



Implementation Science Meets Genomic Medicine: Ideas, Issues and Innovations

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Jeffrey Braithwaite, PhD, FAIM,
FCHSM, FFPHRCP, FAcSS, Hon FRACMA

Professor and Director
Australian Institute of Health
Innovation

Director
Centre for Healthcare
Resilience and
Implementation Science



Australian Institute of Health Innovation's mission



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Our mission is to enhance local, institutional and international health system decision-making through evidence; and use systems sciences and translational approaches to provide innovative, evidence-based solutions to specified health care delivery problems.

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- **Professor Jeffrey Braithwaite**

Foundation Director, AIHI; Director, Centre for Healthcare Resilience and Implementation Science

- **Professor Enrico Coiera**

Director, Centre for Health Informatics

- **Professor Johanna Westbrook**

Director, Centre for Health Systems and Safety Research



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Part 1: Introduction



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“After decades of improving the health care system, patients still receive care that is highly variable, frequently inappropriate, and too often, unsafe.”

The problem



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- Current understanding of how to effect large scale system change is poor
- Challenges:
 - **Translation [Implementation]**
 - **and Diffusion [Spread]**



The initial solution

- To do this we need partnerships:
 - ***Researchers***
 - ***Clinicians***
 - ***Policymakers***
 - ***Managers***
 - ***Patients***
 - ***Media***



The rest of the agenda



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Part 2: Defining translational research and implementation science

Part 3: Models, studies and theories for translational research and implementation science

Part 4: The future

Part 5: Conclusions



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Part 2: Defining translational research and implementation science



- Translational research
- Some see it as **‘knowledge translation’**- exchange, synthesis, and interaction between researchers and users
- Others say its about clinical trails, taking research from the **‘bench-to-bedside’**

Translational research



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- A study of 33 applied research funding agencies across nine countries identified 29 terms related to the definition of translational research
- Many thought of it as the **bench-to-bedside** process of **transferring basic knowledge** into new technologies
- Is a process of taking current **scientific knowledge** and ensuring it is applied in **routine clinical care**

Implementation science



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- Promotes the systematic uptake of clinical research findings [on **effectiveness, reliability, safety** and **appropriateness** in health care] and puts these into practice
- Includes the study of influences on **healthcare professional** and **organisational behaviour**

Implementation science



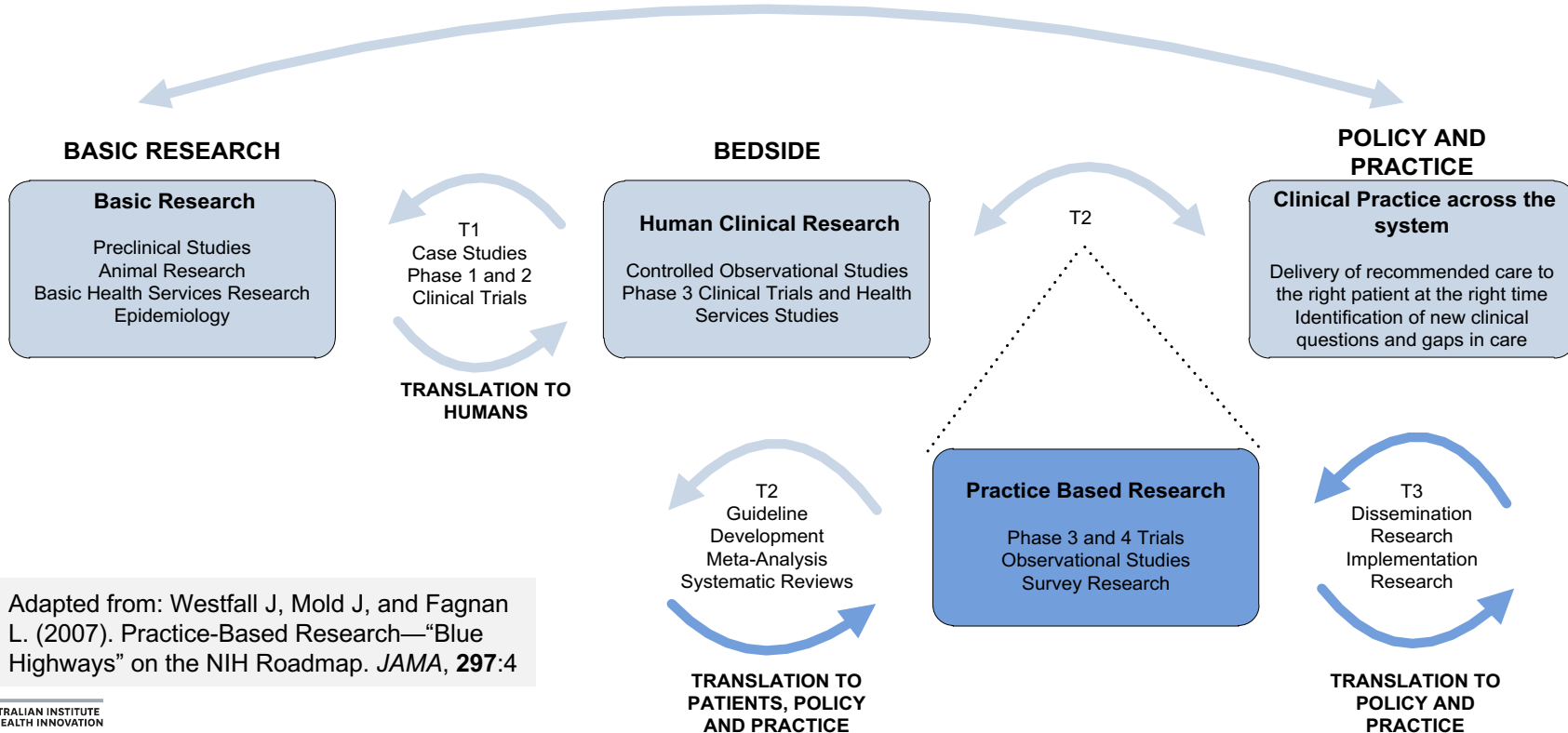
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- Helps explains why, within complex adaptive systems like health services, interventions that work in one setting may **not spread** to other settings
- Seeks to explain **variance in translational outcomes** based on the impact of local context

T1 T2 T3 as seen by the Cancer Institute, NSW



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Adapted from: Westfall J, Mold J, and Fagnan L. (2007). Practice-Based Research—“Blue Highways” on the NIH Roadmap. *JAMA*, **297**:4

So, what works at a local level?



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Interventions “generally effective” to reduce patient harm, improve process reliability or patient outcomes

- Clinical pathways; standardised protocols
- Audit and feedback
- Local opinion leaders
- Local consensus processes
- Small group interactive continuing medical education
- Electronic patient management systems

Sources: Cochrane Effective Practice and Organisation of Care Group (EPOC) <http://epoc.cochrane.org/epoc-reviews>;
Registered Nurses Association of Ontario (2002). Toolkit: Implementation of clinical practice guidelines. Toronto, Canada:
http://rnao.ca/sites/rnao-ca/files/BPG_Toolkit_0.pdf; Brand CA, Barker AL, Morello RT, Vitale MR, Evans SM, Scott IA, and
Stoelwinder JU, Cameron PA.(2012) A review of hospital characteristics associated with improved performance. *International
Journal for Quality in Health Care*, **24**:5; Scott I. (2009) What are the most effective strategies for improving quality and safety of
health care? *Internal Medicine Journal*, **39**:6

But ...



