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Te Tāhū Hauora
Health Quality & Safety Commission

MACQUARIE University
SYDNEY·AUSTRALIA

The Learning Health System:
Implications for quality of care in Aotearoa New Zealand

November 8, 2023 (10:05 am - 10:50 am)

Jeffrey Braithwaite, PhD,
FIML, FCHSM, FFPHRCP, FAcSS, Hon FRACMA, FAHMS
Professor and Director
Australian Institute of Health Innovation
Director
Centre for Healthcare Resilience and Implementation Science
President
International Society for Quality in Health Care (ISQua)

Quality Improvement Scientific Symposium 2023 (Auckland, New Zealand)

Keynote 1 - November 8, 2023

Holiday Inn Auckland Airport, Māngere, Auckland

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Our goal is to co-create high-impact health services and systems research that drives positive change in policy, practice and behaviour for the benefit of all.

aihi.mq.edu.au

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Heal | Learn | Discover

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NHMRC Centre of Research Excellence in Digital Health

AIHI at a glance

PROVIDING THE EVIDENCE TO IMPROVE HEALTHCARE

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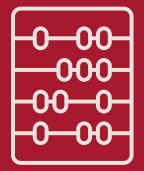
Understanding the relationship between system complexity and system performance



Evaluating the impact of interventions on health, workplace and social outcomes

Understanding behaviour as a basis for practice improvement

Use of artificial intelligence as a technique to support evidence-based decision-making

Designing models of care and ways of working which provide improved safety and quality

Applying an economic lens to evaluations and policy development

AIHI snapshot

2022

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$49.8 million
Enterprise value of projects under AIHI management

$79.6 million
Enterprise value of key projects administered elsewhere involving AIHI or MUCHE

129
Research projects under AIHI management

312
Peer-reviewed publications

Australian Institute of Health Innovation

AIHI

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Prologue to Learning Health Systems in New Zealand

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The New Zealand Approach

[1] The Health Charter

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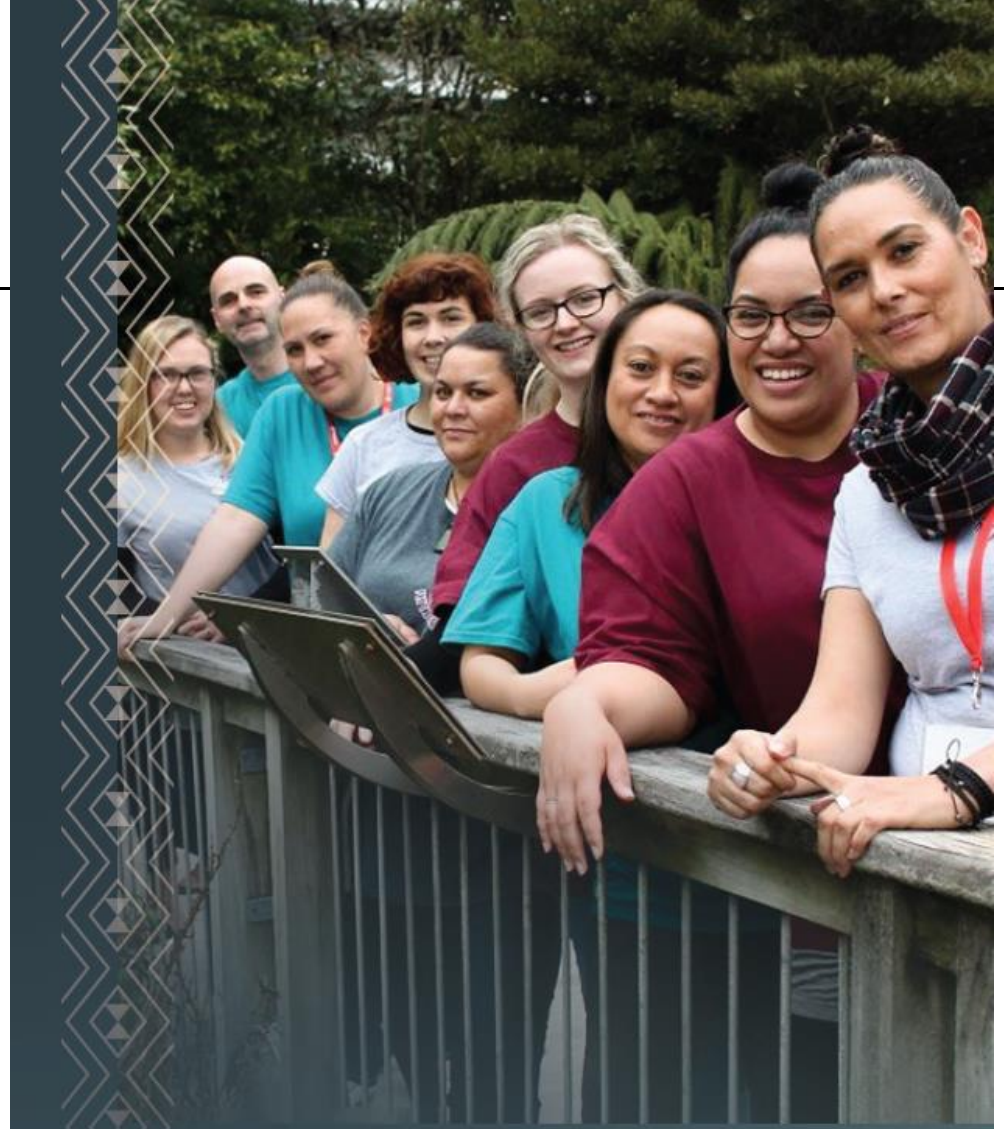

Te Mauri o Rongo

THE NEW ZEALAND HEALTH CHARTER

Te Mauri o Rongo – The New Zealand Health Charter

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Te Mauri O Rongo is a statement of values, principles, and behaviours that health entities and health workers are expected to demonstrate at a collective, organisational and individual level and ensures that health and care workers are supported and empowered by shared values in workplaces that value their contributions.

Te Mauri o Rongo – The New Zealand Health Charter

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Wairuatanga

Working with heart, the strong sense of purpose and commitment to service that health workers bring to their mahi.

Rangatiratanga

As organisations we support our people to lead. We will know our people; we will grow those around us and be accountable with them in contributing to Pae Ora for all.

VALUES AND PRINCIPLES THAT SHAPE OUR BEHAVIOURS

Whanaungatanga

We are a team, and together a team of teams. Regardless of our role, we work together for a common purpose. We look out for each other and keep each other safe.

"Whiria te tangāta" – we will weave our people together.

Te Korowai Āhuru

A cloak which seeks to provide safety and comfort to the workforce.

Te Mauri o Rongo – The New Zealand Health Charter

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Te Mauri O Rongo is how [New Zealand] will provide healthcare that is more responsive to the needs of, and accessible to, all people living in Aotearoa New Zealand.

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The New Zealand Approach

[2] The Health Strategy

New Zealand Health Strategy 2023

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New Zealand Health Strategy

Purpose

The New Zealand Health Strategy sets the medum - and long-term direction for health and identifies priority areads for change to improve health outcomes.

Our vison

Our long-term vision is to achieve pae ora | healthy futures for all New Zealanders.

Commitment to Te Tiriti o Waitangi | The Treaty of Waitangi

The health sector is committed to fulfilling the special relationship between Māori and the Crown under Te Tiriti o Waitangi | The Treaty of Waitangi.

The Crown's approach to meeting its obligations under Te Tiriti is outlined in section 6 of the Pae Ora (Healthy Futures) Act 2022. The legislation contains specific provisions intended to give effect to the Crown's obligations. In particular, the health sectors principles in section 7 of the Act guide the Minister of Health, Manatū Hauora | Ministry of Health and health entities in how they carry out their functions. The health sector principles incorporate key outcomes and behaviours derived from the principles of Te Tiriti, as articulated by the courts and the Waitangi Tribunal

Relationship to other health strategies

The New Zealand Health Strategy takes a whole-population focus and considers systemic issues, opportunities and priorities. It does this in partnership with Pae Tū | the Hauora Māori Strategy, which provides a framework to guide health entities in upholding Te Tiriti o Waitangi and improving Māori health outcomes. Together, the New Zealand Health Strategy and Pae Tū set the overarching long-term direction for health.

The four population strategies (for Pacific health, health of disabled people, women's health and rural health) set a more focused direction for specific populations.

The New Zealand Health Strategy - key points

The strategy is **focused on achieving pae ora | healthy futures for all New Zealanders.**

The strategy is **built on our commitment to Te Tiriti o Waitangi.**

The strategy has **two overarching long-term goals:**

- to **achieve health equity** for our diverse communities and especially for Māori, Pacific, disabled and other groups who have poorer outcomes
- to **improve health outcomes** for all New Zealanders.

The strategy has **six strategic priorities** that set a clear direction for the for the type of change needed in the next 10 years to move towards achieving these goals and ensure that our health system is fairer, stronger, more sustainable and responsive.

The strategy sets **ten-year ambitions** for the changes that are needed in each priority area, to direct efforts on the actions that will have the greatest impact on our goals.

These ambitions require collective action and aim to build alliances across the health system, the wider public sector, the private sector industry and other partners.

Recognising and responding to the voices of our people and communities throughout the health system, so people have greater control over the design of services and decisions made about their care.

Ten-year ambitions

- People, whānau and communities will have greater control and influence over their health and the services they need.
- People have the best possible experience of health services and the health system.

Supporting the health workforce to develop the diverse, skilled and confident workers for the future.

Ten-year ambitions

- The workforce will reflect our diverse communities and have the skills and capabilities required to meet their needs.
- The workforce will feel valued, recognised and respected and will be supported and motivated to deliver high-quality care.
- Flexible learning and working environments will give more room for growth and development.

Developing services that are focused on preventing illness and delivering care closer to home, and support access for most uder-served communities

Ten-year ambitions

- Health services will be flexible to people's range of needs and their cultural expectations.
- People are able to access the care they need, when they need it.
- The health system will make a significant shift in investment towards services that reduce, delay and prevent ill health and prioritise the early years of life.
- The health system will value physical and mental health equality.

