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Acting scientifically in complex social systems

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HALMSTAD UNIVERSITY

About Me…

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10 year collaborative research programme (2008 – 2019) £20 million from NIHR; £20 million matched funding from NHS, academia, industry

Health Foundation Improvement Science Fellowship (2011-2014)

The Health Foundation

HALMSTAD UNIVERSITY

NHS National Institute for Health Research

Where do our boundaries lie?

Whose job is it?

Evidence → Practice

NIHR | National Institute for Health and Care Research

NIHR CLAHRC
Northwest London

The Health Foundation

NHS
Chelsea and Westminster Hospital
NHS Foundation Trust

BMJ Quality & Safety 2022;**31:**31-44.

ORIGINAL RESEARCH

OPEN ACCESS

Conceptualising interventions to enhance spread in complex systems: a multisite comprehensive medication review case study

Laura Lennox [1,2] Susan Barber,[1,2] Neil Stillman,[1] Sophie Spitters,[1] Emily Ward,[3] Vanessa Marvin,[3] Julie E Reed [4,5]

► Additional supplemental material is published online only. To view, please visit the journal online (http://dx.doi.org/10.1136/bmjqs-2020-012367).

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ABSTRACT

Background Advancing the description and conceptualisation of interventions in complex systems is necessary to support spread, evaluation, attribution and reproducibility. Improvement teams can provide unique insight into how interventions are operationalised in practice. Capturing this 'insider knowledge' has the potential to enhance intervention descriptions.

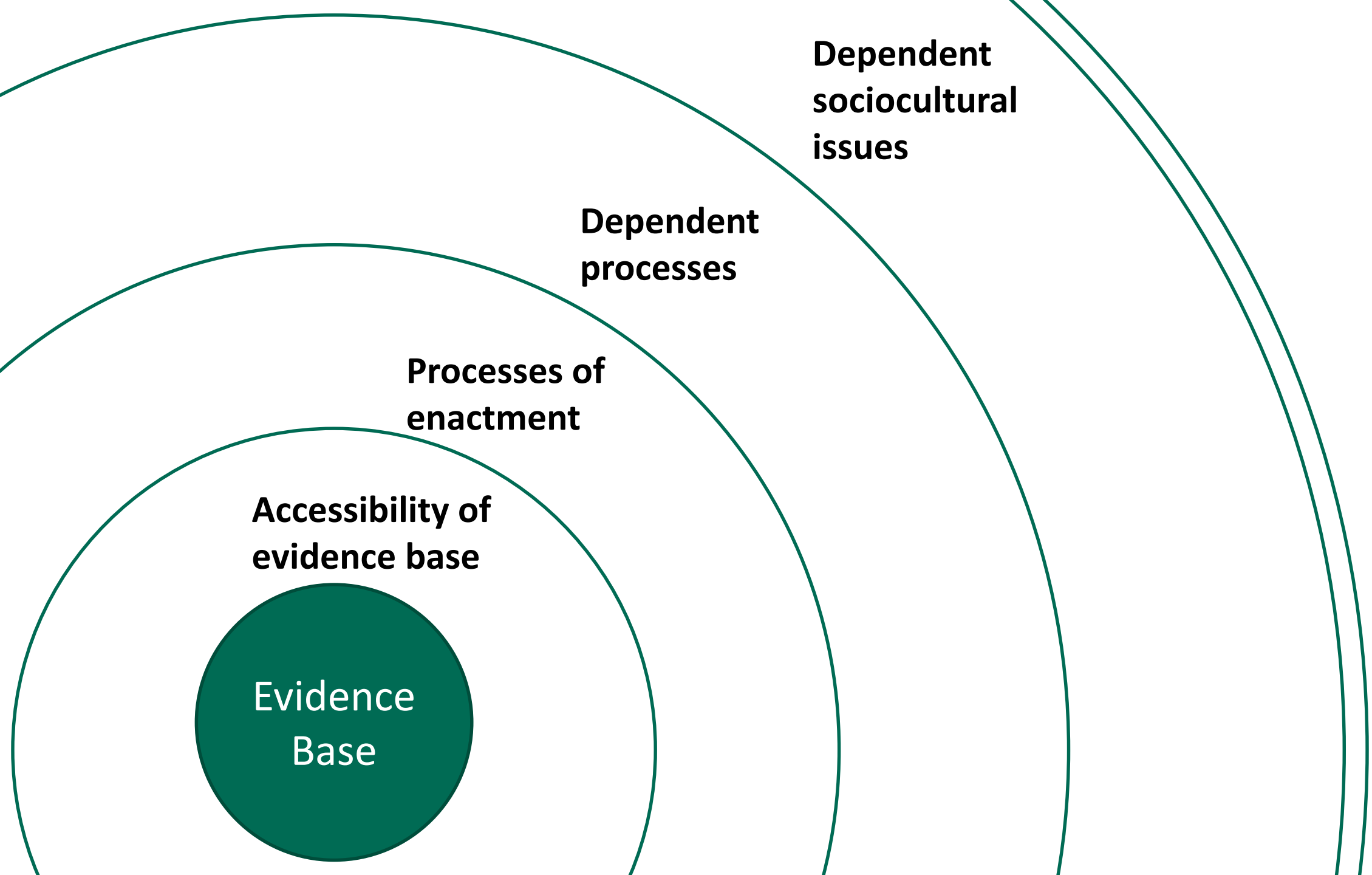
Objectives This exploratory study investigated the spread of a comprehensive medication review (CMR) intervention to (1) describe the work required from the improvement team perspective, (2) identify what stays the same and what changes between the different sites and why, and (3) critically appraise the 'hard core' and 'soft periphery' (HC/SP) construct as a way of conceptualising interventions.

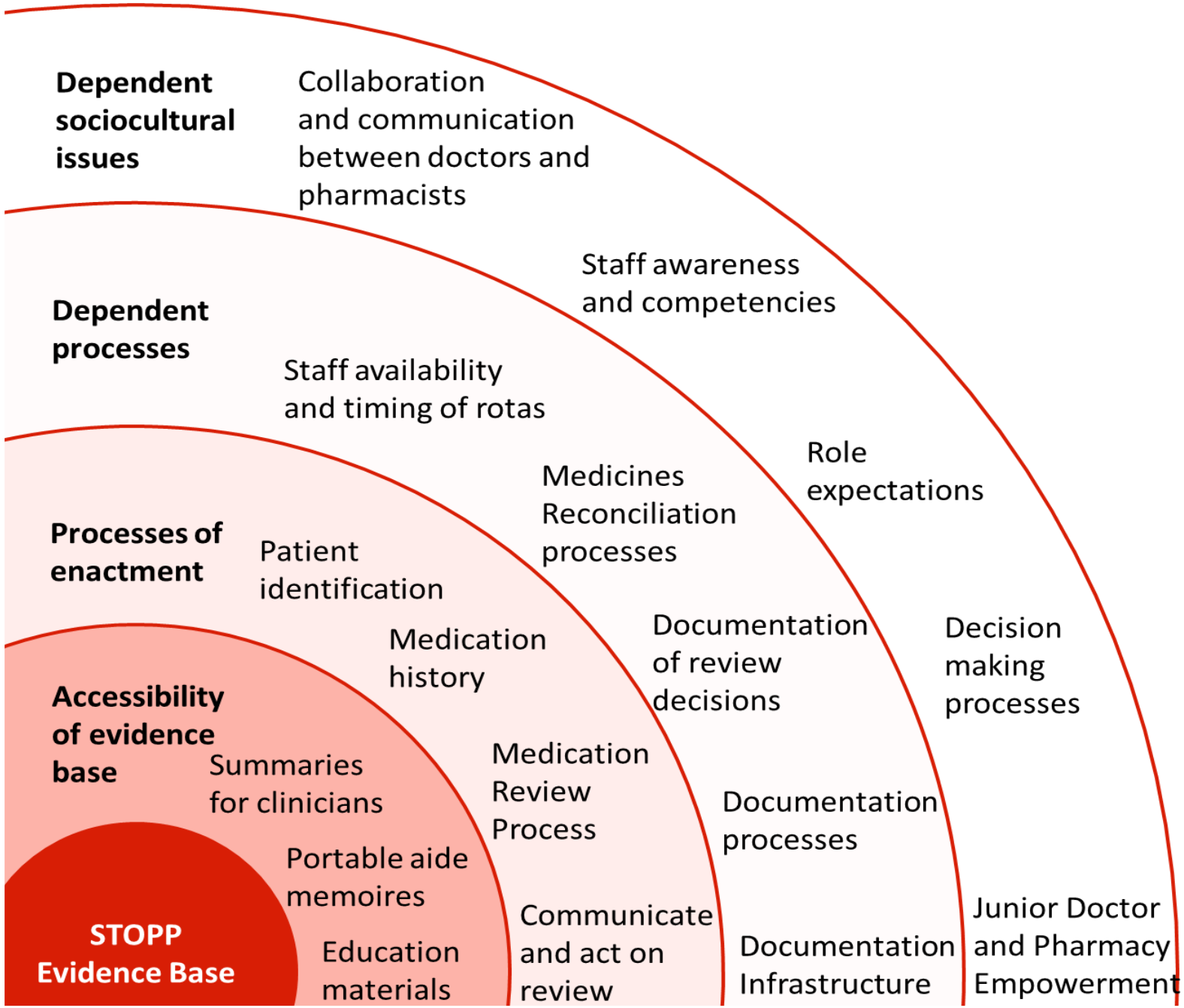
Design A prospective case study of a CMR initiative across five sites. Data collection included: observations, document analysis and semistructured interviews. A facilitated workshop triangulated findings and measured perceived effort invested in activities. A qualitative database was developed to conduct thematic analysis.