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- Number of **systematic reviews** published **each day**:

11

- Number of **randomised trials** published **each day**:

75



Part 3:

Models, studies and theories for translational research and implementation science



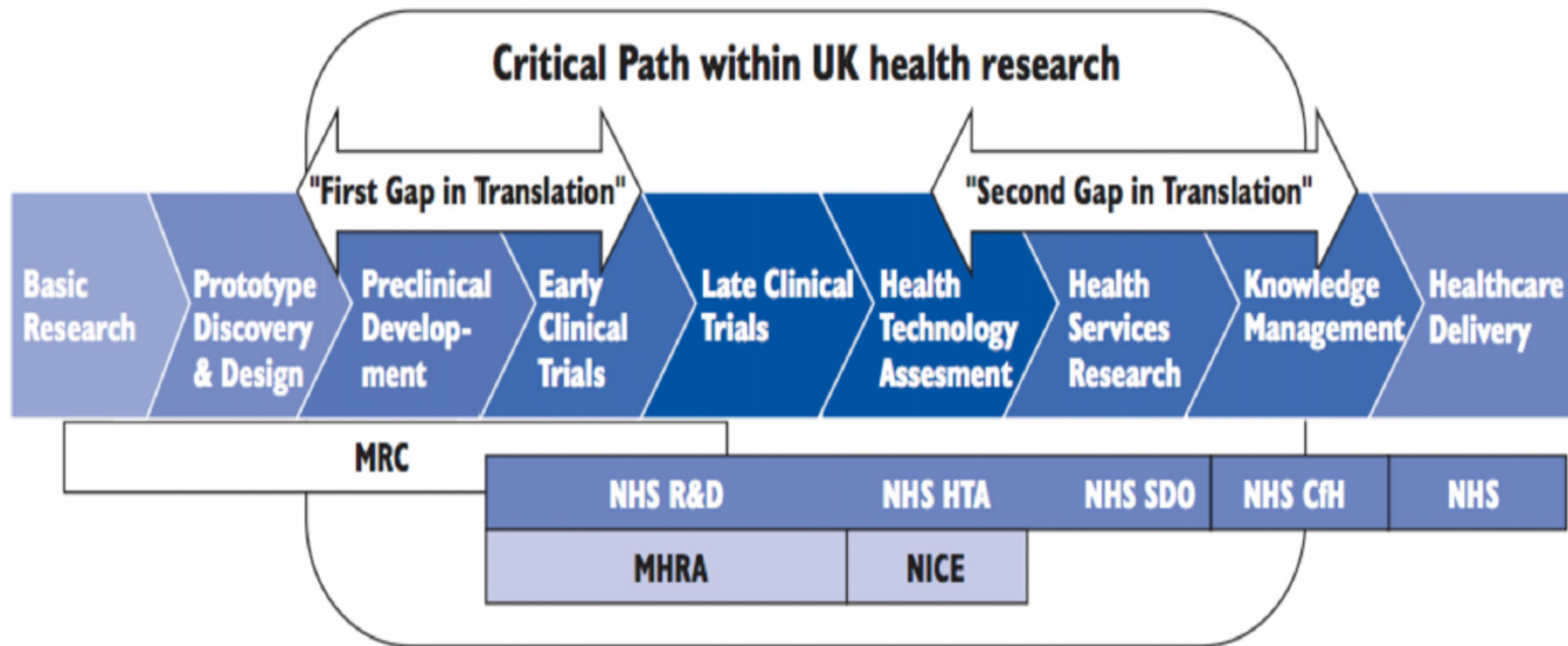
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Models

Model: Translation of health research into practice

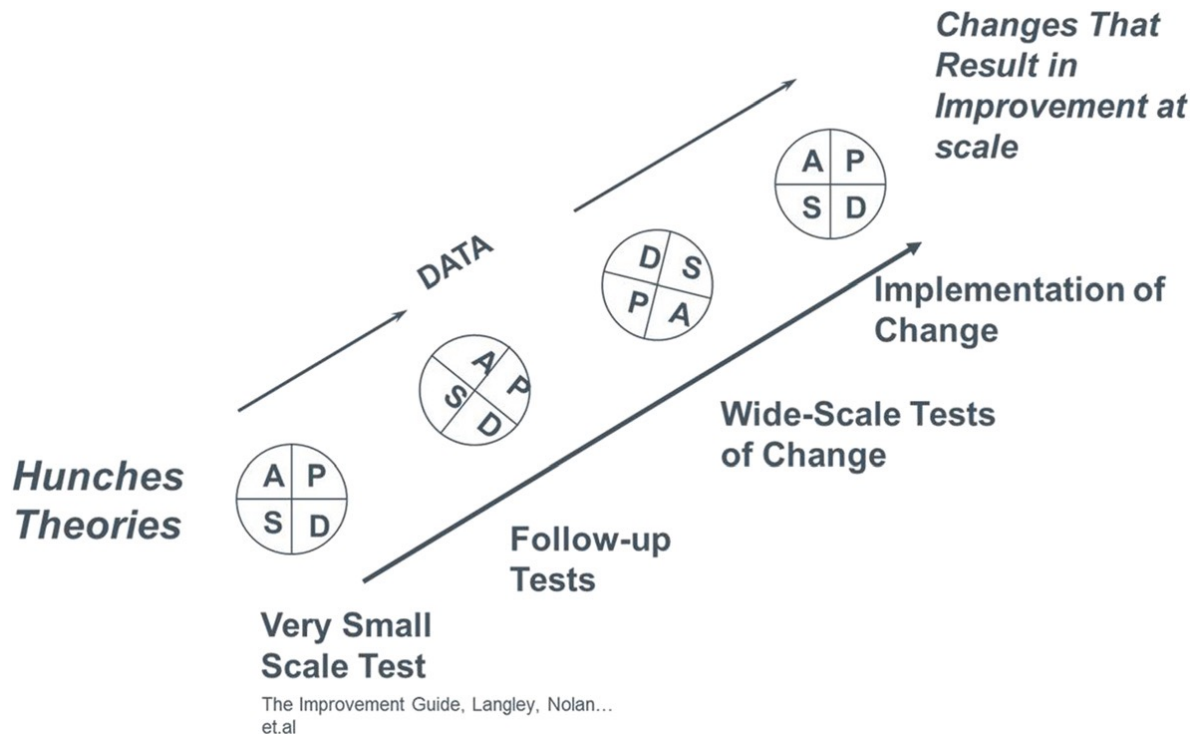


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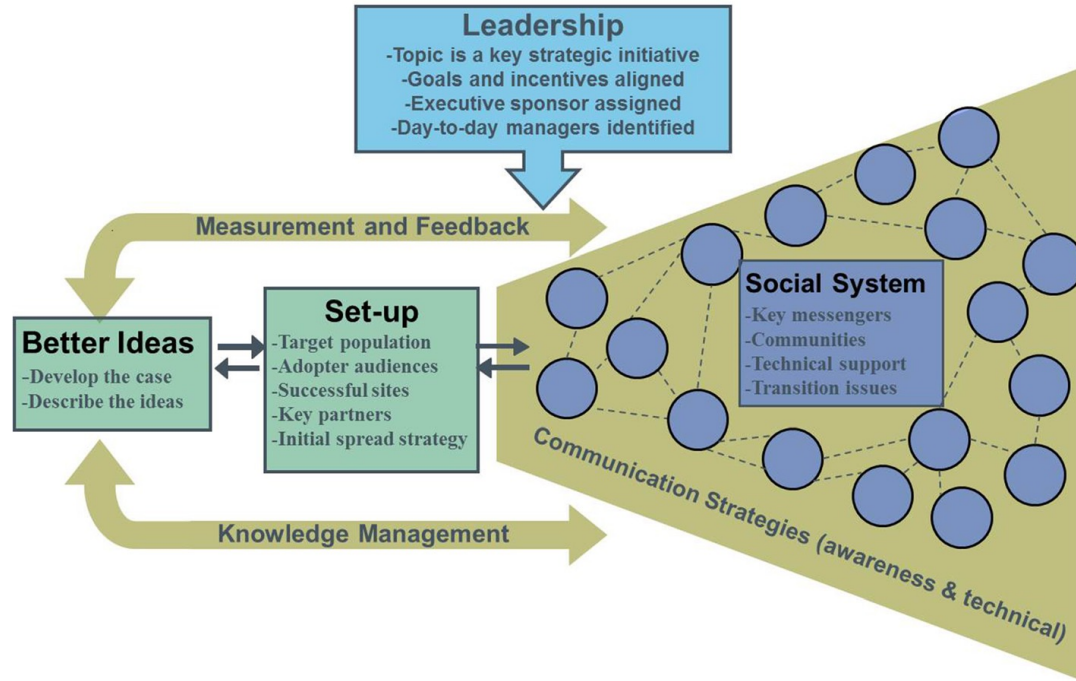
Source: Ogilvie D, Craig P, Griffin S, Macintyre S. and Wareham NJ.(2009) A translational framework for public health research. *BMC Public Health*, **9**:116.

