Addressing Chaos in Work and Improving Patient Safety with the SEIPS Model

Theresa Frei, RN, MBA
Chair, CAPSAC

California
Patient Safety Action Coalition
CAPSAC

“Finally, systems-engineering knowhow must be propagated at all levels;

PCAST recommends that the United States build a health-care workforce that is equipped with essential-systems engineering competencies that will enable system redesign.

Implementation of these strategies bears potential not only to improve the efficiency of care delivery, but also to improve its quality. PCAST hopes that this report will provide a framework that helps the Administration achieve these aims as it proceeds with ACA implementation.”

……the President’s Council of Advisors on Science and Technology

Objectives

- Describe the System Engineering Initiative for Patient Safety (SEIPS) framework for proactive and reactive system design
- Review recent survey outcomes on Newly Licensed Registered Nurses and Physicians in Group Practice
- Provide information on the collaboration between the CAPSAC and the SEIPS Program

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Acknowledgements

- Pascale Carayon, Ph.D., Center for Quality and Productivity Improvement; Department of Industrial and Systems Engineering, University of Wisconsin-Madison: Presentation to July 2014 CAPSAC Membership
- SEIPS 2.0: a human factors framework for studying and improving the work of healthcare professionals and patients; Holden, et al *Ergonomics* 2013
- RN Work Project 2012; a national study of new nurses, focusing on career changes and work attitudes; New York University, Christine T. Kovner, PhD, RN FAAN; Carol S. Brewer, PhD, RN, FAAN Distinguished Professor

http://cqpi.engr.wisc.edu/

Human Factors and Systems Engineering to Improve Patient Safety

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THE UNIVERSITY of WISCONSIN MADISON

In 1985…

- CQPI was created by Professors George Box and Bill Hunter.
- Tradition of community involvement

April'2010
Celebration of 25th anniversary of CQPI

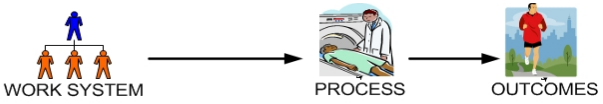
http://cqpi.engr.wisc.edu/

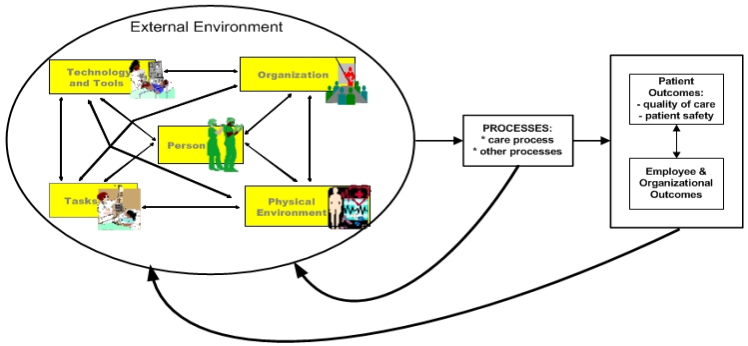
CQPI Today…

SEIPS or Systems Engineering Initiative for Patient Safety

Originally funded by AHRQ in 2001:

- Developmental Center for Education and Research in Patient Safety
- 1 out of 18 centers funded
- Only center in engineering





