2 *Human Factors & Patient Safety*

Objectives:

1. Define and describe the Human Factors and its relation to patient safety
2. Recognize the importance of applying human factors in healthcare
3. Summarize the impact of Human Factors on people's health and patient safety
4. Differentiate between the different types of Medical Errors
5. Describe several specific Actions to reduce medical errors as related to Humans Factors

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What are Human Factors?

Human factors refer to environmental, organizational and job factors, and human and individual characteristics which influence behavior at work in a way which can affect health and safety.
OR Anything that affects an individual's performance.

Aspects of Human Factors

The Job	The Individual	The Organization
Including: ● Nature of the task. ● Workload. ● Working environment. ❖ (This includes matching the job to the physical and the mental strengths and limitations of people).	**Including**: ● Competency. ● Skills (changeable). ● Personality, attitude (fixed). ● Risk perception. ● Sleep deprivation . ❖ (Individual characteristics influence behavior in complex ways).	**Including:** ● The culture of the workplace, resources Communications. ● Leadership and so on.

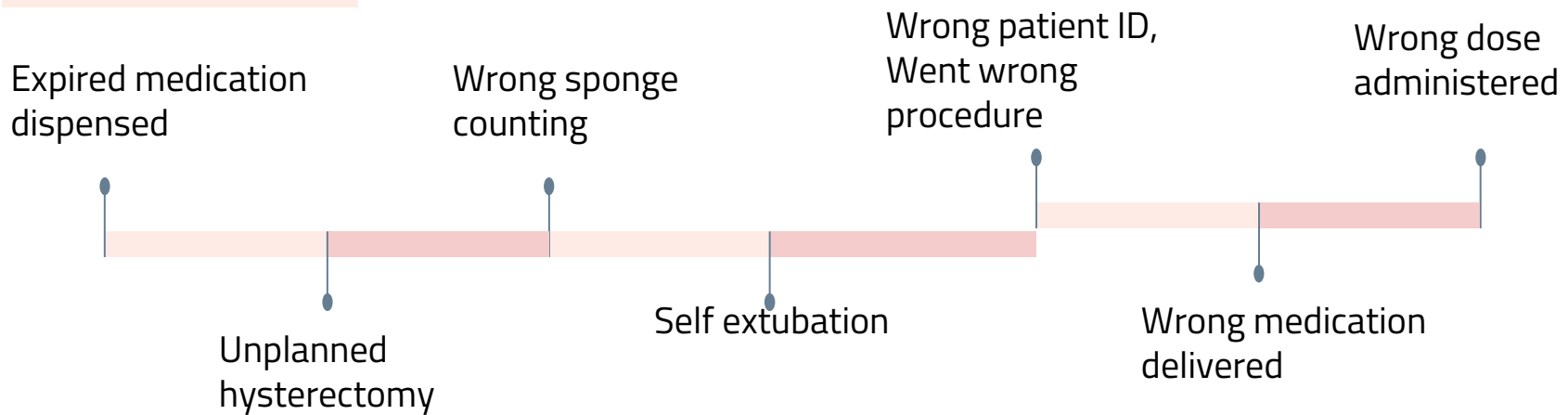# The Benefits of Applying Human Factors in Healthcare

- To prevent Medical Errors.
- Understand why healthcare staff make errors.
- Identify 'systems factors' threaten patient safety.
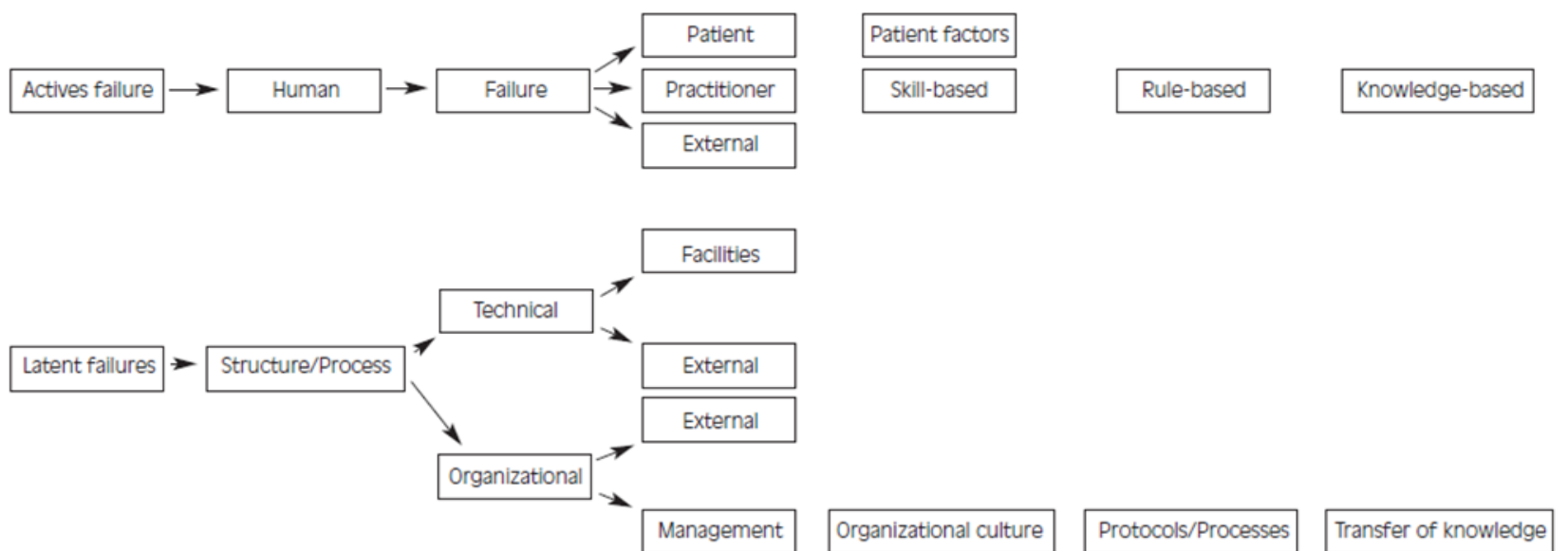- To prevent occupational accidents and ill health.

