Implementation Science 101

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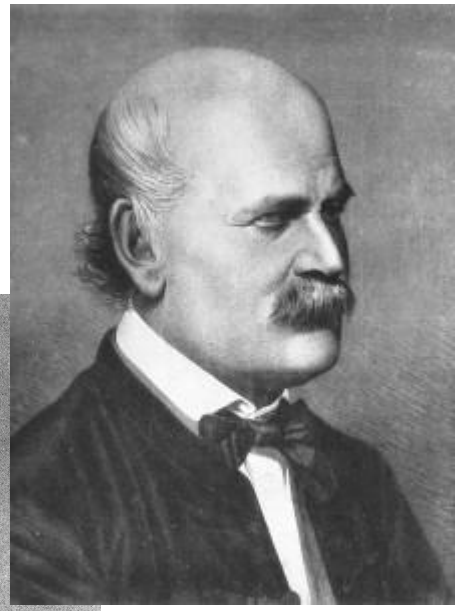
A cautionary tale: Ignaz Semmelweis (1818-1865)



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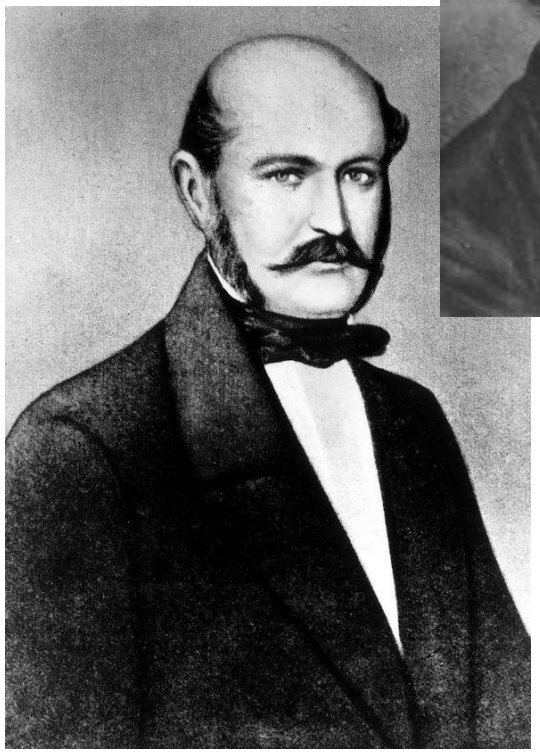

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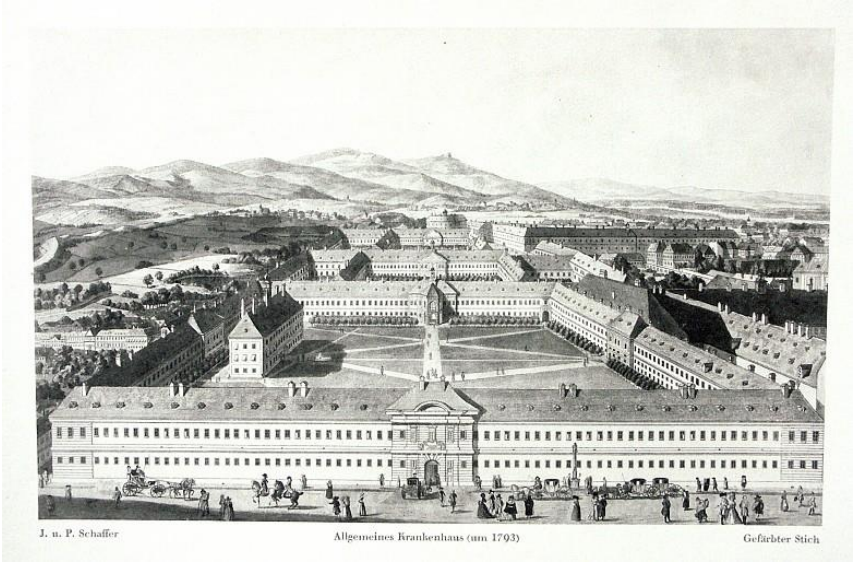
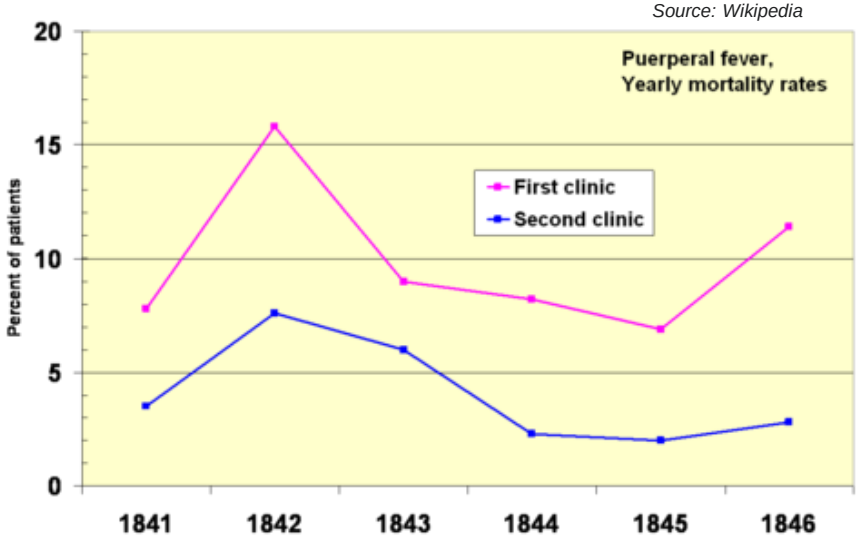
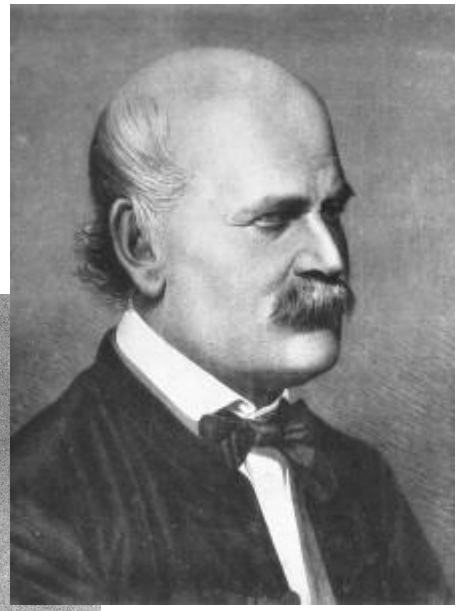
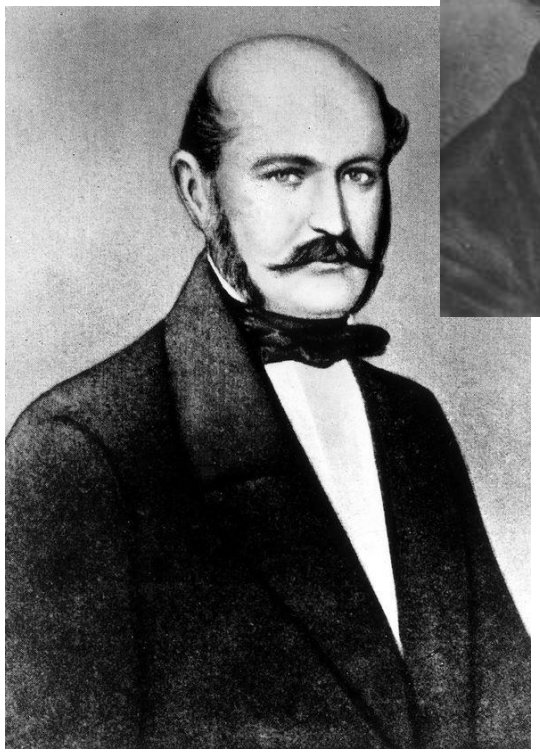


