"Why don't people do what they're told?!"

Dr Adam Sutherland, PhD., PGDipHF/E, FFRPS, MRPharmS
School of Pharmacy & Medical Sciences

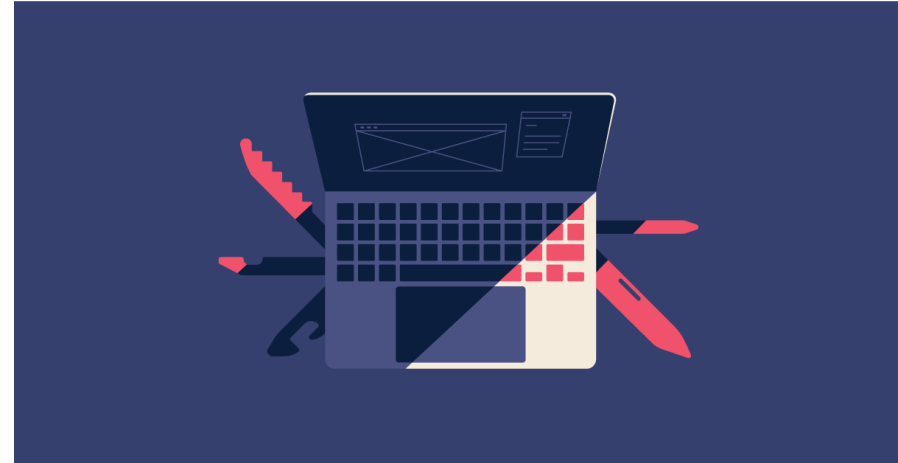# "Make good decisions…"

Outline

- What IS "Human Factors"
- Critique of "human error"
- Theory of human behaviour in complex systems
- "Safety, differently"
- Resilience
  - Why do things go right!?

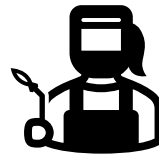# What Human Factors ISN'T

What Human Factors actually is…

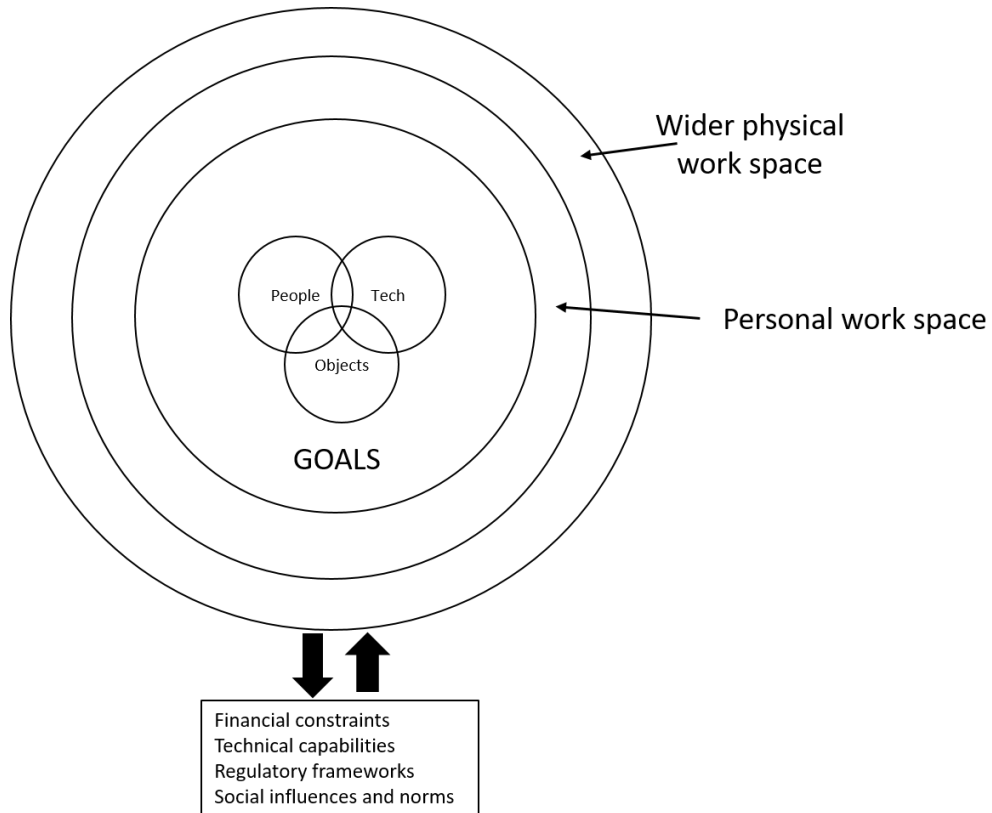| Can these **people** | With this **training** or information | Do this **task** | With the **kit** available | To the **standard** expected | Under these **conditions**? |
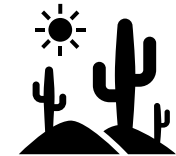
INDIVIDUAL   TEAM   TASK   EQUIPMENT   ORGANISATION   ENVIRONMENT

