A9: Introduction to the Science Symposium stream and new methodologies / evaluation design

International Forum on
QUALITY & SAFETY
in HEALTHCARE
COPENHAGEN

Adapting to a changing world: equity, sustainability and wellbeing for all

@QualityForum #Quality2023

Institute *for* Healthcare Improvement

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International Forum on QUALITY & SAFETY in HEALTHCARE COPENHAGEN

15-17 May 2023

Bella Center | Copenhagen, Denmark

A9: Introduction to the Science Symposium stream and new methodologies / evaluation design

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Welcome

Kamran Abbasi, BMJ

Institute for Healthcare Improvement

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Danish quality Improvement endeavours

Søren Paaske Johnsen, Aalborg University Hospital

Institute for Healthcare Improvement

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Danish quality Improvement endeavours

Søren Paaske Johnsen
CLINICAL Professor - MD - PhD

Danish healthcare system

Universal Coverage

Free & Equal Access

Financed by general taxes

A high degree of decentralization

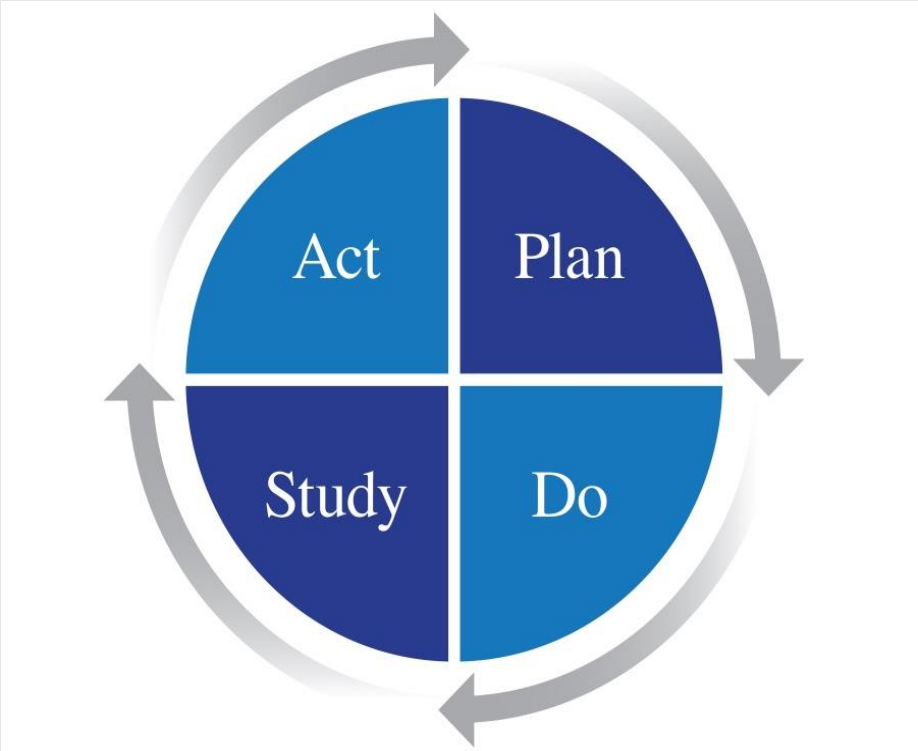
National quality improvement initiatives

- National clinical guidelines
- National clinical quality registries (databases)
- National patient experience surveys in somatic and psychiatic hospital and ambulatory care
- National relatives experience surveys in psychiatic hospital and ambulatory care
- National Agency for Patients` Rights and Complaints and reporting of Adverse Events
- The Danish Health Quality Programme
- Public disclosure of quality of care data

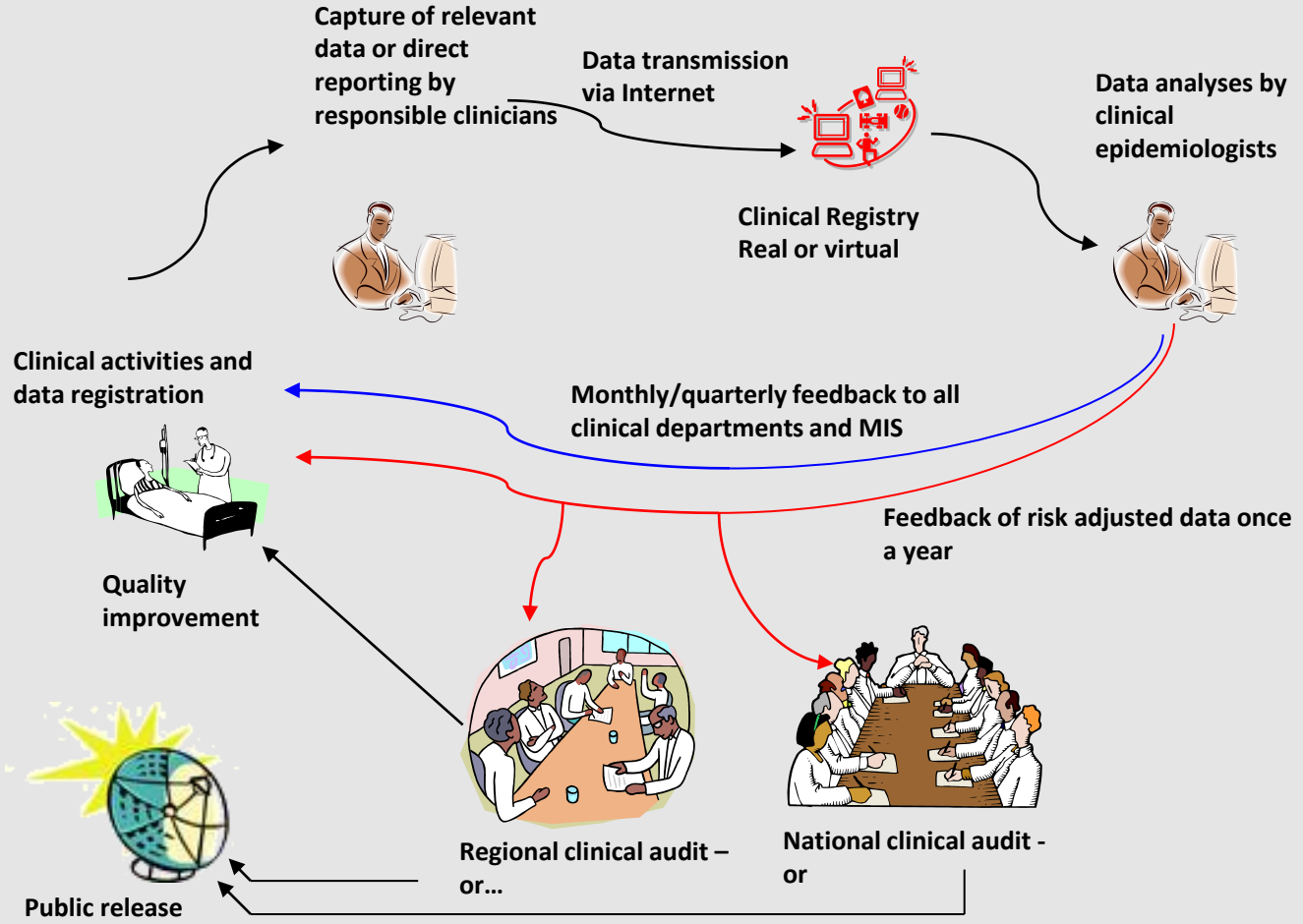
National quality improvement initiatives

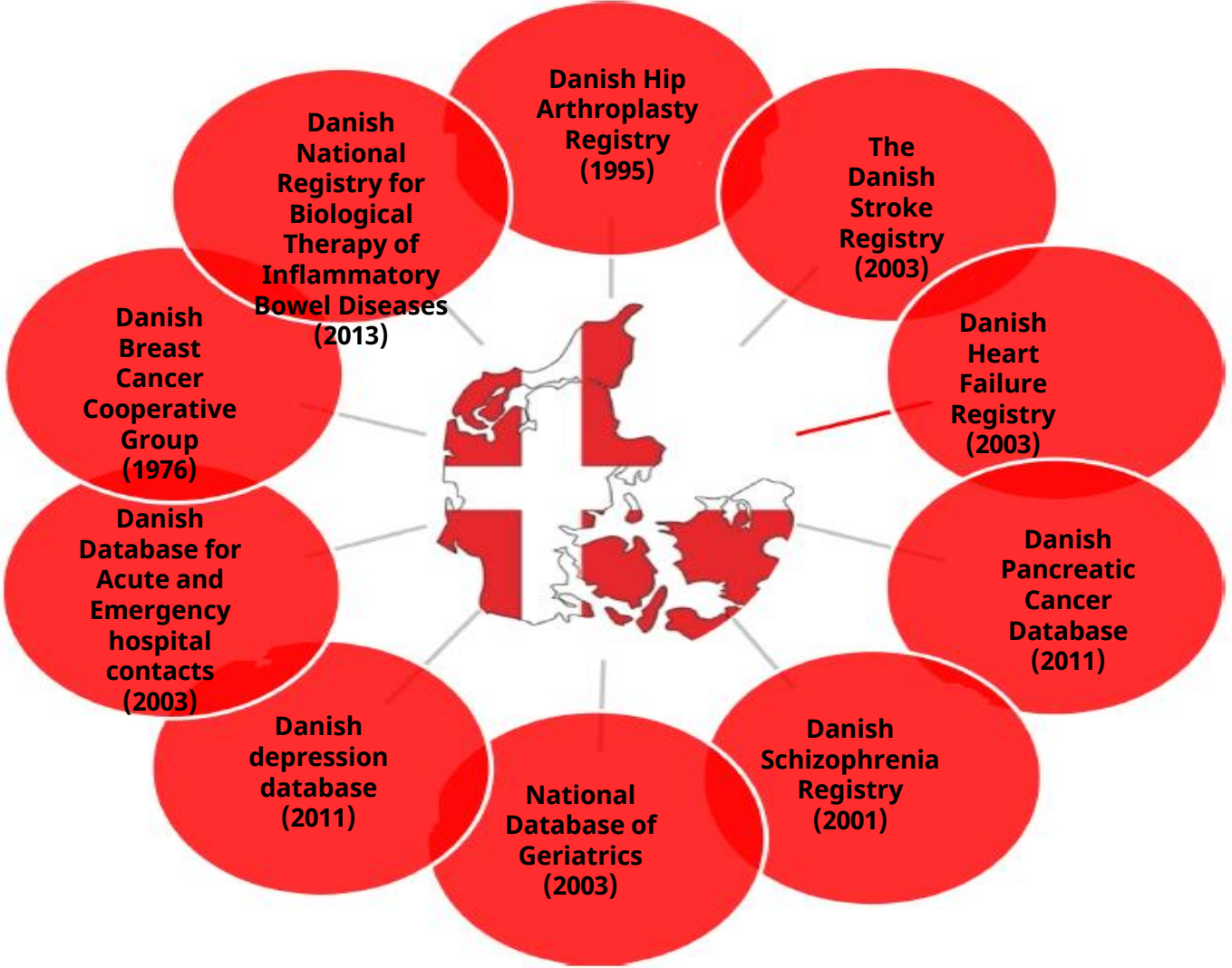
- National clinical guidelines
- National clinical quality registries (databases)
- National patient satisfaction surveys in somatic and psychiatic hospital and ambulatory care
- National relatives satisfaction surveys in psychiatic hospital and ambulatory care
- Danish Patient Safety Authority - reporting of Adverse Events
- The Danish Health Quality Programme
- Public disclosure of quality of care data