Creating a culture of continuous learning and improvement that supports quality, innovation, research and evaluation.

Ten-year ambitions

- The health system will develop standards for high-quality care that support all services to improve.
- New initiatives will healp all parts of the system to harness innovation and new technologies and put evidence and research into everyday practice.
- New national functions will drive continuous improvement and support the development of new technologies.

Ensuring preparedness for future shocks and the best use of resources to manage the demand for health services and affordability of the system over long term.

Ten-year ambitions

- The health system will be better prepared to manage future adverse events.
- The health system will be more productive and efficient, to make the best use of public money.

Working with the other sectors and across government to partner on actions that address the drivers of health and wellbeing and support healthy communities and environments.

Ten-year ambitions

- The health system will lead and influence across government to improve health and wellbeing outcomes.
- Health entities will partner with other sectors to support shared approaches to improve health and wellbeing.

Our approch to setting priorities

The strategy balances the different driving forces of change

Achieving and sustaining change to deliver our long-term goals requires coordinated action in different areas.

The strategy seeks to guide a cultural shift to align the motivations and values of a diverse workforce, to rebalance decision making and influence more evenly, and to focus on how relationships and connections inform how people behave.

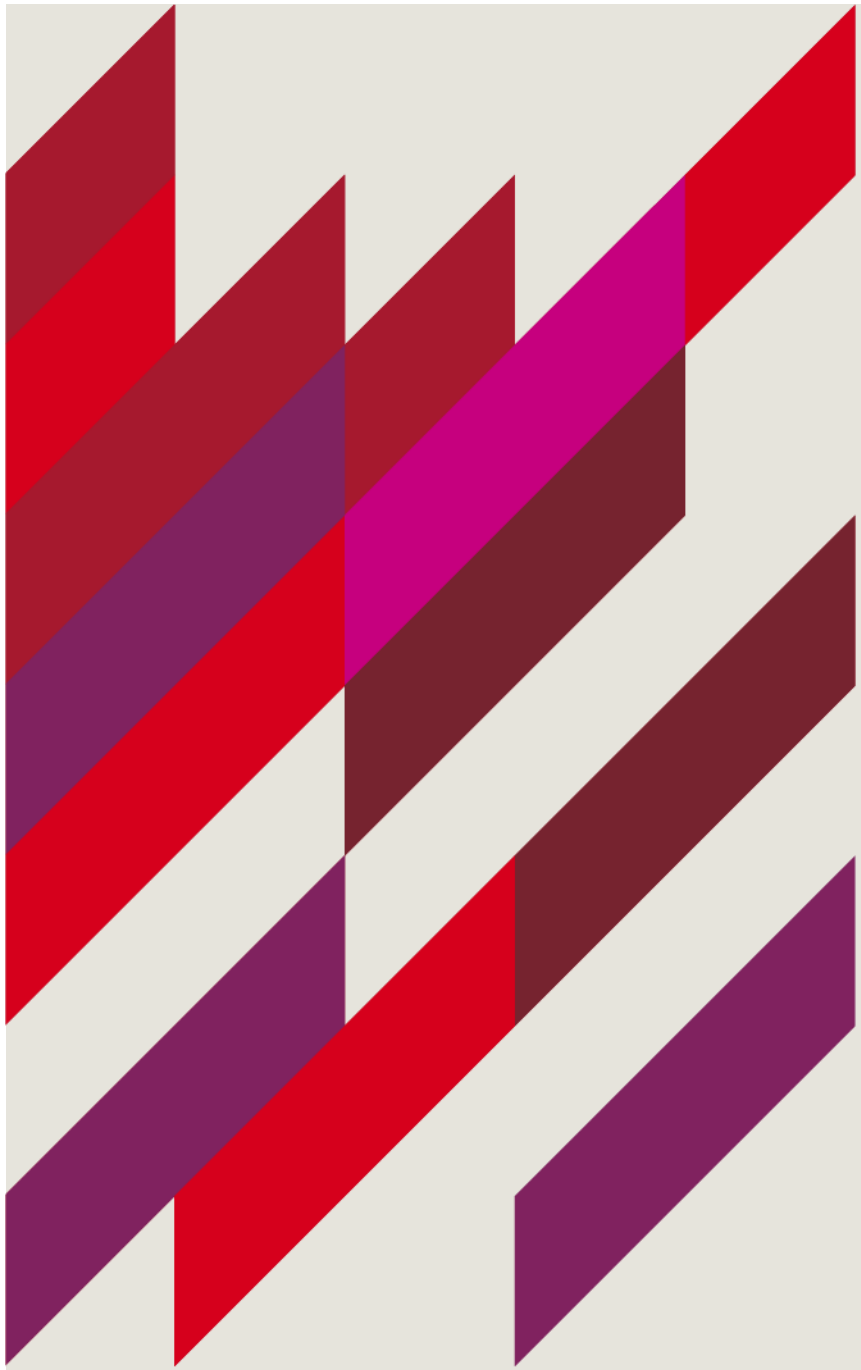
Our approach to change recognises the driving forces that influence how the system works as a whole and balances a focus on:

- systems, policies and practices that set rules, funding and expectations
- behaviours, relationships and mindsets that inform how people think and act.

The strategy is based on the evidence and what we have heard from people, whānau and communities

The strategy has been developed based on an understanding of current health outcomes and trends, including inequity between groups, and opportunities for change.

The choice of priorities and ambitions has been informed by the voices of people, whānau and communities and their experiences and aspirations for health and wellbeing.



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Part 1: Overview

Thinking about LHSs

Thinking about Learning Health Systems

The Learning Health System

Examples of recent research

ISQua International Society for Quality in Health Care

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Received: 29 November 2017 | Revised: 14 February 2018 | Accepted: 20 March 2018
DOI: 10.1002/lrh2.10055

COMMENTARY

Transforming the future of health together: The *Learning Systems Consensus Action Plan*

Joshua C. Rubin[1] | Jonathan C. Silverstein[2] | Charles P. Friedman[3] | Rebecca D. H
W. Holt Anderson[7] | Allen S. Lichter[8] | Darin J. Humphreys[9] | Jeffrey Brown[10] |
Laura Crawford[11] | James M. Walker[12] | Richard L. Tannen[13] | Kate Berry[14] |
Marianne Hamilton Lopez[15] | Robert M.
Frank W. Rockhold[18]

[1] Learning Health Community, Arlington, Virginia
[2] Department of Biomedical Informatics, University of Pittsburgh Schoo
[3] Department of Learning Health Sciences, University of Michigan Med
[4] Catalysis Research, Austin, Texas
[5] Elligo Health Research, Austin, Texas
[6] Translational Research Informatics Center, Foundation for Biomedical
[7] Learning Health Strategies and NCHICA, Research Triangle Park, Nort
[8] American Society of Clinical Oncology (ASCO), Alexandria, Virginia

Learning Health System

EXPERIENCE REPORT | Open Access

A framework for understanding, des evaluating learning health systems

Tom Foley | Luke Vale

First published: 20 May 2022 | htt

MEDICAL EDUCATION ONLINE
2021, VOL. 26, 1917038
https://doi.org/10.1080/10872981.2021.1917038

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Learning health systems from an academic perspective: establishing a collaboratory within a school of medicine and health sciences

Paige L. McDonald[a], Philip Van Der Wees[a,b], Gregory C. Weaver[a], Kenneth Harwood[a], Jessica R. Phillips[a]

Learning Health Systems
Open Access

EDITORIAL | Open Access

What is unique about learning health systems?

Charles P. Friedman

/10.1002/lrh2.10328 | Citations: 2

Learning Health Syster

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DOI: 10.1002/lrh2.10265

RESEARCH REPORT

Learning Health Systems

COMMENTARY | Open Access

The science of Learning Health Syst journal

Charles P. Friedman, Nancy J. Allee, Brendan C. Delane
Kevin Sullivan, Kathleen A. Young

First published: 29 November 2016 | https://doi.org/10.1002/lrh2.10020 | Citations: 53

Learning health systems: A review of key topic areas and bibliometric trends

Chiara Pomare[1] | Zeyad Mahmoud[1] | Alex Vedovi[1,2] | Louise A. Ellis[1,2] |
Gilbert Knaggs[1,2] | Carolynn L. Smith[1,2] | Yvonne Zurynski[1,2] |
Jeffrey Braithwaite[1,2]

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GUEST EDITOR COMMENTARY | Open Access

Patient empowerment and the Learning Health System

Joshua C. Rubin

First published: 09 June 2017 | https://doi.org/10.100

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BMJ Open

Identifying requisite learning health system competencies: a scoping revie

Paige L McDonald, Jessica Phillips, Kenneth Harwood, Joyce Maring
Philip J van der Wees

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PMCID:
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The Science of Learning Health Systems: Scoping Review of Empirical Resea

Monitoring Editor: Christian Lovis

Reviewed by Vasa Curcin and Michael Seid

l Sarkies, PhD,[1] Kate Churruca, PhD,[1] Genevieve Dammery, BSc (Hons),[1]
[1] Carolynn L Smith, PhD,[1] Chiara Pomare, PhD,[1] Zeyad Mahmoud, PhD,[1]
Jeffrey Braithwaite, PhD[1]

BJGP British Journal of General Practice
bringing research to clinical practice

Editorials

High-performing primary care: reinvigorating general practice as a learning health system

Darran Foo, Janani Mahadeva, Francisco Lopez, Louise A Ellis, Kate Churruca, Genevieve Dammery, Simon Willcock and Jeffrey Braithwaite

LEARNING HEALTH COMMUNITY

So let's see what you think …

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I don't know much LHSs but I'm here to learn:

Strongly agree		Neutral		Strongly disagree
5	4	3	2	1

So let's see what you think …

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LHSs have taken off in New Zealand:

Strongly agree		Neutral		Strongly disagree
5	4	3	2	1

Can we address the challenges for healthcare to 2030 through the creation of a Learning Health System?