Results Sites identified 16 intervention components. All were considered essential due to their interdependency.

maximising the benefits of treatments and innovations for patients and healthcare systems.[1 2] However, it is recognised that spreading interventions is a significant challenge for healthcare teams and managers.[2–6] Many promising initiatives fail to spread, remaining isolated within the local context in which they were created.[1 7] This results in missed opportunities to improve patient care at scale and can lead to significant variation in care processes and outcomes across healthcare organisations.[8 9]

The difficulty in spreading interventions is often attributed to a lack of consideration for the complexity and variation among different healthcare settings.[5 10–12] Healthcare organisations are increasingly recognised as complex systems (ie, systems that dynamically change overtime, where activities are interdependent and inter-


Dependent sociocultural issues
Dependent processes
Processes of enactment
Accessibility of evidence base
Evidence Base


Dependent sociocultural issues
Collaboration and communication between doctors and pharmacists
Dependent processes
Staff awareness and competencies
Staff availability and timing of rotas
Role expectations
Processes of enactment
Medicines Reconciliation processes
Patient identification
Documentation of review decisions
Decision making processes
Medication history
Accessibility of evidence base
Medication Review Process
Summaries for clinicians
Documentation processes
Portable aide memoires
Communicate and act on review
Junior Doctor and Pharmacy Empowerment
STOPP Evidence Base
Education materials
Documentation Infrastructure

Nurse

So it was chaos and, you know, the nurses at the end of the day, they were going to the notes: oh my goodness, Dr X's been in. And I didn't know she's been in…. And we would be standing at 9 o'clock at a board round scratching our heads, you know - the team thinking, when will this person be discharged? What are we planning for?… Meanwhile, the senior decision-makers out on the ward are on their own. So it was just the system was broken.

Consultant

For so many months before I cannot remember having a nurse with me on a ward round. For, I don't know, years, probably. I mean occasionally, but not... Almost by chance, really, and junior doctors, having them with you on a ward round was also reasonably infrequent... I'm sick of doing ward rounds on my own.

Whose job is it?

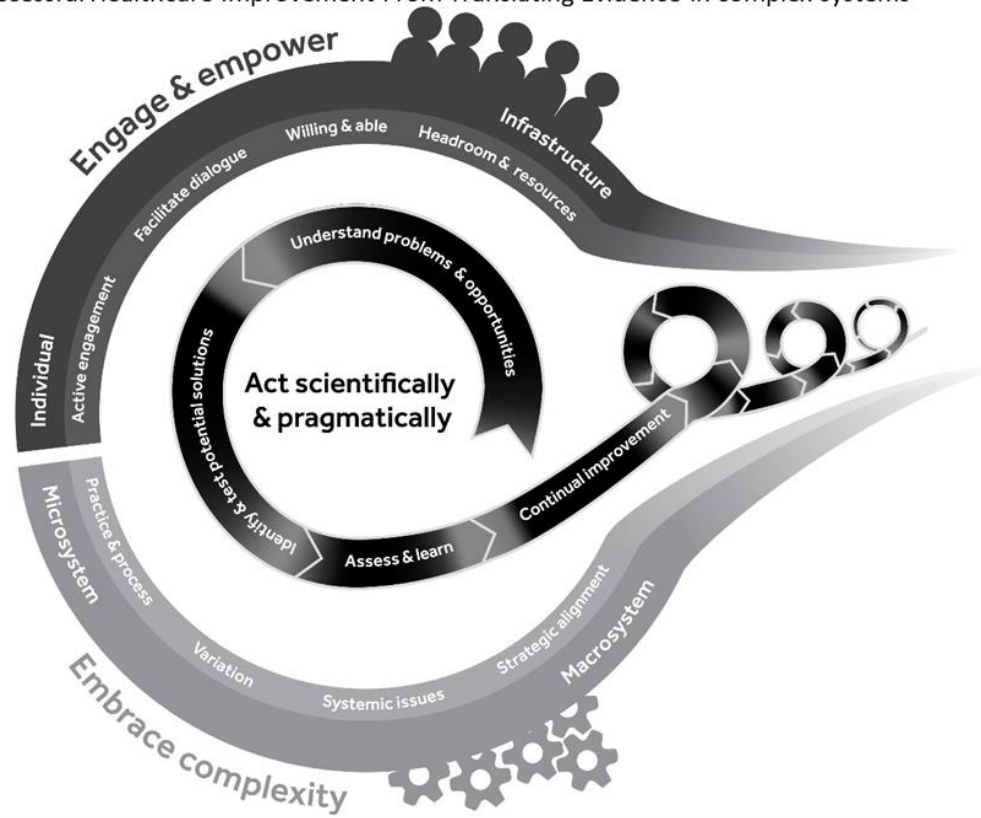
Reconceptualising the gap between evidence and practice

National Institute of Healthcare Research;
model for translation of research into practice

Informed by 10 years of empirical research and working collaboratively with patients, practitioners and researchers