QUALITY IMPROVEMENT IN CLINICAL QUALITY DATABASES



Important Phases in the Danish Clinical Registries




Danish Hip Arthroplasty Registry (1995)
The Danish Stroke Registry (2003)
Danish Heart Failure Registry (2003)
Danish Pancreatic Cancer Database (2011)
Danish Schizophrenia Registry (2001)
National Database of Geriatrics (2003)
Danish depression database (2011)
Danish Database for Acute and Emergency hospital contacts (2003)
Danish Breast Cancer Cooperative Group (1976)
Danish National Registry for Biological Therapy of Inflammatory Bowel Diseases (2013)

Danish Clinical Registries - framework

- Mandated by law
- Mandatory national coverage
- Contain information about individual patients
- Fulfilment of national criteria for functionality, data safety and methodology
- Clinical ownership of and responsibility for content and analysis and interpretation and ACTION (professional board for each registry)
- Information can be used for surveillance and improvement of quality (and research)
- Provide accountability and transparency

WHAT HAVE WE LEARNED? Quality of care matters

Quality of early stroke care and 30 days mortality (Med Care 2008;46:63-69)

Number of Process Indicators fullfilled	Mortality (%)	Adjusted MRR (95% CI)
0	51 / 626 (8.2)	*1.00 (reference)*
1	103 / 1323 (7.8)	1.07 (0.65 to 1.49)
2	111 / 1950 (5.7)	0.83 (0.51 to 1.15)
3	95 / 2305 (4.1)	0.60 (0.36 to 0.84)
4	109 / 2450 (4.5)	0.63 (0.38 to 0.87)
5	81 / 2581 (3.1)	0.48 (0.29 to 0.68)
6	46 / 1519 (3.0)	0.45 (0.24 to 0.66)

WHAT HAVE WE LEARNED? Quality of care matters

Quality of HIP fracture care and 30 days mortality (Int J Qual Health Care. 2016;28:698-708)

	30 days mortality, % (n)	Unadjusted OR (95% CI)	Adjusted OR* (95% CI)
0-50% fulfillment	22.6 (657)	1	1
50-75% fulfillment	17.4 (533)	0.73 (0.64-0.83)	0.71 (0.61-0.81)
75-100% fulfillment	8.5 (1645)	0.30 (0.27-0.33)	0.32 (0.29-0.36)

*Adjusted for age, sex, housing situation, civil status, income, BMI, comorbidity, fracture type, fracture position, type of surgery, surgery delay and hospital characteristics.

WHAT HAVE WE LEARNED? Quality of care matters

Quality of Schizophrenia care and Subsequent Criminal offences (Can J Psychiatry 2013;58:515-21)

	All criminal offences[a]		Nonviolent[a]		Violent[a]	
Total received processes of care, %	HR	95% CI	HR	95% CI	HR	95% CI
<50	Reference		Reference		Reference	
50–74	0.99	0.86–1.14	1.12	0.93–1.36	0.90	0.76–1.07
≥75	0.86	0.75–0.99[b]	0.93	0.76–1.14	0.81	0.68–0.97[b]

[a] Adjusted for sex, age, substance abuse (alcohol, cannabis, benzodiazepines, opiates, CNS-stimulating drugs, other street drugs, GAF score, or history of criminal behaviour).

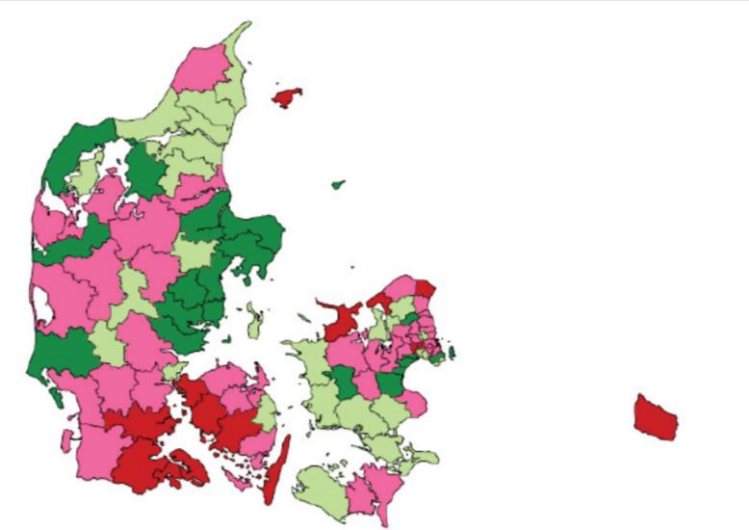
Proces: Kvalitet af behandling og kriminel adfærd blandt patienter med skizofreni

	Al kriminalitet		Ikke voldelig		Voldelig	
Andel af opfyldte indikatorer, %	HR	95 CI	HR	95 CI	HR	95 CI
< 50	Reference		Reference		Reference	
50-74	0.99	0.86-1.14	1.12	0.93-1.36	0.90	0.76-1.07
>= 75	0.86	0.75-0.99	0.93	0.76-1.14	0.81	0.68-0.97

Ref: Pedersen CG et al. Can J Psychiatry. 2013;58:515-21.