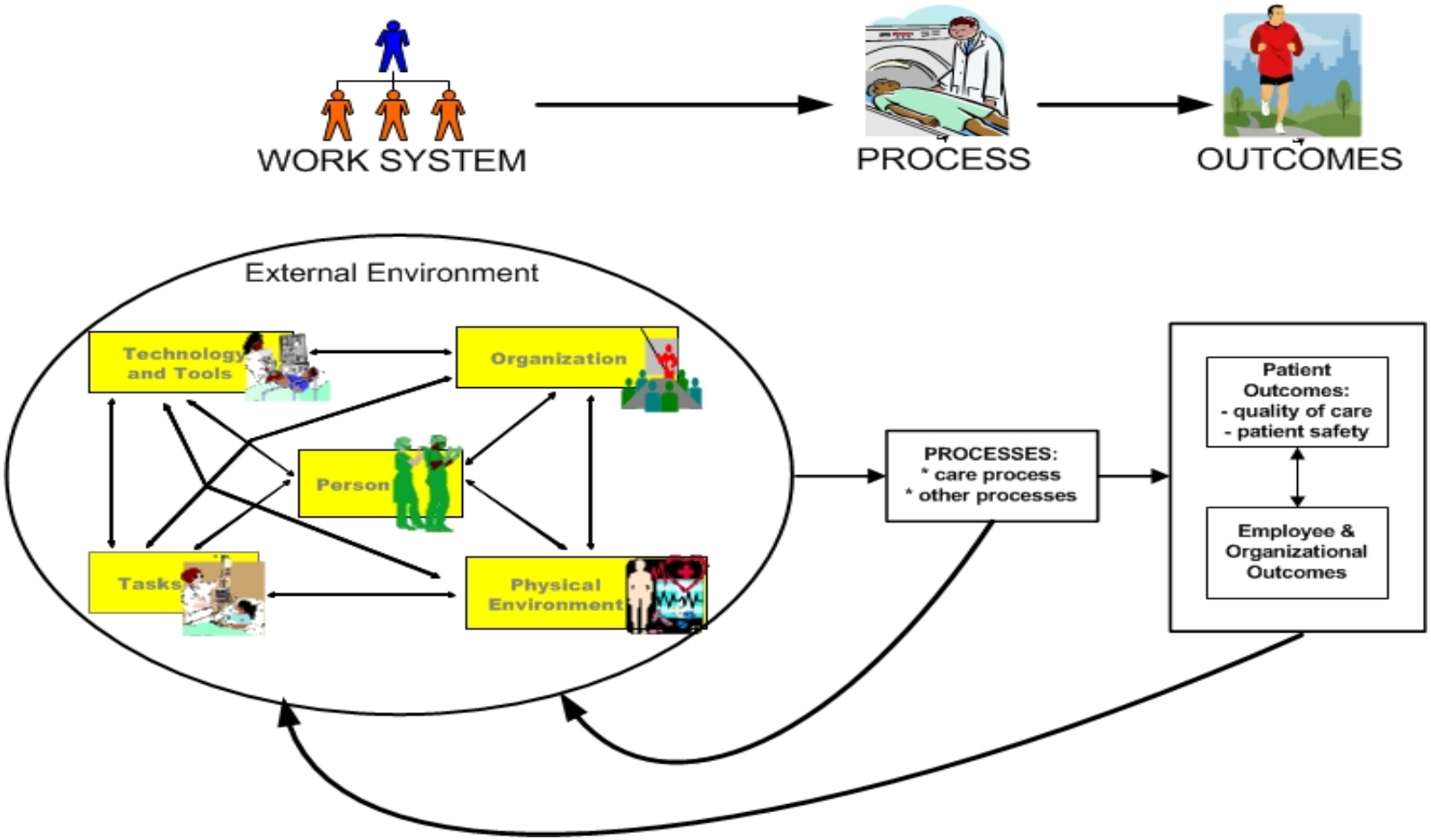
Why don't people do a good job?

Why do people keep making mistakes?

… because of the poor design of work systems

SEIPS Systems Engineering Initiative for Patient Safety

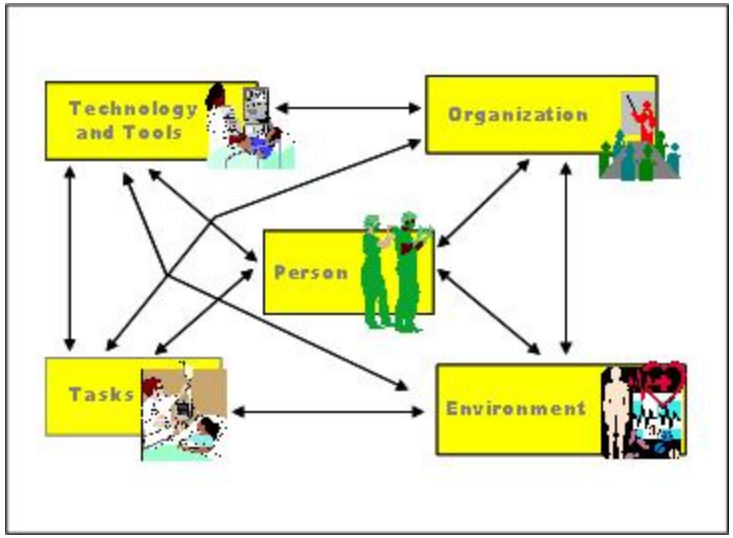
SEIPS Model of Work System and Patient Safety



Carayon, P., Hundt, A.S., Karsh, B.-T., Gurses, A.P., Alvarado, C.J., Smith, M. and Brennan, P.F. (2006) *Quality & Safety in Health Care*
Carayon, P., Wetterneck, T.B., Rivera-Rodriguez, A.J., Hundt, A.S., Hoonakker, P., Holden, R. and Gurses, A.P. (2014) *Applied Ergonomics*

Human Factors and Ergonomics

- System from the viewpoint of users
- Users have physical, cognitive and psychosocial needs
- User-centered design