Model: Improvement cycle



Source: Barker PM, Reid A, and Schall MW. (2016) A framework for scaling up health interventions: lessons from large-scale improvement initiatives in Africa. *Implementation Science*, 11:12

Model: Spread

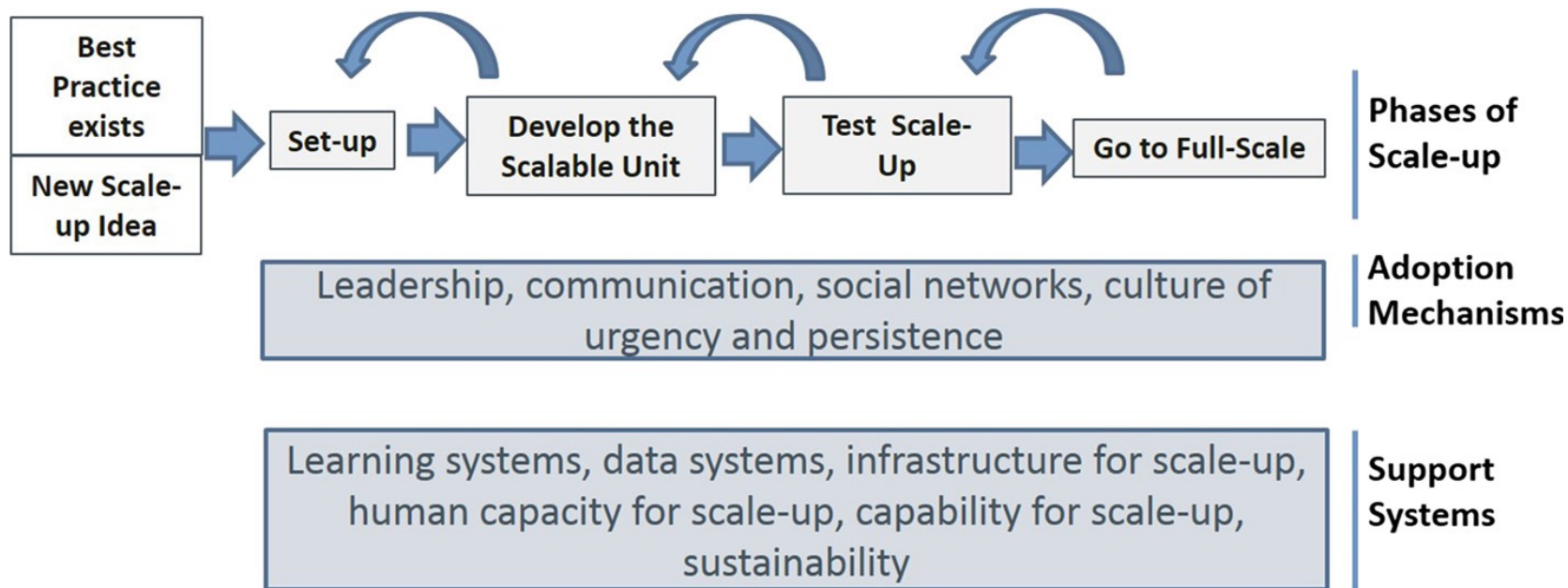


Source: Barker PM, Reid A, and Schall MW. (2016) A framework for scaling up health interventions: lessons from large-scale improvement initiatives in Africa. *Implementation Science*, 11:12

Model: Going full scale

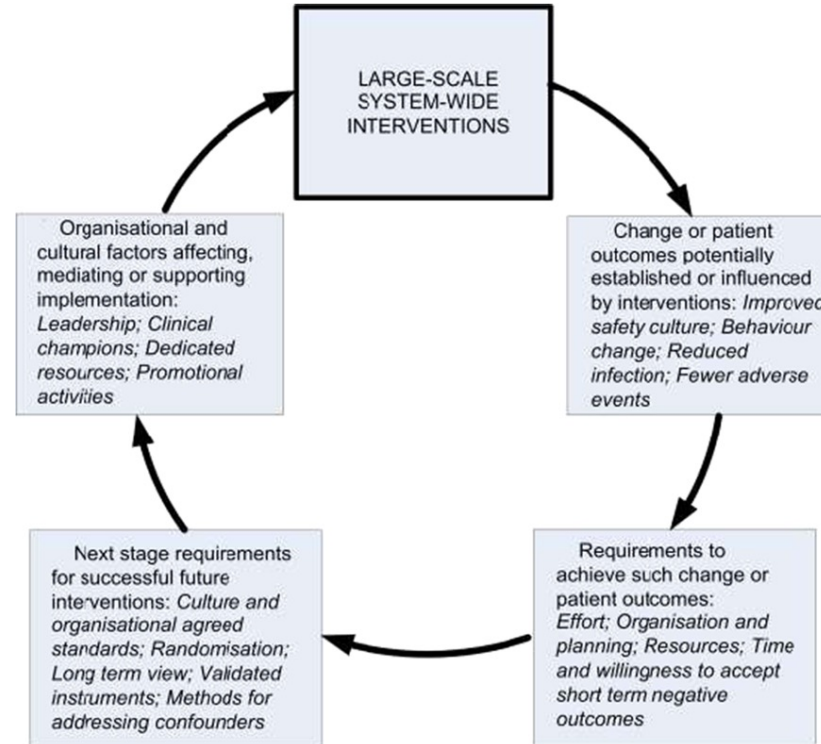


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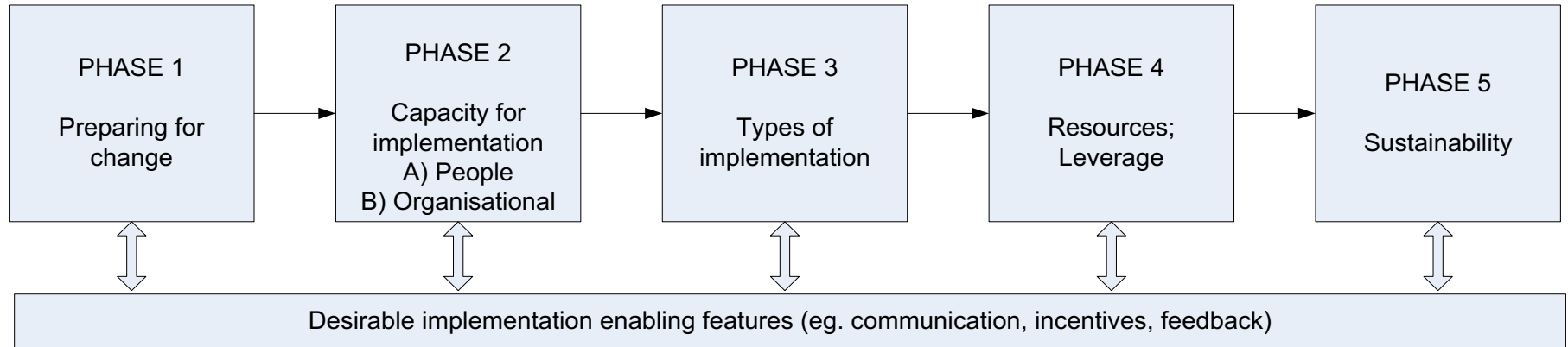
Source: Barker PM, Reid A, and Schall MW. (2016) A framework for scaling up health interventions: lessons from large-scale improvement initiatives in Africa. *Implementation Science*, 11:12

Model: Factors of implementation



Source: Clay-Williams R, Nosrati H, Cunningham FC, Hillman K, and Braithwaite J. (2014) Do large-scale hospital- and system-wide interventions improve patient outcomes: a systematic review. *BMC Health Services Research*, **14**:369.