WHAT HAVE WE LEARNED? IMPROVEMENT IN USE OF EVIDENCE-BASED CARE

2015

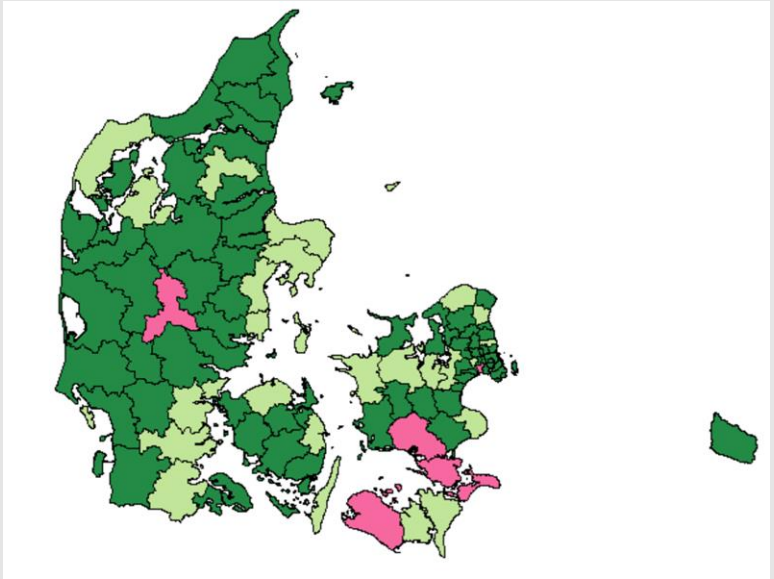


National average= 15%

Use of acute revascularisation therapy in patients with ischemic stroke

WHAT HAVE WE LEARNED? IMPROVEMENT IN USE OF EVIDENCE-BASED CARE

2018



National average= 22%

Use of acute revascularisation therapy in patients with ischemic stroke

What HAVE WE Learned? INEQUAILTY

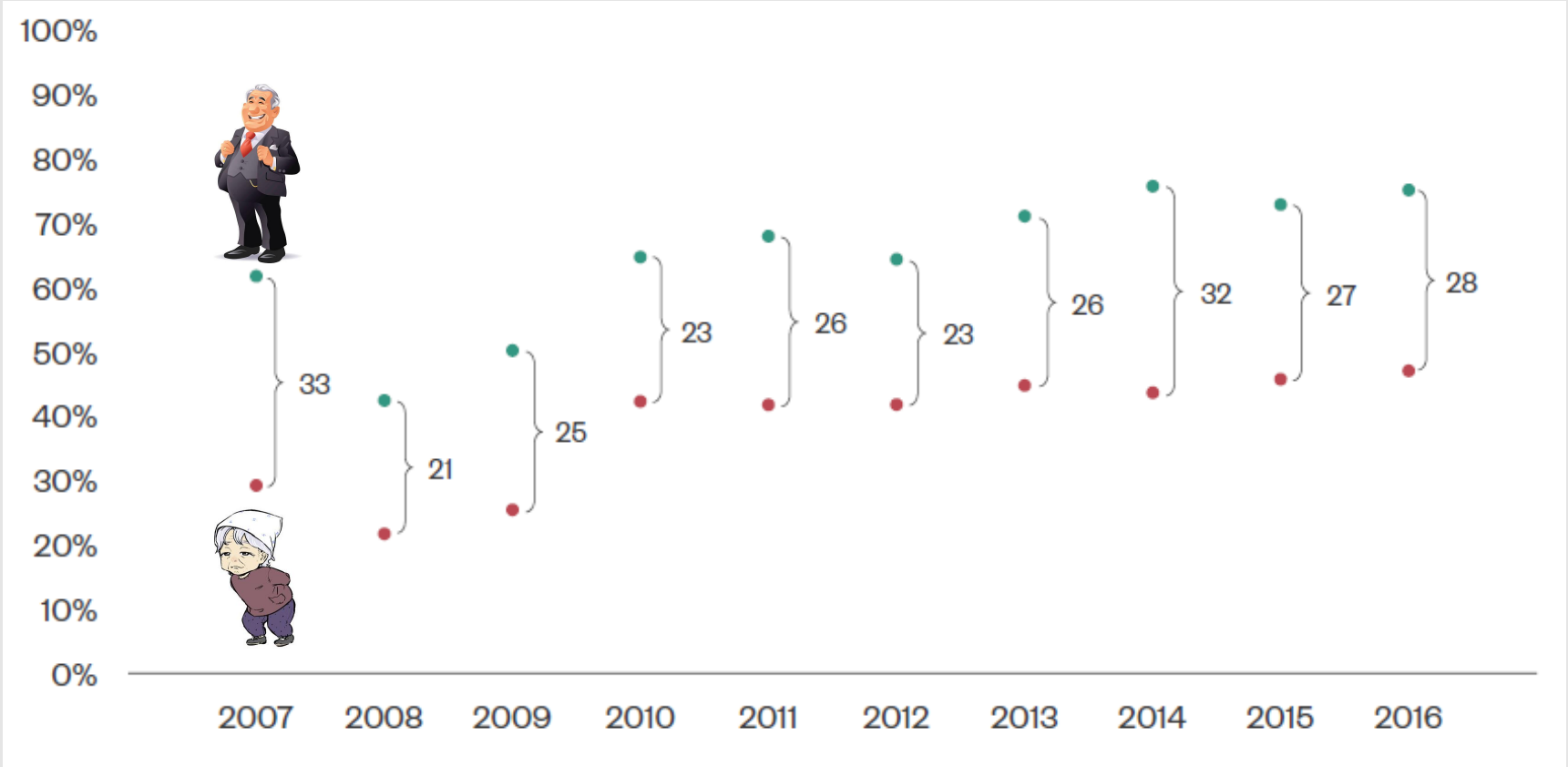
=

- Male
- 45-64 years
- Employed
- Educated higher than primary school
- High household income
- Cohabitation
- No comorbidity
- Mild disease severity

=

- Woman
- 75-85 years
- Outside the workforce
- Primary school only
- Low household income
- Cohabitation
- y
- Severity of apoplexy at admission unclear

Proportion of patients with optimal treatment
Stroke 2007–2016



The lessons from Denmark

- The quality of care can be improved in a public health care system
- No economic incentives
- Involvement and ownership of health professionals
- Increasing political and management focus
- Transparency and accountability
- Variation may persist - despite similar framework conditions

International Forum on QUALITY & SAFETY in HEALTHCARE COPENHAGEN

Learning Agents introduction

Pierre Barker, Institute for Healthcare Improvement

Institute for Healthcare Improvement

BMJ

Institute for Healthcare Improvement

Invitation to Learning Agents

Improvement Science Stream

Pierre Barker MB ChB, MD

Chief Scientific Officer, IHI

International Forum on Quality & Safety, Copenhagen, 15-17 May 2023

Overview & Invitation

Who are “Learning Agents?”

- Everyone attending Improvement Science Symposium stream is invited
- Share your breakthrough learning: ideas, methods, results that resonated
- (ps – focus is on breakthrough/key ideas not asking for a summary of everything!).

Overview & Invitation

The Invitation:

Learning Agents invited to share their insights about the 6 sessions in the Improvement Science Stream in 2 ways….

1. Input your insights on an online form.
2. Learning Agents invited to attend 2 breakfast sessions
   - Tuesday 8:00 – 8:45 Learning agents meeting in Auditorium 12
   - Wednesday 8:00 – 9:00 Learning agents meeting in room C1M3

Did you hear about breakthrough ideas, methods, or results in the Improvement Science Stream?

Share them in the Learning Agents response form!

Relevant sessions:

- ○ A9. Introduction to the Science Symposium stream and new methodologies / evaluation design (Tuesday 11:00 - 12:15)
- ○ B10. The science of workforce and patient safety - the challenges and opportunities of technology for improvement (Tuesday 13:15-14:30)
- ○ C9. The science of workforce and patient safety (Tuesday 15:00-16:00)
- ○ D9. How can Improvement Science improve the quality of care? (Wednesday 11:00 - 12:15)
- ○ E9. Delivering equity and sustainability (Wednesday 13:15-14:30)
- ○ F9. What have we learned about the science of improvement? What's next? (Wednesday 15:00 - 16:00)
- ○ Other

Overview & Invitation

What we'll do with what we learn:

- IHI team will analyse the feedback Tuesday night and early Wednesday and help prepare a set of themes
- Marianne McPherson will share themes during the final in the Improvement Science Stream: *F9. What have we learned about the science of improvement?*

Questions? *Contact Marianne McPherson, Senior Director for Measurement, Evaluation, Learning & Dissemination at IHI via mmcpherson@ihi.org*

Let’s try it…

International Forum on QUALITY & SAFETY in HEALTHCARE COPENHAGEN

New methodologies / evaluation design oral presentations

Marianne McPherson, Institute for Healthcare Improvement
Amar Shah, East London NHS Foundation Trust
Tatjana Sandreva, Nordsjællands Hospital

Institute for Healthcare Improvement

BMJ

Institute for Healthcare Improvement

3 Questions for Evaluation of QI

"FIRE": Framework for Improvement Research & Evaluation

Marianne McPherson, PhD, MS
Senior Director

@MariannePhD

International Forum on Quality & Safety in Healthcare
Copenhagen, Denmark
16 May 2023

Would it help your work if you…

Could confidently say that the measurement and data collection in your project was meaningfully helping to answer: “Whose lives are getting better because we are here [doing this work]”?

Knew how a specific project was helping your organization advance its mission and strategy?

Had a clear set of questions to guide your work and learning?

Questions that were broad enough to follow where the learning takes you and focused enough that you didn’t feel like you had to solve world peace to answer them?

Used standard work to guide your project team in answering those questions in a way that felt valuable and also integrated (so it wasn’t an “add on”)?

Shared what you were learning in your work – about the process and/or the content and results – with others in your organization, with partners and customers, and with the field?

And if you knew and could build upon and share what others were learning?

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D Shared what you were learning in your work – about the process and/or the content and results – with others in your organisation, with partners and customers, and with the field?

- And if you knew and could build upon and share what others were learning?

Purpose of these 3 questions – for a specific project or within an organisation-wide learning system

Understand impact and progress (along the way and at the end)

Surface key areas of learning

Facilitate dissemination

3 Key Evaluation Questions

What was the impact of the project?

1. What happened?

To what extent was the project delivered and/or received as planned (fidelity, delivery)?

What attributes of the project (ideas, methods) affected implementation, and in what ways?

What attributes of the environment (at various levels) affected implementation and in what ways (context)?

2. How and why did it happen?

3. To what extent is there a cause & effect relationship?

3 Key Evaluation Questions

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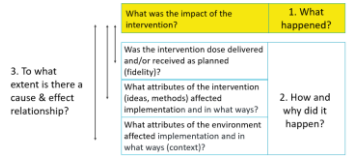
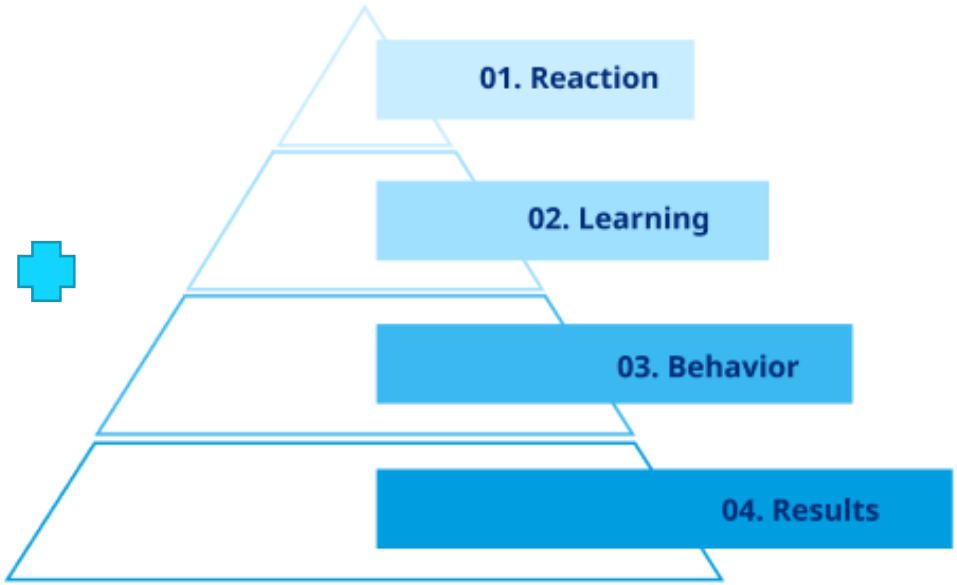
Q1: What happened / is happening?



Assessment Scale for Collaboratives

This scale gives information on how to assess a team's progress throughout a Collaborative Improvement Project.