HFE sub-disciplines & topics

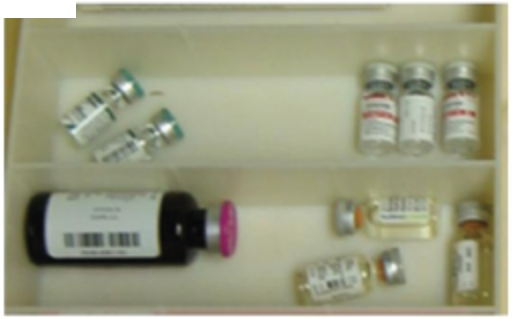
- **Physical ergonomics**
  - Working postures, materials handling, repetitive movements, work-related musculoskeletal disorders, workplace layout, safety and health.
- **Cognitive ergonomics**
  - mental workload, decision-making, skilled performance, human-computer interaction, human reliability, work stress and training as these may relate to human-system design.
- **Organizational ergonomics**
  - optimization of sociotechnical systems, organizational structures, policies, and processes, teamwork, scheduling, coordination/ communication

- Usability
- Mental workload
- Situation awareness
- Human-automation interaction
- Alerts
- Lifting
- Training
- Teamwork
- Information processing
- Naturalistic decision making
- Handoffs
- Interruptions and distractions
- Violations or work-arounds
- Human error
- Safety
- Job stress

Faster; better visibility, usability and organization

A

HFE Design



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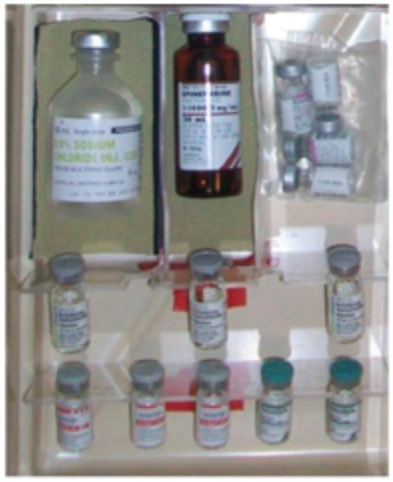


B

(Rousek & Hallbeck, 2011)

ICU Displays

Fig. 1 – Graphical display that contains trending and configural display information.

Anders et al. (2012)

Koch et al. (2013)

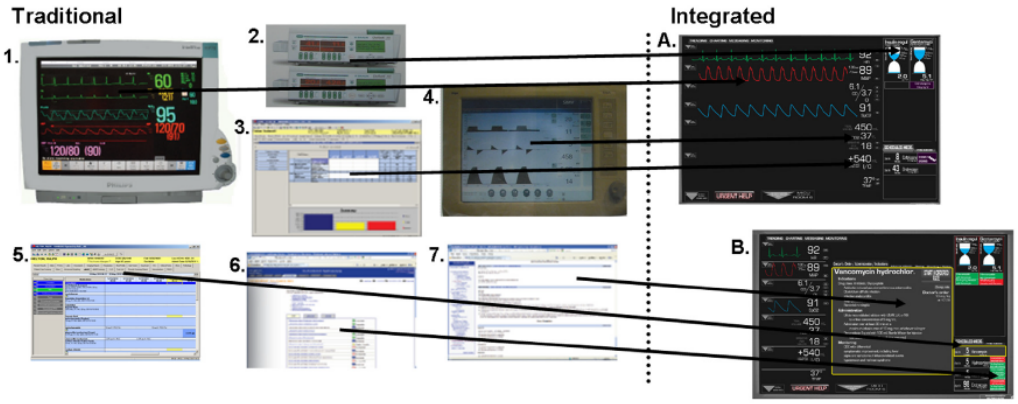
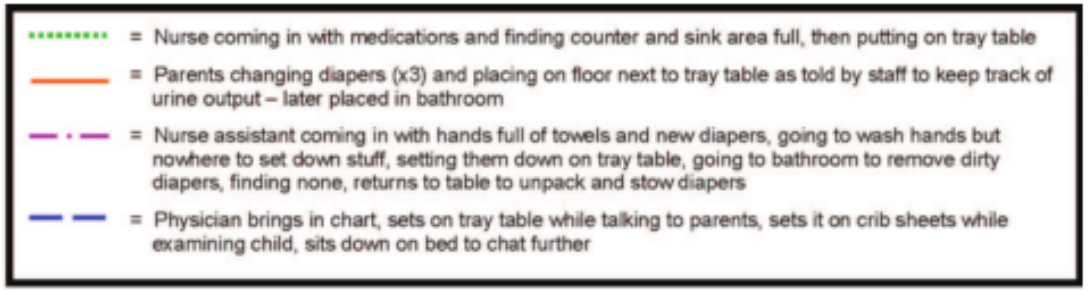


Fig. 3 – Example screens of the traditional display (Traditional) in comparison with the integrated display (Integrated) – arrows indicate the new location of the information. *Traditional*: Devices are (1) patient monitor, (2) infusion pumps, (3) electronic medical record, (4) ventilator control panel, (5) fluid balance, (6) adverse effects, and (7) medication compatibility *Integrated*: On the integrated display, related information is displayed in close proximity. (A) Nurses see an overview of the patient's vital signs, currently administered and scheduled medication, essential ventilation data, and fluid balance. (B) When selecting a medication they see medication compatibility with the other current and scheduled medication, and potential adverse effects.