Sociotechnical theory

Wider physical
work space

Personal work space

People | Tech

Objects

GOALS

Financial constraints
Technical capabilities
Regulatory frameworks
Social influences and norms

(adapted from (Wilson & Sharples, 2015)*)*

WHO'S WHO OF HEALTHCARE SAFETY

Professor James Reason

QATS Symposium
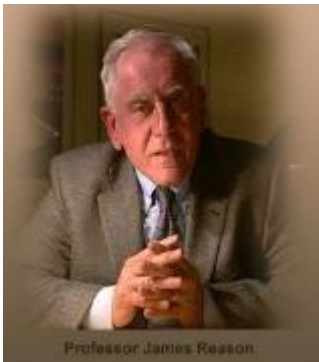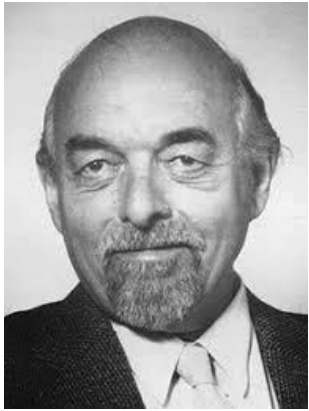
Historical Paradigm

- "Find and fix" (Hignett et al., 2018)

The "Swiss Cheese Model" (Reason, 1995)
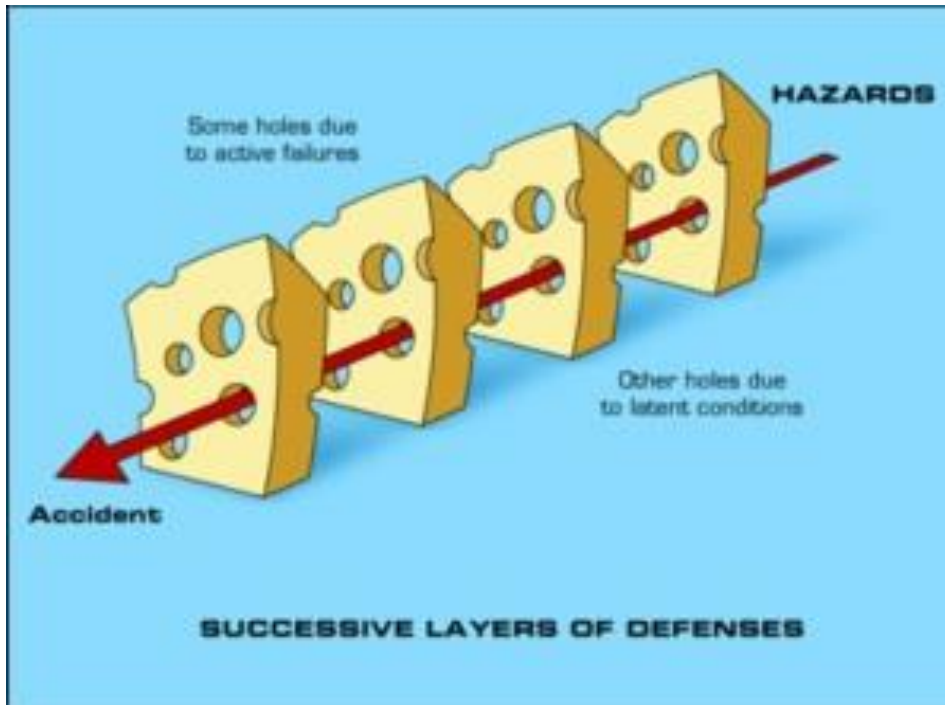
ASSUMPTIONS

- Events have a "root cause"
- We can identify failures in our defences
- We can then fix them
- They won't happen again

Skills, Rules, Knowledge...