The Learning Health Systems Framework

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Dimensions	Characteristics
Science and informatics	Real time access to knowledge
	Digital capture of the care experience
Patient-clinician partnerships	Engaged, empowered patients
Incentives	Incentives aligned for value
	Full transparency
Continuous learning culture	Leadership-instilled culture of learning
	Support system competencies

To which we added

Dimensions	Characteristics
Structure and Governance	Organisation

The Learning Health Systems Framework

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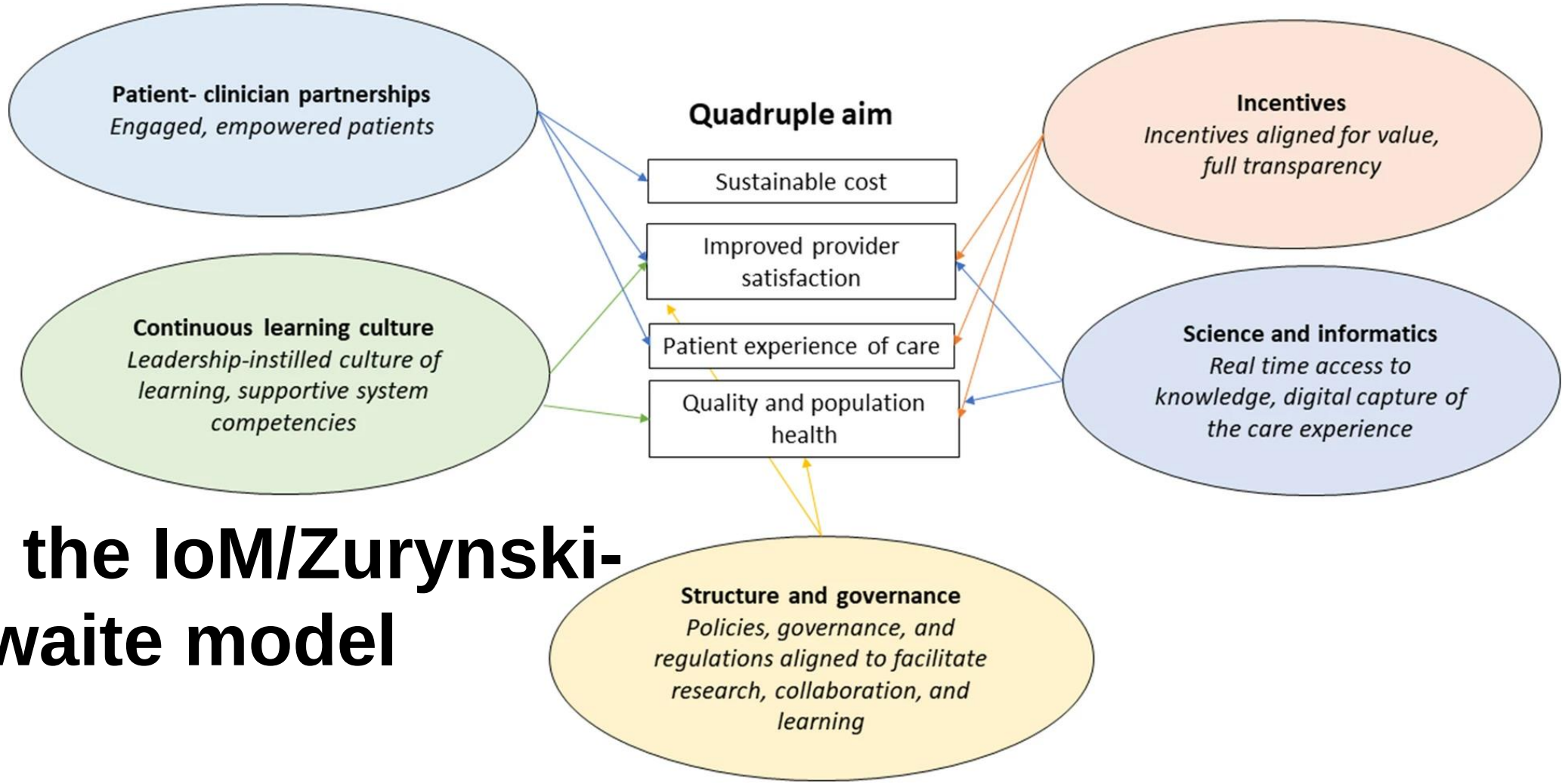
Now we have these five dimensions…



This is the IoM/Zurynski-Braithwaite model

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Part 2: What's the problem we're trying to solve?

Longstanding challenges

The problem

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- It takes an average of 17 years for only 14% of new discoveries to enter practice
- Roughly 60% of care is in line with evidence or consensus-based guidelines
- About 30% of health care is waste of some kind
- Around 10% of patients are harmed when receiving care

[Westfall, JM et al. Practice-Based Research—“Blue Highways” on the NIH Roadmap. JAMA.; Braithwaite, J et al. The three numbers you need to know about healthcare: the 60-30-10 Challenge. *BMC Med*.]

Need a Learning Health System?

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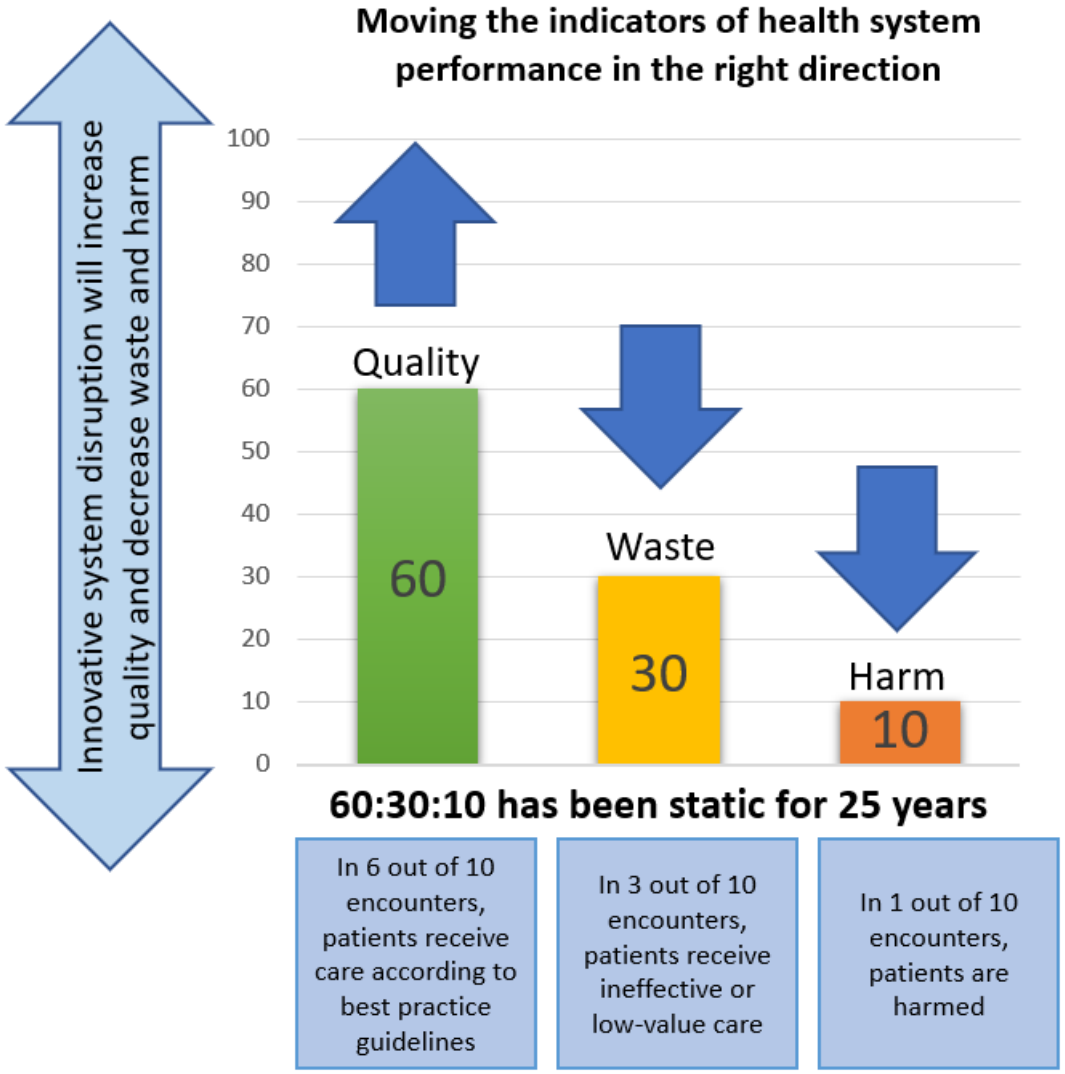

[Braithwaite, J., Glasziou, P. & Westbrook, J. The three numbers you need to know about healthcare: the 60-30-10 Challenge. *BMC Med* 18, 102 (2020). https://doi.org/10.1186/s12916-020-01563-4]