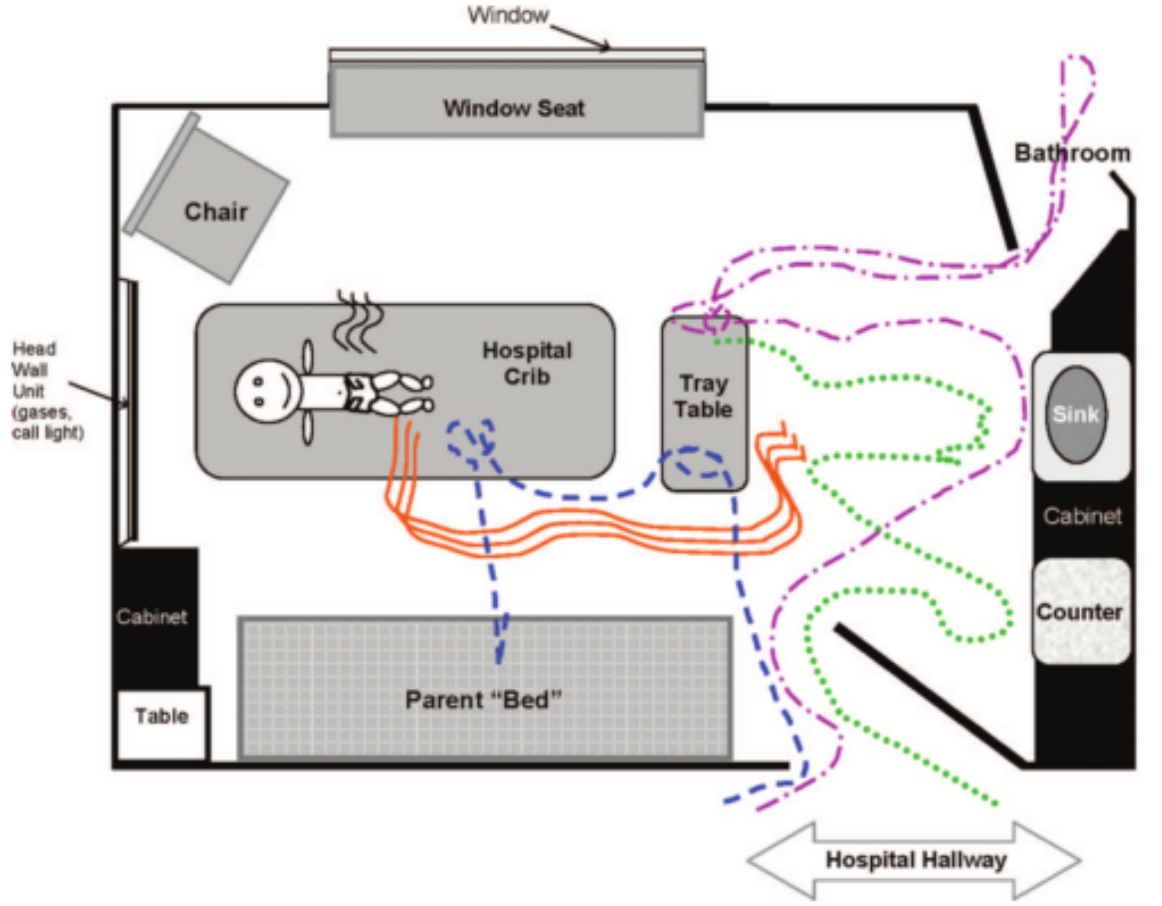
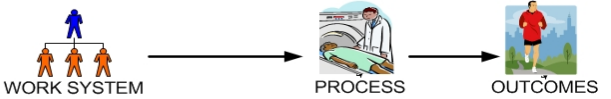
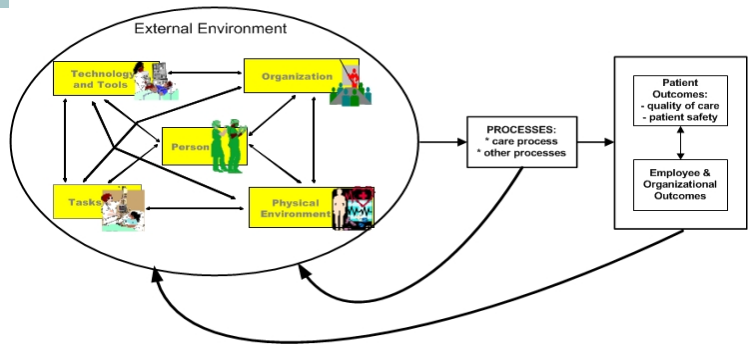


Figure 2. Workflow negatively impacted by room design. Reprinted with permission from Gosbee and Gosbee (59).