Model: Implementation stages





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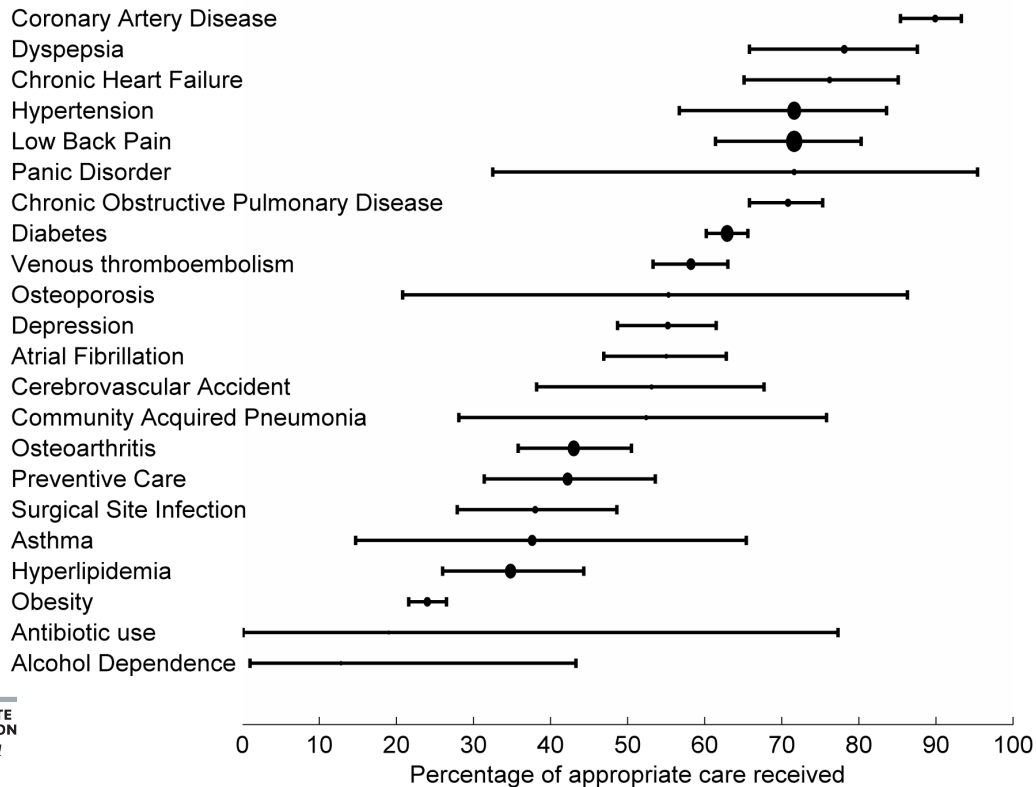
Studies

Study: CareTrack, eligible encounters at which appropriate care was received, 2009–2010



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Condition

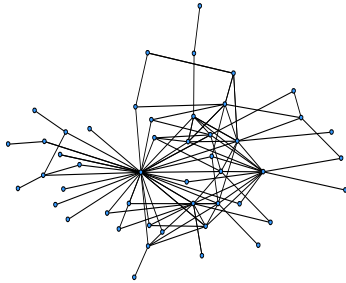


[Source: Runciman WB, Hunt TD, Hannaford NA, Hibbert PD, Westbrook JI, Coiera EW, Day RO, Hindmarsh DM, McGlynn EA, and Braithwaite J. (2012) CareTrack: assessing the appropriateness of health care delivery in Australia. *Medical Journal of Australia*, 197:2]

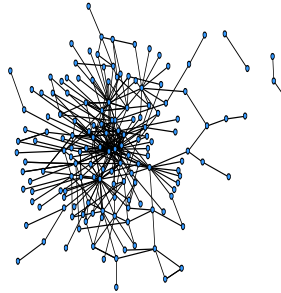
Translational Cancer Research Network – Eastern Sydney, Australia



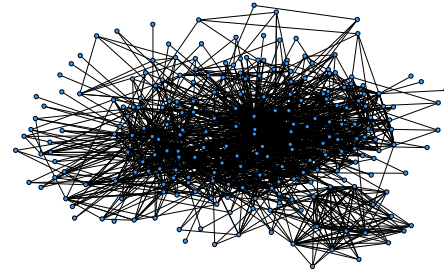
2012



2014



2015

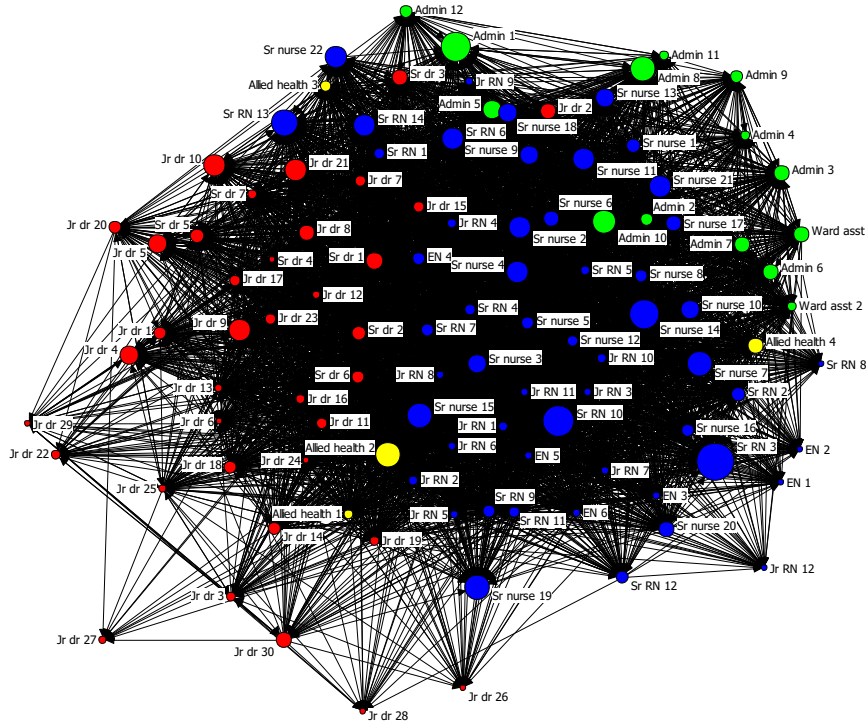


[Long, Hibbert, Braithwaite 2016, Structuring successful collaboration: a longitudinal social network analysis of a translational research network, *Implementation Science* 2016: 11 (19) DOI 10.1186/s13012-016-0381-y]

Study: Professional barriers to spread



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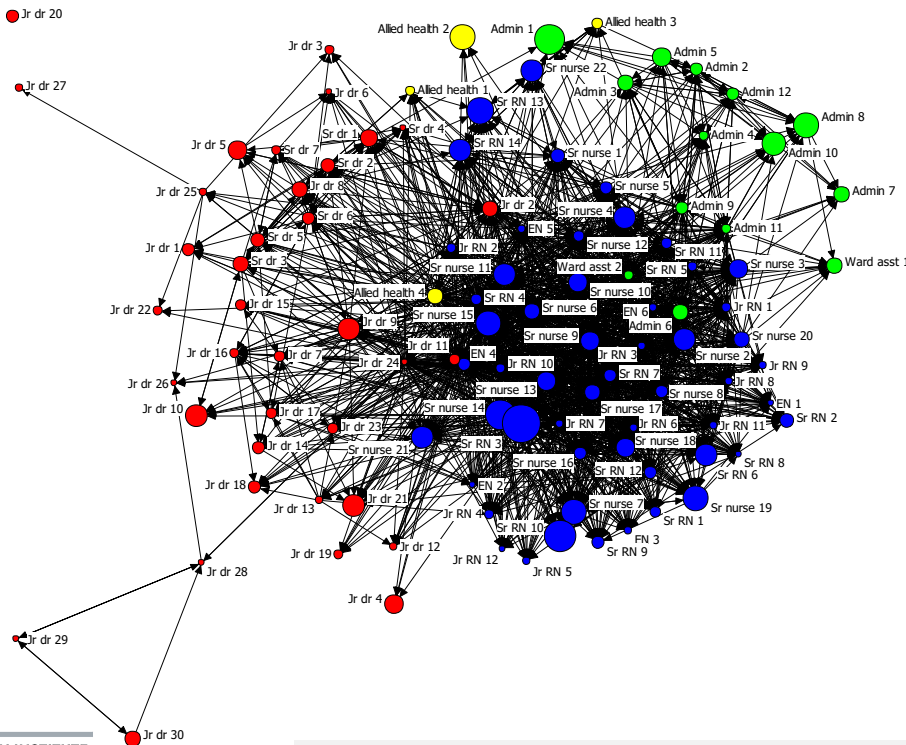
• Problem solving networks in an ED