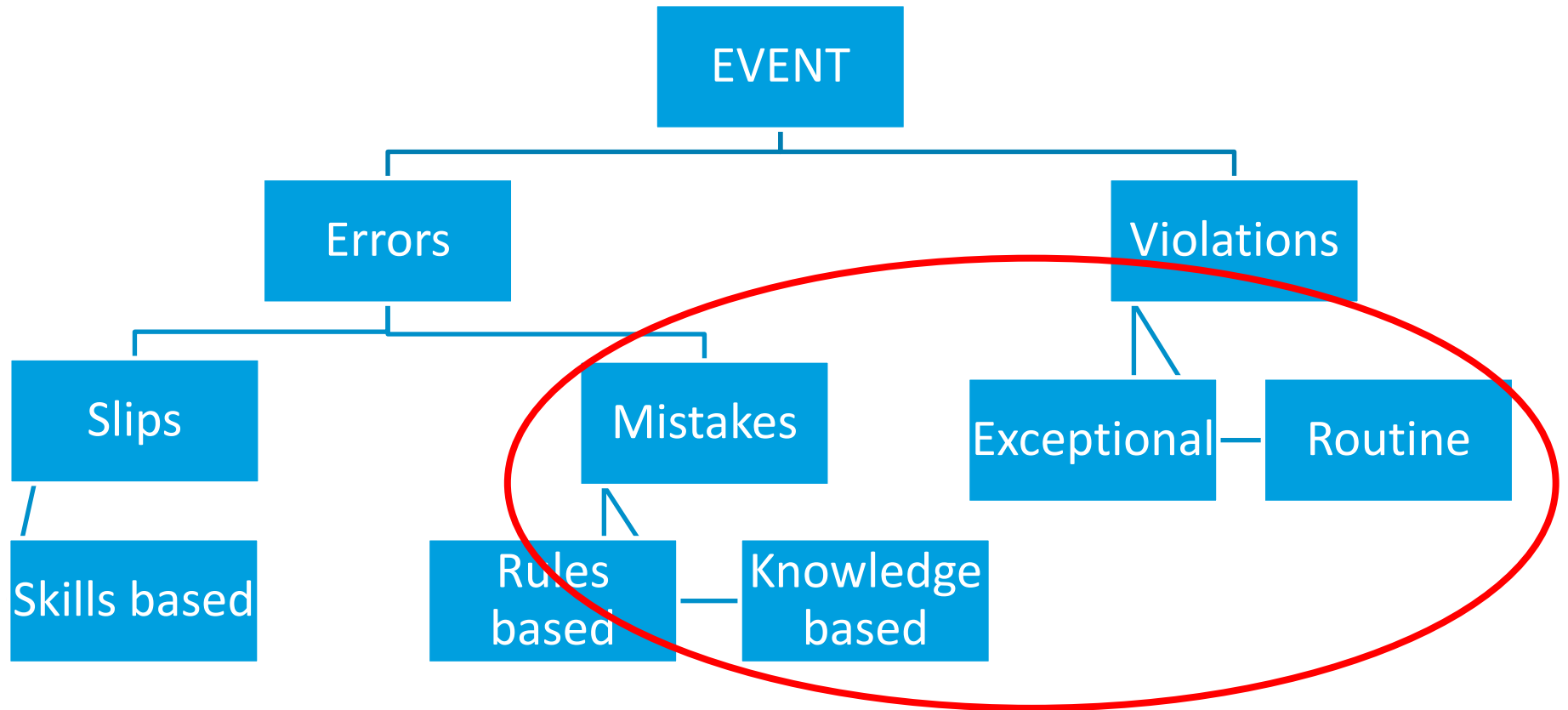| Knowledge	Rules	Skills
• Improvisation • Lack of routine/rule	• Predictable outcome for input • Applied logic	• Automated • No conscious thought • "Muscle Memory"

Conscious effort ➜ **Automatic**

Reasons Classfication of "Error"

Violations

- Agency – humans can make decisions and act
  - Different types of violation (Lawton & Reason, 1995)
  - All reflect response to unexpected conditions

DOES HUMAN ERROR EXIST?

A cause

An event

Hollanagel, Int J Man Mach Stud (1993, 1–32)

"Errors" as a "cause"

- BLAME:
  - Captain, Bosun and Deck Officer
- But:
  - Design issues
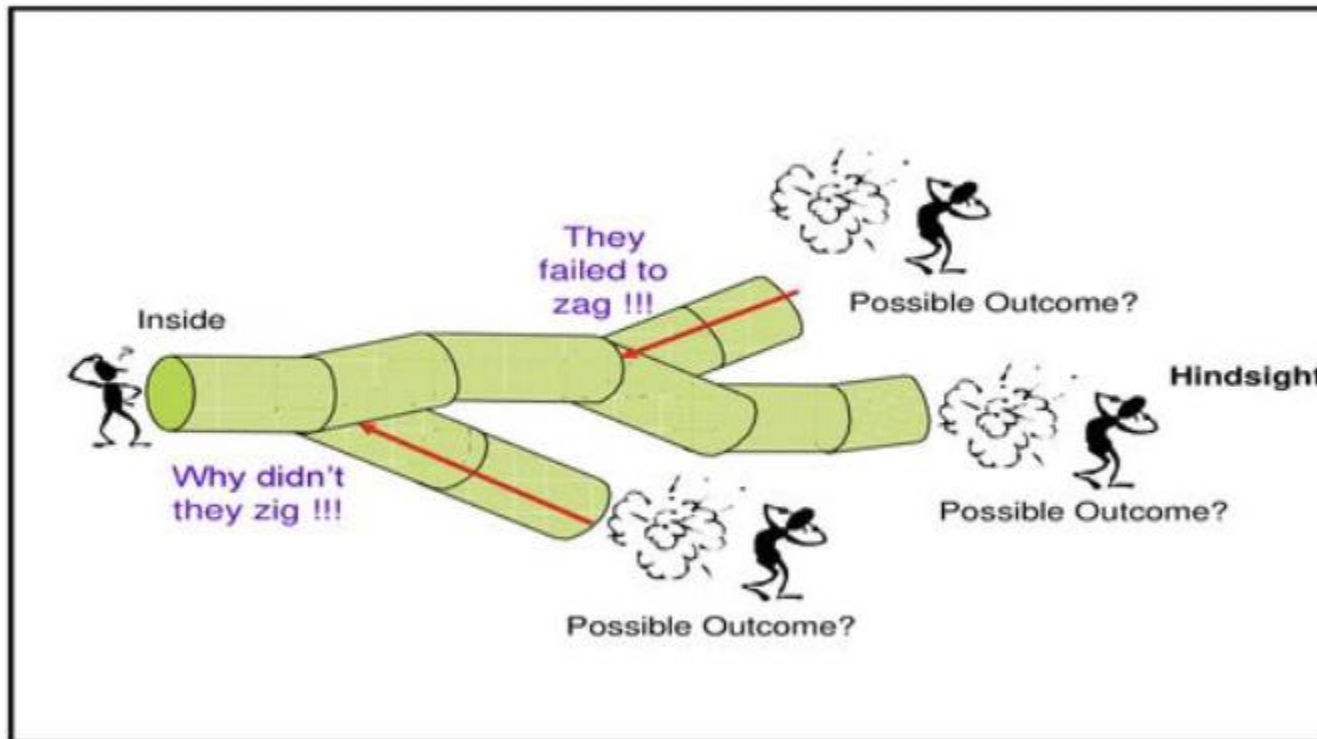 - Corporate culture