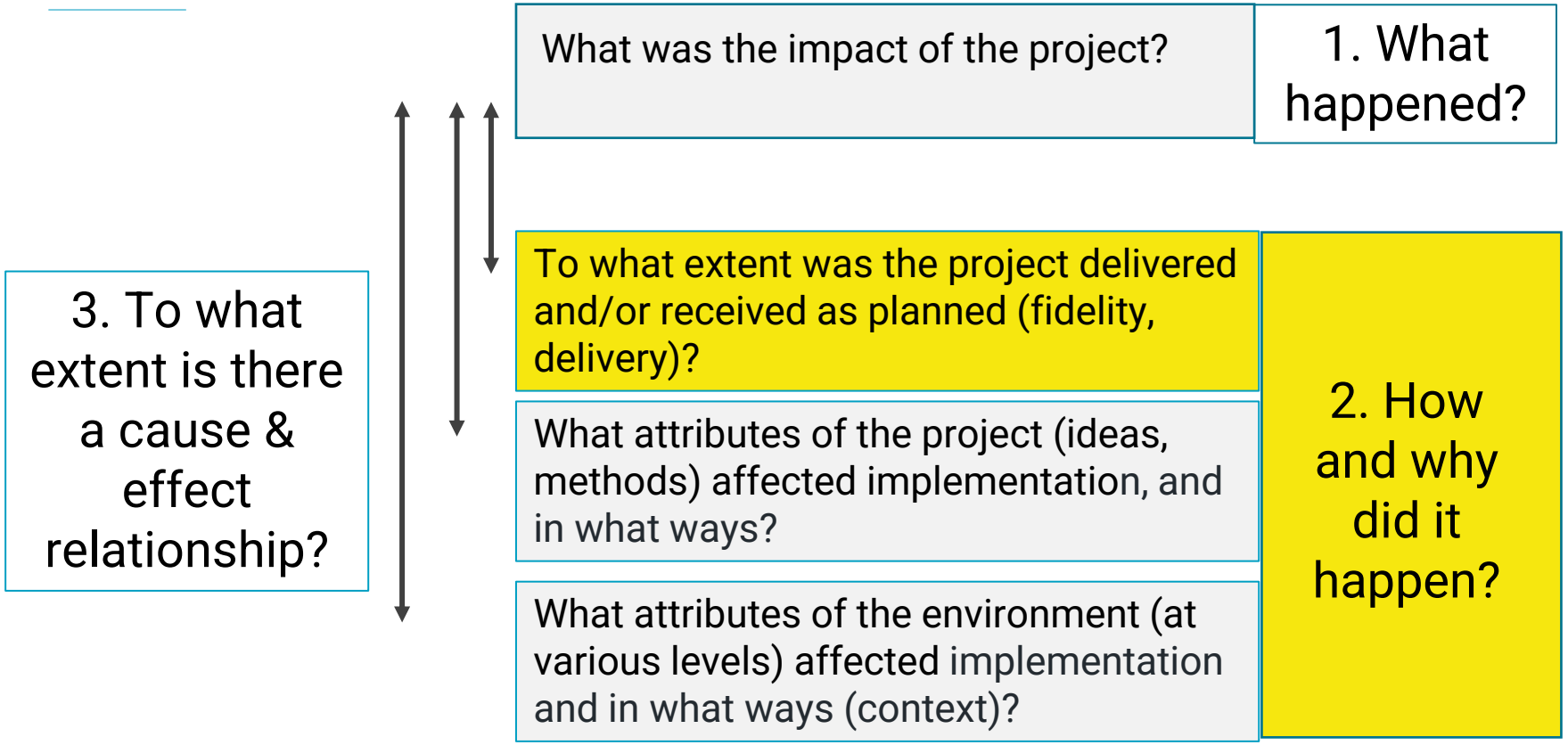
Institute for Healthcare Improvement. Assessment Scale for Collaboratives. Available at ihi.org.

Kirkpatrick DL, Kirkpatrick JD. *Evaluating Training Programs: The Four Levels*. 3rd edition. Berrett-Koehler Publishers; 2006.

Kirkpatrick Partners. The Kirkpatrick Model. Kirkpatrick Partners, LLC. Accessed February 4, 2022. https://www.kirkpatrickpartners.com/the-kirkpatrick-model/

Questions by KP level, include both quantitative and qualitative data where appropriate and available

Level of Learning (adapted from Kirkpatrick Model)	Potential Measures in Phase 1
Experience (KP1)	What was the participants' experience? Consider improvement team participants, project organizing team and partners
Learning (KP2)	What did the participants learn?
Process (KP3)	What behavior(s) changed? To what extent did process measures improve?
Impact/Outcomes (KP4)	To what extent did outcomes improve?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Q2a. Delivery: → Learning supported by design & execution theory documents (Gantt Chart, Logic Model

3. To what extent is there a cause & effect relationship?	What was the impact of the project?	1. What happened?
	To what extent was the project delivered and/or received as planned (fidelity, delivery)?	2. How and why did it happen?
	What attributes of the project (ideas, methods) affected implementation, and in what ways?	
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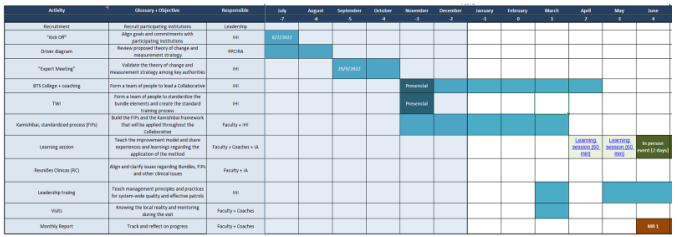
Context & Environment	Inputs	Activities	Outputs	Outcomes
Attributes of the environment that supported/ hindered uptake (soft periphery, CFIR)	*Content theory Methods (Attributes of the intervention that supported/ hindered uptake (hard core, CFIR)*	*Degree to which activities were delivered and taken up*	*Knowledge products (KP2)*	*Experience (KP1) Processes (KP3) Outcomes (KP4)* *5 RE-AIM outcomes* *CFIR Implementation & clinical outcomes*

Gantt Chart



Q2b. Theory: → Learning from content theory “ideas” (driver diagram, change package) and execution theory “methods” (Logic Model)

3. To what extent is there a cause & effect relationship?

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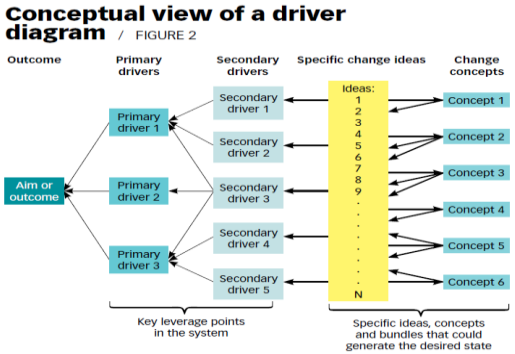

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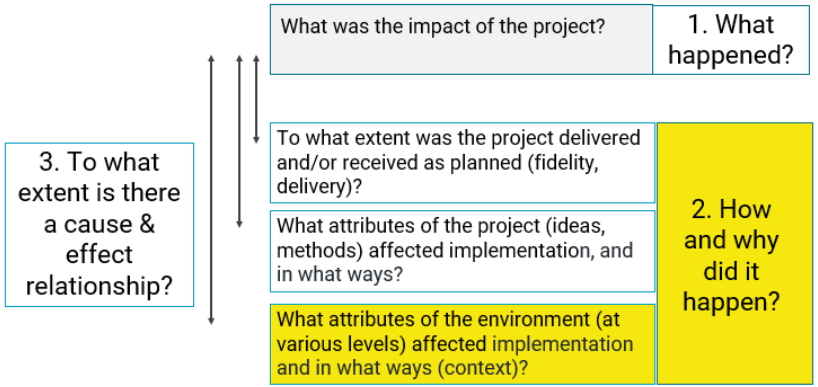
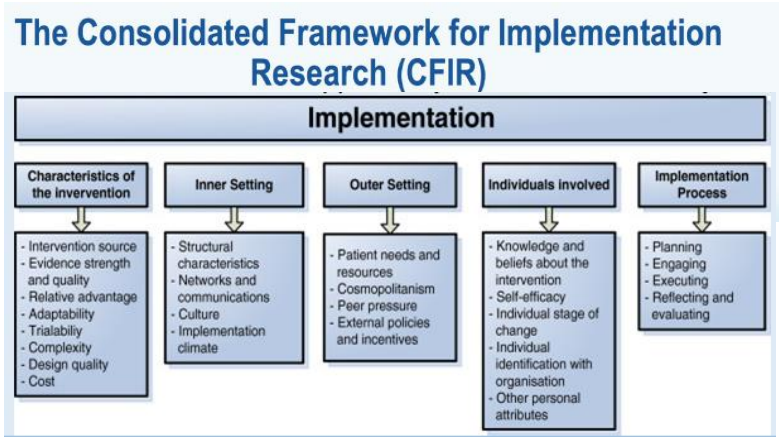
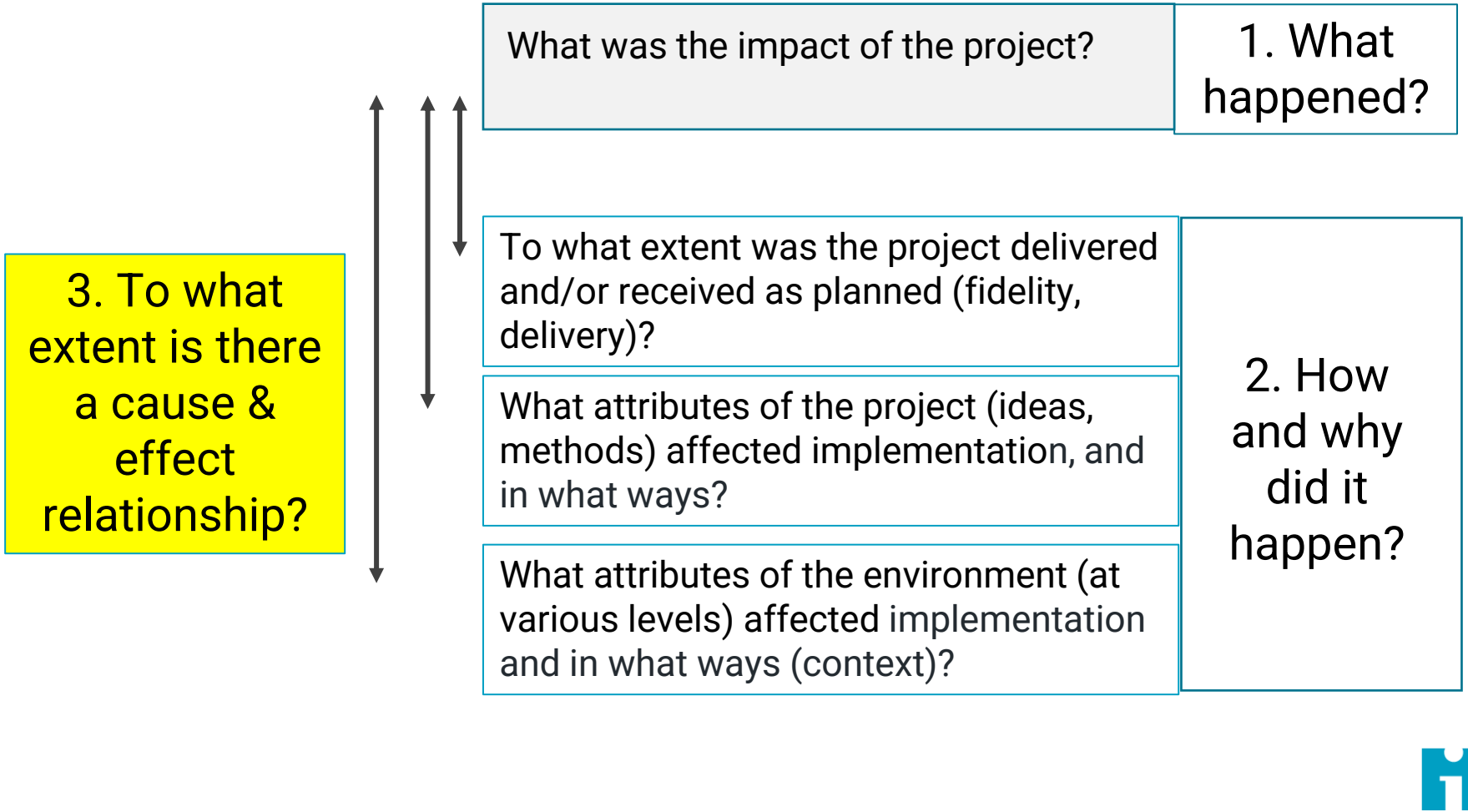
Q2c. Context: → Learning supported by theory, tools to understand contextual factors at multiple levels