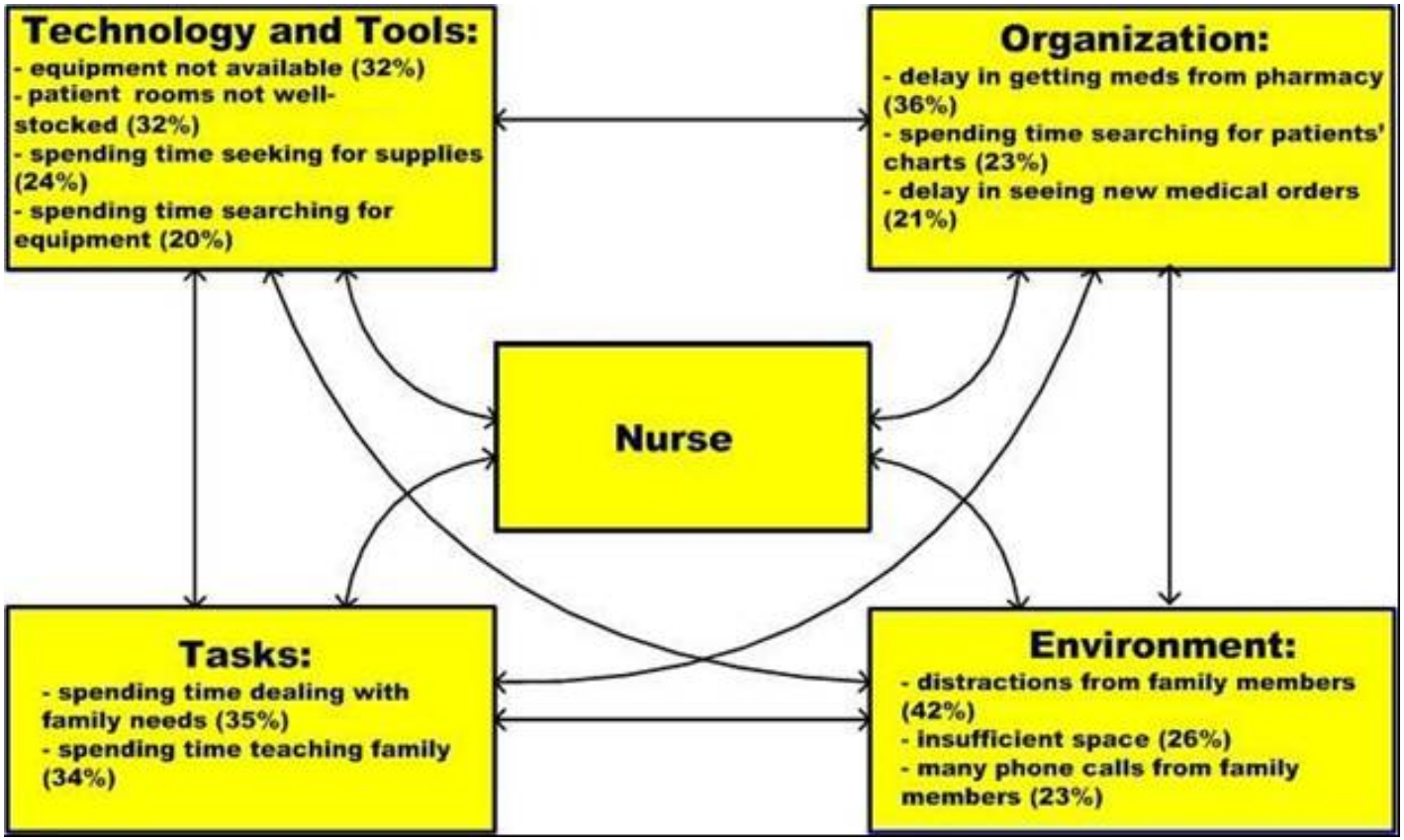


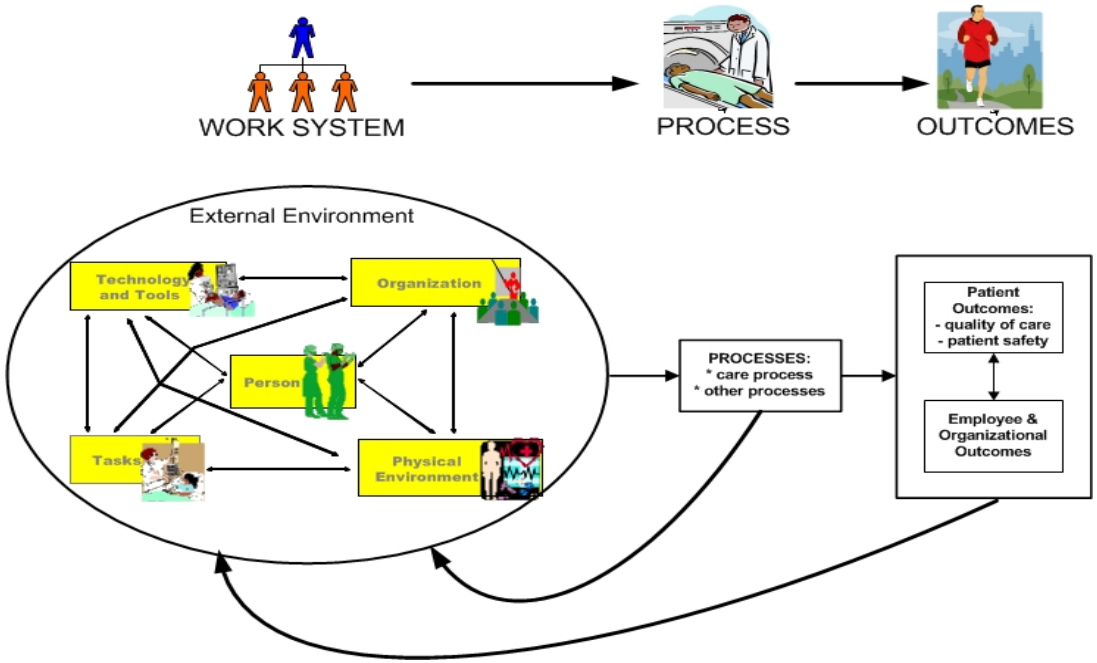
(Anderson et al., 2010)

Workload Awareness

Performance obstacles reported by ICU nurses

(Gurses & Carayon, 2007)