"Errors" as an event

"Individual negligence"

Error, Accountability & Blame

Dekkers Tunnel

Hindsight bias

Dekker "A field guide to human error" (2006, CRC Press)

Error makes things easy

Two sides of the argument

FAILURES ARE INEVITABLE (Perrow, 1984)
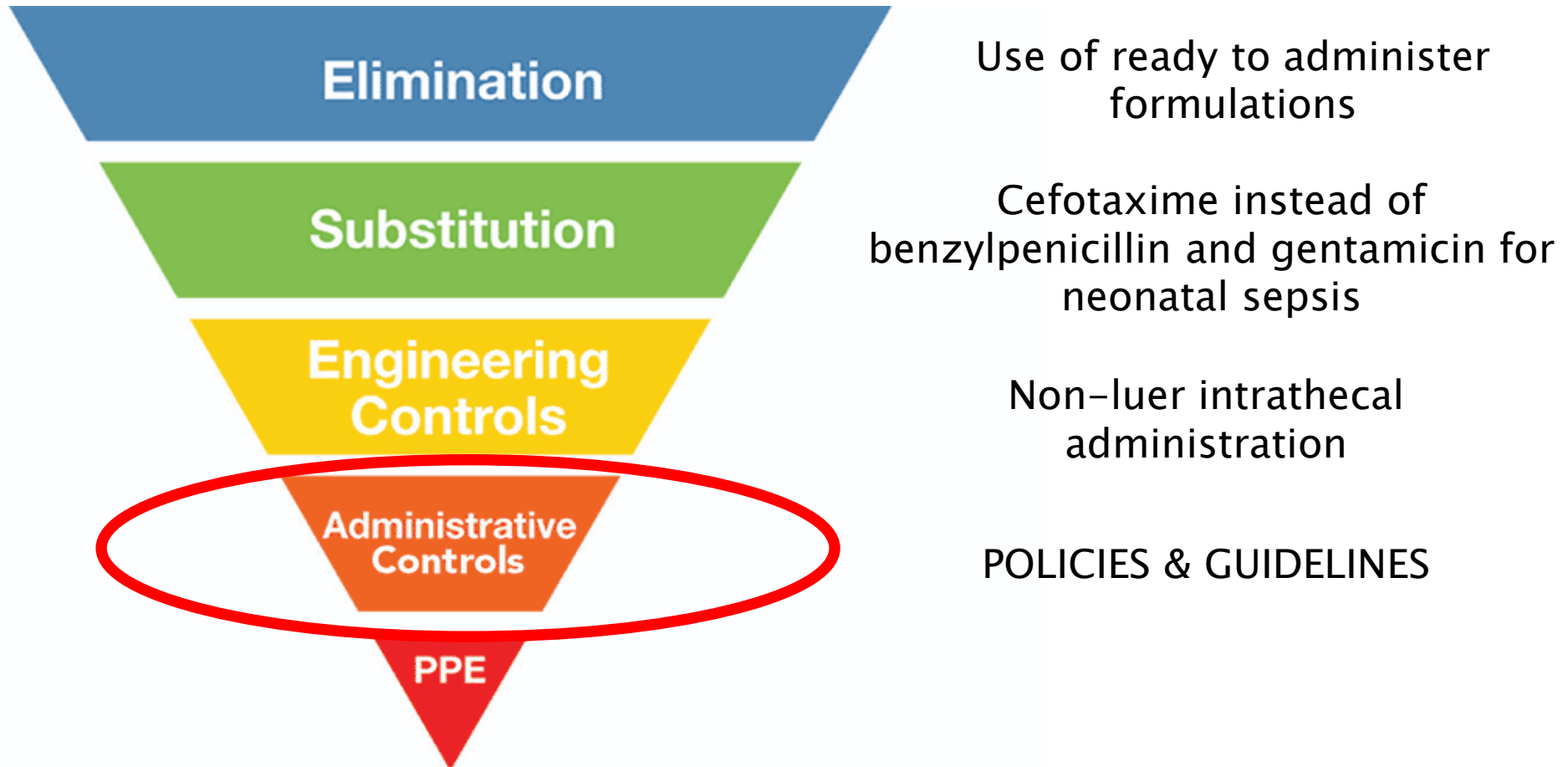
Reason (1990):
- Latent failures lead to error
- Study of errors reveals those latent errors
- We can then mitigate them

