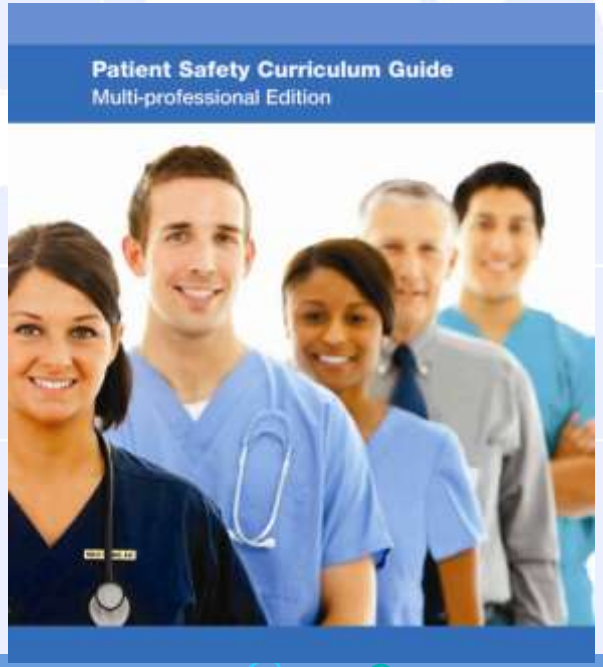
Topic 2

Why applying human factors is important for patient safety

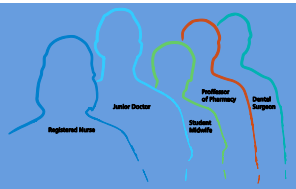


Learning objective

Understand human factors and its relationship to patient safety

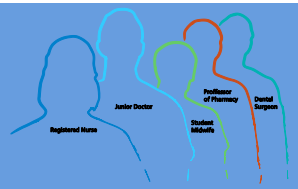
Knowledge requirements

- Know the meaning of the term human factors
- Understand the relationship between human factors and patient safety



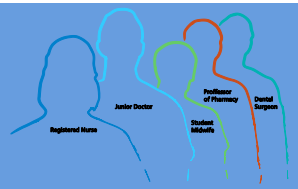
Performance requirement

Apply human factors thinking in the work environment



Human factors and ergonomics definitions

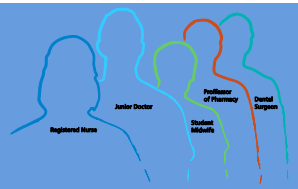
- The study of all the factors that make it easier to do the work in the right way
- Apply wherever humans work
- Also sometimes known as ergonomics



Human factors

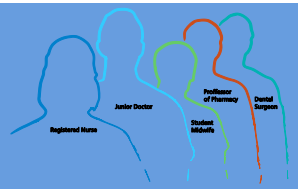
Importance of human factors has been recognized for a long time in:

- Aviation
- Manufacturing
- Military



Human factors: importance in health care

- Human factors only recently acknowledged as an *essential* part of patient safety
- A major contributor to adverse events in health care
- All health-care workers need to have a basic understanding of human factors principles

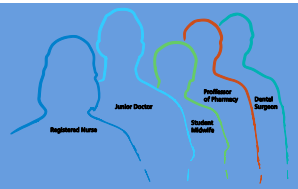


Human factors experts

- Design improvements in the workplace and the equipment to fit human capabilities and limitations

- Make it easier for the workers to get the work done the right way

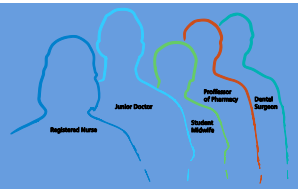
- Decrease the likelihood of errors occurring



The *range* of workers

Good human factors design in health care accommodates *the entire range of workers*

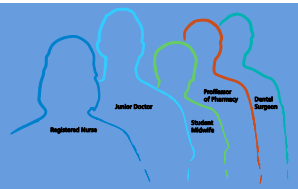
- Not just the calm, rested experienced clinician
- But also the inexperienced health-care workers who might be stressed, fatigued and rushing



Examples

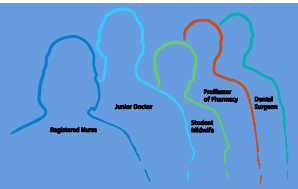
- Prescribing and dispensing
- Hand-over/hand-off information
- Move patients
- Order medications electronically
- Prepare medication

If all of these tasks become easier for the health-care provider, then patient safety can improve



Examples of traps in health care?