Source: Wikipedia



A cautionary tale: Ignaz Semmelweis (1818-1865)





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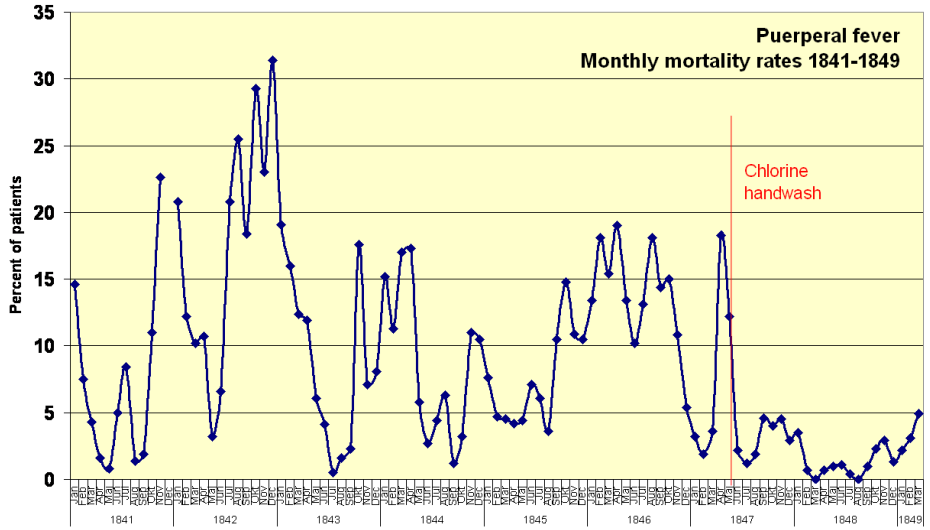


A cautionary tale: Ignaz Semmelweis (1818-1865)

Despite strong evidence Semmelweis was not able to convince his peers to implement his simple solution

- did not communicate the evidence (14 years to publish)
- contradicted established norms, beliefs and paradigms of disease at the time
- not supported by his superiors/poor stakeholder engagement
- washing of hands before treating each patient would be too much work
- needed structural redesign
- unreasonable to think doctors were carrying disease and killing patients
- personal characteristics (rude , confrontational, insulting) – not a change agent

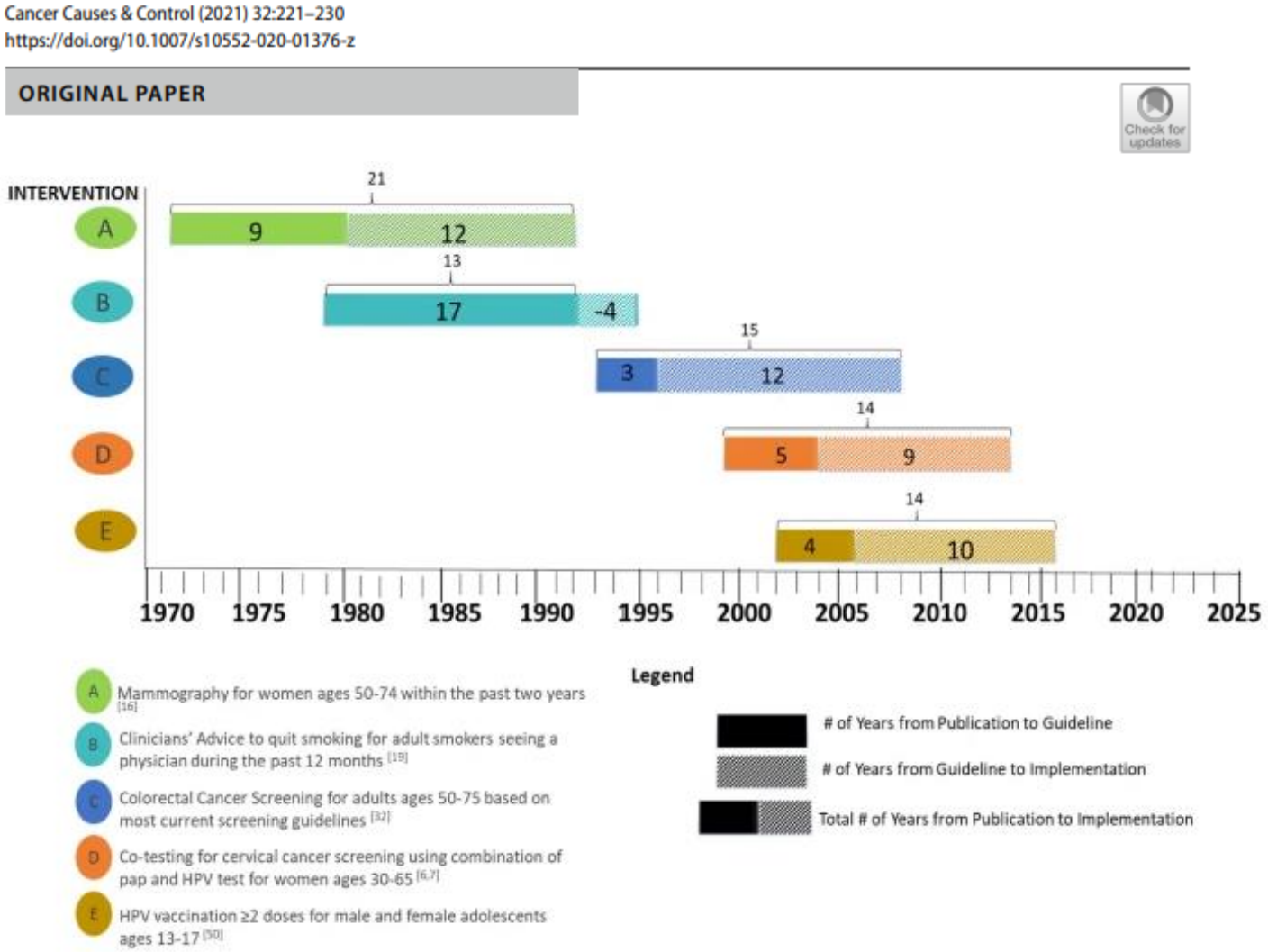
It would be 2 decades after his death before more knowledge about germ theory and antiseptic techniques demonstrated the value of hand washing

Evidence is not enough!