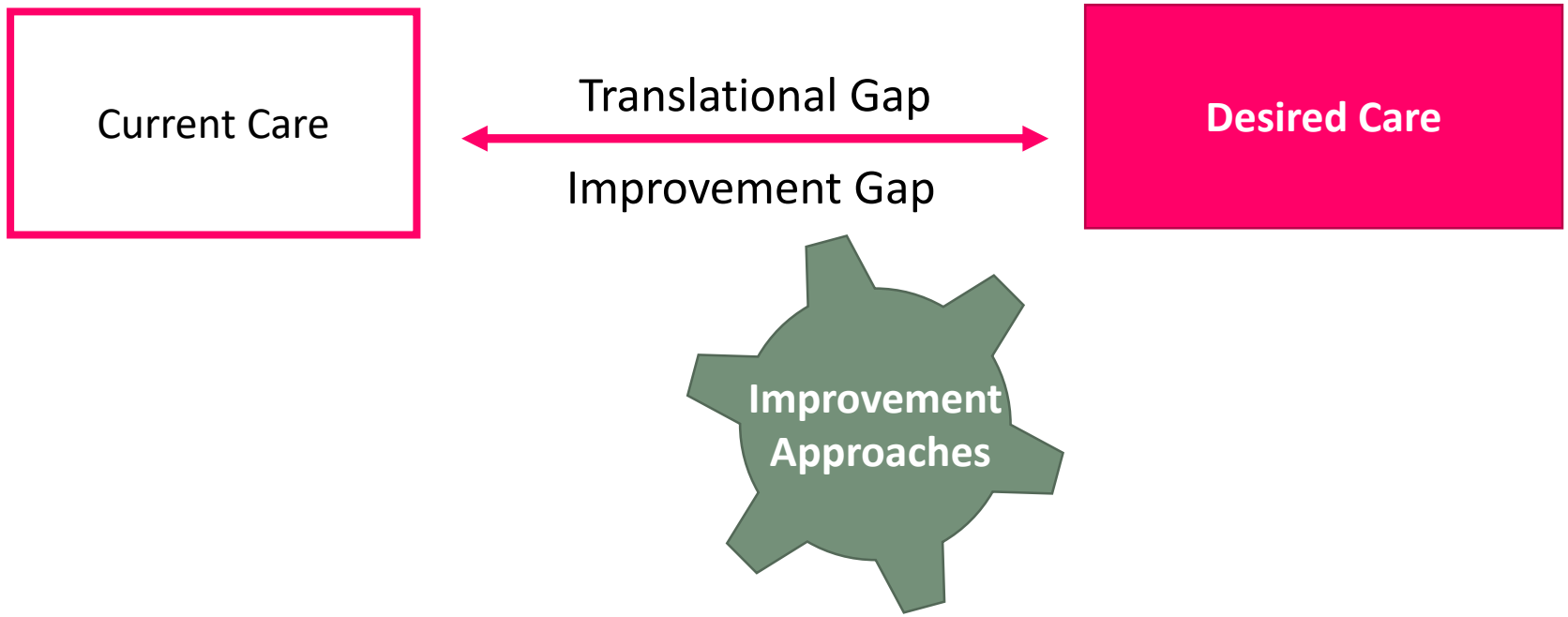
SHIFT-Evidence

Successful Healthcare Improvement From Translating Evidence in complex systems



Reed 2013 Making an Impact? The emergence of Improvement Science in Healthcare
Reed 2018 Simple Rules for translating evidence in complex systems: a qualitative study

BMC Medicine


Current Care
Translational Gap
Improvement Gap
Desired Care
Improvement Approaches

Taylor, McNicholas et al. BMJ Quality and Safety,2014

Principles of PDSA Use

1)Tests of change

2) Prediction

3) Use of sequential cycles

4) Start small scale

5) Use of data over time

6) Documentation

Only 2% of articles adhered to all principles

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Lean healthcare: Rhetoric, ritual and resistance☆,☆☆

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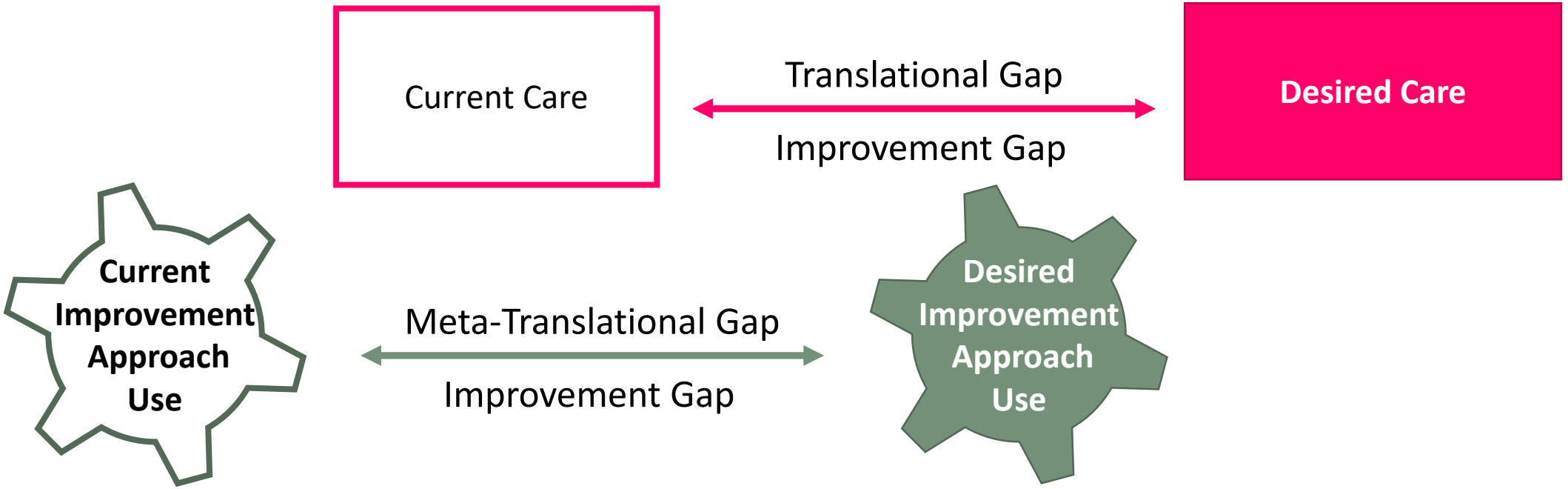
Keywords:
UK
Lean healthcare
Service re-configuration
Organisation
Management

ABSTRACT

This paper presents an ethnographic account of the in
ologies in one UK NHS hospital operating department
'technology', with its emphasis on creating value str
transform the social organisation of healthcare work.
debates related to the standardisation of clinical pract
aries and the stratification of clinical communities. Draw
the study is attentive to the interaction of both the
clinicians to this intent as an ongoing and situated soci
explores three dimensions of social practice to consi
(rhetoric), enacted in social practice (ritual), and experi
(resistance). Through these interlinked analytical lense
clinical practice remains contingent and open to neg
service improvements that bring to the fore tensions b
social organisation of healthcare work. The paper concl
making both efficiency and effectiveness improvement



ORIGINAL RESEARCH

OPEN ACCESS

Evolving quality improvement support strategies to improve Plan–Do–Study–Act cycle fidelity: a retrospective mixed-methods study

Chris McNicholas,[1,2] Laura Lennox,[1] Thomas Woodcock,[1] Derek Bell,[1] Julie E Reed[1]

Two of the challenges facing improvement approaches:

1) Perception of improvement approaches as “unscientific”
2) Challenges with using PDSA in practice – complex socio-technical interventions

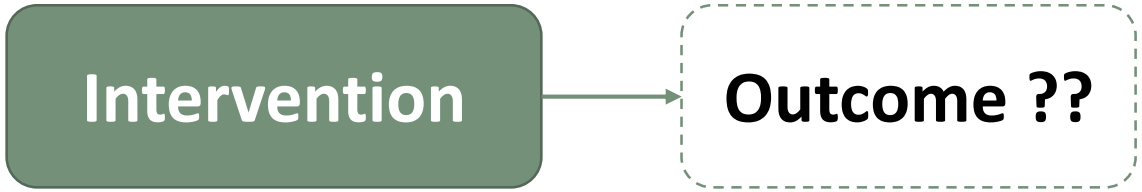
Confirming (goal => causal relationships)