Damschroder LJ, Aron DC, Keith RE, Kirsh SR, Alexander JA, Lowery JC. Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. Implement Sci. 2009;4:50. doi:10.1186/1748-5908-4-50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Q3. To what extent is there a cause-and-effect relationship between what's happening and the "Why and How" factors?

3. To what extent is there a cause & effect relationship?

What was the impact of the project?	1. What happened?
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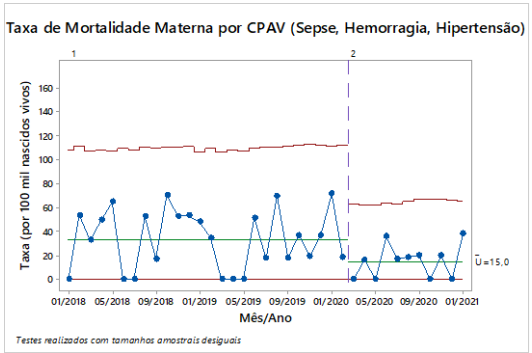
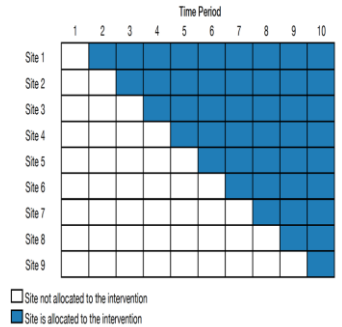




Considerations:

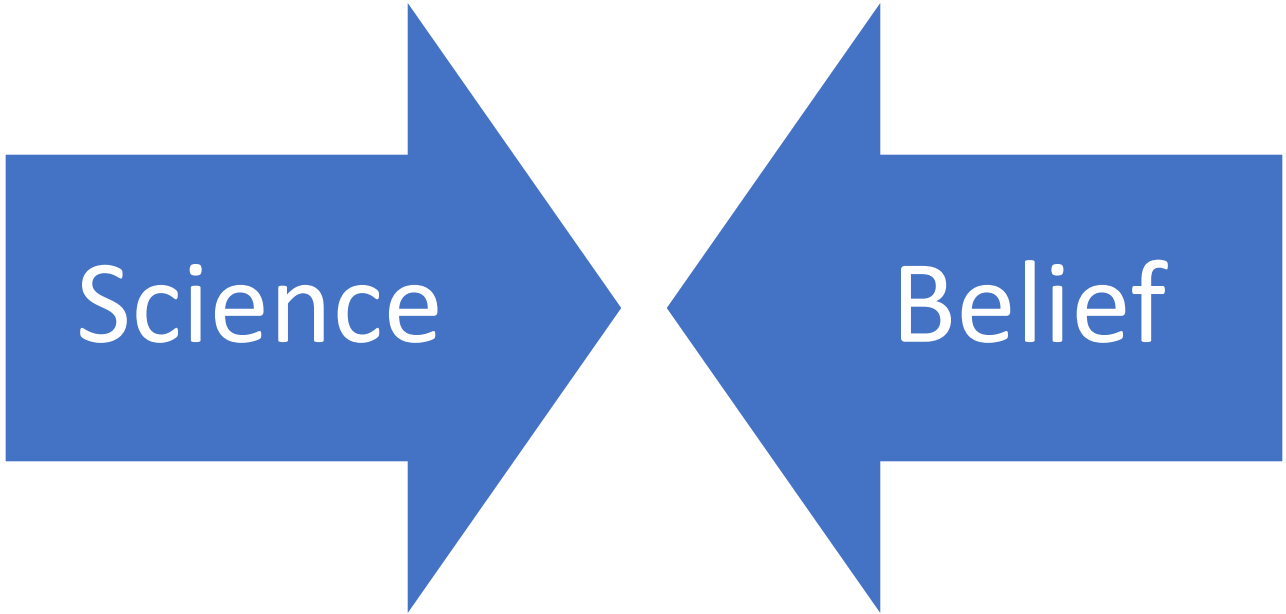
- Connection between changes tested and results experienced (annotations, study design)
- Qualitative data to understand on the ground experiences
- Assessment of external influences and secular trends
- Fidelity to project design

Study designs

The rigour of quality improvement work

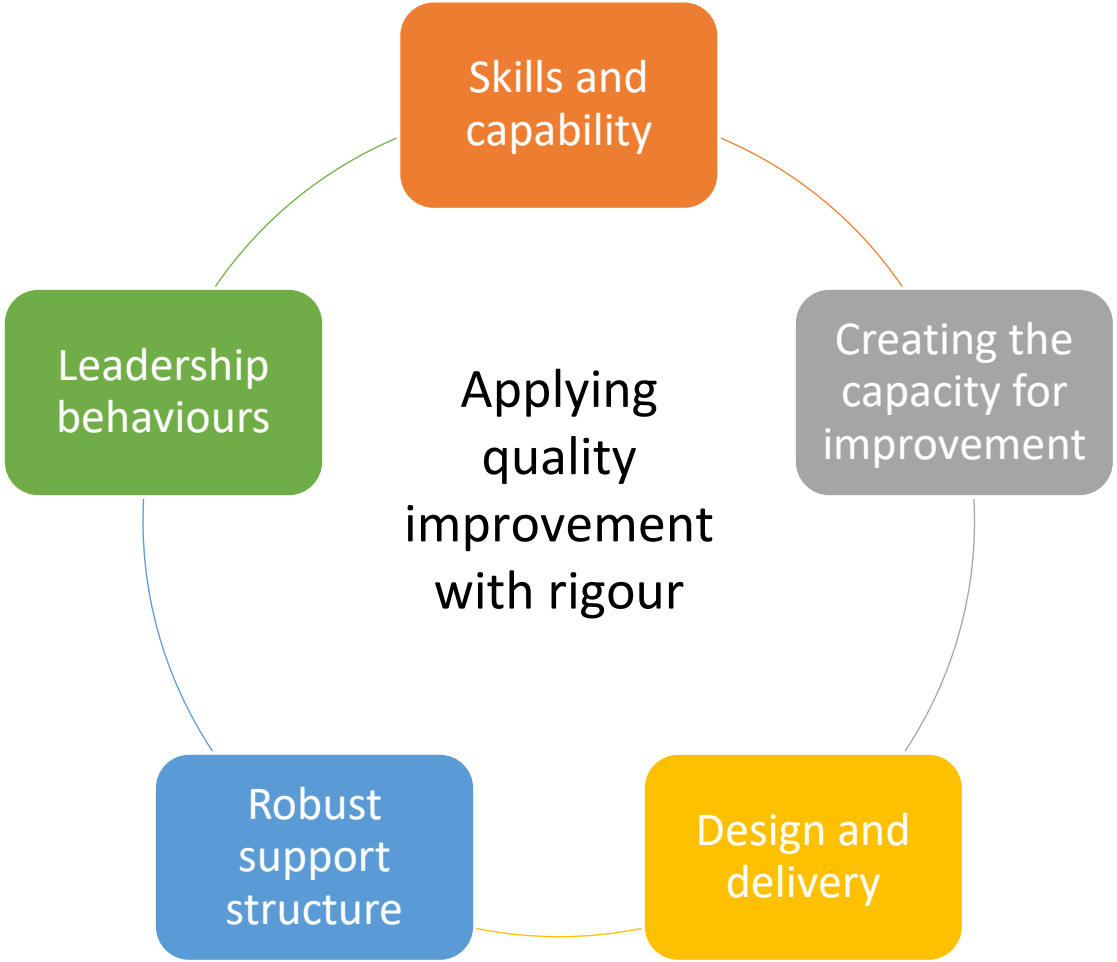
Dr Amar Shah
Chief Quality Officer, East London NHS FT
National improvement lead for mental health, RCPsych

@DrAmarShah


Science
Belief

Why doesn’t quality improvement work deliver the results we expect?