"Good ideas and missionary zeal are sometimes enough to change the thinking and actions of individuals; they are rarely, if ever, effective in changing complicated organizations" Seymour Sarason, 1971

Evidence is not enough

- Gap between research evidence and clinical practice is widely recognised
- Several publications have estimated a mean gap of 17 years between publication and routine uptake in practice
- In 2012/2013 40% of care for children across 3 Australian states did not adhere to guidelines [1]
- Surely things have improved with the broader push towards translational research in recent years?



[1] Braithwaite J, Hibbert PD, Jaffe A, White L, Cowell CT, Harris MF, Runciman WB, Hallahan AR, Wheaton G, Williams HM, Murphy E. Quality of health care for children in Australia, 2012-2013. Jama. 2018 Mar 20;319(11):1113-24.

“Choosing an evidence-based practice is one thing, implementation of that practice is another thing altogether. One without the other is not sufficient for reliably producing benefits.”

—Fixsen, D., Blase, K., Horner, R., & Sugai, G.
Developing the Capacity for Scaling Up the Effective Use of Evidence-Based Programs in State Departments of Education

A role for implementation science

Many attempts to implement change/improvement within organisations fail and effective treatments/interventions take too long to be integrated into routine patient care

Successful implementation requires more than just knowledge production and dissemination; it's largely a social process which requires **human agency**, **behavioural** change, **culture** change and **organisational** change.

Need to focus on **'how to**' turn new knowledge into action: **introducing solutions** into a health system, understand **processes** of implementation, identify **barriers and facilitators** of implementation, and factors that promote **sustainability**

Led to the development of '**Implementation Science**'

What is implementation science?

Key concepts/definitions

Dissemination, knowledge translation, implementation science?

Sharing information, in order to increase people's awareness and their knowledge of something e.g present at conference, guidelines

"How do we get the word out about this evidence?"

The dynamic and iterative process of making evidence usable, understandable, and applicable in practice or policy e.g tailored messages

"How do we adapt this evidence for practical use in real-world settings?"

The scientific study of methods and strategies to promote the systematic uptake of research findings and evidence-based practices into routine practice or policy e.g understand barriers and enablers

"What strategies work best to implement and sustain this in real-world contexts?"

Words used to define implementation science

Action	From	To	Goal	Result
Translating/transferring/ transporting/exchanging	Intervention/program	Practice/routine practice	Improve/change	Quality of healthcare
Reducing/closing gap	Research	Use/utilisation/routine use	Meet/achieve	Intervention/ implementation
Promoting uptake	Knowledge	Real-world/ reality/ context/ settings	Deliver	Healthcare
Getting/bringing/delivering	Evidence	Innovation/program/ policy	Identify/clarify	Outcomes/health outcomes
Understanding	Practice	Knowledge		
Implementing	Innovation			
Putting	Science			
Bridging/nexus				
Integrating				
Promoting/encouraging				
Process				

Implementation science relates to the idea of transferring evidence-based knowledge into practice, in a scientific way to improve outcomes

Dintrans PV, Bossert TJ, Sherry J, Kruk ME. A synthesis of implementation science frameworks and application to global health gaps. Global health research and policy. 2019 Dec;4(1):1-1.

Key implementation science questions

How do contextual factors influence implementation success or failure? How can they be modified to increase chances of success)?

What are the most effective techniques to incorporate new discoveries and evidence-based practices into care delivery?

What are the most effective techniques to de-implement practices that are no longer effective or were never effective?

- Scaling up
- Sustaining
- Replicating
- Integrating
- Equitability
- Real-world effectiveness

- Exploring
- Describing
- Influences
- Explaining
- Predicting

https://impsciuw.org/https://impsciuw.org/implementation-science/research/frame-your-question/

Multi-faceted uses and targets

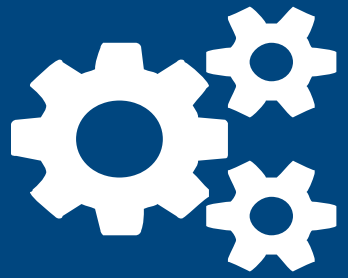
Change in practice behaviour

e.g. getting doctors to prescribe new Drug B, instead of old Drug A

New model of care

Simple: single organisation / single clinical discipline

Complex: multi-organisational / multi-disciplinary



Product, infrastructure or technology

e.g. multi-organisational rollout of digital management software

Policy change

Within an organization

Large scale

A simplified explanation

The intervention/practice/policy/innovation is **THE THING**

Effectiveness research looks at whether **THE THING** works

Implementation research looks at how best to help people/places **DO THE THING**

Implementation practice/strategies are what we do to try and help people/places **DO THE THING**

Implementation outcomes are **HOW MUCH** and **HOW WELL** they **DO THE THING**

The goal of implementation science is not to establish the health *impact* of a clinical innovation, but rather to identify the factors that affect its *uptake* into routine use

Curran, G.M. Implementation science made too simple: a teaching tool. *Implement Sci Commun* **1,** 27 (2020). https://doi.org/10.1186/s43058-020-00001-z

What is implementation science?