So that's the problem we're trying to solve with an LHS

- There are many other 'solutions' that have been advanced
- Such as …

A “solution” - the knowledge pipeline

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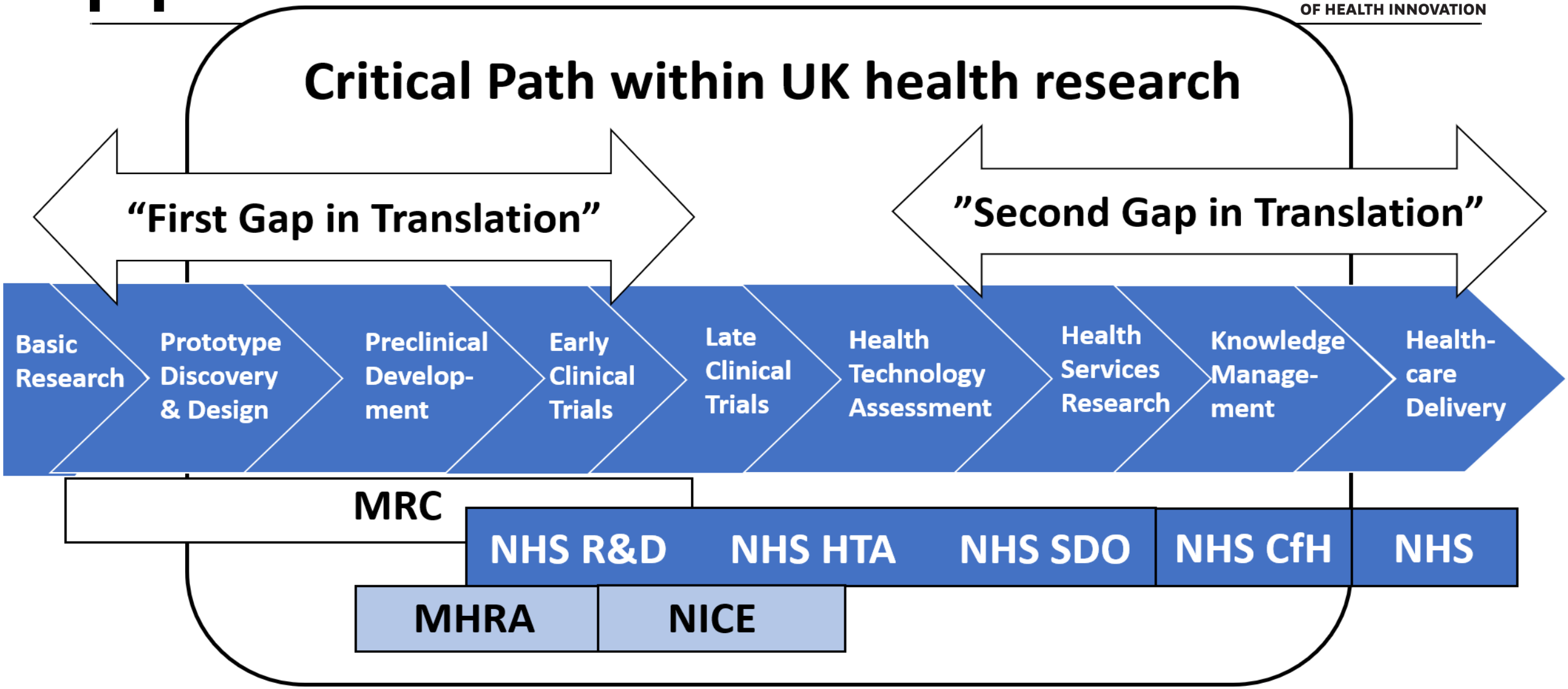

[Cooksey. 2006. A review of UK health research funding]

But the pipeline is an idealisation

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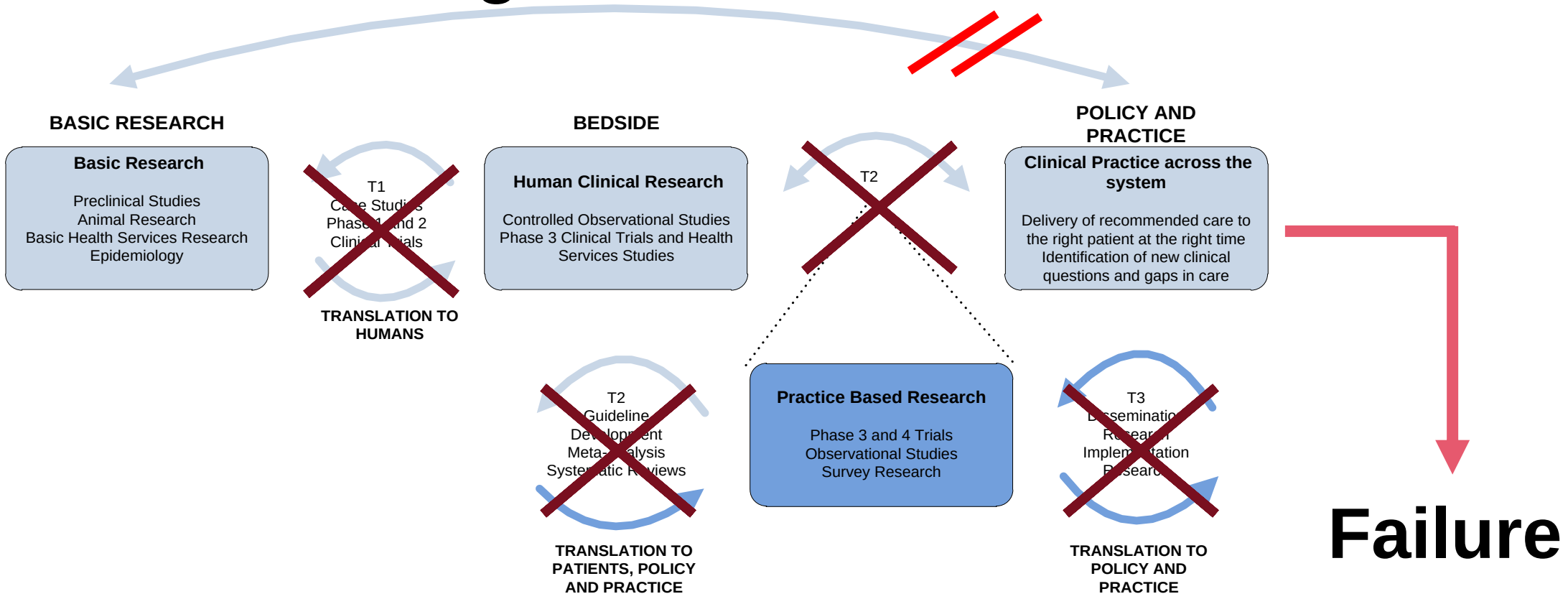
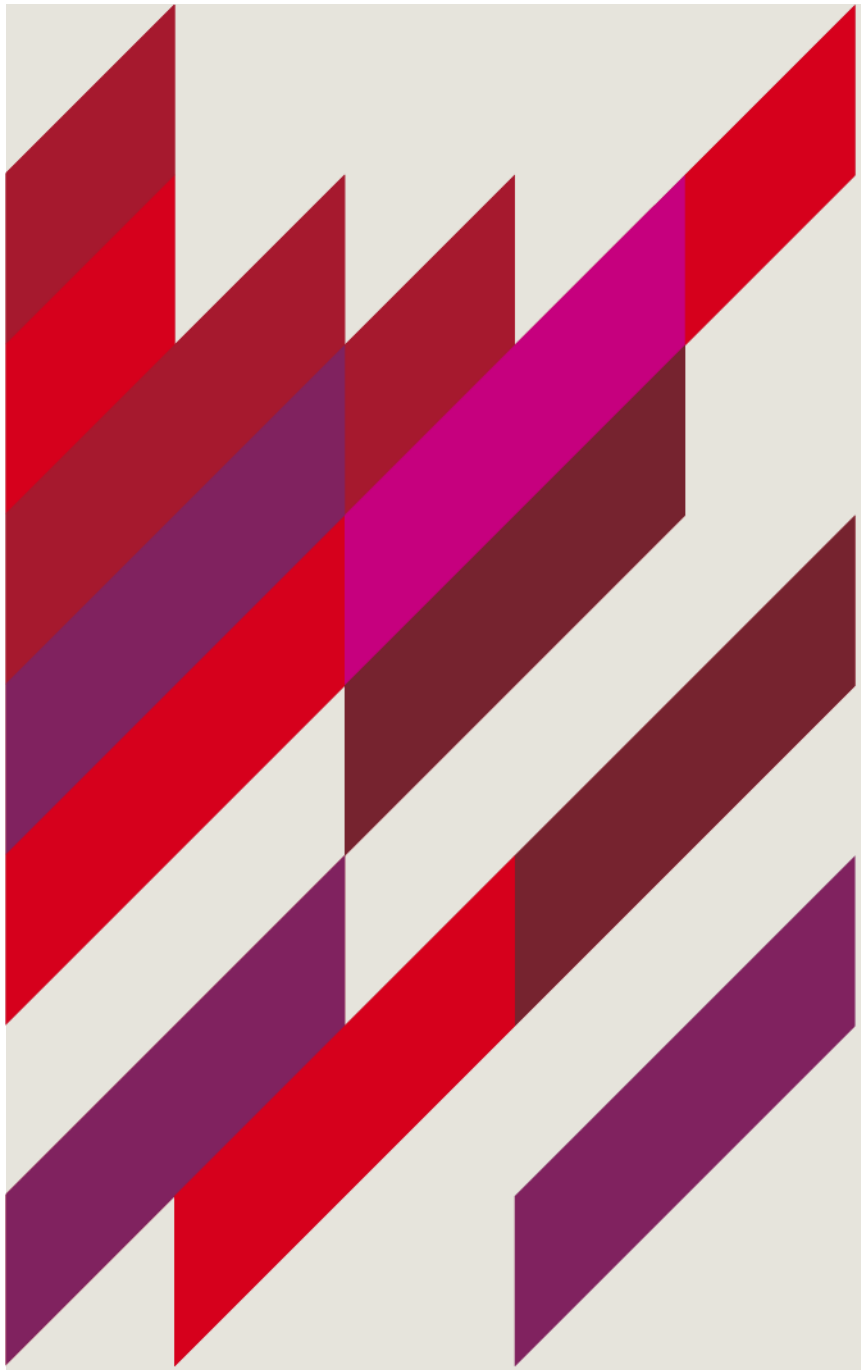
Blockages and fractures



[Westfall, et al. 2007. Practice-based research]



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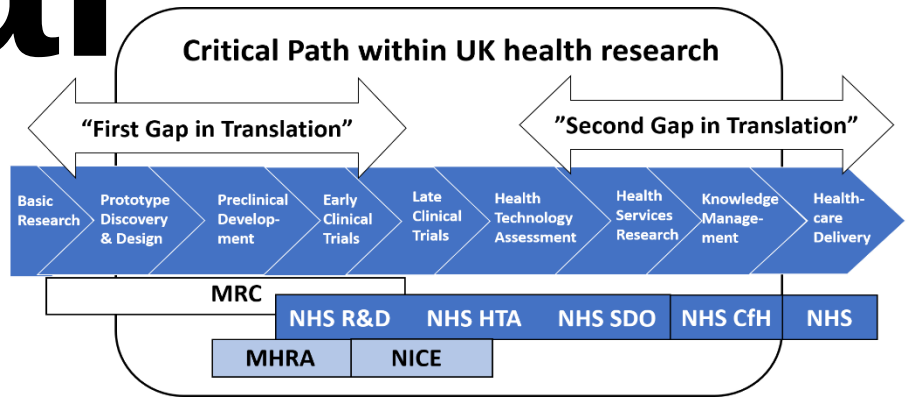
Part 3: Another challenge is it's a complex system

Applications to healthcare

The pipeline model suggests solutions are linear



But the health system is complex – incredibly complex

Complex systems are everywhere

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So: how does care actually work?