Does not make an intervention better

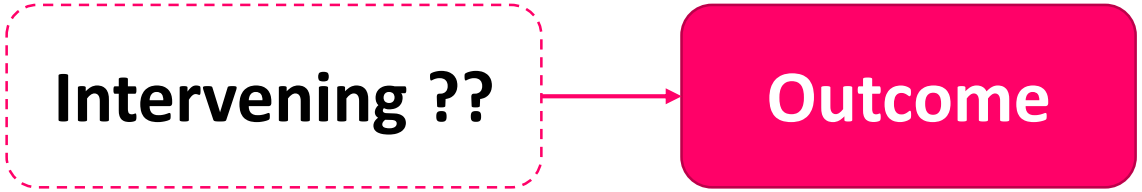
Assesses how good a particular intervention is (in different conditions)

Assesses theories and understanding of how to make a difference

Controlled Trials (positivist/realist)



Quality Improvement (pragmatist)



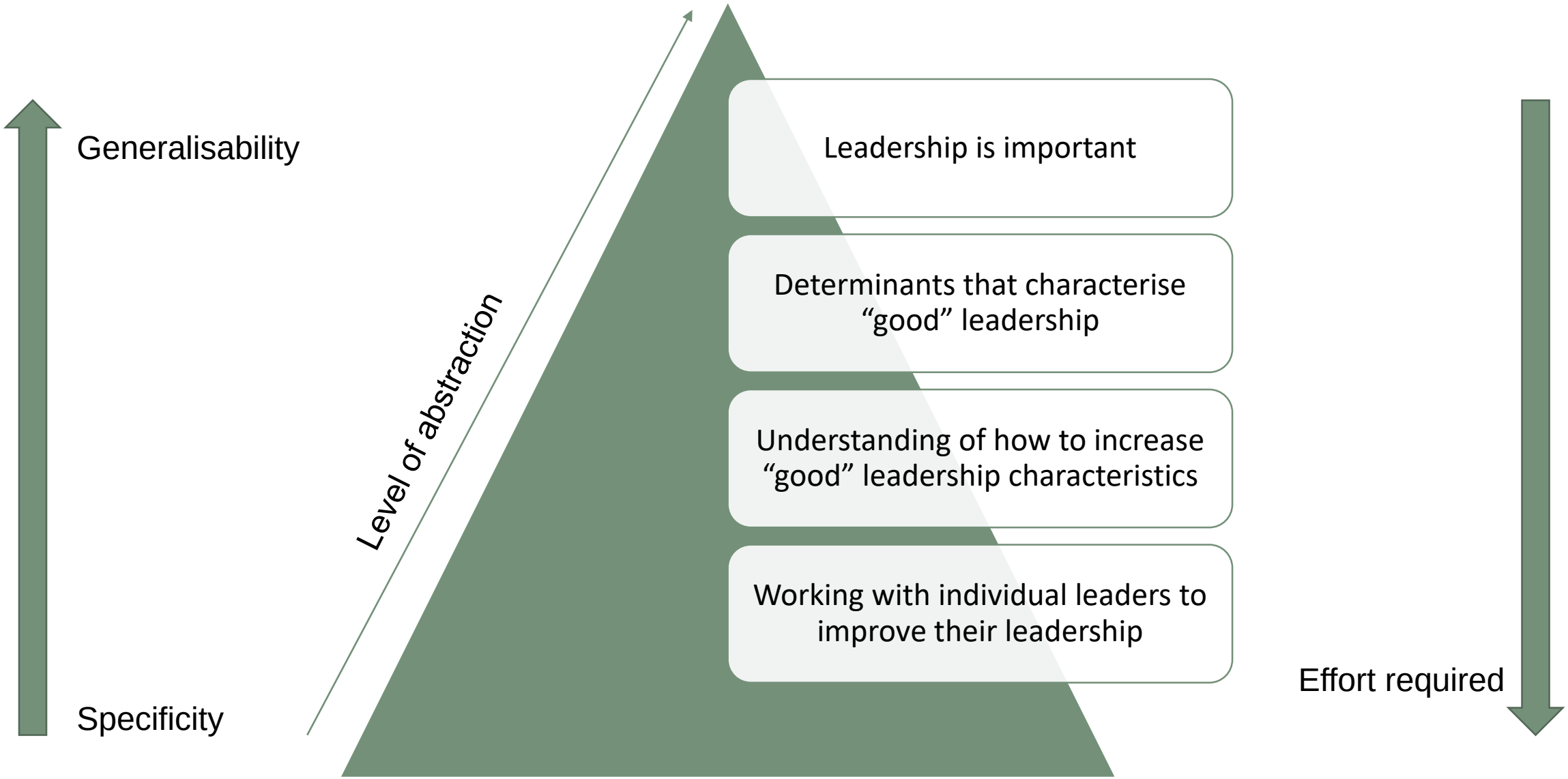
Learning (goal => improvement)

Refine and iteratively develop ideas for interventions

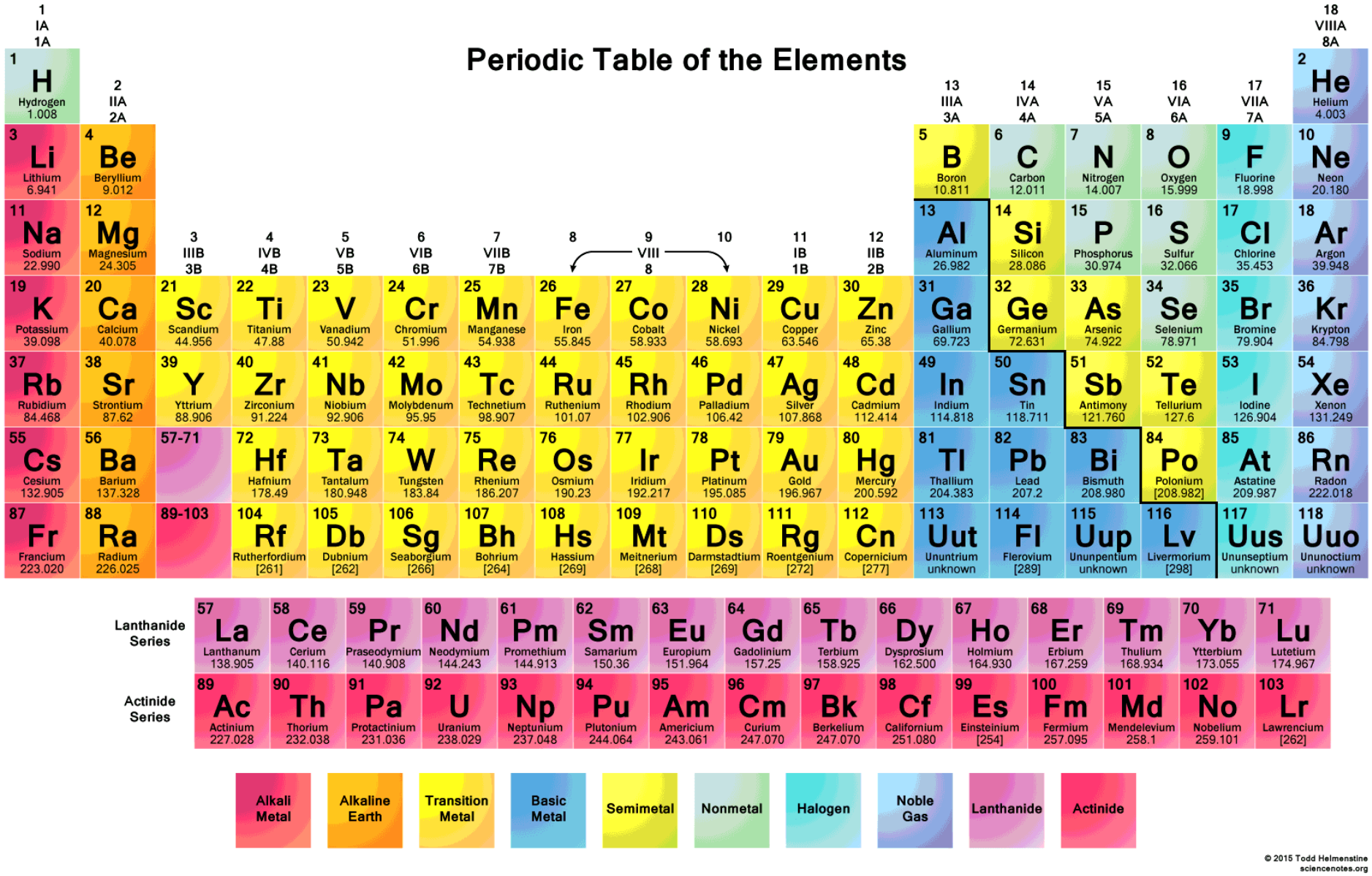
Does not provide conclusive evidence about attribution of intervention to outcome