The process

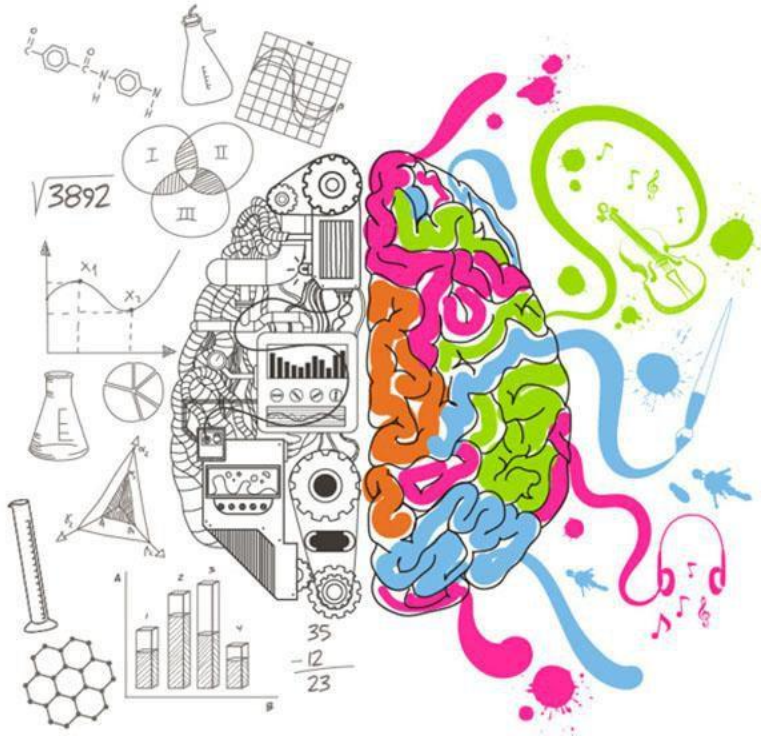
> *...although there are many wrong answers to the question of how to 'do' implementation, there is rarely a single right answer*

—Trish Greenhalgh
Implementation Science Handbook

A science informed practice

“There is no tooth fairy. Nor is there any formal framework or model or checklist of things to do (or questions to ask) that will take you systematically through everything you need to do to ‘implement’ a particular piece of evidence in a particular setting.”

Science?



Art?

https://www.cebm.ox.ac.uk/news/views/knowledge-to-action-there-is-no-tooth-fairy

What methods can I use?

Rapid Evidence Synthesis

Used to summarize and synthesize research literature and can be applied to synthesizing evidence on known determinants for implementing evidence-based interventions. To learn more, visit ImpSciMethods.org.

Impact Evaluation

An evaluation of how the intervention or implementation affects relevant outcomes, intended or otherwise, and typically includes evidence of how outcomes would or would not differ in the absence of the intervention or implementation.

Organizational Assessment

Evaluation of an organization's readiness and capacity to implement evidence-based practices. This process helps identify strengths, weaknesses, and areas needing improvement to ensure successful implementation.

Qualitative Health Systems Research

Research that uses methods of observation and interviewing to evaluate health systems through the lens of those who experience them, and to explain factors that shape outcomes, dimensions of care, as well as the social and political determinants of health. For an excellent overview of qualitative methods in implementation research, see Qualitative methods in implementation research: An introduction (*Psychiatry Research*, 2019).

Operations Research

The use of qualitative or quantitative models to facilitate decision-making in complex implementation, particularly relating to structure, prospective evaluation, and reconfiguration.

Economic Evaluation

Comparing the costs and benefits of different courses of action. Specifically, understanding the costs associated with evidence-based practices (such as interventions, policies, programs, and tools) and the efforts required to deliver and sustain them.

Causal Pathway Diagrams

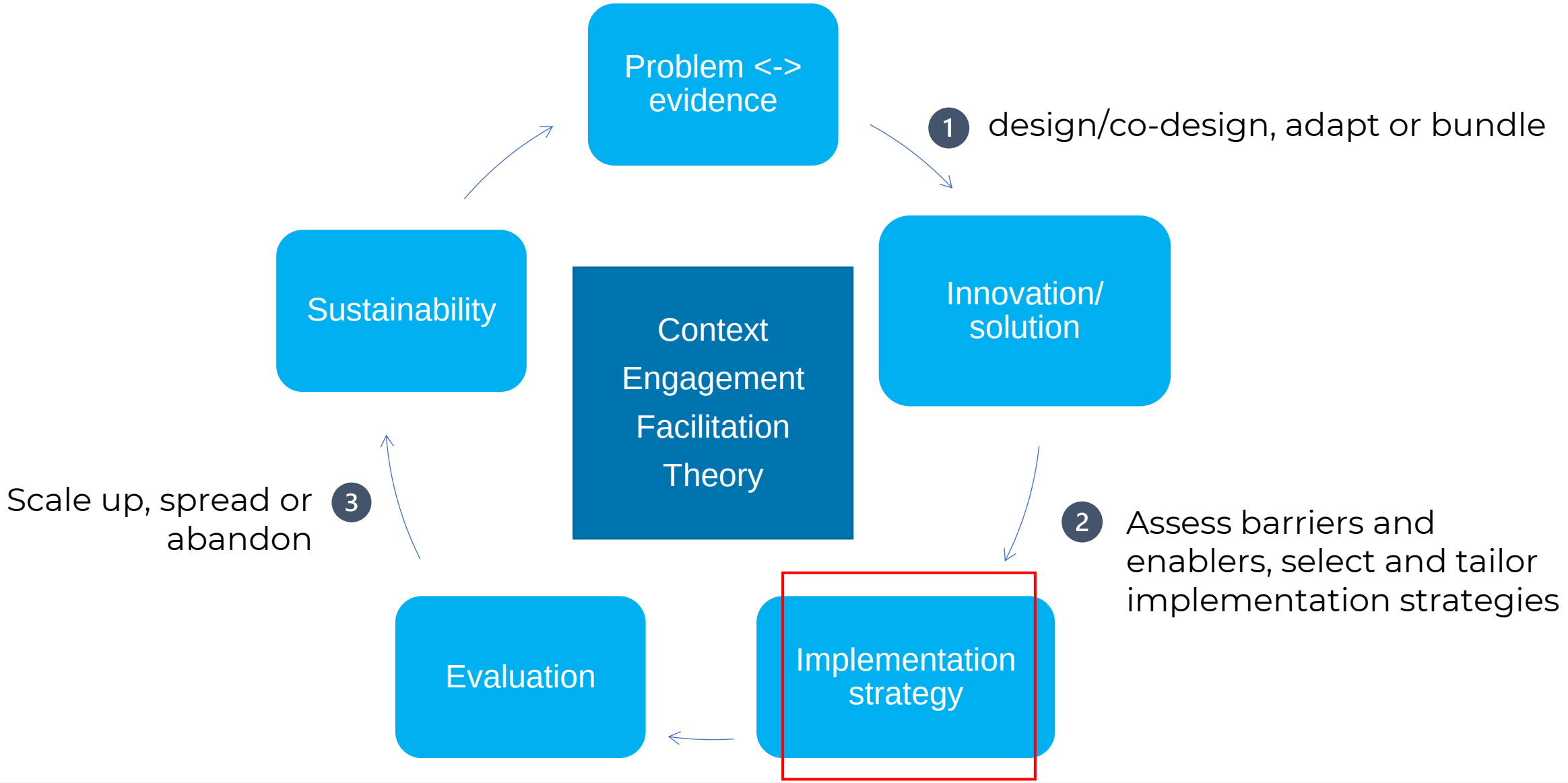
A graphical tool that enables visualization of how implementation strategies bring about implementation outcomes and the conditions under which they work. To learn more, visit ImpSciMethods.org.

