

Working safely in conditions of complexity and uncertainty: lessons from healthcare

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Over the last two decades, we have seen a one way transfer of safety thinking:



Checklists: Aviation & Surgery



But the rate of harm has flatlined at 10%

System heal thyself



Linear solutions applied to care settings have worked to some extent, but sometimes have fallen short of expectations





Faculty of Medicine and Health Sciences What is going on here?



Healthcare is a complex adaptive system delivered by people on the front line who flex and adjust to the circumstances

Not like this ...





.. like this

Like this!





Aviation is becoming increasingly complex too ...













When you get to the end of the day you always find two things ...



You didn't accomplish everything you imagined you would

 Your day wasn't anything like how you'd planned it

Work-as-done?







We think we understand how others work ... but do we?



It may depend on how displaced MACQUARIE we are from the work-as-done (WAD)





The further we are displaced from the work, the simpler view we are likely to have about how it is done. This is work-as-imagined (WAI).





In health care, those doing WAI have designed, mandated or encouraged a bewildering range of tools, techniques and methods, to reduce harm to patients





E.g., root cause analysis, hand hygiene campaigns, failure modes effects analysis ...



And there's lots of others ...



What they do seems perfectly logical, obvious and feasible



Meanwhile work is getting done, often despite all the policies, rules and mandates





And clinicians don't deliver care in the way managers want them to



WAD—workarounds



Glove placed over a smoke alarm, as it kept going off due to nebulisers in patients' rooms.





A leg strap holding an IV to a pole, as the holding clasp had broken.

Plastic bags placed over shoes to workaround the problem a of gumboot shortage.



WAD—fragmentation



Doctors in Emergency Departments in a study:

- Were interrupted 6.6 times per hour.
- Were interrupted in 11% of all tasks.
- Multitasked for 12.8% of the time.

Doctors in EDs in a study:



- Spent on average 1:26 minutes on any one task.
- When interrupted, spent more time on tasks.
- And ... failed to return to approximately 18.5% of interrupted tasks.



Example 1: Work-as-imagined

"After 25 years of evidence based medicine, care is evidence based"

Study 1: Work-as-done







Example 2: Work-as-imagined

"We deliver care in multidisciplinary teams"

Study 2: Work-as-done





Problem solving networks in an ED

Nurses Doctors Allied health Admin and support



Example 3: Work-as-imagined

"We know how our systems work"

Study 3: Work-as-imagined



Work-asimagined:

Lynch syndrome study



Study 3: Work-as-done







So, how does a healthcare system really work?

System operating point





Operating point in healthcare





Operating point in healthcare









Reliable space





In the reliable space ...



We can use tools based on linear systems thinking:

- * variables can be controlled
- * results can be generalised

* local problems can be addressed independently of the larger system

* tools might include: standardisation, checklists, RCAs, FMEA, Six sigma, and so on

Robust space





In the robust space ...



We can still use tools based on **linear systems** thinking, **BUT**:

- * variables may be difficult to control
- * results may **not be generalisable**

* there is likely to be **interaction** between local context and the larger system

* tools might include: Lean, M&Ms, simulation, teamwork/CRM tools, and so on

'Protective' safety





But the system is also dynamic



It changes over time:

* solving a problem does **not** mean it is solved for good

Sut * the intervention might be effective, but we won't necessarily see results (almost) immediately

* multiple interventions **cannot** be applied simultaneously, yet assessed individually

* once we have planned an intervention, we **cannot** necessarily apply the intervention exactly as planned

We need systems thinking



Static thinking Focusing on single events

System-as-effect thinking System behaviour driven by external forces

Tree-by-tree thinking Focus on the details

Factors thinking Listing factors that correlate with a result

Straight line thinking Causality single directional **Dynamic thinking** Focusing on behavior patterns

System-as-cause thinking System behaviour driven by internal actors

Forest thinking Focus on the big picture, context

Operational thinking Understanding how behavior is generated

Loop thinking Causality multi-directional, feedback loop

1. Adam T, de Savigny D. Systems thinking for strengthening health systems in LMICs: need for a paradigm shift. Health Policy and Planning. 2012;27(suppl_4):iv1-iv3.

Resilient space





COMPLEXITY

'Productive' safety





In the resilient space ...



We **can no longer** use tools based on linear systems thinking:

- * they won't work
- * they will further increase system complexity

We need to find ways to deal with the unexpected:

- * embrace diversity
- * understand work-as-done
- * learn from what goes right

* tools might include: Functional Resonance Analysis Method (FRAM), Resilience Assessment Grid (RAG), and so on













More modern modes of thinking



- Patient safety increasingly viewed as a systems issue rather than being attributed to personal fallibility
- Safe systems means errors/adverse events attributed to aberrations in *the system*
- Clinicians are seen as *interacting agents in* problematic systems or cultures rather than culpable or reckless

Health Sciences



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~THANK YOU~

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In the resilience space, people are paramount



Achieving optimum performance in the reliable space

MACQUARIE versity



IQ Score Distribution



Reduce variation





But what if this is your world?





Embrace diversity, leverage variation