- Nurses ●
- Doctors ●
- Allied health ●
- Admin and support ●

Study: Professional barriers to spread



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- **Socialising networks in an ED**

Nurses ●

Doctors ●

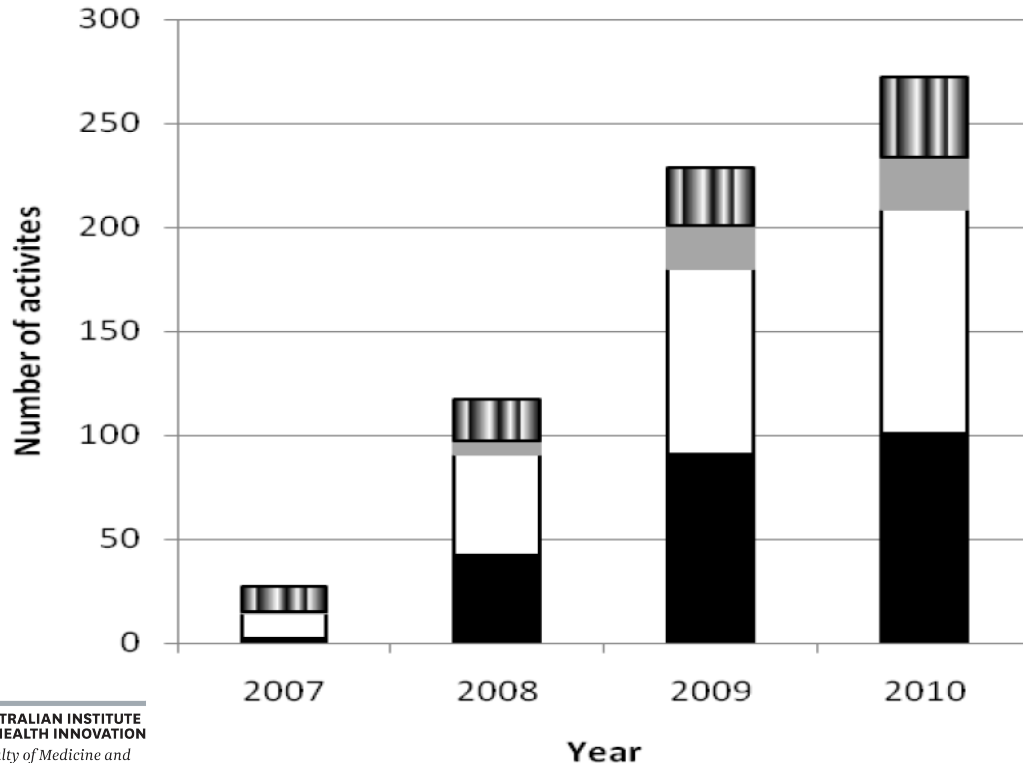
Allied health ●

Admin and support ●

Study: Interprofessional practice



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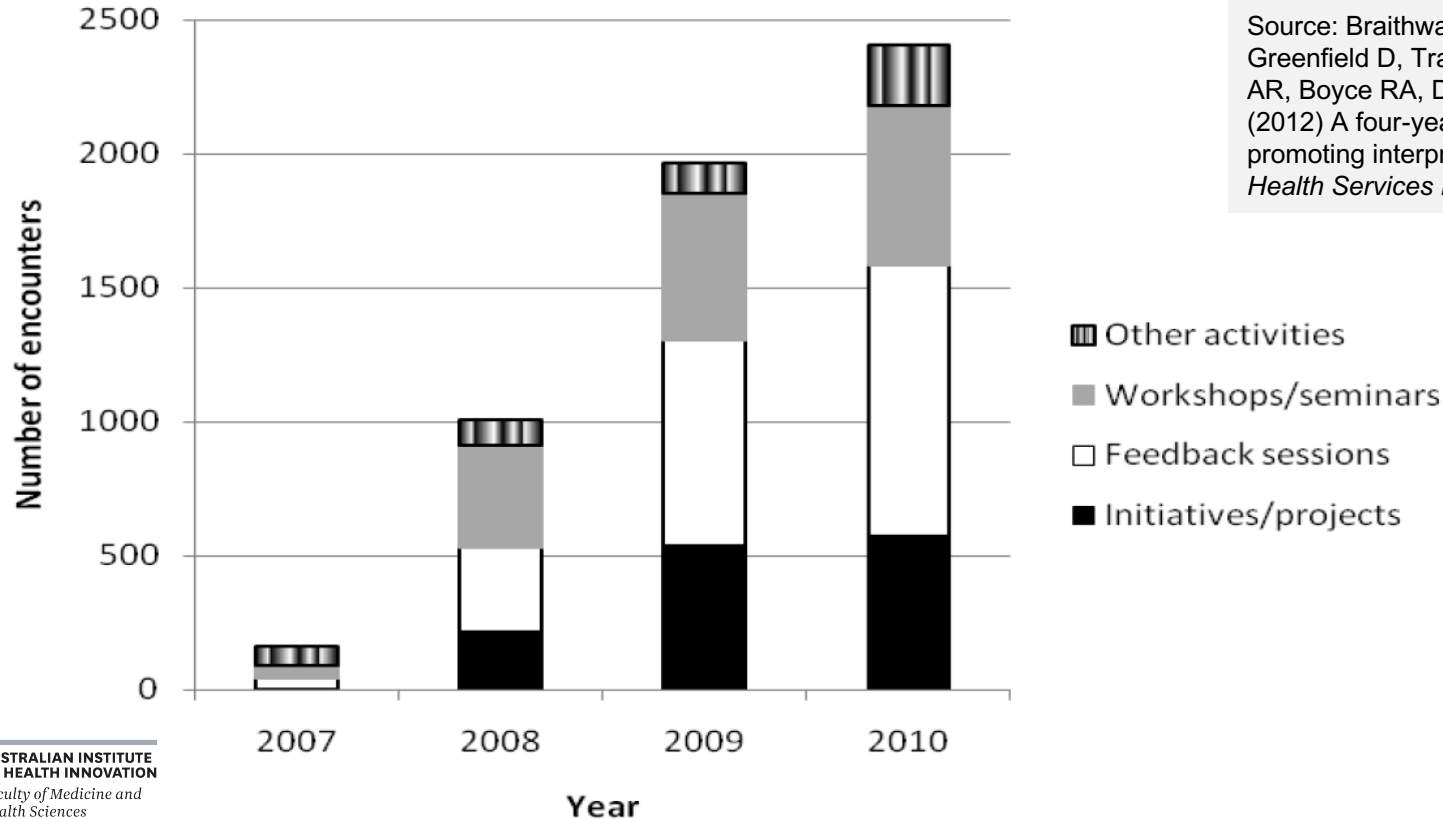


Source: Braithwaite J, Westbrook M, Nugus P, Greenfield D, Travaglia J, Runciman W, Foxwell AR, Boyce RA, Devinney T. and Westbrook J. (2012) A four-year, systems-wide intervention promoting interprofessional collaboration, *BMC Health Services Research*, 12:99