Hollnagel (2004):
- Success and failure are two sides of the same coin
- We learn more from what goes right
- Disaster is unpredictable

Multiple layers of "defence"

Use of ready to administer formulations

Cefotaxime instead of benzylpenicillin and gentamicin for neonatal sepsis

Non−luer intrathecal administration
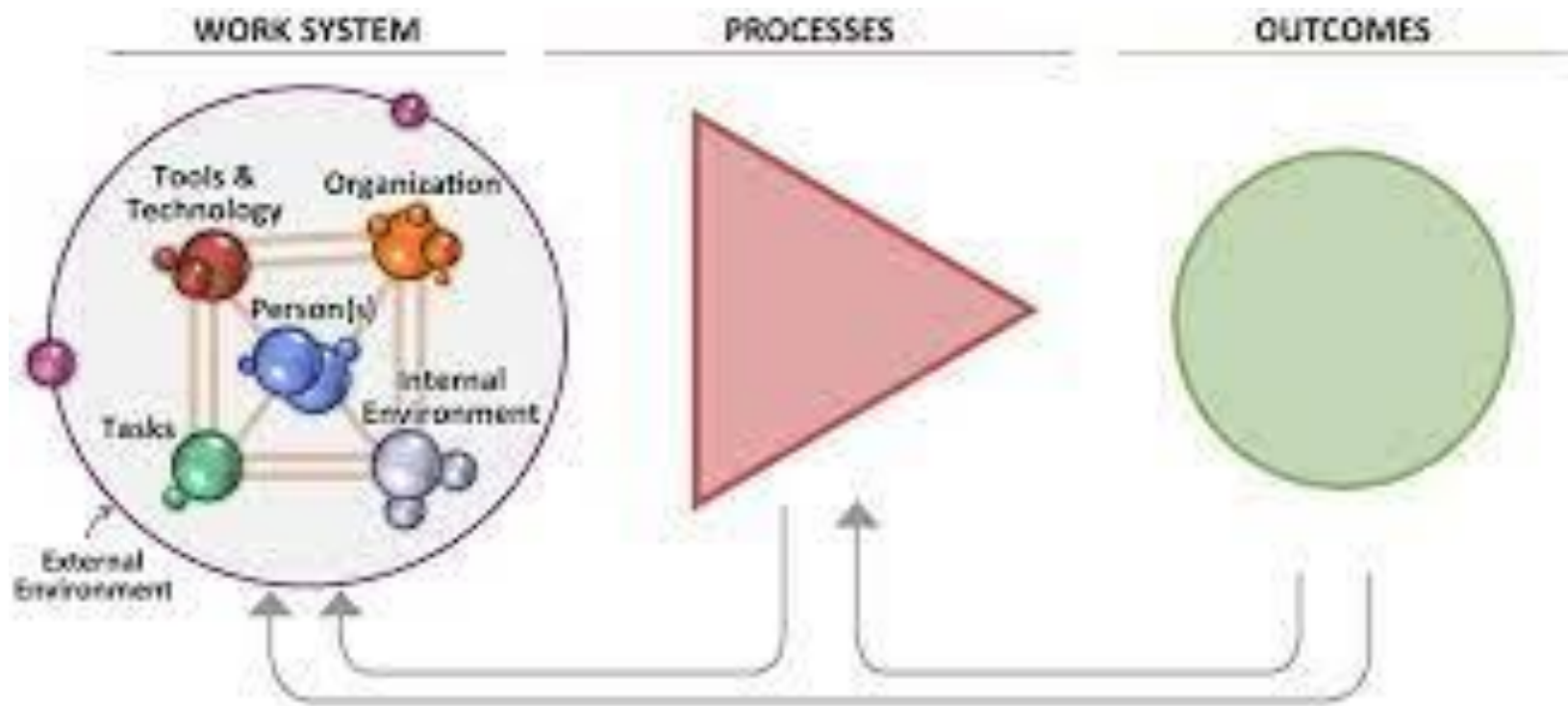
POLICIES & GUIDELINES