Stakeholder & Policy Analysis

The intentional integration of stakeholder (individuals or groups who have an interest in a particular policy or program) perspectives and feedback in the analysis of policy advisability, execution and impact.

https://impsciuw.org/implementation-science/research/select-research-methods/

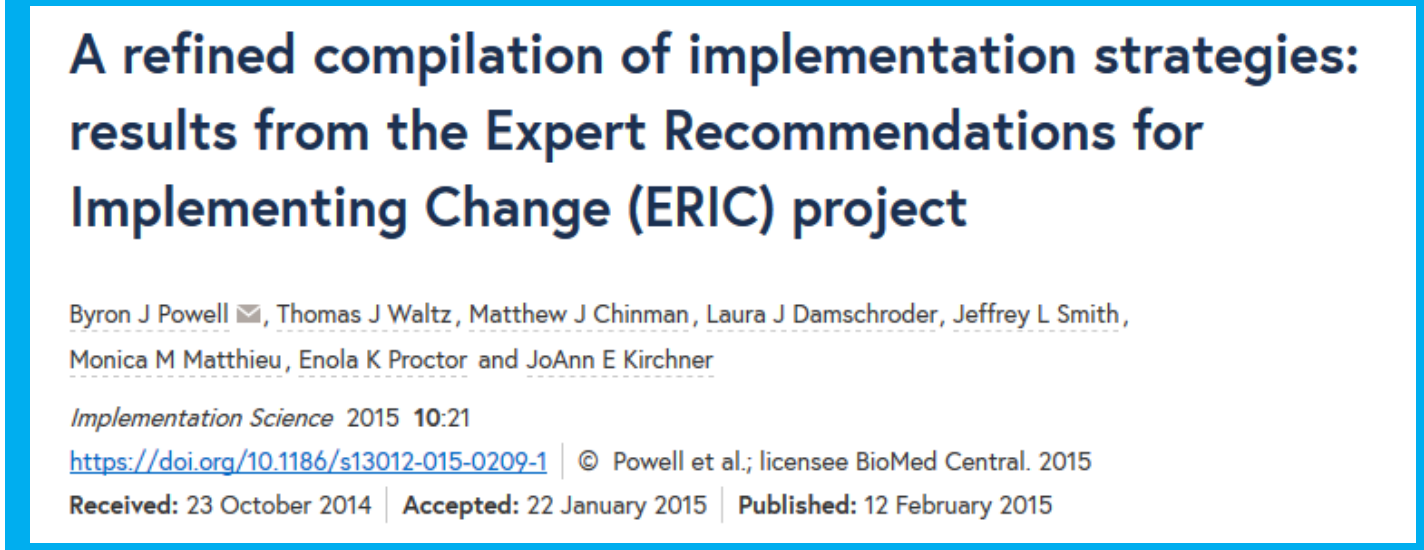
The process of implementation science



Implementation strategies

Approaches or techniques used to enhance the adoption, implementation, sustainment, and scale-up/spread of an innovation[1] ⟶ *implementation outcomes*

- discreet/single (e.g. training)
- multifaceted/bundle (e.g. training plus reminders)



A refined compilation of implementation strategies: results from the Expert Recommendations for Implementing Change (ERIC) project

Byron J Powell ✉, Thomas J Waltz, Matthew J Chinman, Laura J Damschroder, Jeffrey L Smith, Monica M Matthieu, Enola K Proctor and JoAnn E Kirchner

Implementation Science 2015 **10**:21

https://doi.org/10.1186/s13012-015-0209-1 | © Powell et al.; licensee BioMed Central. 2015

Received: 23 October 2014 | **Accepted:** 22 January 2015 | **Published:** 12 February 2015

An expert derived compilation of implementation strategies

73 discreet implementation strategies

1. Powell BJ, McMillen JC, Proctor EK, Carpenter CR, Griffey RT, Bunger AC, Glass JE, York JL. A compilation of strategies for implementing clinical innovations in health and mental health. Medical care research and review. 2012 Apr;69(2):123-57.