Complexity Science in Health Care: *A White Paper*

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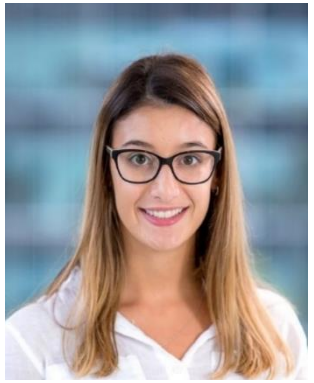

Key features of complexity in health care

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1. Populations of agents + artefacts
2. Interacting
3. Dynamically
4. With emergent rules and governance mechanisms, and bottom-up networks

Collaborations of Translational Cancer Research Network (TCRN)

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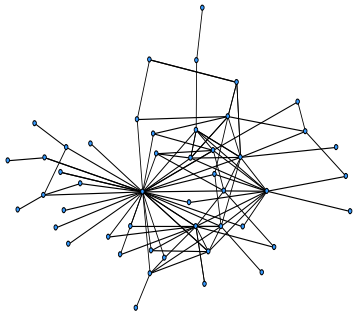
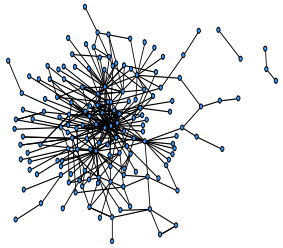
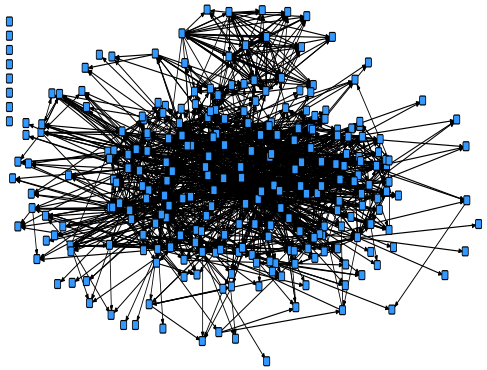
2012



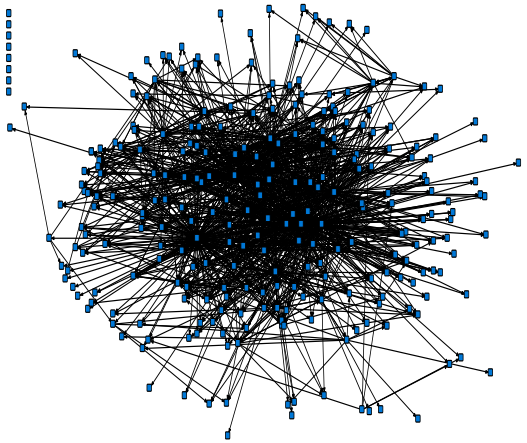
2013



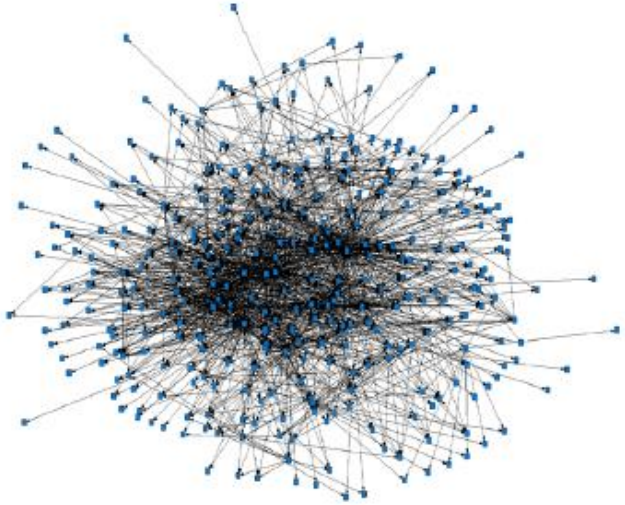
2015



2017



2021



Each dot represents a TCRN member, each line a collaborative tie.

[Source: Long et al., 2016. Implement Sci.]

Creating a learning community with Australian Genomics

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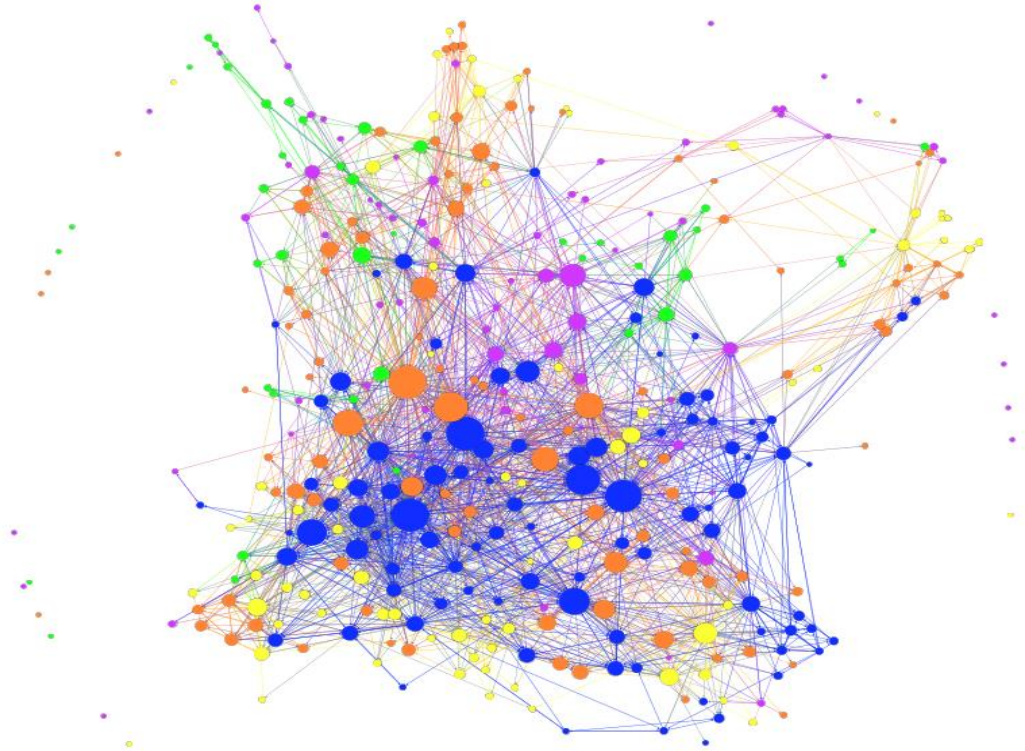
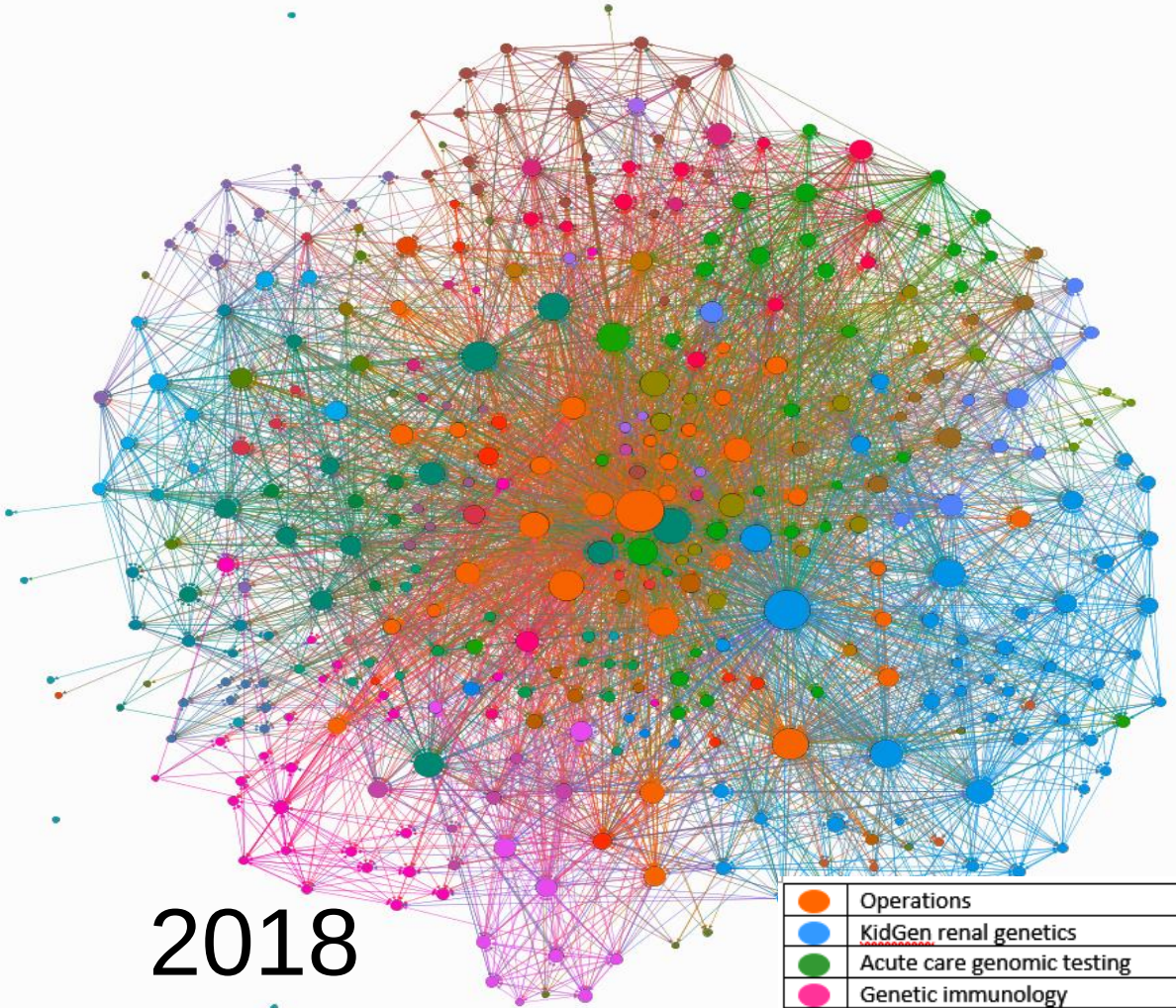