"Why won't people just do what they're told...!?"
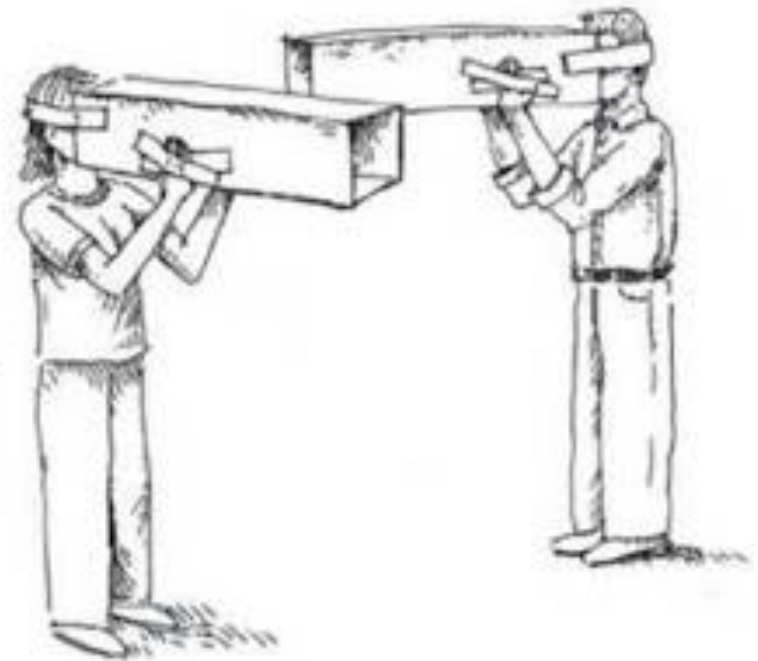
CARE is COMPLEX and CHAOS

Local Rationality

People do things that make sense to <u>them,</u> given

their goals,
understanding of the situation
and
focus of attention

<u>**at that time.**</u>

Law of Requisite Variety (1963)

Outcomes =
N + 1

Efficiency – Thoroughness Tradeoffs

People cannot be EFFICIENT and THOROUGH at the same time…

Something has to give!

QATS Symposium

Efficiency - Thoroughness Tradeoffs

THE ETTO SPECTRUM

HIGH THOROUGHNESS /
LOW EFFICIENCY

MOVE SLOW /
DON'T BREAK THINGS

OPEN ACCESS

ORIGINAL RESEARCH

Associations between double-checking and medication administration errors: a direct observational study of paediatric inpatients

Johanna I Westbrook [1], Ling Li,[1] Magdalena Z Raban [1],[1]

Work isn't what you imagine it to be...