- Look-alike and sound-alike medications
- Equipment design complexity
  e.g. infusion pumps

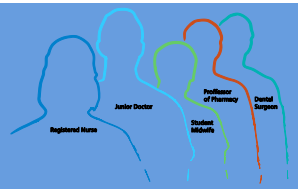


Avoidable confusion is everywhere…

Health care is increasingly complex

Human factors

- Acknowledges:
  - The universal nature of human fallibility
  - The inevitability of error
- Assumes that errors will occur
- Designs things in the workplace to try to minimize the likelihood of error or its consequences



Human factors design principles

Psychomotor

- Hands

Senses

- Vision
- Hearing

I N T E R F A C E

Input Devices

- Buttons

Output

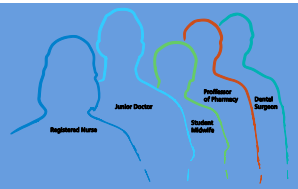
- Display
- Sound

US Department of Veteran affairs

We cope quite well with complexity

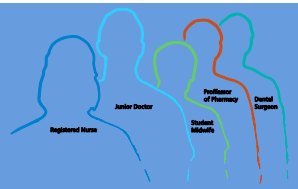
Health-care workers are quite good at compensating for some of the complex and unclear design of some aspects of the workplace

- Equipment
- Physical layouts



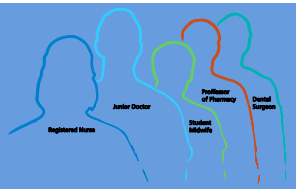
Because the human brain is ….

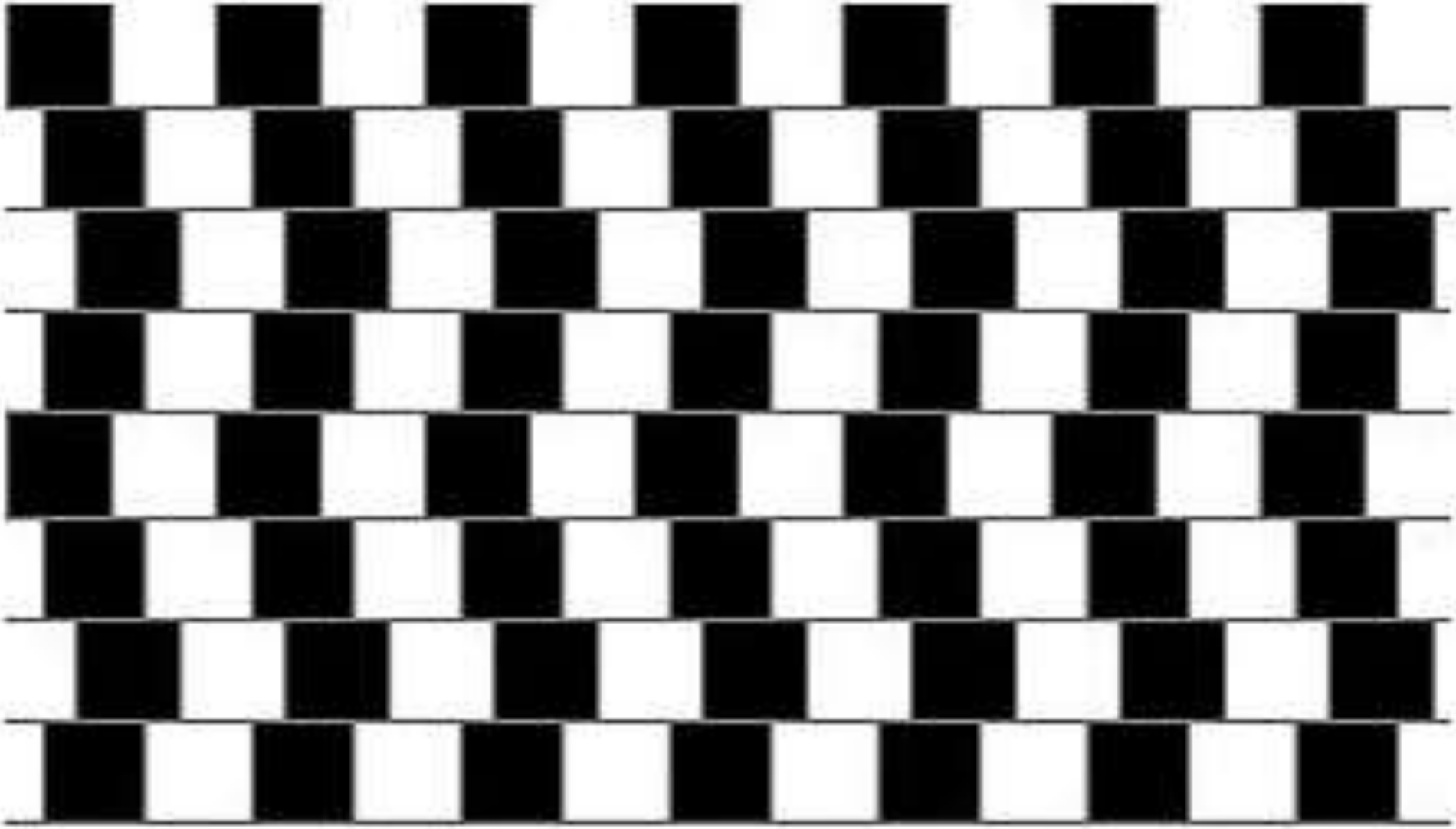
- very powerful
- very flexible
- good at finding shortcuts (fast)
- good at filtering information
- good at making sense of things