Medical Errors

Failure of a planned action to be completed as intended or the use of a wrong plan to achieve an aim.

Medical Errors:

Expired medication dispensed

Wrong sponge counting

Wrong patient ID, Went wrong procedure

Wrong dose administered

Unplanned hysterectomy

Self extubation

Wrong medication delivered

Sources of Error

Table I. Classification of causes (JCAHO - Joint Commission on Accreditation of Healthcare Organizations).

Actives failure →	Human →	Failure →	Patient
			Practitioner
			External

| | | | Patient factors | Skill-based | Rule-based | Knowledge-based |

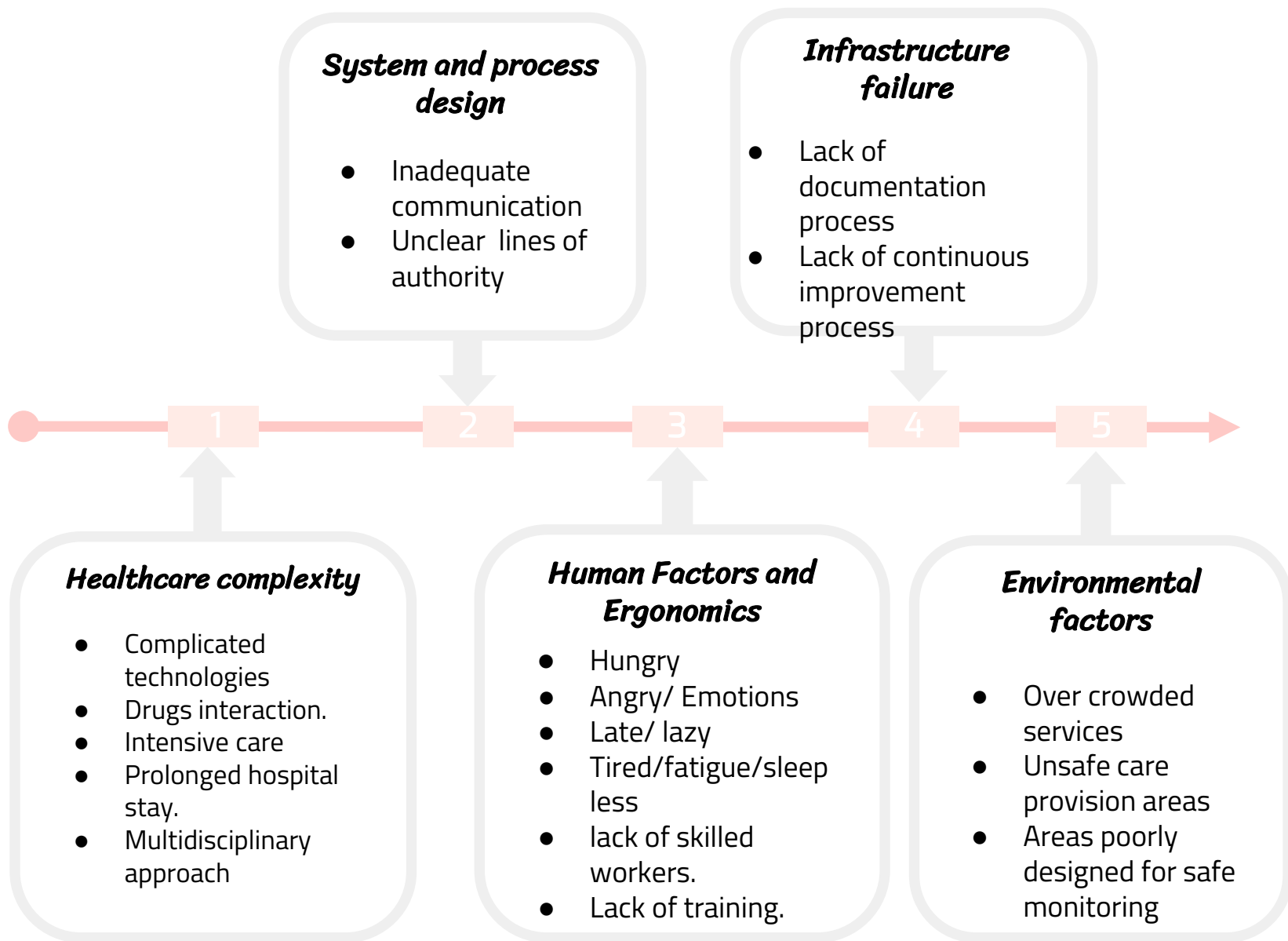| Latent failures ➤ | Structure/Process → | Technical → | Facilities |
			External
			External
		Organizational →	Management	Organizational culture	Protocols/Processes	Transfer of knowledge