- Inconsistent definition of what we mean by QI
- Lack of skill
- Insufficient support
- Context and environment not conducive
- Poor application of the method


Skills and capability
Creating the capacity for improvement
Design and delivery
Robust support structure
Leadership behaviours
Applying quality improvement with rigour

What can we do?

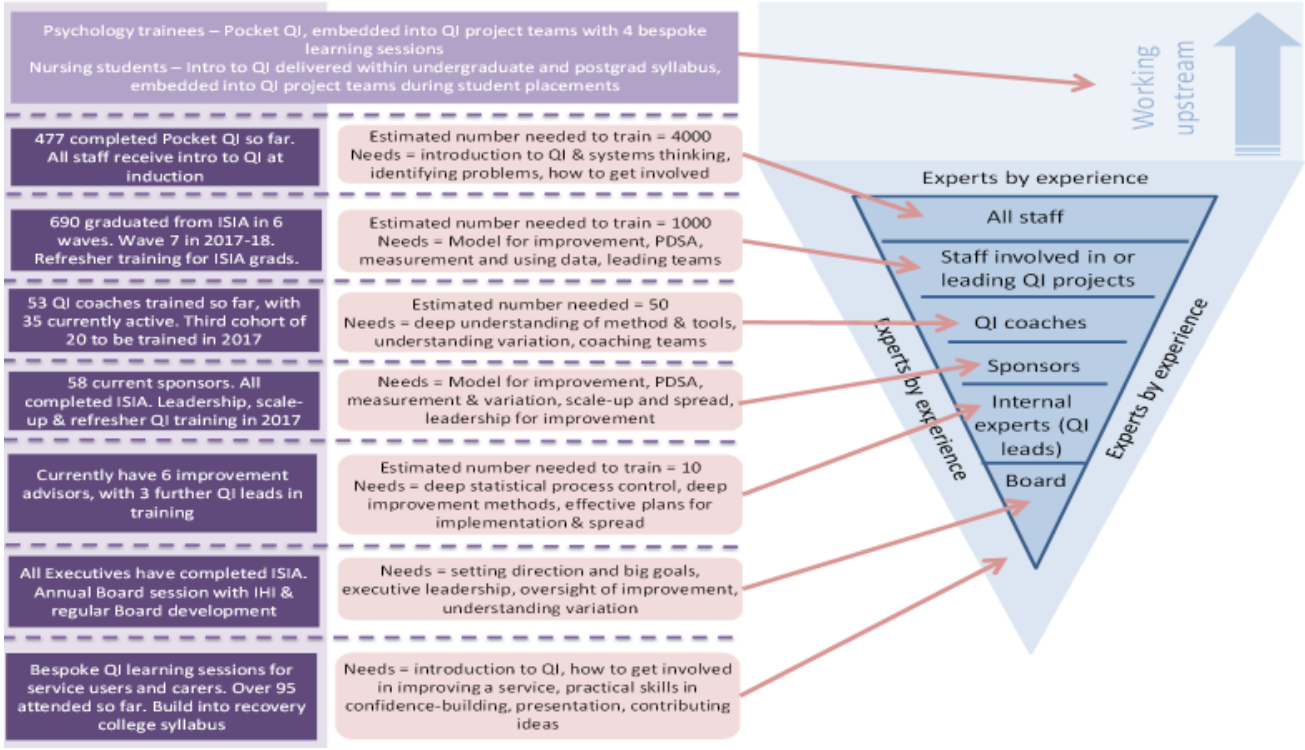
1. Systematically build skills at scale

Apply the dosing approach

Focus on learning through application, not teaching

Evaluate and iterate

Deepen reach



What can we do?

2. Focus on leadership behaviours and culture

Executive and board coalition

Role modelling

Create time, stop less value-adding work

Connect leaders to improvement work

For all leaders

- Act in a way that's consistent with the Trust values
- Be kind to others, and yourself
- Actively listen, involve others and be aware of the needs of others
- Try to find solutions

For those leading teams

- Make decisions when needed, and involve others in decision-making
- Be visible, accessible and approachable
- Build meaningful relationships, focusing on "what matters to you"
- Ensure regular time for reflection and focus on wellbeing
- Promote and celebrate the work of the team
- Encourage people to speak up and try new ideas

For senior leaders

- Frame challenges in a way that gives hope and invites solutions
- Demonstrate curiosity
- Regular time out and with services
- Be willing to tackle difficult issues
- Connect people to purpose

What can we do?

3. Create the infrastructure for improvement at scale

Build skills close to the place where improvement happens

Support should be just a simple reach away

Integrate governance and oversight into operations

What can we do?

4. Learn and apply the whole range of methods for design and evaluation

Test	RunOrder	Safety Huddle	Safety discussion within Community Meeting	BVC	Safety Cross
1	Opal	-	-	-	-
2	Ruth Seifert	+	-	-	+
3	Gardner	-	+	-	+
4	Emerald	+	+	-	-
5	Joshua	-	-	+	+
6	Sapphire	+	-	+	-
7	Topaz	-	+	+	-
8	Conolly	+	+	+	+

Fractional Factorial design 2 (4)
- Four Factors
- Each has two levels

Orchestrated testing
- Wards were able to choose which combination they wanted to test

Testing Matrix - Fractional Factorial Design - 2 (7-4) = 8 runs

have the same effect you will need to do a follow up study

Remove negatives in all four combination to change from full factorial to fraction factorial

	-	No	No	No	No											
	+	Yes	Yes	Yes	Yes											
Test	Run Order	Safety Huddle	Safety discussion	Broset Violence Checklist	Safety Cross	BVC & SC	BVC & SH	BVC & SD	SC & SH	SC & SD	SH & SD	BVC, SC, SH	BVC, SH, SD	BVC, SC, SD	SC, SD, SH	BVC, SC, SH, SD
1	Opal	-1	-1	-1	-1	1	1	1	1	1	1	-1	-1	-1	-1	1
2	Ruth Seifert	1	-1	-1	1	-1	-1	1	-1	-1	-1	-1	1	1	-1	1
3	Gardner	-1	1	-1	1	-1	1	-1	-1	1	-1	1	1	-1	-1	1
4	Emerald	1	1	-1	-1	1	-1	-1	1	-1	1	1	-1	1	-1	1
5	Joshua	-1	-1	1	1	1	-1	-1	1	-1	1	-1	1	-1	1	1
6	Sapphire	1	-1	1	-1	-1	1	-1	-1	1	-1	-1	-1	1	1	1
7	Topaz	-1	1	1	-1	-1	-1	1	-1	-1	-1	1	-1	-1	1	1
8	Conolly	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
9	no ward	-1	-1	1	-1	-1	-1	-1	1	1	1	1	1	1	-1	-1
10	no ward	1	1	1	-1	-1	1	1	1	-1	1	-1	1	-1	-1	-1
11	no ward	-1	1	1	1	1	-1	1	-1	1	-1	-1	-1	1	-1	-1
12	no ward	-1	-1	-1	1	-1	1	1	1	-1	1	1	-1	1	1	-1

Types of experiments

1. *Trial-and-learning methods (PDSA tests of change)*

   Introduce a change and see what happens. One-shot case studies (Campbell & Stanley)
2. *Running special lots or batches*

   Produced under controlled conditions
3. *Pilot runs*

   Set up to produce a desired effect
4. *One-factor experiment*

   A single change with background variables
5. *Experiment planned with two to four factors*

