4.1 Introduction to Human Factors in Patient Safety

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Objectives

• Define human factors and ergonomics (HFE) is and its objectives

• Introduce Human Factors Ergonomics (HFE) and discuss the role of HFE in patient safety

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What is Human Factors Ergonomics?

MEA

International Ergonomics Association defines human factors (ergonomics) as "the scientific discipline concerned with the

"the scientific discipline concerned with the understanding of <u>interactions</u> among humans and other elements of a system, and the profession that applies <u>theory</u>, <u>principles</u>, <u>data</u> <u>and methods</u> to <u>design</u> in order to <u>optimize</u> human well-being and overall system performance."

Goal(s) of HFE

Making the human interaction with systems one that – Enhances performance

- Increases safety
- Increases user satisfaction
- Trade-offs between multiple goals

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HFE is NOT

- Common sense
- Checklists or guidelines
- Limited to correct labeling or design of a device
- Designing solutions based on only what users say they need

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Cognitive Ergonomics

Relevant topics
 Mental workload
 Decision-making
 Human-computer interaction
 Training



- Examples of Application to Health Care
 Usability of health information technologies and
 medical devices
 Designing training systems
- Examples of Application to Patient Safety
 Designing an event reporting system
 Creating and implementing incident analysis
 processes

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- Organizational Ergonomics (Macroergonomics) • Relevant topics • Communication • Crev resource management • Tearwork • Job design • Participatory design

- Examples of Application to Health Care
 Designing health care jobs for reducing stress and burnout and improving satisfaction and retention
 Implementing improvement activities that consider
 HFE principles of teamwork and participation
- Examples of Application to Patient Safety
 Implementing crew resource management training in surgery teams
 Designing work schedule for reduced fatigue and enhanced performance



Scope of HFE

- Human- Information Display/ Machine interaction
- Human Environment interaction
- Human Job Interaction
- Human Organization Interaction
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System approach

 Multiple faults that occur together in an unanticipated interaction, creating a chain of events in which the faults grow and evolve.
 Countermeasures: based on the assumption that though we cannot change the human condition, we can change the conditions under which humans work (e.g., system defenses).

To Err is Human- Building a Safer Health System, Committee on Quality of Health Care in America, Institute of Medicine, 2000.

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What is a Poorly Designed System?

· One that Does not match the needs of human being or task

Does not take into account human limitations (perception, memory, anthropometrics).

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System approach

Two principles:

• Same set of circumstances can provoke similar errors, regardless of the people involved.

• Safety is seriously impeded if an organization does not seek out and remove the error provoking properties within the system at large.

	Human error	4
 What is an error? The aliure of a planned action to be completed as intended (e.g., error of execution) or the use of a wrong plan to achieve an aim (e.g., error of planning). Active failures (sharp end) Occur at the level of the frontine operator, and their effects are felt almost immediately. Latent conditions (blunt end) Translate into error provoking conditions within the local workplace (for compressing, undequate equipment, fatigue, and inexperience) Or create long-lasting holes or weaknesses in the defenses (untrustworthy alarms and indicators, unworkplace) 		
- Reason, J. BMJ 2000;320:768-77 - To Err is Human- Building a Safer Medicine, 2000.	0 Health System, Committee on Quality of Hea	Ith Care in America, Institute of
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Components and Elements of SEIPS Model Environment Person • Nayout • Education, skills and knowledge • Layout • Motivation and needs • Noise • Physical characteristics • Ughting • Psychological characteristics • Ughting • Organization • Work station design Work station of Organization Teamwork Coordination, collaboration and communication Organizational culture and safety culture Work schedules Social relationships Supervisory and management style Performance evaluation, rewards and incentives

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Components and Elements of SEIPS Model

- Technologies and tools Various information technologies: electronic health record, computerized provider order entry, bar coding medication administration, etc. Medical devices Human factors characteristics of technologies and tools (e.g., usability)

- Tasks

 Variety of tasks

 Job content, challenge and utilization of skills

 Autonomy, job control and participation

 Job demands (e.g., workload, time pressure, cognitive load, need for

 Transform

Components and Elements of SEIPS Model

Processes • Care processes • Other processes: information flow, purchasing, maintenance, cleaning • Process improvement activities

Employee and organizational outcomes -Job satisfaction and other attitudes -Job stress and burnout -Employee safety and health -Turnover -Organizational health (e.g. profitability)

Patient outcomes • Patient safety • Quality of care • Healthcare acquired infections, Health Care

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Individual and the SEIPS model

- Design/ redesign health care systems to enhance performance of individual and to minimize the negative consequences on the individual, hence the organization
- Goal: (Re)design a health care system to make it "easy to do things right and hard to do things wrong."

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Application of the SEIPS Model to IT

- Assess health care systems, processes, and outcomes to develop system redesign interventions
 - Open-ended questions to staff Shadowing of care providers
 Review of hardware

 - Review of training
 - Review of error reports

Design intervention(s) using a participatory approach and evaluate

Staff Questionnaire

- What do you think are the main issues related to quality of patient care and patient safety in your use of HIT?
- Please think of instances in the past year when you feel your performance was challenged or below par due to problems in HIT "system". Please briefly describe any such instance(s) you experienced by explaining the situation and what you think caused it?
- Please think of instances in the past year when you feel your performance was exceptional. Please briefly describe any such instance(s) you experienced by explaining the situation and what you think caused it.

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Patient Shadowing



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Summary

- Define human factors and ergonomics (HFE) is and its objectives
- Introduce Human Factors Ergonomics (HFE) and discuss the role of HFE in patient safety