Sometimes our brain

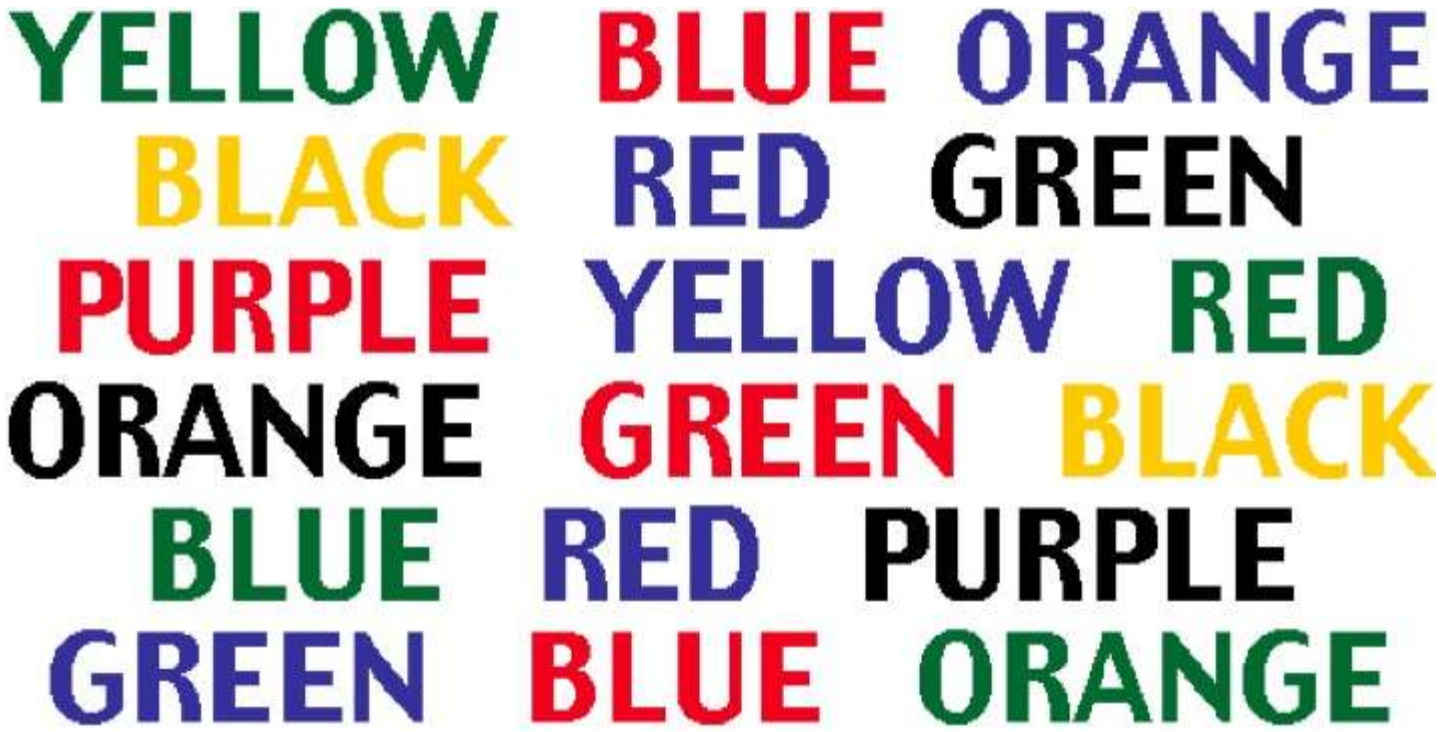
can play 'tricks' on us…





Are the lines crooked or straight?