   Study separate effects and interactions
6. *Experiment with 5 to 20 factors*

   Screening studies
7. *Comprehensive experimental plan with many phases*

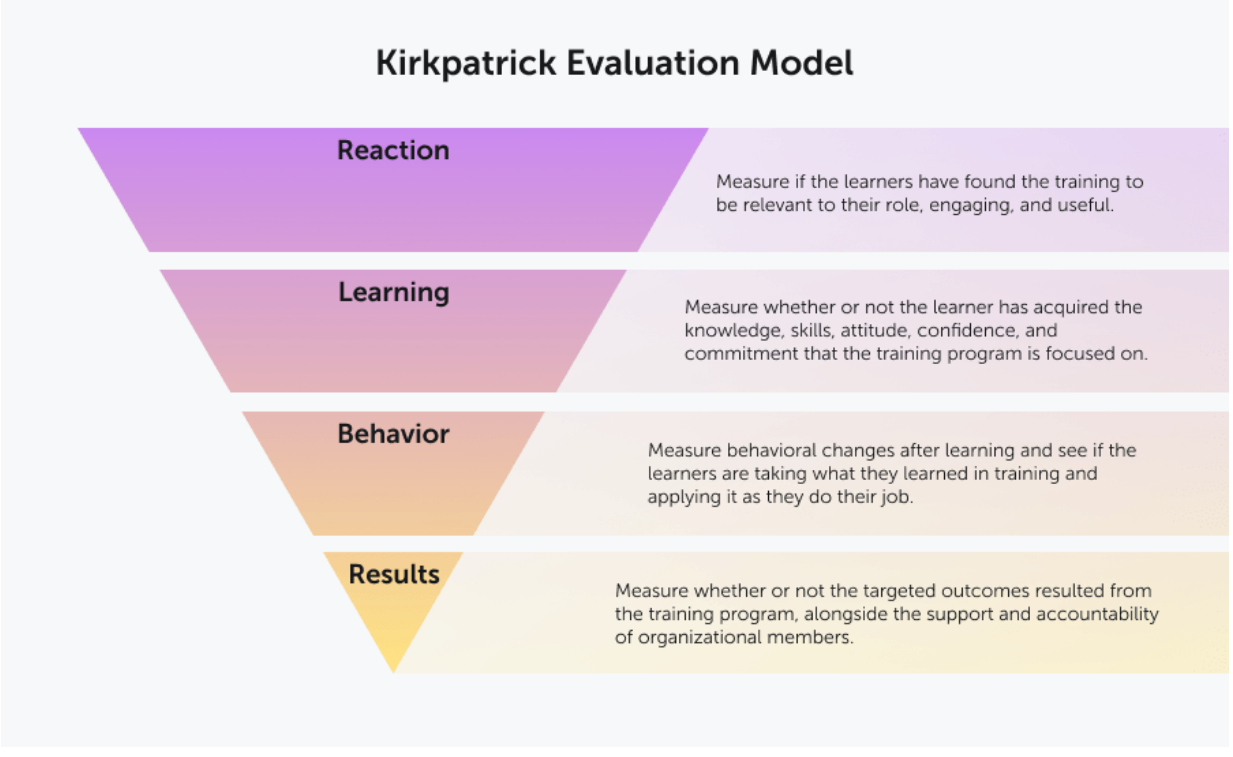
   Modeling, multiple factor levels, optimisation

What can we do?

5. Evaluate in order to learn and adapt continuously

Apply good improvement science to the way we practice

Set tangible goals, create measurement plans, learn and iterate



What can we do?

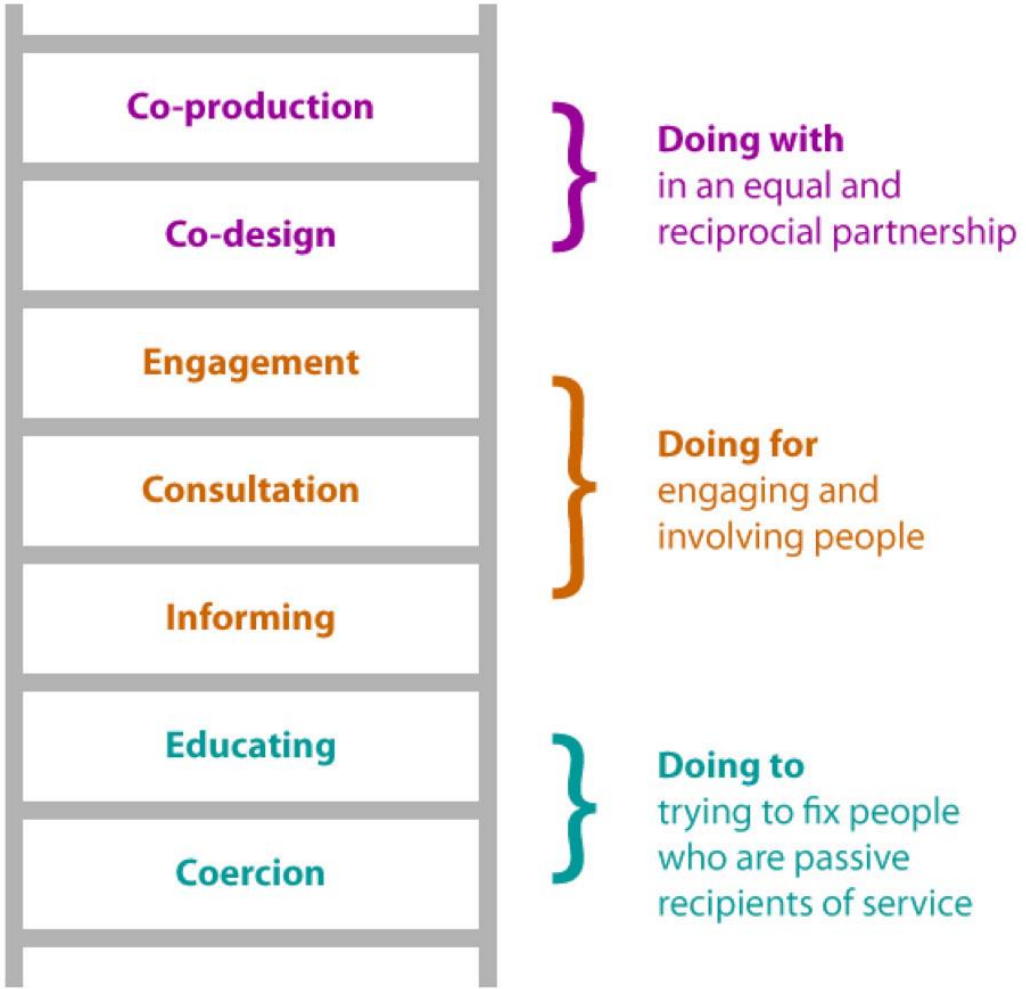
6. Involve people meaningfully in change, including those that the change is aimed at benefiting

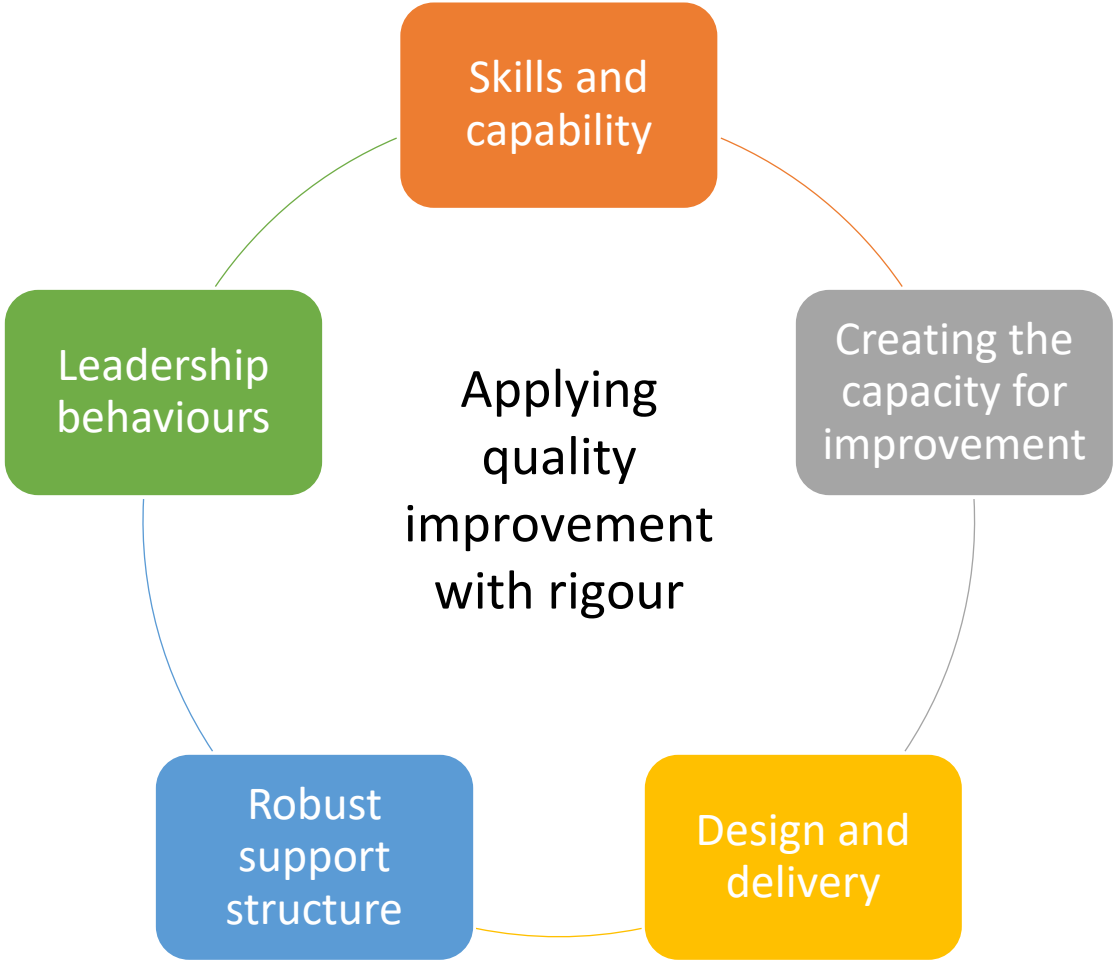
Retrospective study of 500 quality improvement projects at East London NHS Foundation Trust

Projects that truly coproduced with patients and service users (Big I) compared to those with no patient involvement, or occasional patient involvement (little i)

Big I projects were **2.8 times** more likely to achieve their aim

Kostal G, Shah A. (2021) Putting improvement in everyone's hands: opening up healthcare improvement by simplifying, supporting and refocusing on core purpose. British Journal of Healthcare Management. 2021. https://doi.org/10.12968/bjhc.2020.0189




Skills and capability
Creating the capacity for improvement
Design and delivery
Robust support structure
Leadership behaviours
Applying quality improvement with rigour

@DrAmarShah

Nordsjællands Hospital
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SDU netcompany Innovation Fund Denmark

REGION

How to unpack the ‘black box’ of improvement?

Process evaluation of a telemedicine-supported early discharge program *Influenz-er*

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Declaration of interest

- Funding by Innovation Fund Denmark and Nordsjællands Hospital
- Conference registration fee paid by Nordsjællands Hospital

Introduction

- Low hospital workforce and increasing demand for hospital care introduced a wicked problem to the health care systems world-wide.