Modified from Chang et al., 2005 [5].

The Most Common Medical Errors

- Wrong Site Surgery (13.4%)
- Patient Suicide (11.9%)
- Operative and postoperative Complication (10.8%)
- Delay in Treatment (8.6%)
- Medication Error (8.1%)
- Patient Fall (6.4%)

Causes of Medical Errors

System and process design

- Inadequate communication
- Unclear lines of authority

Infrastructure failure

- Lack of documentation process
- Lack of continuous improvement process

1   2   3   4   5

Healthcare complexity

- Complicated technologies
- Drugs interaction.
- Intensive care
- Prolonged hospital stay.
- Multidisciplinary approach

Human Factors and Ergonomics

- Hungry
- Angry/ Emotions
- Late/ lazy
- Tired/fatigue/sleep less
- lack of skilled workers.
- Lack of training.

Environmental factors

- Over crowded services
- Unsafe care provision areas
- Areas poorly designed for safe monitoring

OVR(Occurrence Variance Reporting) or IR(Incident Reporting)

- **Occurrence** : An Occurrence is defined as any event or circumstance that deviates from established standards of care & safety.
- **OVR** : An internal form/system used to document the details of the occurrence/event and the investigation of an occurrence and the corrective actions taken.

Actions to Reduce Medical Errors as Related to Humans Factors

Making your care and work safer (individual level)	Organizational Management and Human Factors
Stress ● Focus first on the tasks that are high risk or where it is particularly important. ● In emergency situations: Use Algorithms and Protocols. ● Quickly allocate a clear leader. ● Consider if there is a way of running a simulation with your team.	**Developing a positive safety culture** ● Just culture ● Reporting culture (e-OVR Reporting system) ● Learning culture(Morbidity and mortality review process)
Complex calculations ● Find out if there is a pre-calculated list available in your area ● Before you start the task, think about ways of managing or avoiding distractions. For example, ask a colleague to take your bleep for a minute ● Look at the dose strengths of ampoules in your drug cupboard ● Double check with your colleague	● Human factors training in healthcare
Storage ● Look at the products you use and have stored. E.g Look-alike packaging	● Develop Clinical Practice Guidelines, Protocols, Algorithms.
Physical demands ● Physical tiredness :get enough sleeping before your duty ● Demands exceeding capability : Most people at some time overestimate their abilities or underestimate their limitations.	
Teamwork ● Briefing and debriefing can help teams develop a shared mental model of a planned procedure or a patient's clinical status ● SBAR (Situation, Background, Assessment, Recommendation)	
● Poor lighting Look at the lighting in the areas where you need to perform detailed or complex tasks	

Case Study

A child with a known penicillin allergy was prescribed and administered an intravenous dose of an antibiotic of the penicillin class 2.
A child was due to have a pacemaker fitted. On pre-admission an allergy to penicillin was recorded. This was noted on both the nursing admission assessment form and the anesthetic record chart. Prior to operation, the allergy was discussed with the specialist pediatric cardiology registrar, the consultant pediatric anesthetist, anesthetic specialist registrar and the cardiology consultant. However, following the procedure the patient's plan included intravenous and oral penicillin.

💡 How did this happen?

- There was no up-to-date protocol on what other antibiotics should be used if a pediatric cardiac patient has a penicillin allergy.
- There was no clear record of the allergy in the medical.
- No system was in place to prevent penicillin prescription when a known allergy was recorded.
- A number of appropriate checks were not followed prior to administration of the antibiotics.
- During independent checks, neither nurse checked allergy status, and both were under pressure to complete tasks.
- The patient's allergy band was on the same side as their identity band, both of which were covered with a bandage for an intravenous drip.

◄ Do you think the outcome could be quite different if human factors had been taken into account?
◄ How we can prevent such error by applying human factors in healthcare?

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