Pre-2016

(before Australian Genomics)
Ties=2,925; Nodes=384

	Medical scientist
	Genetic specialist
	Other
	Medical specialist
	Researcher



2018

Ties=6,381; Nodes=384

	Operations
	KidGen renal genetics
	Acute care genomic testing
	Genetic immunology
	Cardiovascular genetic disorders
	National steering committee
	Acute lymphoblastic leukemia

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Part 4: More about Learning Health Systems

Going deeper: definitions and empirical evidence

Defining a Learning Health System – more information

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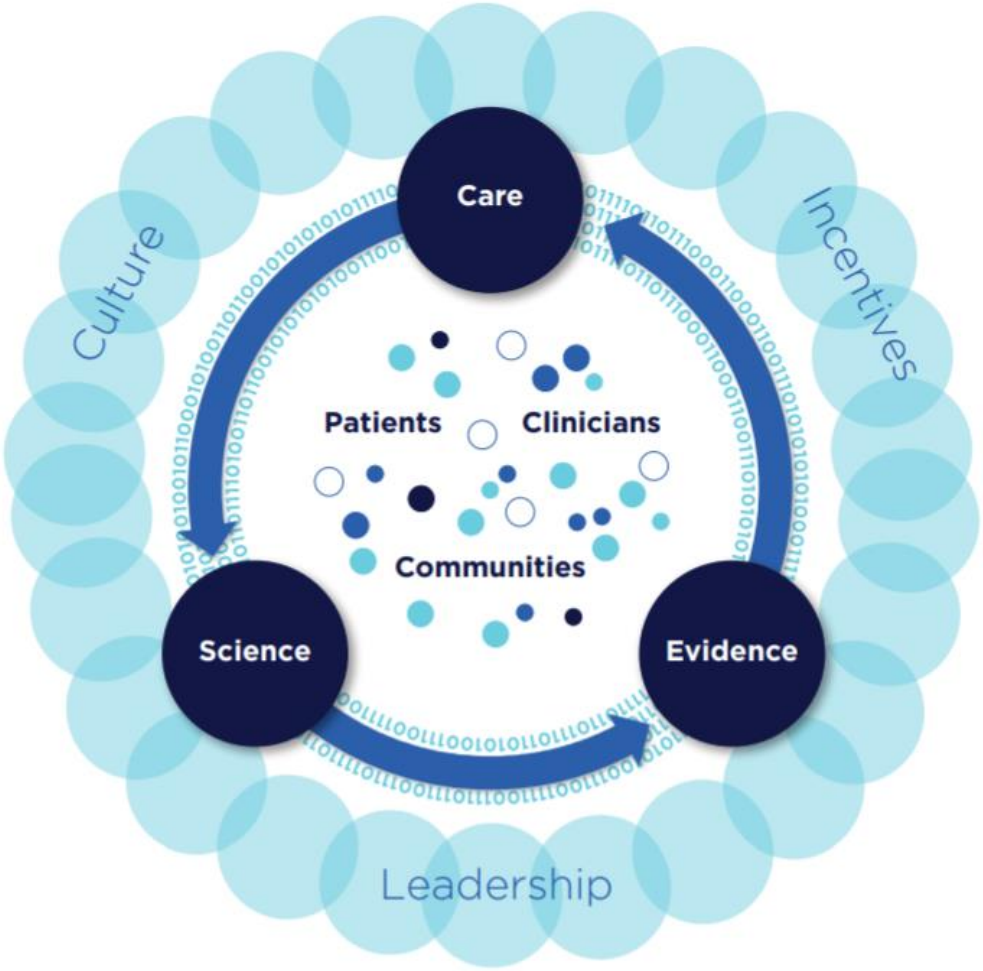

A Learning Health System is a system in which *"Science, informatics, incentives, and culture are aligned for continuous improvement and innovation, with best practices seamlessly embedded in the care process, patients and families active participants in all elements, and new knowledge captured as an integral by-product of the care experience".* (Institute of Medicine, 2007)

[Source: Institute of Medicine. Best Care at Lower Cost: The Path to Continuously Learning Health Care in America. Washington (DC): The National Academies Press; 2013.]

Learning Health Systems: A review of key topic areas and bibliometric trends (2022)

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RESEARCH REPORT

Learning Health Systems

Learning health systems: A review of key topic areas and bibliometric trends

Chiara Pomare[1] | Zeyad Mahmoud[1] | Alex Vedovi[1,2] | Louise A. Ellis[1,2] | Gilbert Knaggs[1,2] | Carolynn L. Smith[1,2] | Yvonne Zurynski[1,2] | Jeffrey Braithwaite[1,2]

[1]Australian Institute of Health Innovation, Macquarie University, Sydney, Australia
[2]Partnership Center for Health System Sustainability, Macquarie University, Sydney, Australia

Correspondence
Chiara Pomare, Australian Institute of Health Innovation, Macquarie University, Sydney, New South Wales 2109, Australia.
Email: chiara.pomare@mq.edu.au

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Abstract

Introduction: The emergent field of learning health systems (LHSs) has been rapidly evolving as the concept continues to be embraced by researchers, managers, and clinicians. This paper reports on a scoping review and bibliometric analysis of the LHS literature to identify key topic areas and examine the influence and spread of recent research.

Methods: We conducted a scoping review of LHS literature published between January 2016 and May 2020. The authors extracted publication data (eg, journal, country, authors, citation count, keywords) and reviewed full-texts to identify: type of study (empirical, non-empirical, or review), degree of focus (general or specific), and the reference used when defining LHSs.

Results: A total of 272 publications were included in this review. Almost two thirds (65.1%) of the included articles were non-empirical and over two-thirds (68.4%) were from authors in the United States. More than half of the publications focused on specific areas, for example: oncology, cardiovascular care, and genomic medicine. Other key topic areas included: ethics, research, quality improvement, and electronic health records. We identified that definitions of the LHS concept are converging; however, many papers focused on data platforms and analytical processes rather than organisational and behavioural factors to support change and learning activities.

Conclusions: The literature on LHSs remains largely theoretical with definitions of LHSs focusing on technical processes to reuse data collected during the clinical process and embedding analysed data back into the system. A shift in the literature to empirical LHS studies with consideration of organisational and human factors is warranted.

KEYWORDS
bibliometrics, healthcare, learning health systems, learning healthcare systems

1 | INTRODUCTION

Contemporary health systems are not fit for purpose. Even in the most developed countries less than two-thirds of healthcare delivered is in line with evidence-based guidelines (60%); one third of care is some form of waste (30%) and one tenth (10%) of it is associated with an adverse event.[1] These numbers have persisted for decades despite substantial efforts and resources dedicated to improving the safety

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- We conducted a scoping review of 272 included papers
- 65.1% of articles were non-empirical
- 68.4% from US-based authors
- We found that definitions of the LHS are converging
- Most papers focus on data platforms, rather than organisational and behavioural factors

[Pomare, C, Mahmoud, Z, Vedovi, A, et al. Learning health systems: A review of key topic areas and bibliometric trends. *Learn Health Sys*. 2022; 6:e10265. https://doi.org/10.1002/lrh2.10265]

The Learning Health Systems Framework

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Buzz with your neighbour …

Is this a model you can use - the IoM/Zurynski-Braithwaite model?