Study: Interprofessional practice



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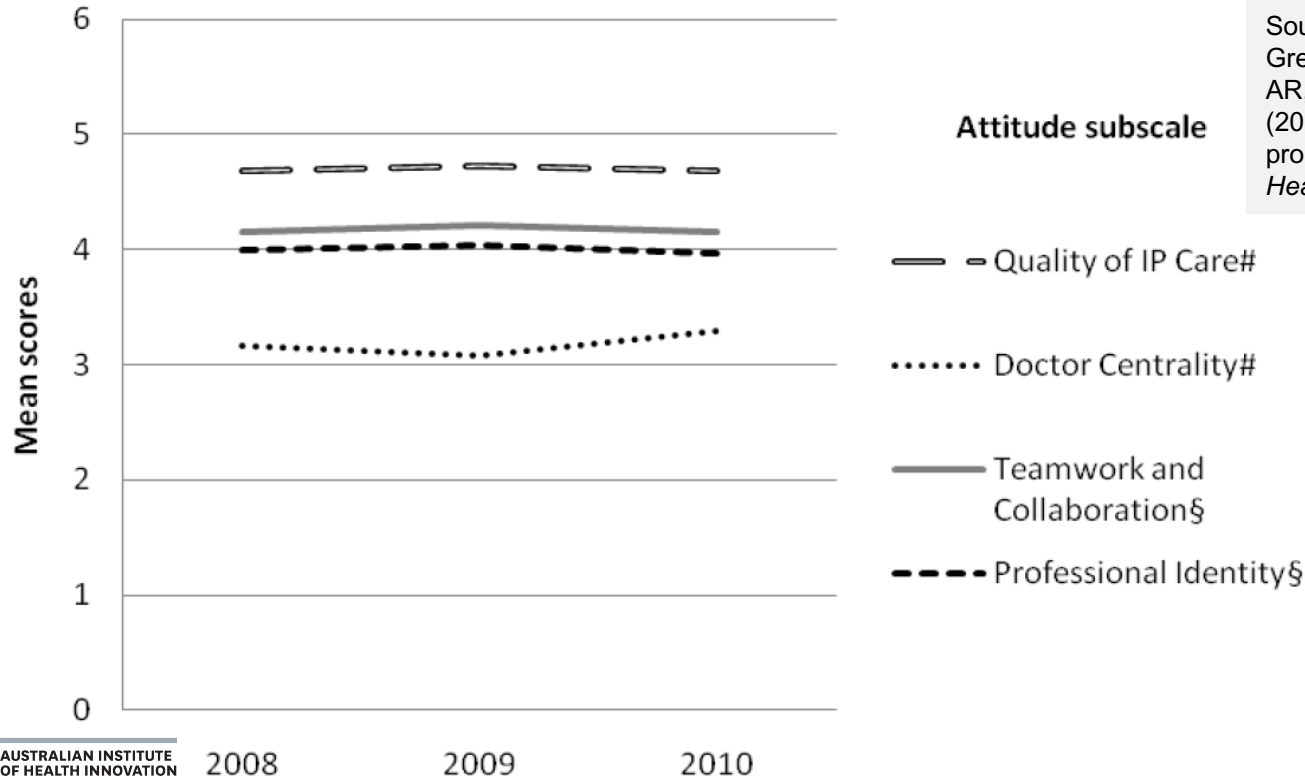


Source: Braithwaite J, Westbrook M, Nugus P, Greenfield D, Travaglia J, Runciman W, Foxwell AR, Boyce RA, Devinney T. and Westbrook J. (2012) A four-year, systems-wide intervention promoting interprofessional collaboration, *BMC Health Services Research*, **12:99**

Study: Interprofessional practice



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Source: Braithwaite J, Westbrook M, Nugus P, Greenfield D, Travaglia J, Runciman W, Foxwell AR, Boyce RA, Devinney T. and Westbrook J. (2012) A four-year, systems-wide intervention promoting interprofessional collaboration, *BMC Health Services Research*, 12:99

6 point scale



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Theories

Theory: PARIHS Framework



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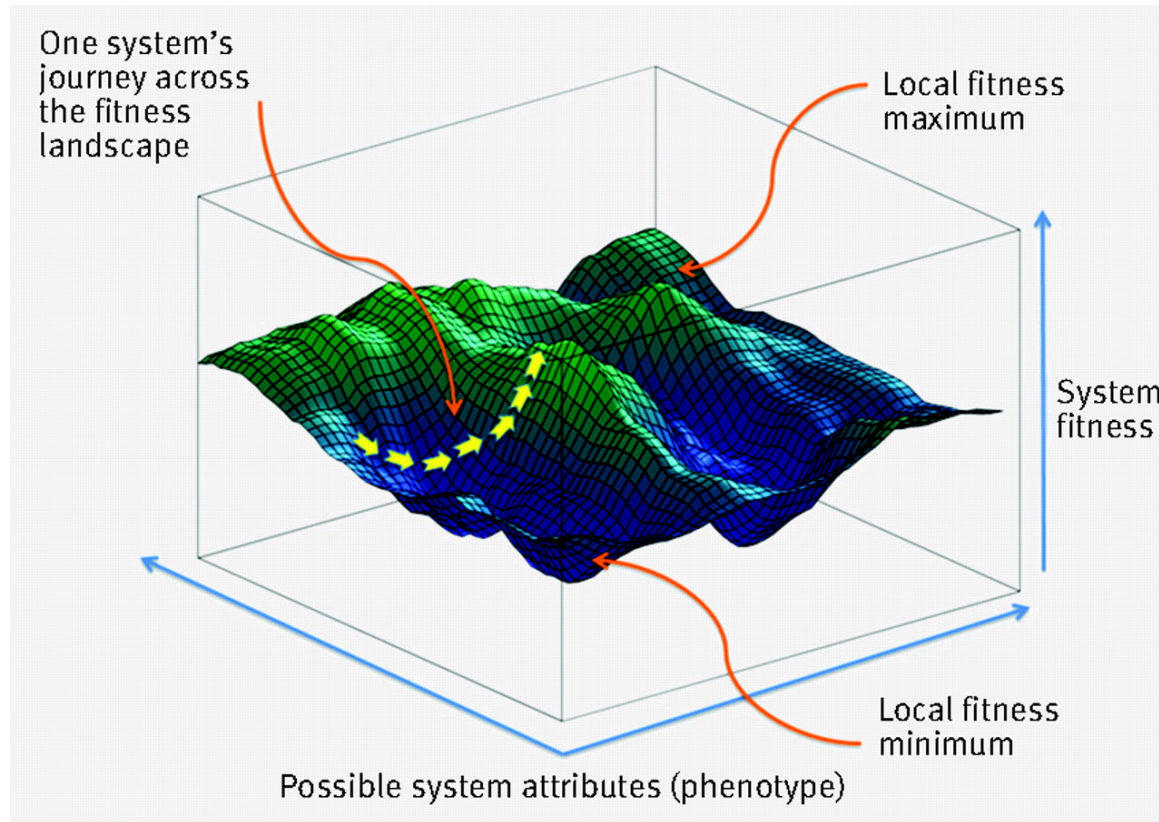
- The **P**romoting **A**ction on **R**esearch **I**mplementation in **H**ealth **S**ervices framework

$$SI = f(e, c, f)$$

Theory: Systems inertia



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Source: Coiera, E. (2011)
Why system inertia
makes health reform so
difficult. *BMJ*, 342:d3693

Literature Search



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Implementation Science; Genomic Medicine

Aim:

Conduct a literature search to identify articles and papers examining the nexus between implementation science and genomic medicine

Method:

- a) Search of titles/abstracts in PubMed on **April 27, 2017**
- b) Strategy: (((genom*) OR genom* AND revolution) OR human genom*)) AND ((Implement* AND science) OR improvement studies) OR change) OR PDSA cycle) OR translat* AND research))
- c) Select articles, papers with titles and/or abstracts that relate to the Aim

Implementation Science; Genomic Medicine

Results:

