrating the Application of Human Factors and Systems Safety Principles: Thinking Differently about Patient Safety. *Presentation, IHI Patient Safety Congress*.
- Manfuso, J. (2019, July 25). Human Factors in Health Care: Center for Health Care Human Factors. Human Factors in Health Care | Center for Health Care Human Factors. https://www.hopkinsmedicine.org/armstrong_institute/centers/human_factors_engineering/human_factors_in_health_care.html.
- Pennsylvania Patient Safety Authority. (2007). Drug Labeling and Packaging—Looking Beyond What Meets the Eye. *PA PSRS Patient Saf Advis*, 4(3):69,73-7.
- Pronovost, P., Ravitz, A., & Grant, C. (2017, February 9). How Systems Engineering Can Help Fix Health Care. *Harvard Business Review*. <https://hbr.org/2017/02/how-systems-engineering-can-help-fix-health-care>.
- Resnick, R. (2020, January 14). There's Much Work to Be Done: 8 Medical Errors Statistics to Know. *Blog*. <https://blog.cureatr.com/theres-much-work-to-be-done-8-medical-errors-statistics-to-know>.
- Rivera, A. J., & Karsh, B.-T. (2008). Human Factors and Systems Engineering Approach to Patient Safety for Radiotherapy. *International Journal of Radiation Oncology*Biophysics*Physics*, 71(1), 174–177. <https://doi.org/10.1016/j.ijrobp.2007.06.088>.
- Ryan, J. (2005). Systems Engineering: Opportunities for Health Care. In Reid, P.P., Compton, W.D., Grossman, J.H., et al., *Building a Better Delivery System: A New Engineering/Health Care Partnership*. National Academies Press (US).
- Second Victim Experience. Center for Patient Safety. (n.d.). <https://www.centerforpatientsafety.org/second-victims/>.
- Valdez, R. S., Brennan, P.F. (2009). Background Report -- Industrial and Systems Engineering and Healthcare: Critical Areas of Research. Prepared for Agency for Healthcare Research and Quality (AHRQ) U.S. Department of Health and Human Services.
- Weaver, S. J., Lubomski, L. H., Wilson, R. F., Pfoh, E. R., Martinez, K. A., & Dy, S. M. (2013). Promoting a Culture of Safety as a Patient Safety Strategy. *Annals of Internal Medicine*, 158(5_Part_2), 369. <https://doi.org/10.7326/0003-4819-158-5-201303051-00002>.



Thank you!



Patient Safety Word Cloud. Digital Image. n.d. https://www.cmpa-acpm.ca/serve/docs/ela/goodpracticesguide/pages/patient_safety/Just_culture/just_culture_safety-e.html.