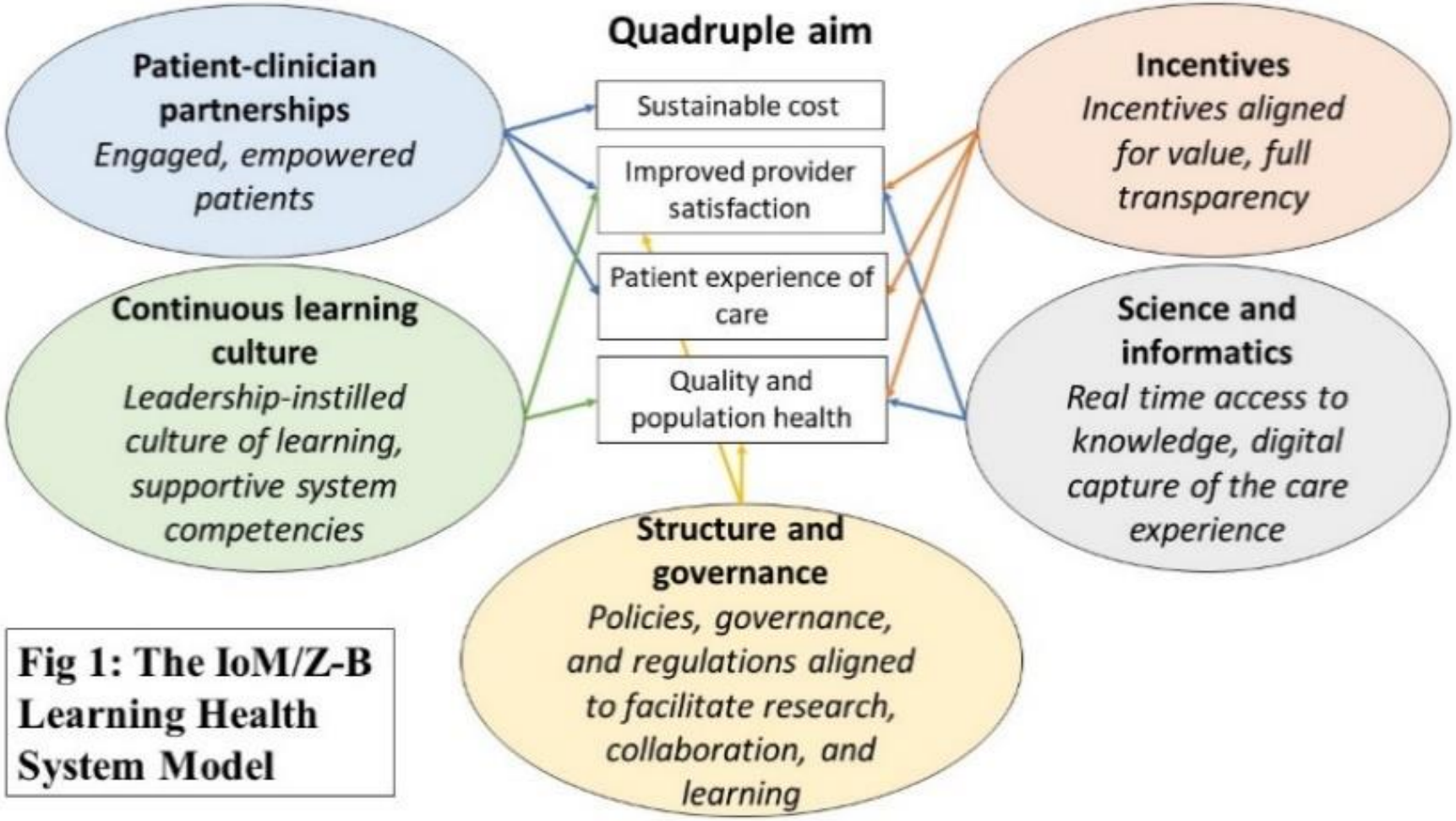

Fig 1: The IoM/Z-B Learning Health System Model

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Part 5: LHS case studies

Selected exemplars

Case study: Veterans Health Administration (VHA)

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- The VA provides healthcare to 9 million military veterans each year and is the largest publicly funded healthcare delivery system in the USA.
- It consists of 1,293 healthcare facilities including 171 medical centres and 1,112 outpatient sites

VA | U.S. Department of Veterans Affairs

Case study: Veterans Health Administration (VHA)

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Science and informatics		Patient-clinician partnerships	Incentives		Culture	
Real time access to knowledge	Digital capture of the care experience	Engaged, empowered patients	Incentives aligned for value	Full transparency	Leadership-instilled culture of learning	Supportive system competencies
National Corporate Data Warehouse enabling performance tracking Providing clinicians with access to multiple dashboards to track quality relative to their peers	Systemwide eHRs Daily processing of more than two million lab results 500,000 pharmacy fills, and 400,000 patient encounters	My HealtheVet web portal allows patients to access and update their health records, schedule appointments, and refill prescriptions	Clinicians are paid a salary so that remunerations is not based on care volume	Public reporting of large amounts of data on quality for both self-auditing purposes and for the benefit of unaffiliated researchers Providing clinicians with access to multiple dashboards to track quality relative to their peers	Academic affiliations in larger VHA hospitals, with many clinicians holding dual appointments	Diffusion of Excellence Program seeks to discover how VHA facilities are rewarded for sharing their best practices and to what degree such innovations are adopted elsewhere in the system

[Zurynski Y, Smith CL, Vedovi A, Ellis LA, Knaggs G, Meulenbroeks I, Warwick M, Gul H, Pomare C, Braithwaite J. Mapping the Learning Health System: A Scoping Review of Current Evidence. Australian Institute of Health Innovation, and the NHRMC Partnership Centre for Health System Sustainability, Sydney, Australia, 2020]

Geisinger Health System

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- Geisinger Health is based in Pennsylvania and services over 3 million patients across the state, predominantly in rural areas.

Geisinger

- Geisinger aims to deliver high quality care at a low cost, with a focus on population health.

Geisinger Health System

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Real time access to knowledge	Digital capture of the care experience	Engaged, empowered patients	Incentives aligned for value	Full transparency	Leadership-instilled culture of learning	Supportive system competencies
Robust eHR system that feeds genomic data back into the sequence and allows for data analysis to improve genetic variant annotation, creating a cycle	Stable enrolment of patients into eHR system within a robust informatics infrastructure allowing for the tracking patient experiences and outcomes over the long term Over 180,000 patients had consented to contribute their genomic data	MyCode Community Health Initiative (biorepository) relies on opt-in consent, and of those approached, 85-90% agree to participate Informatics infrastructure with security requirements and stores patient data behind a system firewall to protect patient information	Paying clinicians a salary so that their remuneration is not based on care volume	eHR and genomic data variants are reported back to patient participants, while also being deposited into publicly available databases	The goal of establishing an LHS has been embraced by the organisation's leadership, who have aimed to develop conceptual and business models for moving toward a learning culture	Emphasis on continual quality improvement and the promotion of best practices checklists for physicians

The Ottawa Hospital

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- The Ottawa Hospital is a three campus acute care facility in Canada and one of the main providers of cancer treatment in the Ottawa region.

- The Ottawa Hospital operates with a transformation model. It aligns several domains: people, processes and technology.

The Ottawa Hospital

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Process monitoring and business intelligence tools allowed for the local generation of dashboards to visualise and track performance metrics at a provincial level, create alerts and queries to monitor individual and clinical team performance	Process monitoring and business intelligence tools that integrate process-related data were also employed to establish a learning cycle and create insights on system performance	Patients were among the stakeholder groups engaged – through interviews – in the system redesign	N/A	Consensus approach to the initiative's creation led to general buy-in among most relevant stakeholders and their ability to access and benefit from the process monitoring and business intelligence tools implemented in the restructuring	Reported buy-in from leaders of the academic and community hospitals	Operating with a conceptual focus of a "health region" as a geographic unit of implementation, the OHTM brought about the establishment of a "regional Community of Practice" to engage stakeholders

MQ Health General Practice

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- MQ Health General Practice operates across two sites and is a department of MQ Health, a not-for-profit health enterprise.
- MQ Health includes a private hospital, specialist clinics, allied health clinics, digital mental health services and an affiliation with the university's medical faculty.

MQ Health

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HEALTH SCIENCES CENTRE

MQ Health General Practice

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Science and informatics		Patient-clinician partnerships	Incentives		Culture	
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Access to subscription only platforms through Macquarie University Lunchtime teaching sessions on topical health issues Access to clinical auditing tool to provide practitioners with overview of their patient cohort	Trialling implementation of 'MyPractice' App which provides patients with access to referrals, prescriptions, certificates Use of online booking system	Opportunities for patients to leave Google reviews Patient focus groups to discuss the implementation of 'MyPractice' App	Paying clinicians a salary so that their remuneration is not based on care volume	*In progress:* the practice is in the process of designing a way to publish metrics on patient health outcomes, centred around the Quadruple Aim	Affiliation with University medical school providing teaching and learning opportunities for staff Research opportunities for practice staff Opportunities for learning through educational sessions and grand rounds	Regular meetings involving clinical and non-clinical staff that address quality improvement

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Part 6: An LHS toolkit

Available for you

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A world-first launch in August, 2023

A Learning Health System Toolkit

THE LEARNING HEALTHCARE PROJECT

How do we build a Learning Health System?

The Learning Health Systems Toolkit

HOME ABOUT FIND TOOLS ALL TOOLS SUBMIT A TOOL SEARCH TOOLS

Navigate Tools

The Wheel shows the key components of an LHS: strategy, complexity and technology. You can click on the Wheel's rings to further navigate the categories and subcategories of Tools in the toolkit. You can find more information about the key LHS components and the subject terms used at Learning Healthcare Systems website, LHS components.

CLICK ON A TILE TO EXPLORE RELATED TOOLS

Tools to help you understand and manage strategic issues within your Learning Health System

Structure Designing Organisational Structures	**Workforce** Managing Workforce Issues	**Behaviour** Achieving behaviour change
Co-Design Involving Stakeholders	**Culture** Understanding and changing organisational culture	**Evaluation** Evaluating effectiveness
Implementation Implementation Science	**Maturity** Measuring Maturity	**Strategy** Defining LHS strategy

https://lhstoolkit.learninghealthcareproject.co.uk

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Part 7: Implementing the LHS model