Need to understand work systems

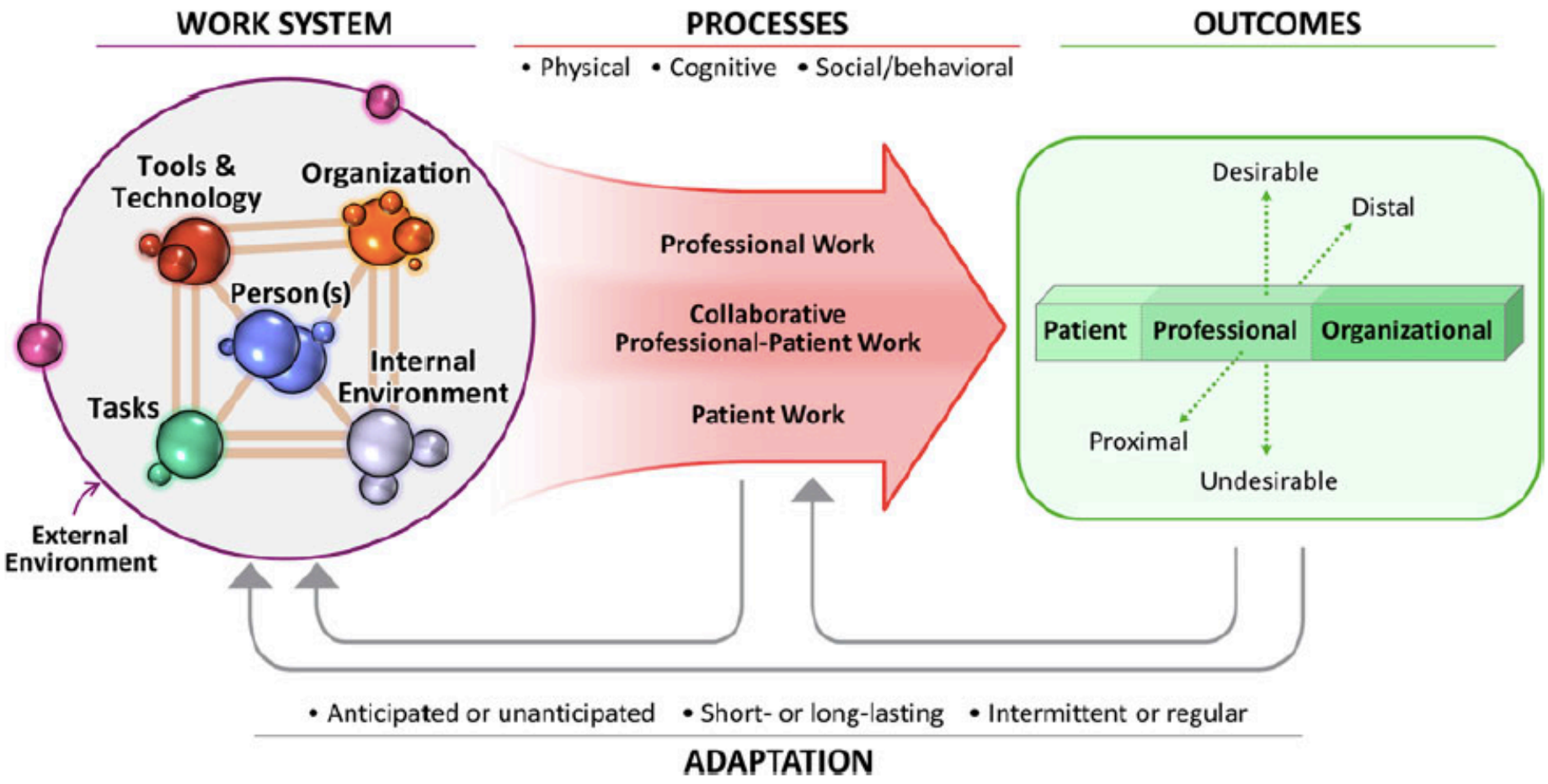
Systems in which they work

Systems in which they work


Who are the ‘users’?

SEIPS 2.0 Principles

- System Orientation
- Person Centeredness
- Design-Driven Improvements



- Holden, R.J., Carayon, P., Gurses, A.P., Hoonakker, P., Hundt, A.S., Ozok, A.A. and Rivera-Rodriguez, A.J. (2013) *Ergonomics*

How Are We Doing on Person Centeredness?

RN Work Project

Unsafe, poorly managed and poorly equipped work environments hold Newly Licensed RNs back

- 25% reported at least one on-the-job needle-stick
- 39% reported at least one strain or sprain
- 21% reported a cut or laceration
- 46% reported a bruise or contusion
- 62% reported verbal abuse

RN Work Project

NLRNs work long hours

- Almost 13% worked mandatory overtime
- 51% worked voluntary overtime

NLRNs don't leave nursing, but they do leave their employers

- 41% planned to leave their first job within 3 years
- 18.1% left their first nursing job within 13 months of starting
- 26.2% left their first nursing job within 25 months of starting

Why do NLRNs leave their first job?

- Top 3 professional reasons: poor management, stressful work, wanting experience in another clinical area
- Top 3 personal reasons: moving to a different geographic area, partner takes a job elsewhere, compatible school schedule