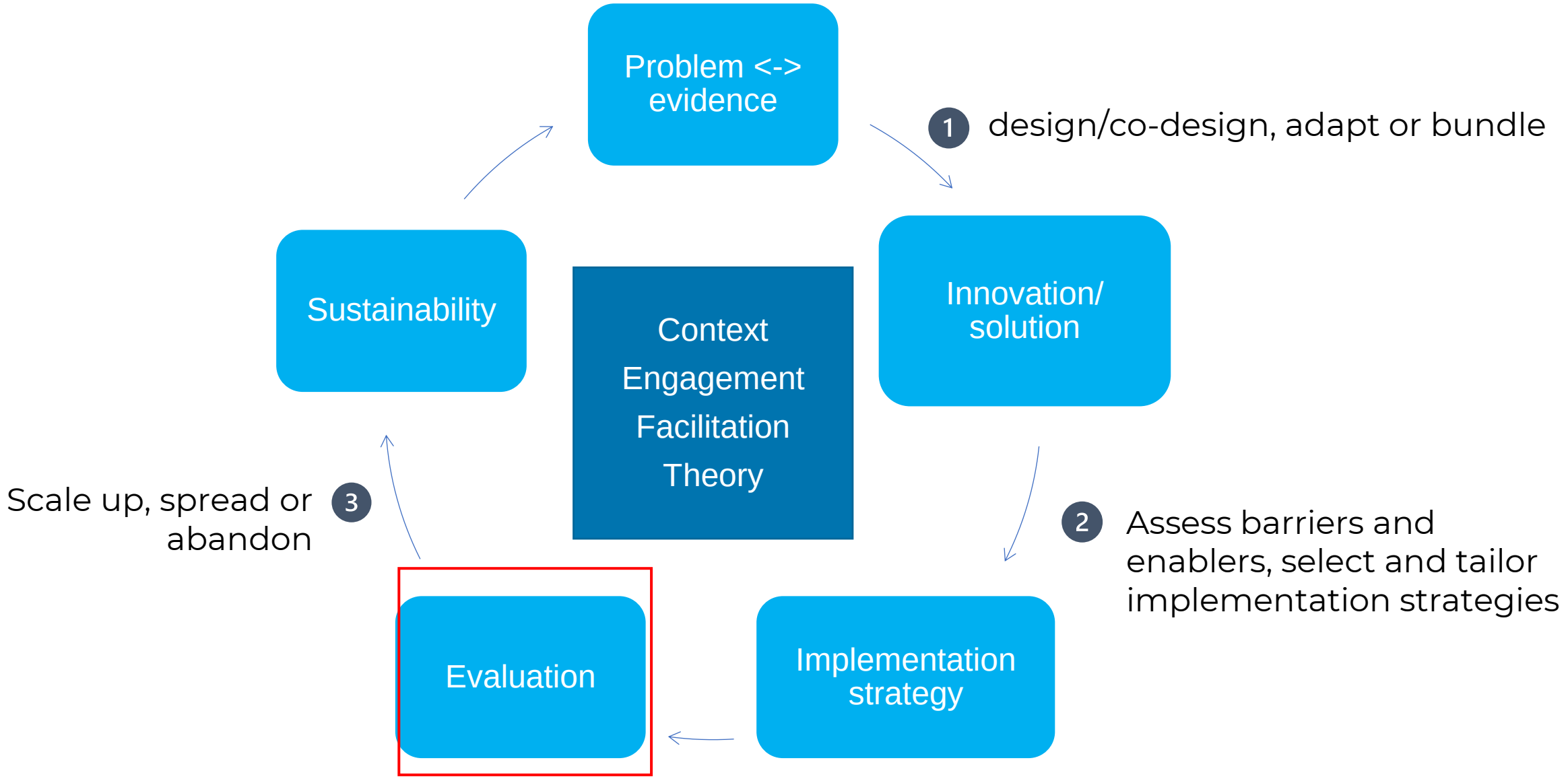
Example implementation strategies

Use evaluative and iterative strategies	· Assess for readiness and identify barriers and facilitators · Audit and provide feedback · Purposefully reexamine the implementation
Adapt and tailor to context	· Tailor strategies · Promote adaptability · Use data experts
Train and educate stakeholders	· Conduct ongoing training · Distribute educational materials · Use train-the trainer techniques
Engage consumers	· Increase demand · Use mass media · Involve patients/consumers and family members
Change infrastructure	· Mandate change · Change record systems · Change physical structure and equipment
· Facilitation · Provide local technical assistance · Provide clinical supervision	**Provide interactive assistance**
· Identify and prepare champions · Organize clinician implementation team meetings · Identify early adopters	**Develop stakeholder interrelationships**
· Remind clinicians · Revise professional roles · Fascilitate relay of clinical data to providers	**Support clinicians**
· Alter incentive/allowance structures · Access new funding · Fund and contract for the clinical innovation	**Utilize financial strategies**

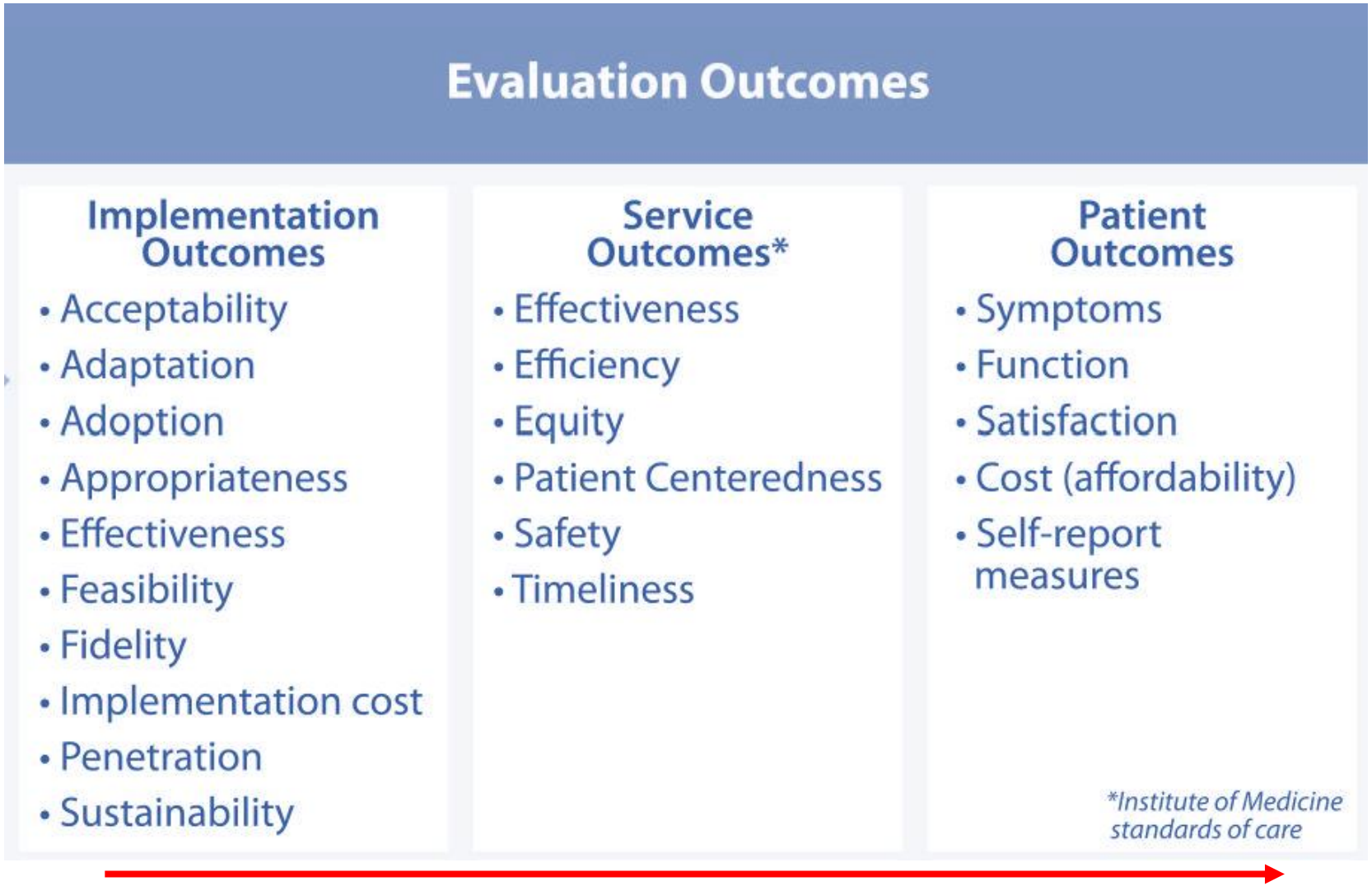
From: https://impsciuw.org/implementation-science/research/implementation-strategies/

Waltz TJ, et al. Use of concept mapping to characterize relationships among implementation strategies and assess their feasibility and importance: results from the Expert Recommendations for Implementing Change (ERIC) study. Implementation Science. 2015 Dec;10(1):1-8