Models for creating LHSs through transformation

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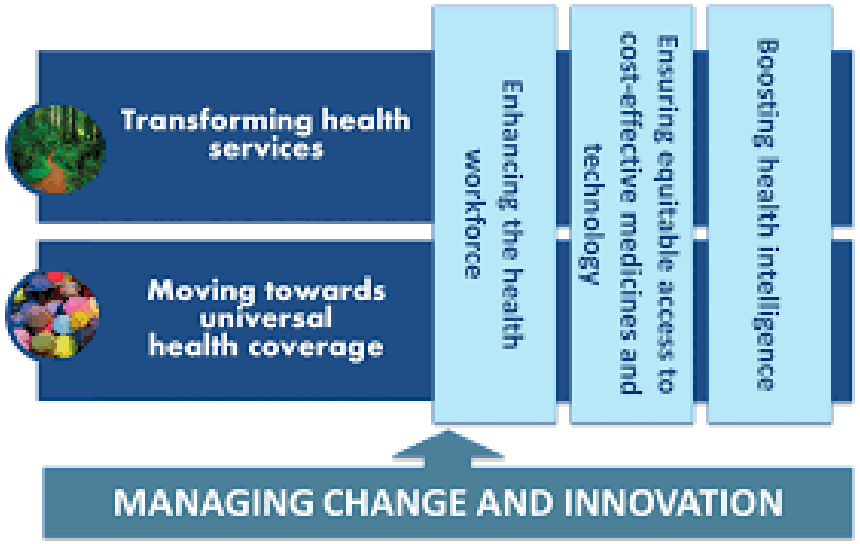
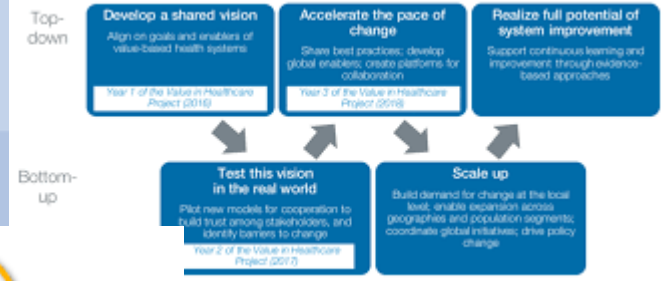
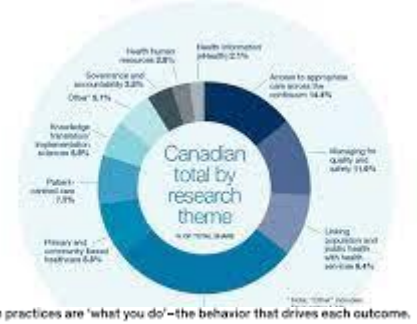
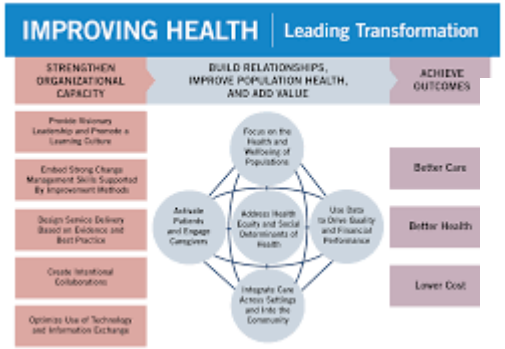
By the World Health Organisation



By lots of other people

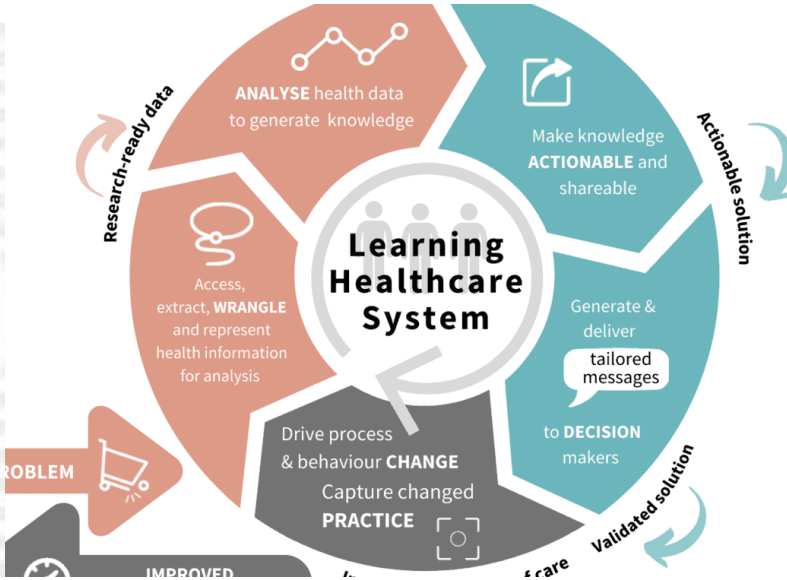


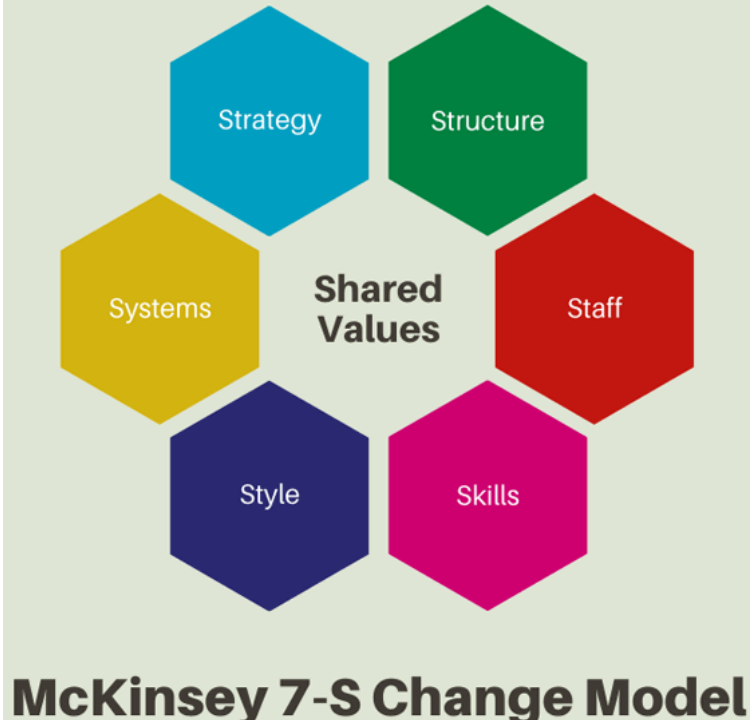




ADKAR Change Management Model

Awareness Desire Knowledge Ability Reinforcement





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Renuka Chittajallu
Faran Naru
Sagda Osman
Maryam Vizheh
Darran Foo

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Prof Yvonne Zurynski
Dr Trent Yeend
Dr K-lynn Smith
Isabelle Meulenbroeks
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Dr Karen Hutchinson
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Dr Ann Carrigan
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Shalini Wijekulasuriya

Professional Research Administration
Elle Leask
Chrissy Clay
Romika Patel
Ella McQuillan

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A/Prof Peter Hibbert
Dr Louise Wiles
Dr Gaston Arnolda
Dr Rebecca Bilton
Ms Charlie Molloy
Dr Louise Raggett

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Dr Elizabeth Austin
Dr Collen Cheek
Dr Luke Testa
Dr Emilie Francis-Auton
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Health Outcomes
A/Prof Rebecca Mitchell
Dr Reidar Lystad
Dr Tolesa Okuba
Dr Seigo Mitsutake
Sandy Sa
Shalini Wijekulasuriya
Nicole Halim

NHMRC CRE Implementation Science in Oncology
Dr Gaston Arnolda
Dr Bróna Nic Giolla Easpaig
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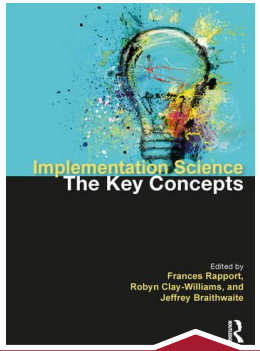
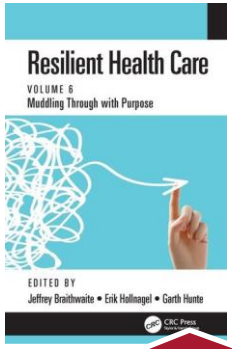
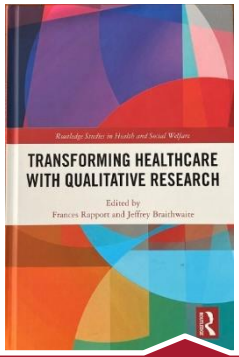


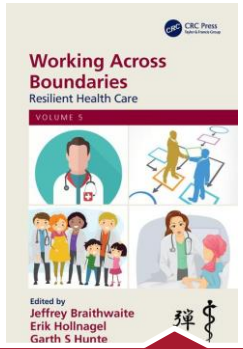
2022 – Transforming Healthcare with Qualitative Research



2021 – Muddling Through With Purpose



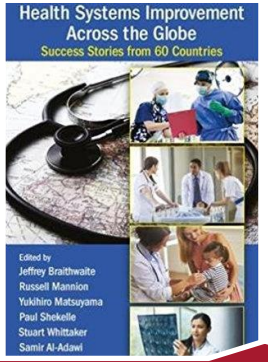
2020 – Transforming Healthcare with Qualitative Research



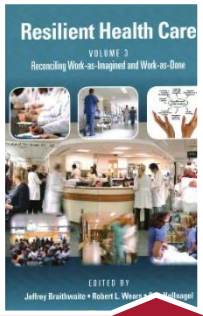
2019 – Working Across Boundaries

2018 – Delivering Resilient Health Care

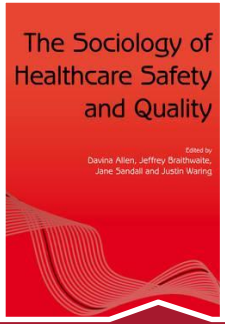
2018 – Healthcare Systems: Future Predictions for Global Care



2017 – Health Systems Improvement Across the Globe: Success Stories from 60 Countries

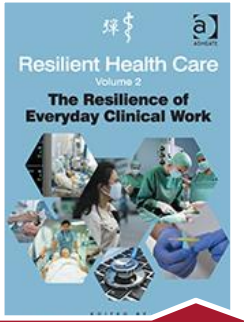


2017 – Reconciling Work-as-imagined and Work-as-done

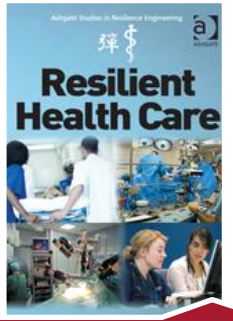


2016 – The Sociology of Healthcare Safety and Quality

2015 – Healthcare Reform, Quality and Safety: Perspectives, Participants, Partnerships and Prospects in 30 Countries



2015 – The Resilience of Everyday Clinical Work



2013 – Resilient Health Care

2010 – Culture and Climate in Health Care Organizations

Forthcoming books

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Gaps: the Surprising Truth Hiding in the In-between

Surviving the Anthropocene

Counterintuitivity: How your brain defies logic

Handbook on Climate Change and Health System Sustainability

Jeffrey Braithwaite PhD

FIML, FCHSM, FFPHRCP, FAcSS, Hon FRACMA, FAHMS

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Professor
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Sydney, Australia
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✉	Email:	jeffrey.braithwaite@mq.edu.au
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	Twitter:	@JBraithwaite1
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