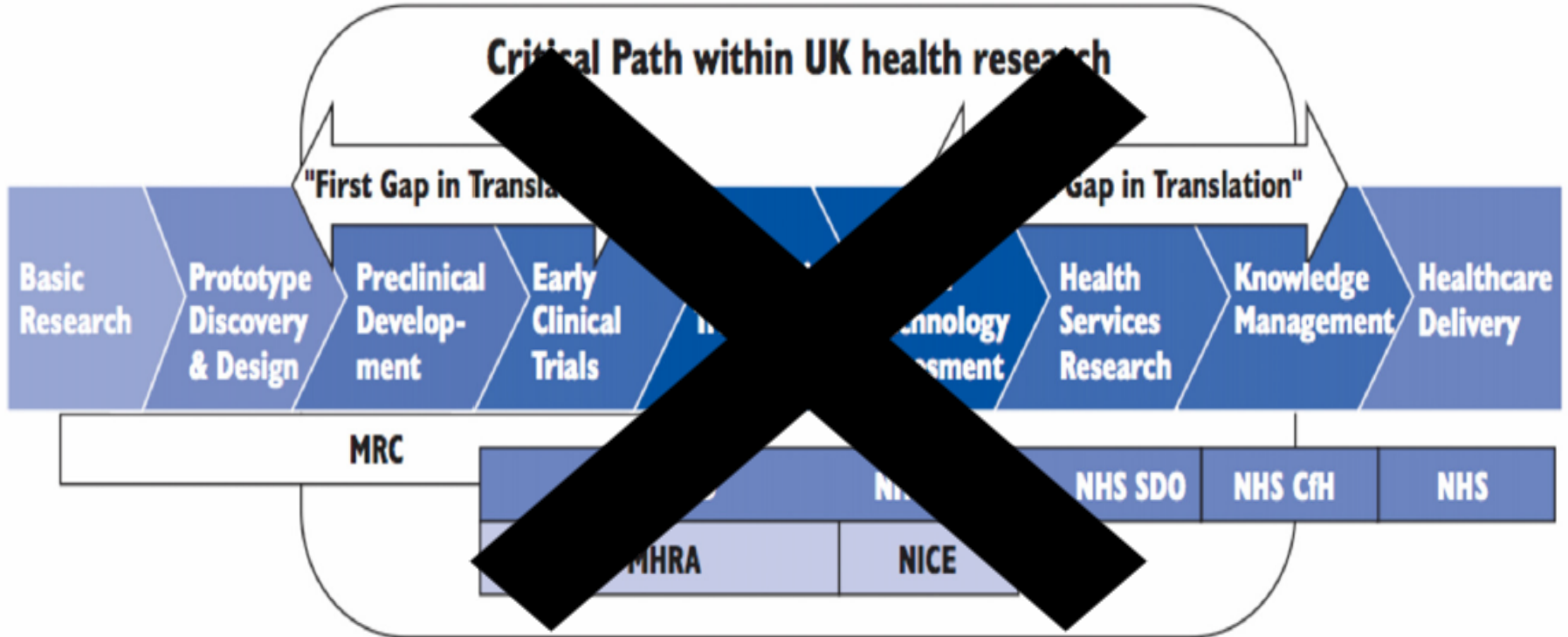
- a) 439 results; 399 full text papers
- b) Refined to 29 articles

Key messages:

- a) Bench to bedside and then population health is hard
- a) There's lots of barriers
- b) Clinicians, patients need tools, support, help



But health care translation doesn't look like this





Part 4: The future



The future—taking on the translational challenge



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- Knowing what to target
- Clinical standards, indicators and tools
- Big data
- Untapped resources at the frontline

..... Continued



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- Implementation and diffusion
- Levering eHealth
- Consumer mobilisation and engagement



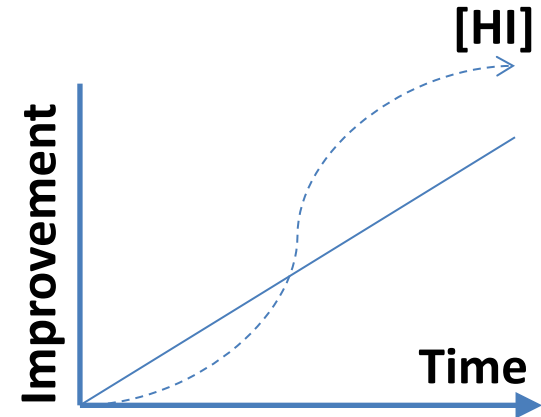
Part 5: Conclusions





Hypothesis I: Optimistic bias

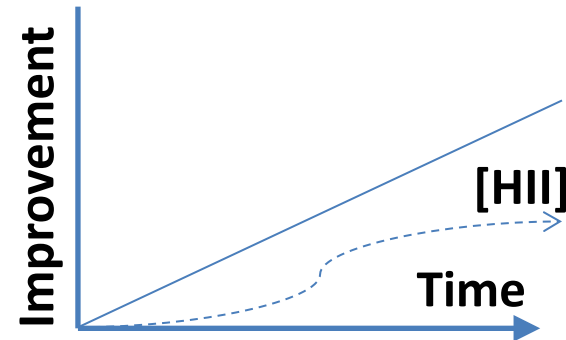
- Will we actually succeed with all this effort?
- American “can-do”, British “bulldog”, Swedish “doer”, Australian “convict”-ion
- This says yes, we will do well and get more evidence into practice and improve care
- Maybe better than hoped →





Hypothesis II: Pessimistic bias

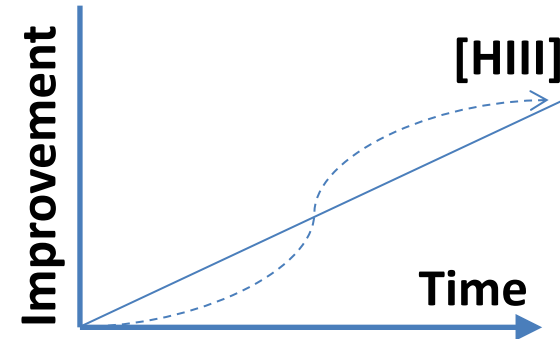
- Will we actually succeed with all this effort?
- Evidence: we have thrown a lot at this e.g., patient safety
- This says no, progress has been poor, we have a wicked problem where this is not even solvable in principle let alone practice
- Worse than expected →





Hypothesis III: Realistic bias

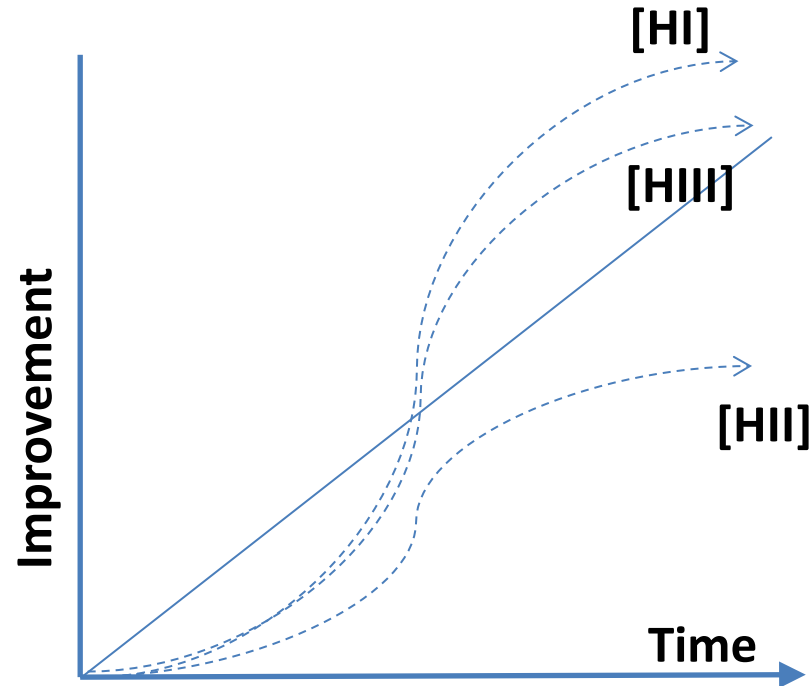
- This is a complex adaptive system we are working on
- Achievements will be hard won, and require investments:
- We will get about what we aim
- for; progress will be tough →





Hypotheses I, II and III: vote

- What do you think? Voting is open
- Hypothesis I: Optimism
= do better; improvement ↑
- Hypothesis II: Pessimism
= do worse, improvement ↓
- Hypothesis III: Realism
= what we expected;
improvement →



Conclusion



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- Thank you
- Comments, questions, observations?



Selected references

1. Braithwaite J, Westbrook M, Nugus P, Greenfield D, Travaglia J, Runciman W, Foxwell AR, Boyce RA, Devinney T. and Westbrook J. (2012) A four-year, systems-wide intervention promoting interprofessional collaboration, *BMC Health Services Research* , **12**:99.
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4. Goldblatt EM, Lee WH. (2010) From bench to bedside: the growing use of translational research in cancer medicine. *Am J Transl Res*; **2**(1):1-18.
5. Lenz M, Steckelberg A, Richter B, I. M. (2007) Meta-analysis does not allow appraisal of complex interventions in diabetes and hypertension self-management: a methodological review. *Diabetologia*; **50**(7):1375-83.
6. Ogilvie D, Craig P, Griffin S, Macintyre S. and Wareham NJ. (2009) A translational framework for public health research. *BMC Public Health*, **9**:116.
7. Westbrook JI, Reckmann M, Li L, Runciman WB, Burke R, et al. (2012) Effects of Two Commercial Electronic Prescribing Systems on Prescribing Error Rates in Hospital In-Patients: A Before and After Study. *PLoS Med* ,**9**(1).