American Medical Group Association Physician Satisfaction Survey- 2014

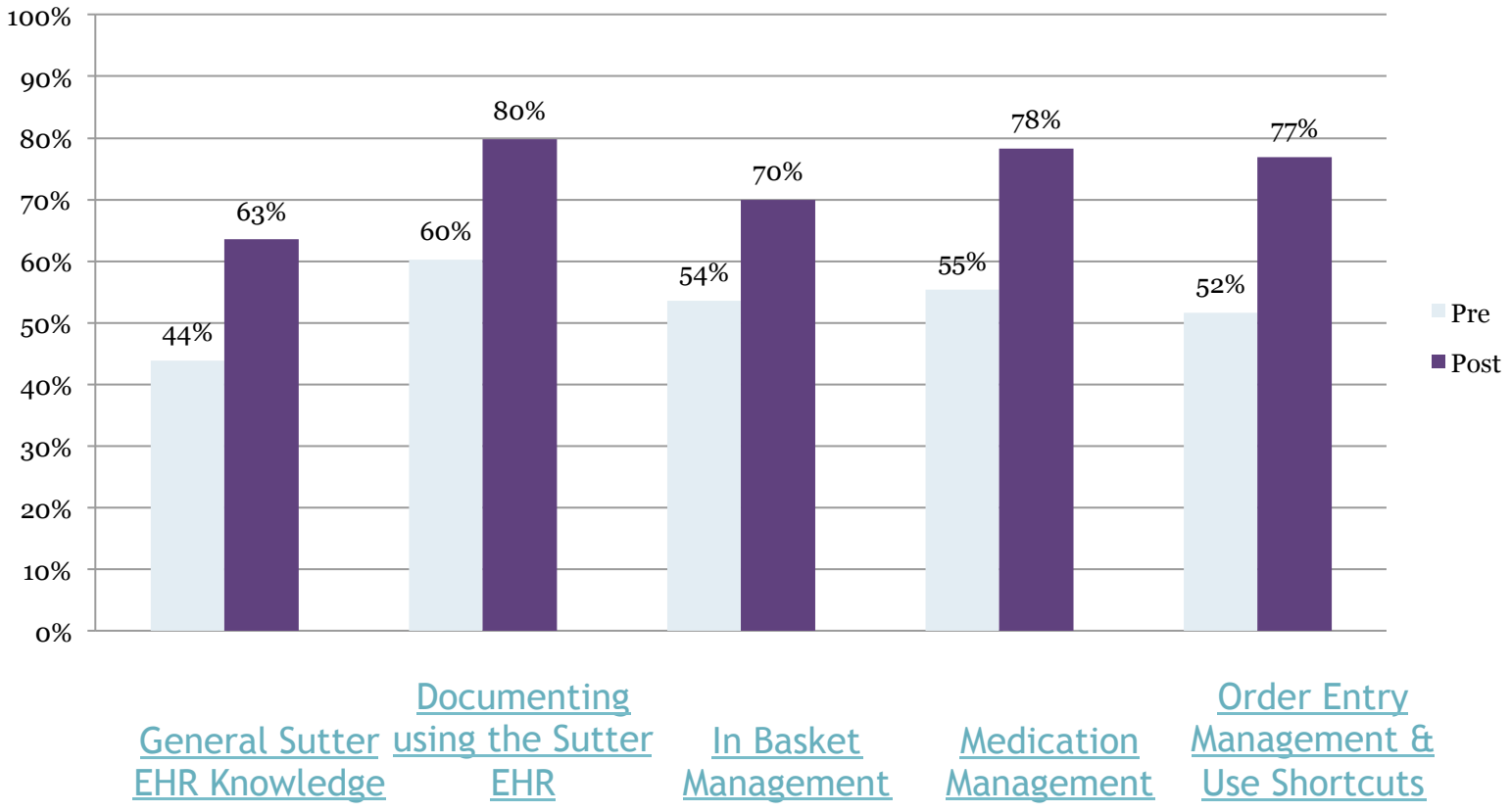
Quality Care	% Very Satisfied
Quality of care you are able to provide	60%
Your ability to obtain specialty referrals whenever you feel they are necessary	45%
Your ability to prescribe the medications you want	42%
Your ability to obtain tests or procedures for patients whenever you feel they are necessary	47%
Your ability to refer patients to high quality specialist	50%

"Whoa—way too much information."

American Medical Group Association Physician Satisfaction Survey-2014

Time Spent Working	% Very Satisfied
Time you have available for your family and personal life	28%
Degree of control you have over your schedule	35%
Amount of time you spend working	24%
Amount of time you spend with each patient	32%
The volume of my patient load or panel size is reasonable	21%
Resources For Care	
Medical supplies are available when I need them	34%
I have sufficient exam room space to see my patients	44%
I have adequate equipment for office procedures	35%

Sutter Medical Group – Interventions Work!



CAPSAC And SEIPS

CAPSAC 2013- Confirmed Future Direction

- Continued partnership with CDPH on discussing regulations to increase reporting
- Education and assessment of human factors in our processes
  - Decrease harm related to human error
  - Increased ratio of reports not resulting in harm
- Improve communication related to errors/ omissions
- Engagement of the public to better understand the role of human error in patient safety

California Patient Safety Action Coalition
CAPSAC

CAPSAC-- 2014