The process of implementation science

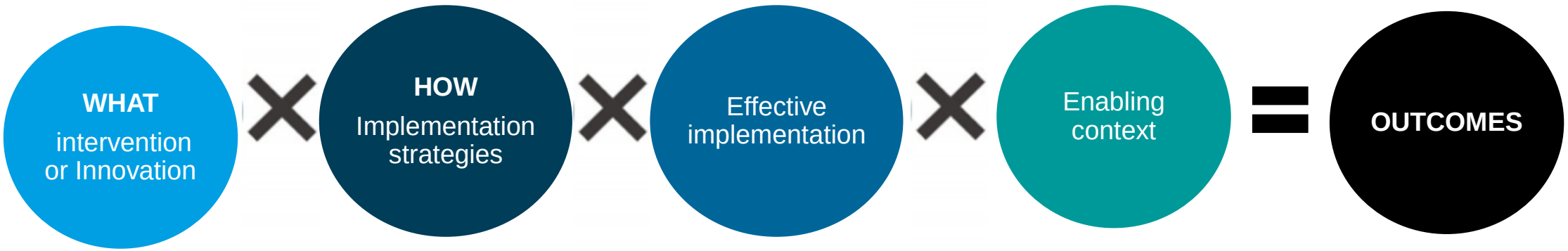


Implementation Outcomes



The QUERI Roadmap for Implementation and Quality Improvement. Adapted from Proctor, 2009.

The implementation equation



Adapted from the Active Implementation Research Network

What is implementation science?

Theories, models and frameworks

"There is nothing so practical as a good theory"

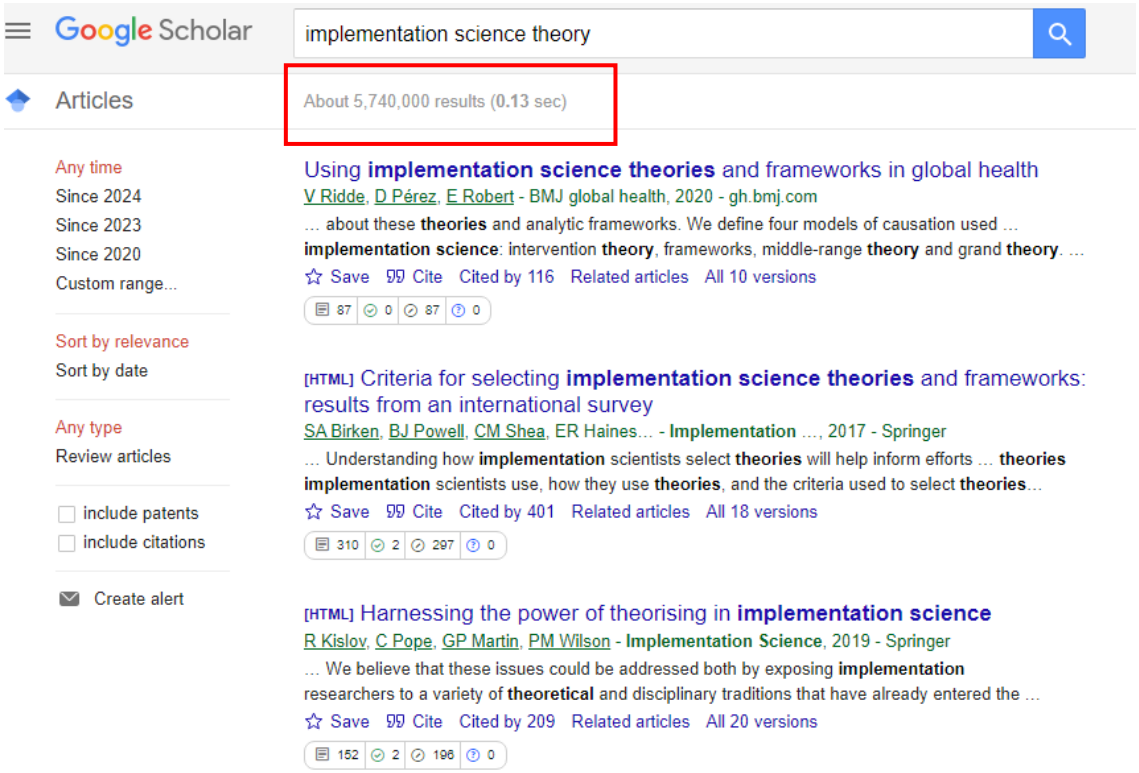
A central tenant of implementation science is the use of theories, models and frameworks

An efficient way to share understanding across diverse settings by using "synthesising architecture" of implementation-related phenomena

- guide implementation
- facilitate the identification of implementation determinants
- help select implementation strategies
- frame study questions and motivate hypotheses
- clarify constructs to be measured
- depict relationships to be tested
- contextualise results

Proctor EK, Powell BJ, Baumann AA, Hamilton AM, Santens RL. Writing implementation research grant proposals: ten key ingredients. Implementation Science. 2012 Dec;7(1):1-3.