Optillusions.com



Look at the chart

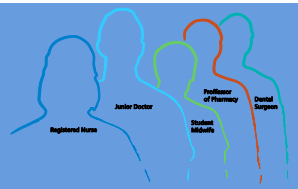
Say the *colour* of the word, not the word itself

Why is it hard?

Source: Optillusions.com

Decisions and actions can be flawed…

The fact that we can misperceive situations despite the best of intentions is one of the main reasons that our decisions and actions can be flawed such that "silly" mistakes are made.

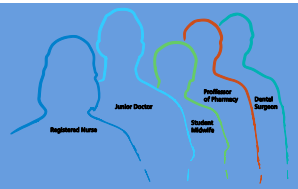


Human beings make "silly" mistakes

Regardless of their experience, intelligence, motivation or vigilance, people make mistakes

Activity

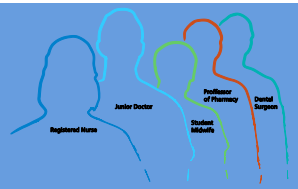
Think about and then discuss with your colleagues any "silly" mistakes you have made recently when you were *not* in your place of work or study - and why you think they happened.



The context of health care

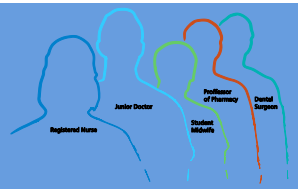
When errors occur in the workplace the consequences can be a problem for the patient

- A situation that is relatively unique to health care



One definition of “human error” is “human nature”

Error is the *inevitable* downside of having a brain!

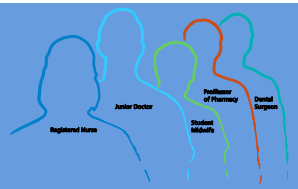


What is an error?

- The failure of a planned action to achieve its intended outcome
- A deviation between what was actually done and what should have been done

James Reason

A definition that may be easier to remember is: 'Doing the wrong thing when meaning to do the right thing.'

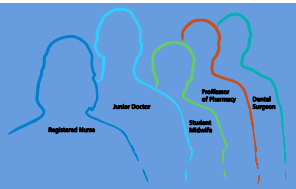


Situations associated with an increased risk of error

- unfamiliarity with the task*
- inexperience*
- shortage of time
- inadequate checking
- poor procedures
- poor human equipment interface

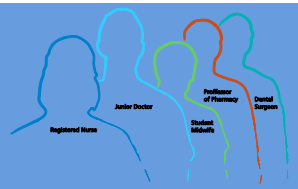
Charles Vincent

** Especially if combined with lack of supervision*



Individual factors that predispose to error

- Limited memory capacity
- Further reduced by:
  - Fatigue
  - Stress
  - Hunger
  - Illness
  - Language or cultural factors
  - Hazardous attitudes