- CAPSAC's role is to provide a forum for organizations to address patient safety and leverage change across the healthcare continuum based on the principles of a fair and just culture.

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Three Pillars

- Provide opportunities for health care organizations to share best practices; and establish a mechanism for shared learning across organizations to minimize the same errors from occurring again.
- Educate regulatory agencies, legislators, consumers, healthcare providers, purchasers of healthcare, and the media.
- Serve as a resource to the Department of Public Health, the Center for Healthcare Quality, patient safety institutions, and professional licensing boards

Human Factors and Systems Engineering for Medication Safety

May 11-13; 2015

International Experts in Human Factors and Systems Engineering, Medicine and Patient Safety

Course on Human Factors and Systems Engineering for Medication Safety

This 2 ½ -day course for healthcare professionals presents internationally recognized speakers discussing a variety of Human Factors Engineering (HFE) and medication safety topics.

Day 1: Introduction to human factors engineering and its application to medication safety; Physical environment; Human factors analysis of medication use process

Day 2: Cognitive ergonomics; Technology design, implementation and usability; Case study

Day 3: Organizational design and resilience; Case study reporting; Moving forward with SEIPS approach

For course information email Theresa Frei at CAPSAC: FreiTh@sutterhealth.org

Sponsored by the California Patient Safety Action Coalition