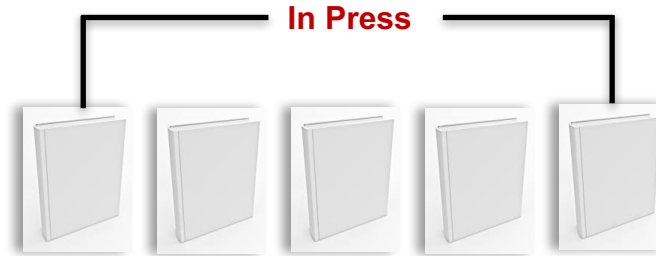
Recent Published Books

Published



- **Culture and Climate in Health Care Organizations**
- **Resilient Health Care**
- **The Resilience of Everyday Clinical Work**
- **Healthcare Reform, Quality and Safety**
- **Reconciling Work-as-imagined and Work-as-done**
- **The Sociology of Healthcare Safety and Quality**

Forthcoming Books



- **Health Systems Improvement Across the Globe: Success Stories of 60 Countries**
- **Gaps: the Surprising Truth Hiding in the In-between**
- **Living, Surviving and Thriving in the Anthropocene**
- **Field Guide to Resilient Health Care**
- **Counterintuitivity: How your brain defies logic**

Contact details



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Jeffrey Braithwaite, PhD

Foundation Director

Australian Institute of Health Innovation

Director

Centre for Healthcare Resilience and Implementation Science

Professor, Faculty of Medicine and Health Sciences

Macquarie University

NORTH RYDE NSW 2109

Email: jeffrey.braithwaite@mq.edu.au

AIHI website: <http://aihi.mq.edu.au>

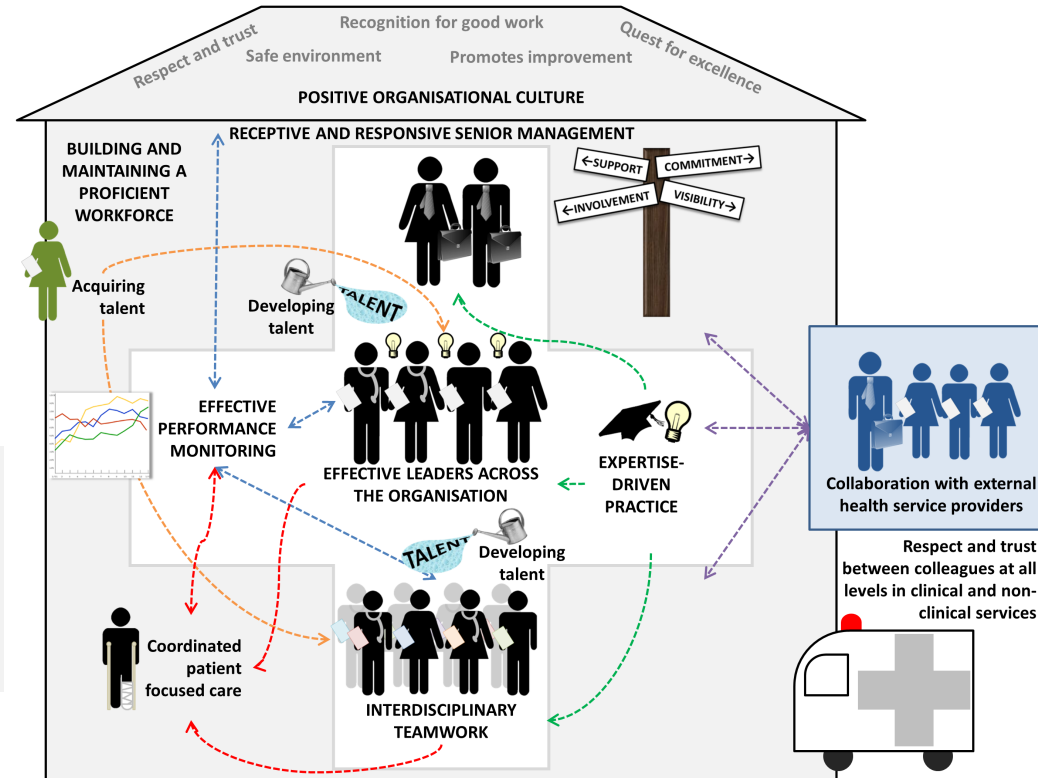
Web: <http://www.jeffreybraithwaite.com/>

Wikipedia: http://en.wikipedia.org/wiki/Jeffrey_Braithwaite

How high performing healthcare organisations work



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Source: Taylor N, Clay-Williams R, Hogden E, Braithwaite J, and Groene O. (2015) High performing hospitals: a qualitative systematic review of associated factors and practical strategies for improvement. *BMC health services research* 1:244

Theory: TDF



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Theoretical Domains Framework

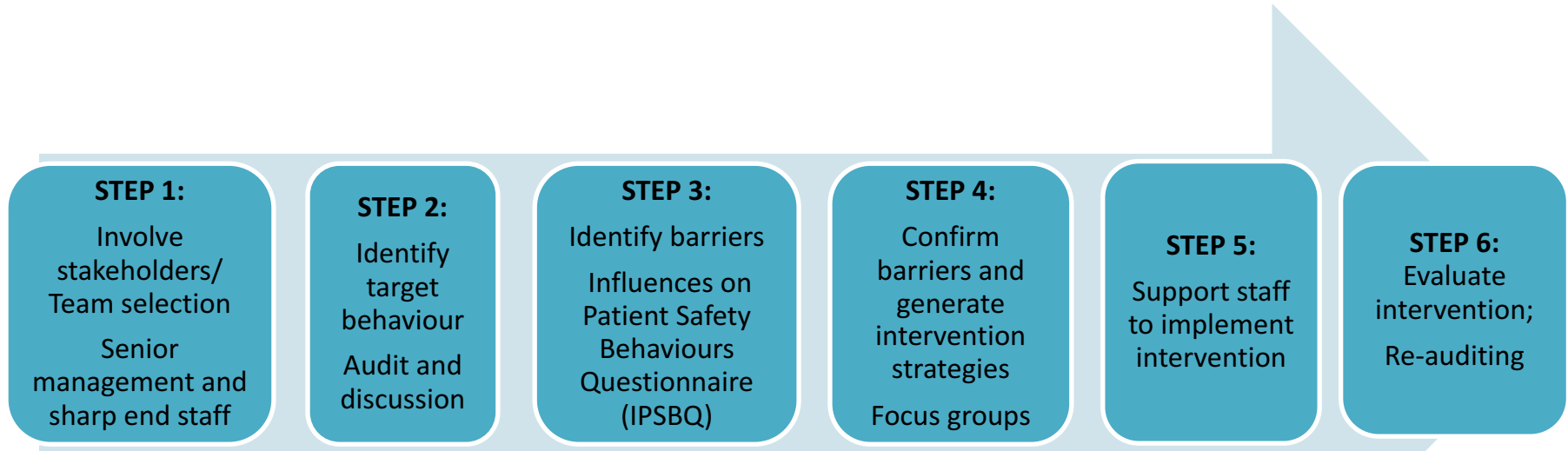
1 Knowledge	2 Skills	3 Social/ Professional Role and Identity	4 Beliefs about Capabilities	5 Optimism	6 Beliefs about Consequences	7 Reinforcement
8 Intentions	9 Goals	10 Memory, Attention and Decision Processes	11 Environmental Context and Resources	12 Social Influences	13 Emotion	14 Behavioural Regulation

Theory: TDFI



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The six step Theoretical Domains Framework Implementation



Source: Taylor N, Long JC, Debono D, Williams R, Salisbury E, O'Neill S, Eykman E, Braithwaite J, and Chin M. (2016) Achieving behaviour change for detection of Lynch syndrome using the Theoretical Domains Framework Implementation (TDFI) approach: a study protocol. *BMC Health Services Research*, 16:89