Fatigue

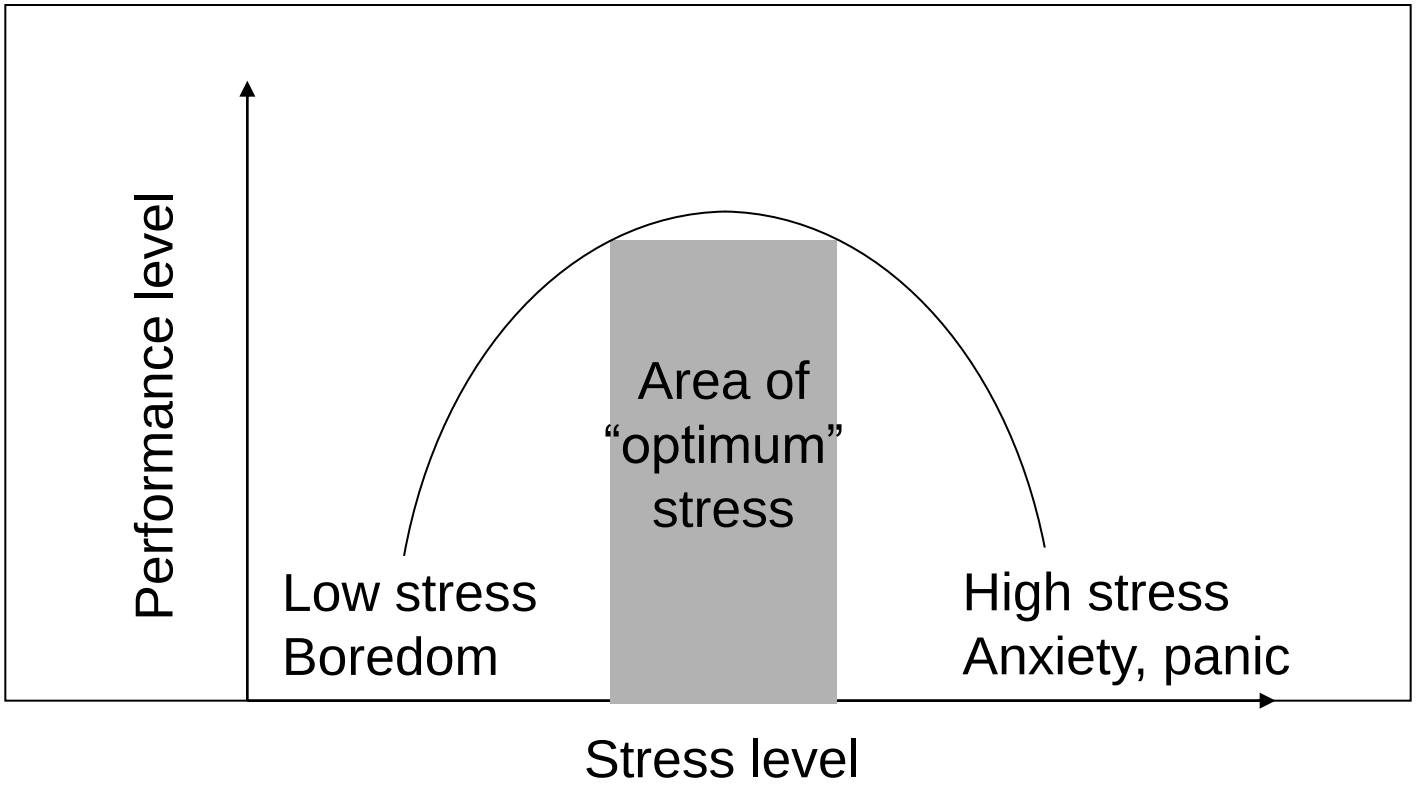
24 hours of sleep deprivation has performance effects

~

blood alcohol content of 0.1%

Source: D. Dawson, Nature, 1997

Stress and performance



The relationship between stress and performance

Source: Yerkes, R. M., & Dodson, J. D. (1908) The relation of strength of stimulus to rapidity of habit-formation. Journal of Comparative Neurology and Psychology, 18, 459-482

Don’t forget ….

If you’re

- **H**ungry
- **A**ngry
- **L**ate

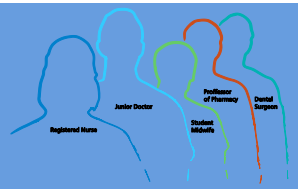
  or
- **T**ired …..

H

A

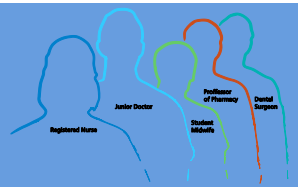
L

T



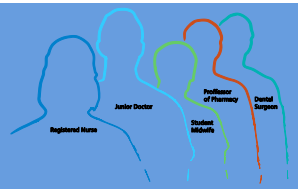
A performance-shaping factors "checklist"

- **I** Illness
- **M** Medication: prescription, over-the-counter & others
- **S** Stress
- **A** Alcohol
- **F** Fatigue
- **E** Emotion



Putting knowledge of human factors into practice

- Apply human factors thinking to your work environment
- Avoid reliance on memory
- Make things visible
- Review and simplify processes
- Standardize common processes and procedures
- Routinely use checklists
- Decrease reliance on vigilance

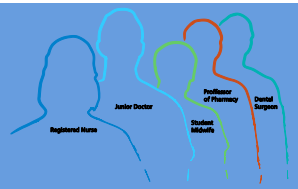


Summary: human factors

- Errors are inevitable - even for experienced health professionals!

- There are situations that can increase the likelihood of error
  - Recognize them for your patient's sake - and yours!

- Attention to human factors principles can lead to a reduction in error or its consequences



Summary

Human factors engineering is about designing the workplace and the equipment in it to accommodate for limitations of human performance.