Work-as-Imagined

Work-as-Prescribed
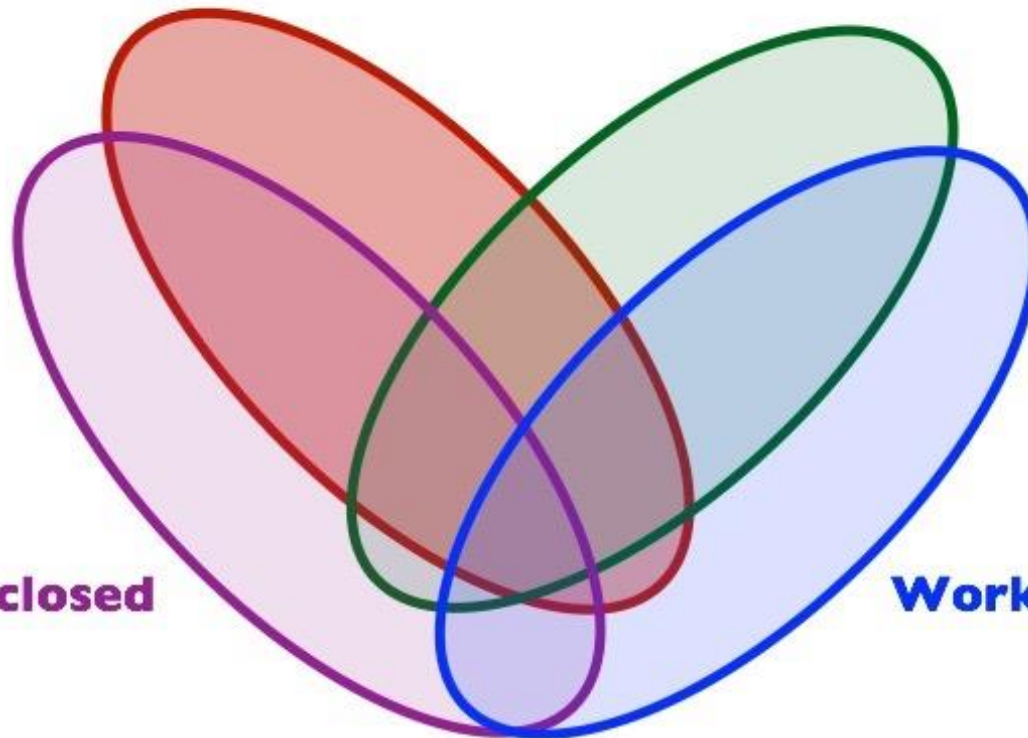
Work-as-Disclosed

Work-as-Done

Shorrock, 2016

Work as Imagined

- The way things "*should be*"
  - Contextually sterile
  - "If people just follow the rules, everything will be fine"
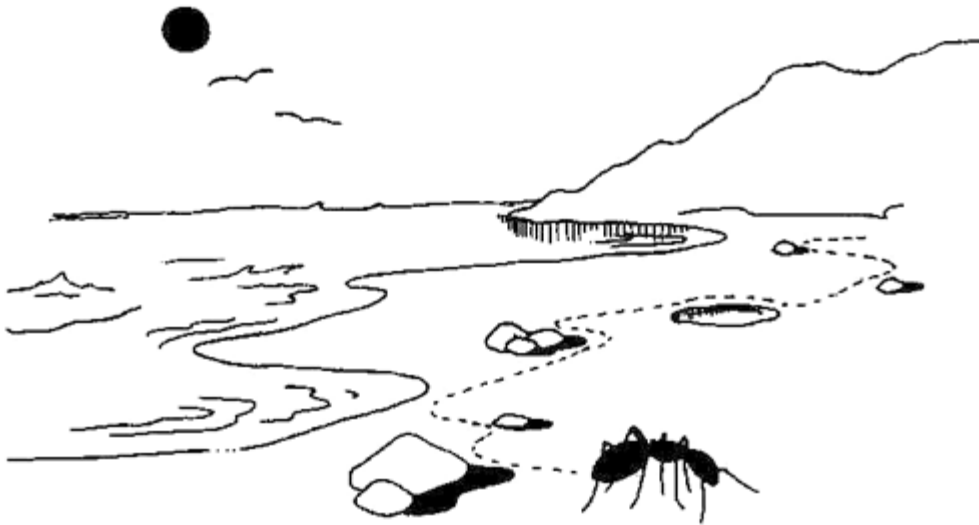
Simon H "The Science of the Artificial" 1969, MIT Press)

Work as Done

- What do we want to do?
- How do we get there?
- Adaptations are unavoidable
  - Equifinality
    - There's more than one way to skin a cat
  - Multifinality
    - Multiple outcomes from the same input

Healthcare Resilience Theory

Anticipate
- Know when something is going well (or failing)

Adapt
- Know how to act to keep the system functioning

Monitor
- The signs of system function – feedback, perception
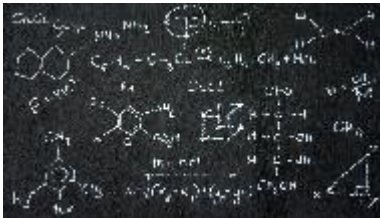
Learn
- Learning from these experiences

Applications of Resilient Healthcare in Practice

- Unexpected patient (booking failure)
  - Squeeze them in
- Labelling mismatch
  - If one matches and the product is as expected, proceed
- Variations in infusion concentration
  - "titrate to effect"
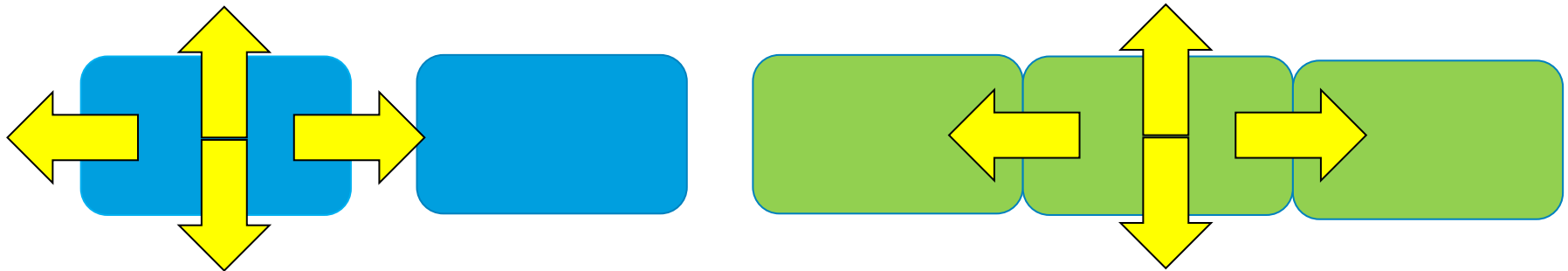
Resilience Theory

- "Flexible adaptation rather than procedural compliance" (Sanford, 2022)
- Common systems problems:
  - Capacity/Demand mismatch
  - Tradeoffs
  - Variability of input and outcome
  - Adaptations on adaptations

"Smart Infusion Systems" as a source of resilience

ANTICIPATE	RESPOND	MONITOR	LEARN
• Dose limits • Standard concentrations	• Audio-visual alerts of deviation • Permit adaptation (software disable)	• Data storage and analysis • Soft-limits allow nudge if outside of practice	• Data analysis • Reactive library adjustments
System-wide	Individual	Organisation	Organisation/ System-wide