Test and develop theory of change (properties and conditions)

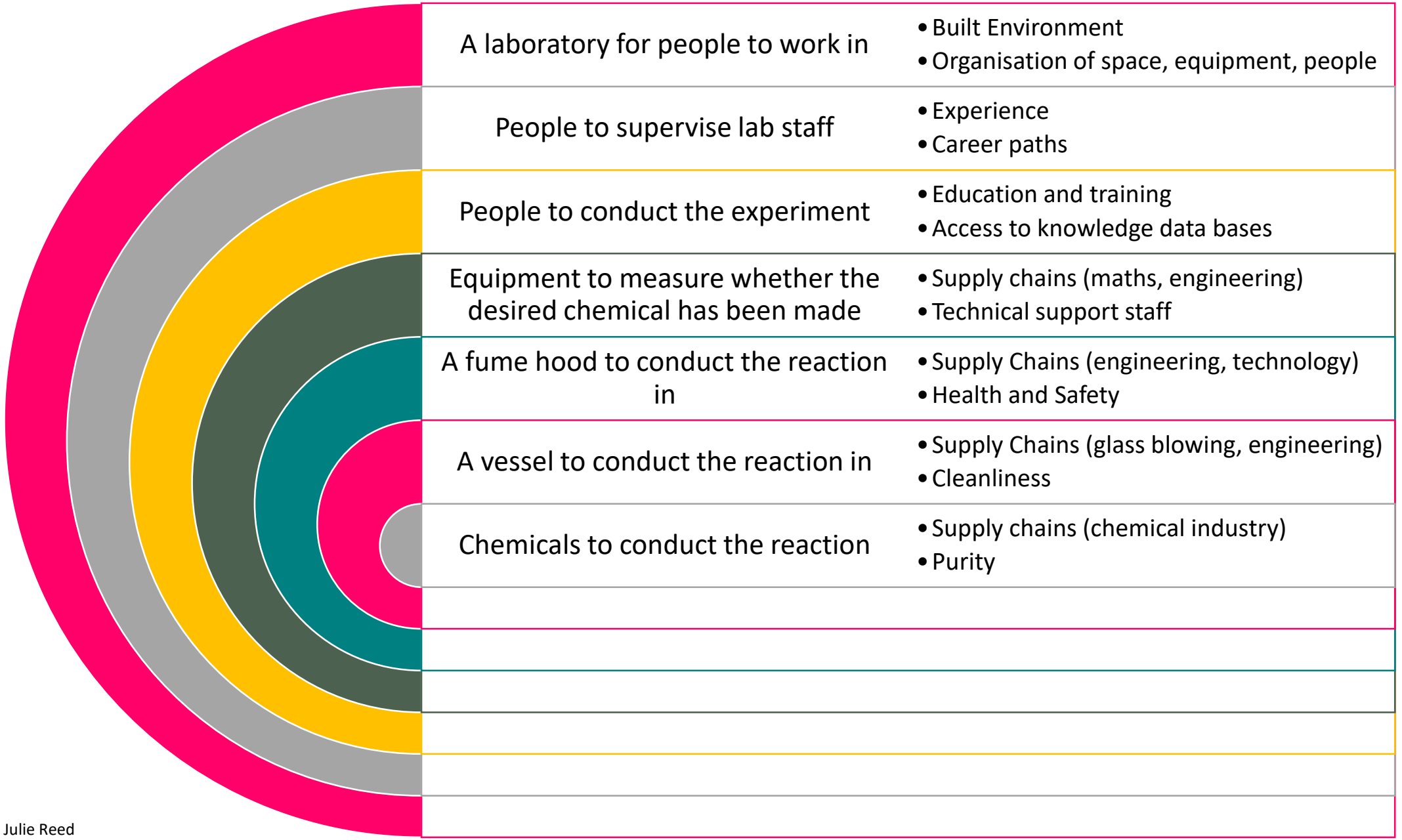
I don't want to be a bad leader….