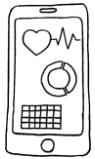
- Complex interventions such as remote patient monitoring and hospital-at-home models are proposed as a valuable solution for patients and organisations.

Introduction

- Influenz-er project aims to develop, implement and evaluate a telemedicine supported early discharge program for patients with acute infections.

Influenz-er
Hospital-at-home

Video solution
Fascilitates virtual ward rounds



Patient-centered app
Facilitates patient data registration, virtual ward rounds and contact requests from patients to the hospital staff.

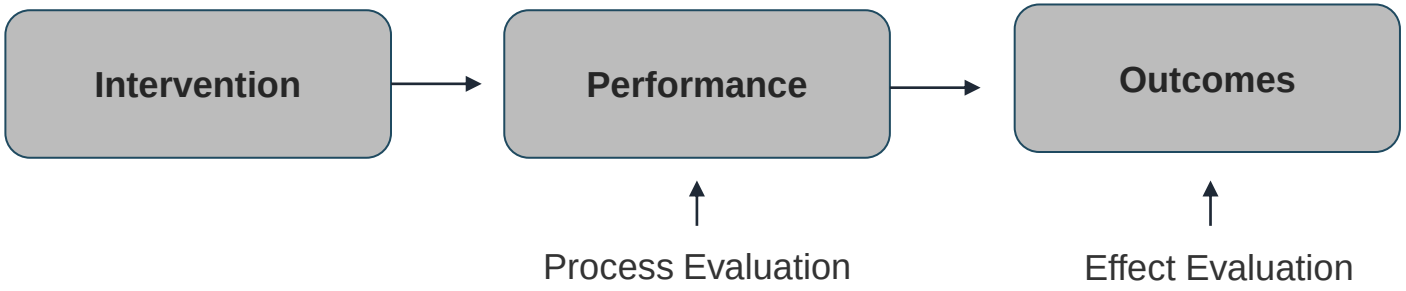
Patients' home
Mobile health-devices for self-measurements.

Virtual Epidemic Center
Hospital staff virtual access 24/7. Provider dashboard receives, displays and interprets patient data. Out-of-range readings as a sign of clinical deterioration initiate alarms.

Mobile team
Medical interventions at patients' home (e.g. bloodanalysis; IV. treatments)

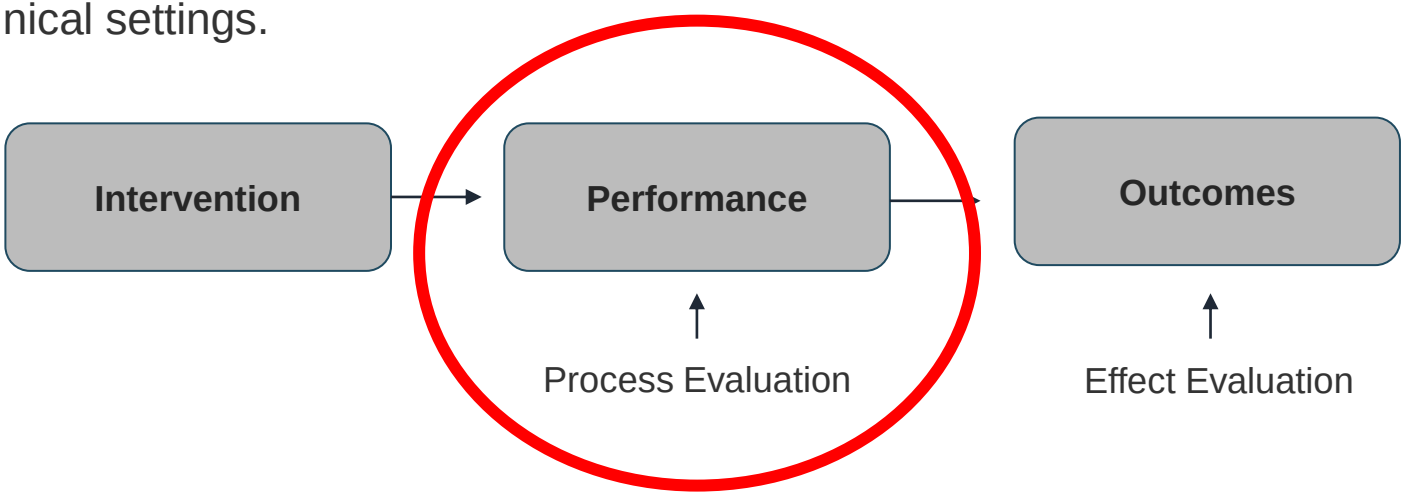
- In case of limited effects of the intervention, it is critical to identify the cause – is it due to **bad design** or **bad implementation**?

- Evaluation of a complex intervention should include a process evaluation to open the ”black box” of the intervention performance.



Aim

- To generate a comprehensive understanding of how Influenz-er program was implemented and used and which factors contributed to that process in the clinical settings.



Methods

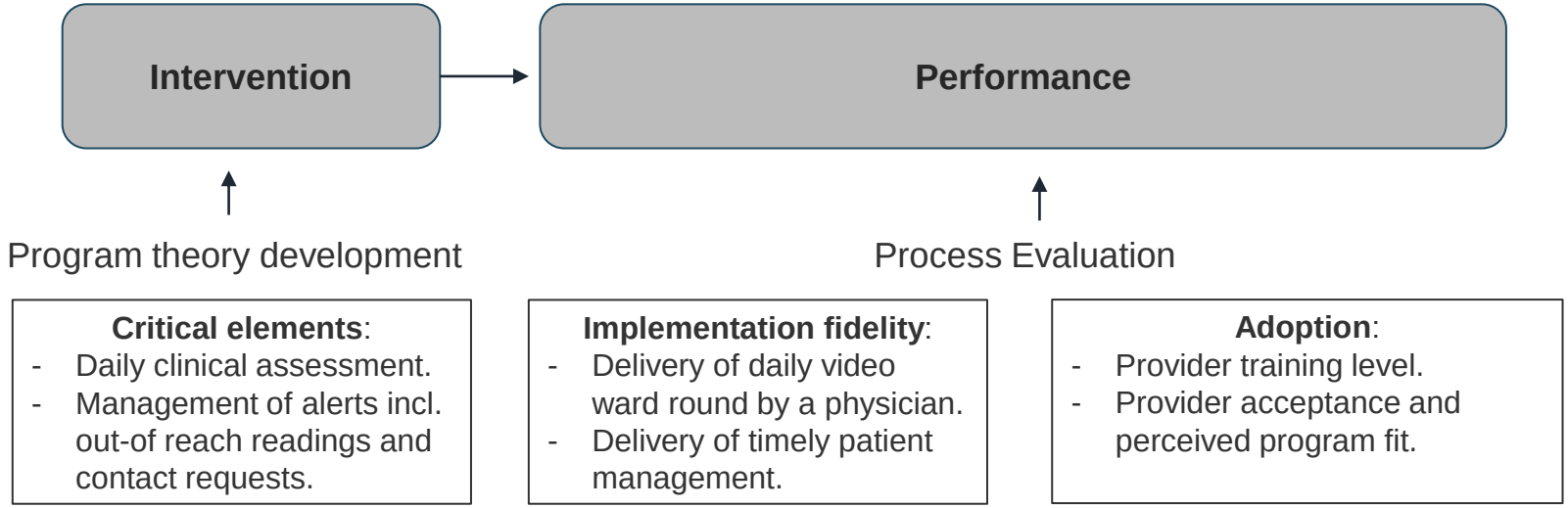
- RE-AIM framework
- Feasibilty trial
- Process Evaluation

RE-AIM Dimension	Questions
Reach (Individual Level)	What percent of potentially eligible participants a) were excluded, b) took part and c) how representative were they?
Efficacy or Effectiveness (Individual Level)	What impact did the intervention have on a) all participants who began the program; b) on process intermediate, and primary outcomes; and c) on both positive and negative (unintended), outcomes including quality of life?
Adoption (Setting Level)	What percent of settings and intervention agents within these settings (e.g., schools/educators, medical offices/physicians) a) were excluded, b) participated and c) how representative were they?
Implementation (Setting/agent Level)	To what extent were the various intervention components delivered as intended (in the protocol), especially when conducted by different (non-research) staff members in applied settings?
Maintenance (Individual Level)	What were the long-term effects (minimum of 6-12 months following intervention)? b) What was the attrition rate; were drop-outs representative; and how did attrition impact conclusions about effectiveness?
Maintenance (Setting Level)	a) To what extent were different intervention components continued or institutionalized? b) How was the original program modified?

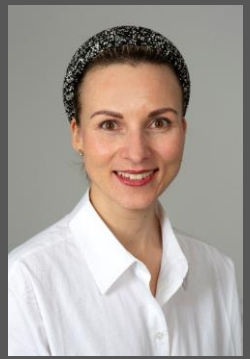
Source: www.re-aim.org

Study description

- Process evaluation nested in a single-arm feasibility study with 19 patients (recruitment from April 2022 till May 2023) at the Department of Pulmonary and Infectious Diseases.



Thank you



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Discussion

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Institute for Healthcare Improvement

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Did you hear about breakthrough ideas, methods, or results in the Improvement Science Stream?

Share them in the Learning Agents response form!

Relevant sessions:

- ○ A9. Introduction to the Science Symposium stream and new methodologies / evaluation design (Tuesday 11:00 - 12:15)
- ○ B10. The science of workforce and patient safety - the challenges and opportunities of technology for improvement (Tuesday 13:15-14:30)
- ○ C9. The science of workforce and patient safety (Tuesday 15:00-16:00)
- ○ D9. How can Improvement Science improve the quality of care? (Wednesday 11:00 - 12:15)
- ○ E9. Delivering equity and sustainability (Wednesday 13:15-14:30)
- ○ F9. What have we learned about the science of improvement? What's next? (Wednesday 15:00 - 16:00)