Designing for Resilience

Data	Reported and anecdotal	Realistic

Work as Done	Observation	Conversation	Inclusive

Adaptations	Variations	Coupling
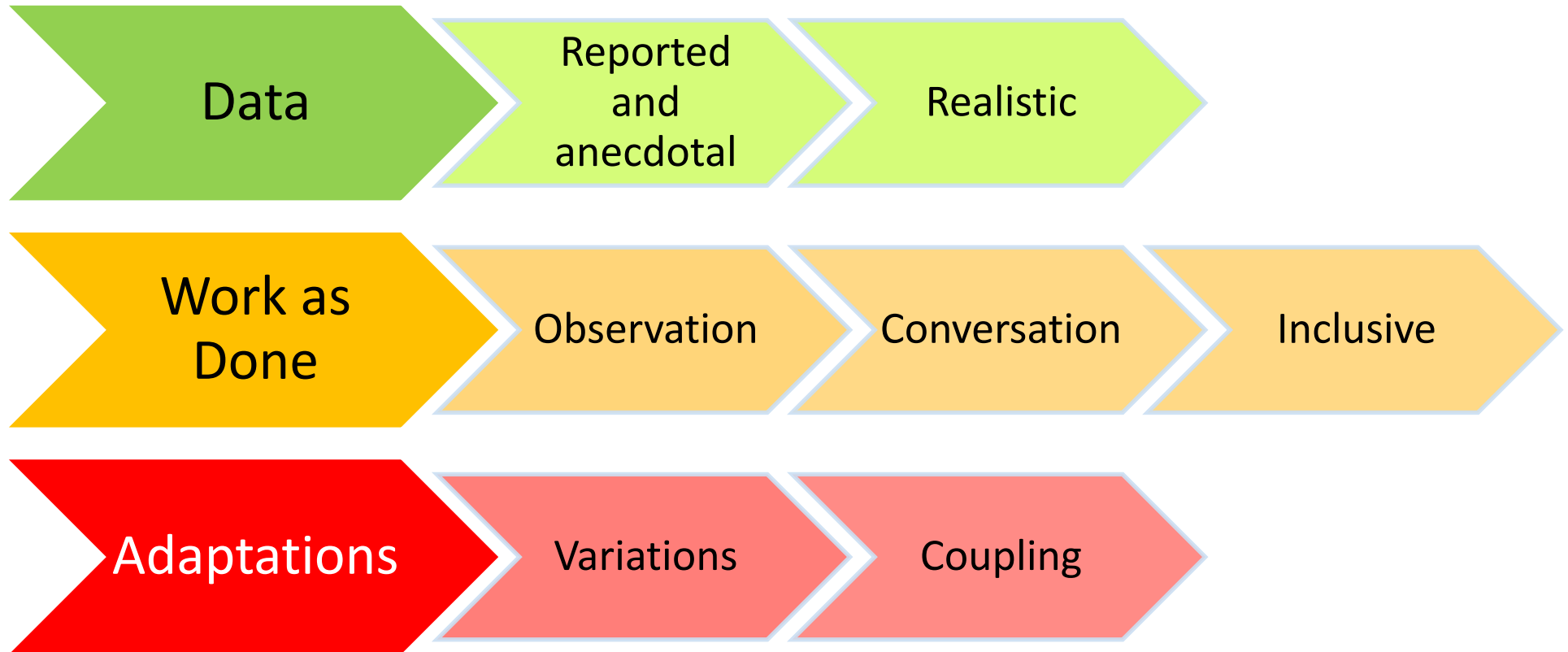
Wrapping up...

- Human Factors (HF) is about designing SYSTEMS around PEOPLE to improve their performance and their wellbeing
- People do what they're told most of the time
- When they don't it's because they can't
  - Adaptation
- Traditional models of "human error" are misleading or negligent
  - Assume the worst
  - Hindsight bias
  - Unreasonable expectations

Wrapping up

- We offer only limited options for task completion
  - Law of equifinality
  - Requisite Variety
- Our processes should support flexible adaptation
  - Recognise skill and expertise of operators
  - Rationale and theory to support decision making
  - Alternative actions for alternative conditions

People need help to make good decisions

References

- Hignett S et al. "Human factors and ergonomics and quality improvement science: integrating approaches for safety in healthcare" BMJ Qual Saf. 2015 Apr;24(4):250-4.
- Hollnagel, Erik. (2009). The ETTO Principle: Efficiency-Thoroughness Trade-Off. Why Things That Go Right Sometimes Go Wrong.
- Hollnagel E, Wears, R, Braithwaite J "From Safety-I to Safety-II: A white paper" 2015 Denmark Centre for Quality
- Shorrock S, (2016) The Archetypes of Human Work; https://humanisticsystems.com/2017/01/13/the-archetypes-of-human-work/
- Simon, H "The Sciences of the Artifical" 1969; MIT Press
- Westbrook JI, et al. "Associations between double-checking and medication administration errors: a direct observational study of paediatric inpatients." BMJ Qual Saf. 2021 Apr;30(4):320-330.
- Wiig, S., Aase, K., Billett, S. *et al.* Defining the boundaries and operational concepts of resilience in the resilience in healthcare research program. *BMC Health Serv Res* 20, 330 (2020).
- Wilson J, Sharples S "Evaluation of Human Work" 2015 CRC Press, Boca Raton Fl.
- Woods, D., Cook, R. Nine Steps to Move Forward from Error. *Cognition Tech Work* 4, 137–144 (2002).
- Reason Violations
- Reason Human Error
- Sanford Resilience