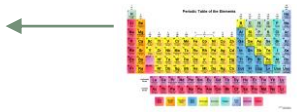
Seeing science through a different lens

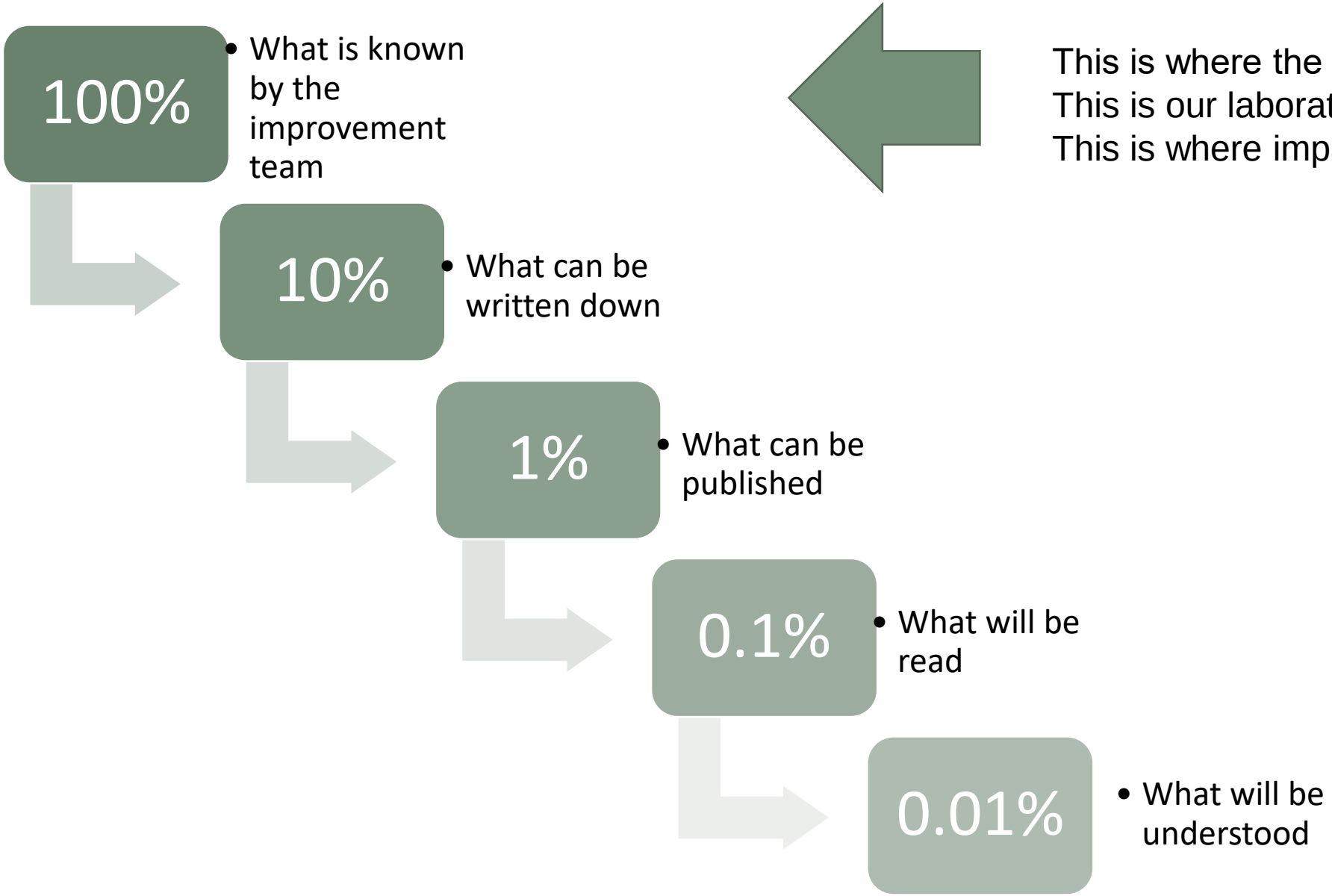


Systems for supporting improvement



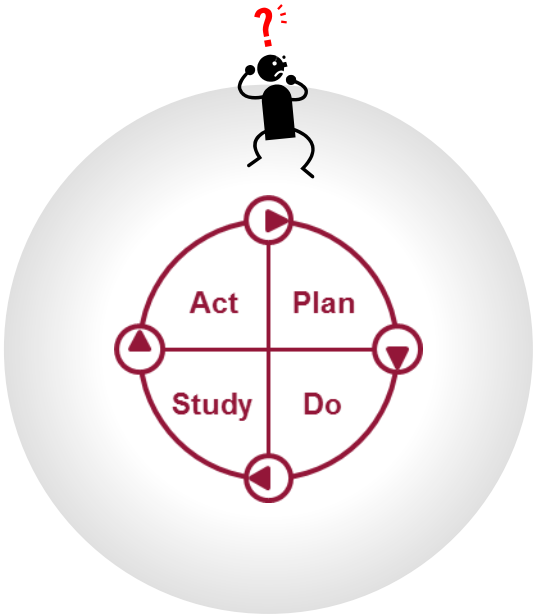
A laboratory for people to work in	• Built Environment • Organisation of space, equipment, people
People to supervise lab staff	• Experience • Career paths
People to conduct the experiment	• Education and training • Access to knowledge data bases
Equipment to measure whether the desired chemical has been made	• Supply chains (maths, engineering) • Technical support staff
A fume hood to conduct the reaction in	• Supply Chains (engineering, technology) • Health and Safety
A vessel to conduct the reaction in	• Supply Chains (glass blowing, engineering) • Cleanliness
Chemicals to conduct the reaction	• Supply chains (chemical industry) • Purity



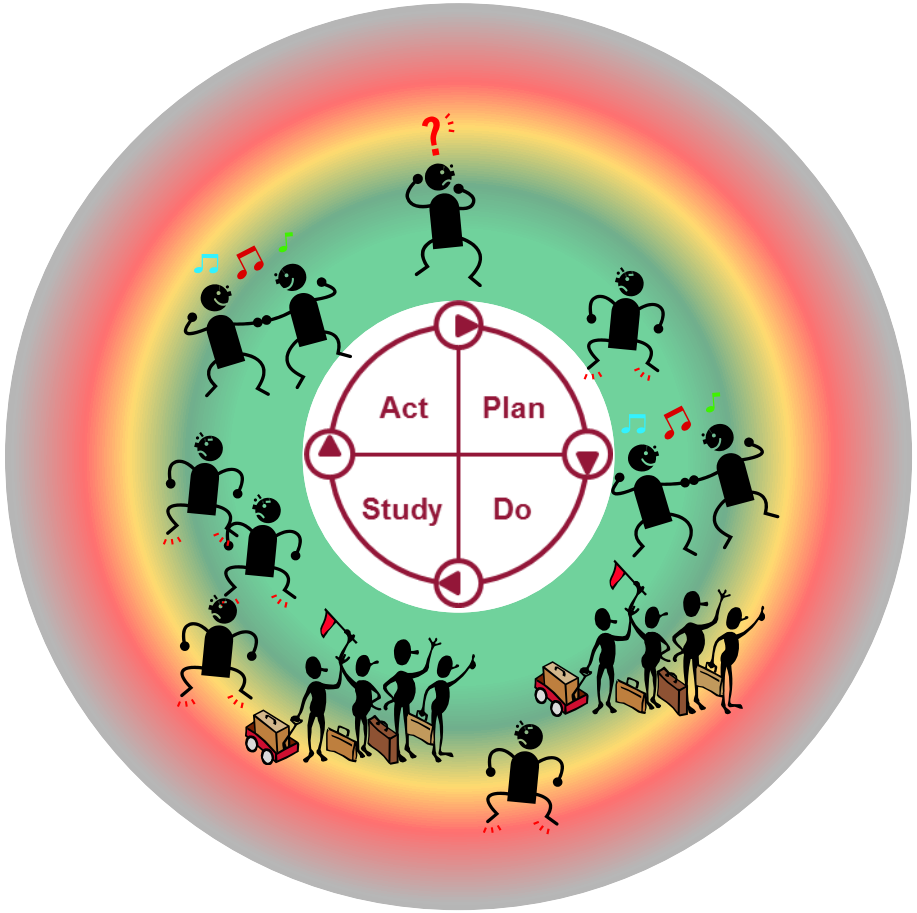

100%
What is known by the improvement team
10%
What can be written down
1%
What can be published
0.1%
What will be read
0.01%
What will be understood
This is where the science happens…
This is our laboratory
This is where impact can be made

PDSA in complex (social) systems

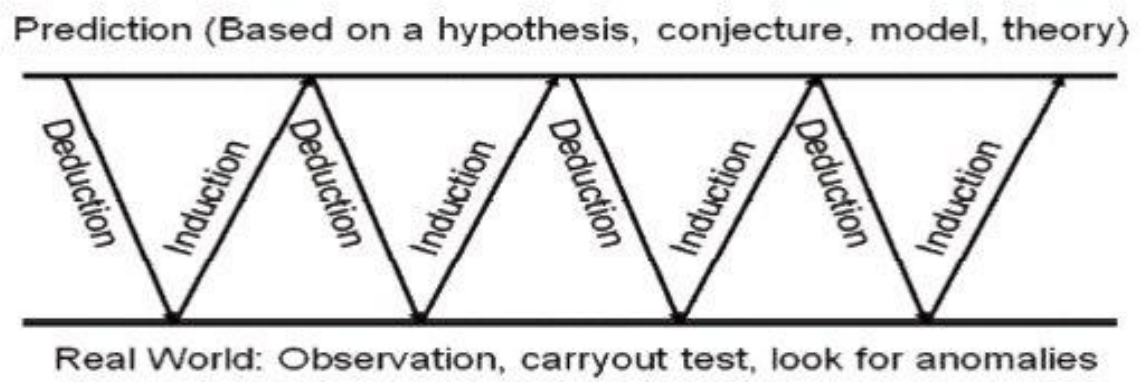
Chemistry



Healthcare



Acting scientifically



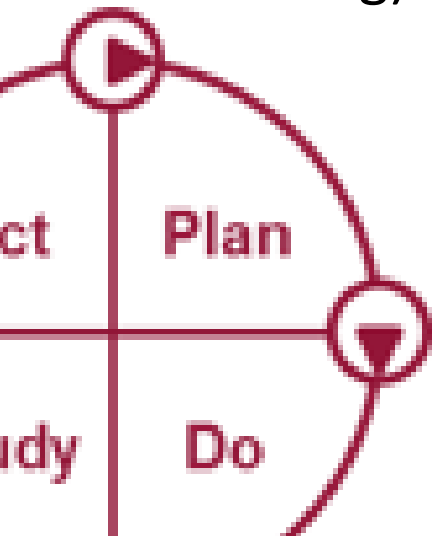
The scientific method	**Maintaining scientific rigour**
Formulating theory and predictions or hypothesis	Drawing on evidence to inform theories, predictions and hypothesis
Conducting experiments and collecting data to test theory and predictions	Precise enactement of experimental design and identification of any deviations from plan
Analyzing and interpreting the results	Objective analysis of data using appropriate methods
Making inferences to iterate theory, predictions and hypothesis	Incorporate learning into revised theories, predictions and hypothesis

Taylor, McNicholas et al. BMJ Quality and Safety,2013

Plan

The scientific method	Maintaining scientific rigour
Formulating theory and predictions or hypothesis	Drawing on evidence to inform theories, predictions and hypothesis

- **Risk of failure for plans to be relevant or actionable**
- Evidence and expert knowledge not sufficient
- Need local knowledge to ensure relevant and implementable
- In-depth consideration of practical details
- Alignment with what matters to staff to secure engagement in planning (and doing)



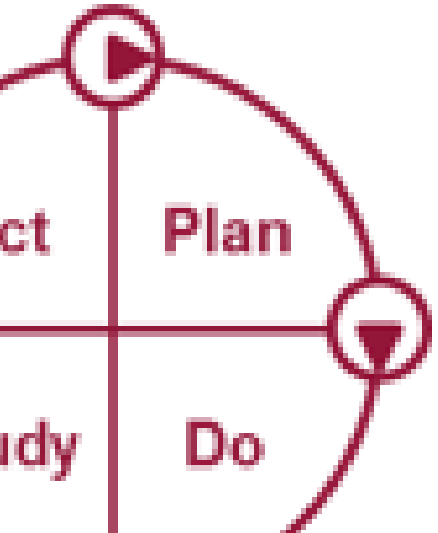
‘‘there’s a tendency to say, let’s just ask an expert, the expert will tell us and we’ll do it… [but for it] to work we actually have to sit down and do the improvement work ourselves”. (P2 improvement specialist)

Do

The scientific method	Maintaining scientific rigour
Conducting experiments and collecting data to test theory and predictions	Precise enactement of experimental design and identification of any deviations from plan

- **Risk of failure for experiments to be enacted and deviations from plans not identified**
- Communicating tests to the people enacting them
- Motivating staff to adopt new ways of working
- Creating time and space for tests

"[the plan] kind of gets filtered down through the managers and then down through the charge nurses. …What I have found is that the more it gets filtered down, the more diluted it gets…. it's not the same message." (P14 nurse)



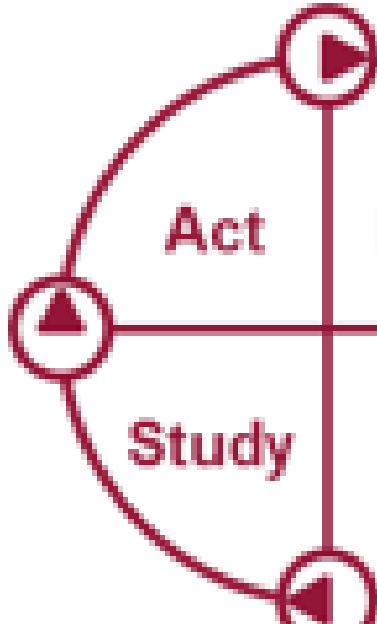
"…the overlapping and competing priorities of the teams created a lot of confusion for the frontline staff. And so the staff just [say] forget it…I'll do what I know I need to do, which is take care of the patient."

Study

The scientific method	Maintaining scientific rigour
Analyzing and interpreting the results	Objective analysis of data using appropriate methods

- **Risk of failure to secure or understand the reliability of data and feedback**
- Data availability and accuracy
- Data origins – how collected, by whom, when, why etc (socially construted)
- Building relationships for honest feedback
- Challenge to interpret data and feedback due to complexity
- Time to analyse and make sense of results

“they don’t understand why they’re having to collect the data, because they do quite a lot of the data collection… they sometimes report 100% all the time"

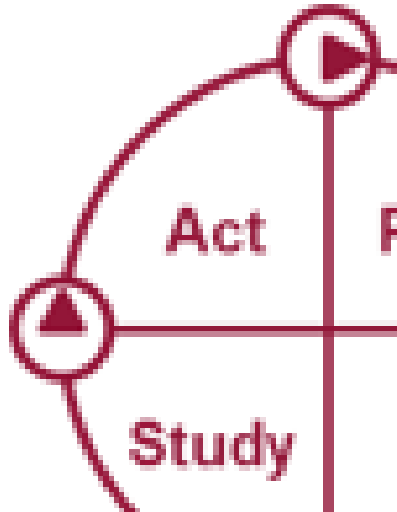


Act

The scientific method	Maintaining scientific rigour
Making inferences to iterate theory, predictions and hypothesis	Incorporate learning into revised theories, predictions and hypothesis

- **Risk of failure to build on learning to inform future tests**
- Multiple perspectives interpreting findings - facilitation
- Willingness to learn versus emotional resistance [pride, shame, vulnerability]
- Managing disappointment, change fatigue and maintaining motivation
- Required changes out of control or sphere of influence
- Investment in new relationships to support growth or change in direction
- Change dependent on other problems being resolved

"We know what the problem is… we just can't do anything about it" (observation)



Making sense of complex social systems

- No one person has a full understanding of how any particular health system works
- Gathering and making sense of different perspectives required numerous and lengthy conversations, and emerges over time through use of iterative PDSA cycles.

“That’s actually where I think the most value [of PDSA] comes in… you have to have a conversation with people to realise most of us don’t hold it all, right? ...that’s a two-hour conversation sometime… just getting to that point is what takes a long time but also where the most valuable conversation can happen” (P19 manager)

"No expert is ever going to be able to tell you right up front everything that they know and everything that they need. They have too much packed in their heads and they don’t know what’s there. " (P10 information systems manager)

Making sense of complex social systems

Lead Dr: We can use the data that is reported in form A…

Lead Nurse: But that report hasn't been used for 2 years

Lead Dr: Oh, but what about the governance report we do each month

Lead Nurse: Yes, that draws from form B…

Lead Dr: Great well that will provide us with time-stamped data so..

Junior Nurse:… umm… [pause]…I'm not sure it will

Lead nurse: What do you mean?

Junior Nurse: well, we know we have to fill it in, but we don't really have time to fill it in when we're with the patient, so we always fill them in at the end of the shift, for everyone at once. That way we know all the data is reported.

Lead Nurse: Oh.

Lead Dr: Oh.

Lead Nurse: But that data is for external reporting requirements.

Junior Nurse: Yes, we always achieve our reporting targets.

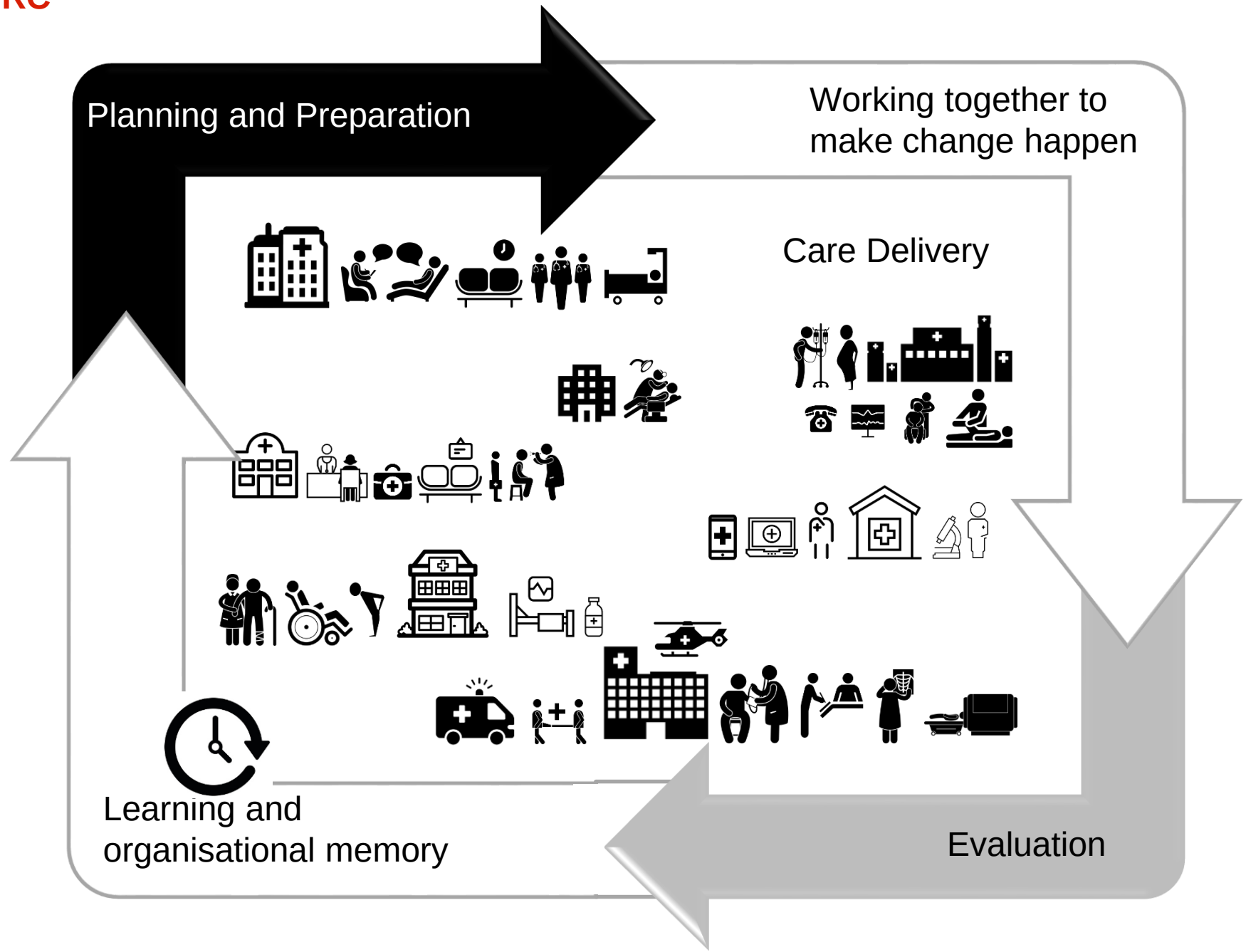
Implications for PDSA use

- Hidden work that is required to maintain scientific rigour of PDSA
- Challenges of gradually constructing a shared understanding of system practices and processes
- Importance of relationships between QI practitioners and frontline staff
- Effective PDSA requires technical functions to be met, but also system understanding and staff engagement

What does it mean to act scientifically in complex social systems?

Traditional View	Compex Systems View
Agendas set externally	Agendas consider what matters to patients and staff
Predefined aims and scope	Prepared to refine aims and scope
Interventions designed by experts	Interventions coproduced through negotiated process, learning through doing
Objectivity	Reliable feedback dependent on relationships with staff and understanding of social construction of data
Scientist as spectator	Scientific rigour dependent on relationships Scientists are part of the intervention Scientists take shared responsibility for the success of the experiment

NIHR CLAHRC
Northwest London



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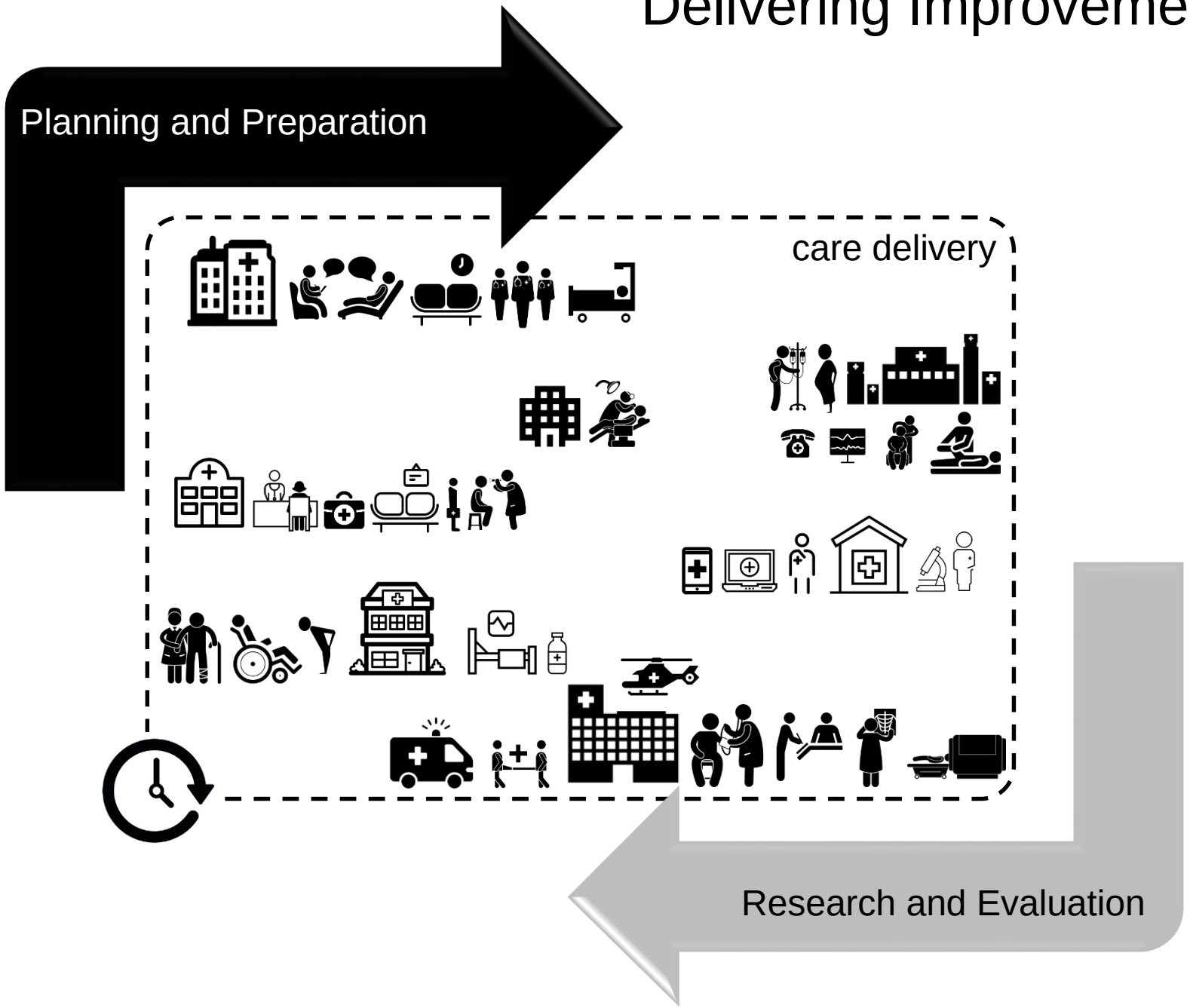
Delivering Improvements



NIHR CLAHRC
Northwest London

Increased pressure

Urgent Response

Ambitious plans
Rapid development time
Cost restricted
Intervention focused
Pressure for immediate change

Planning and preparation

Targets
Financial pressures
Incentives
Policies & Guidelines
Strategic Plans

care delivery

Wasted resources
Wasted effort
Wasted morale

Research and Evaluation

Trials and observational research
Audit
Incident reporting
Root cause analysis
Monitoring & Inspection
Inquiries

Problem not solved

Increased pressure

Urgent Problems

(Little time or capacity to reflect on impact of previous plans)

Improvement Collisions

Whose job is it?

Whose job is it?


The future is ours to create…