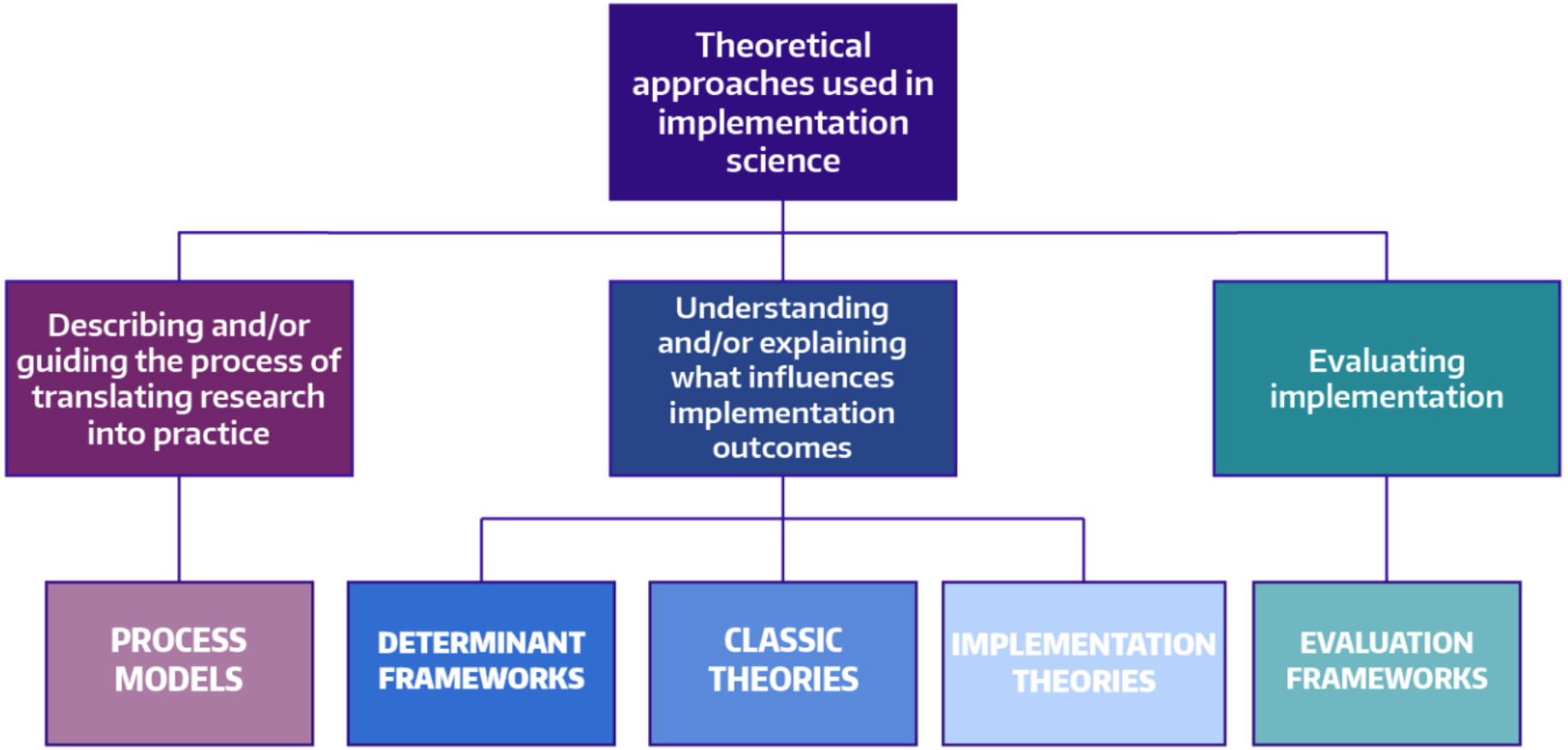
“Theories are like toothbrushes”



Over 150 theories, models or frameworks for knowledge translation and/ or implementation found in the literature

So how do I choose which is right for my project?

Categorisation of implementation science TMF



Adapted from: Nilsen P. Making sense of implementation theories, models and frameworks. *Implement Sci*. 2015;10(1):1-13.

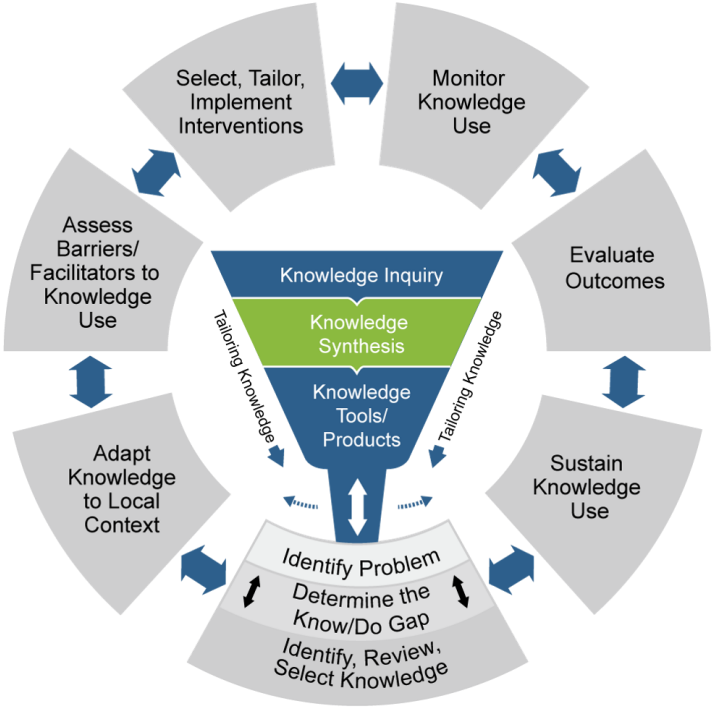
https://impsciuw.org/implementation-science/research/frameworks/

Process models

Dynamic Sustainability	EPIS Model	Dynamic Adaptation	PRISM	Quality Implementation

Describing and/or guiding the process of translating research into practice

- Specify the steps or stages in the process of implementation
- Provides a “roadmap” for your journey
- May be a good place to start
- Usually depict a dynamic/iterative process
- Can use additional models or frameworks to help with various process model stages e.g. examining contextual factors that may influence implementation



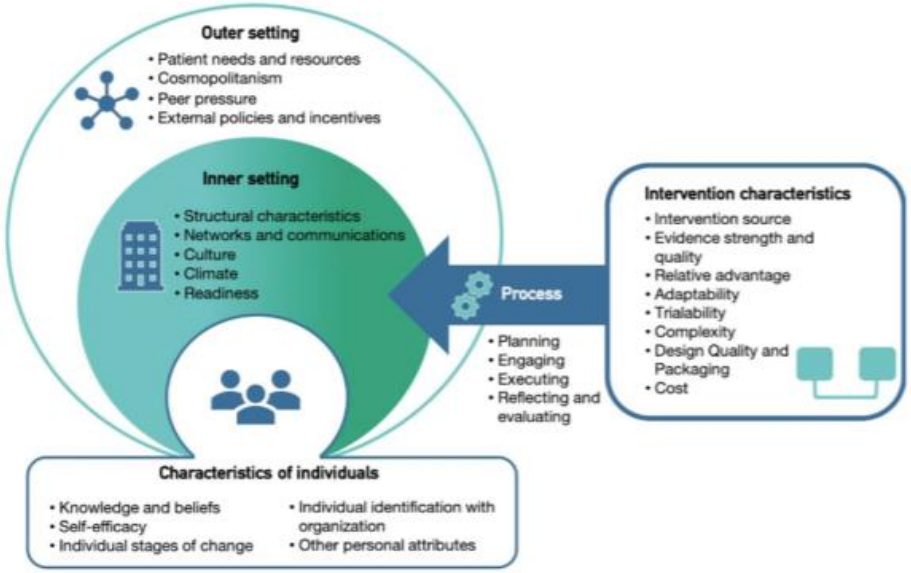
From: https://impsciuw.org/implementation-science/research/frameworks/

Determinants frameworks

Active Implementation Framework	CFIR	Theoretical Domains Framework	PARIHS

Understanding and/or explaining what influences implementation outcomes

- Descriptive, highlight factors which may influence implementation outcomes and relationships between them
- Assessment of barriers and enablers to implementation
- Can be used to assess context
- No “how-to” support



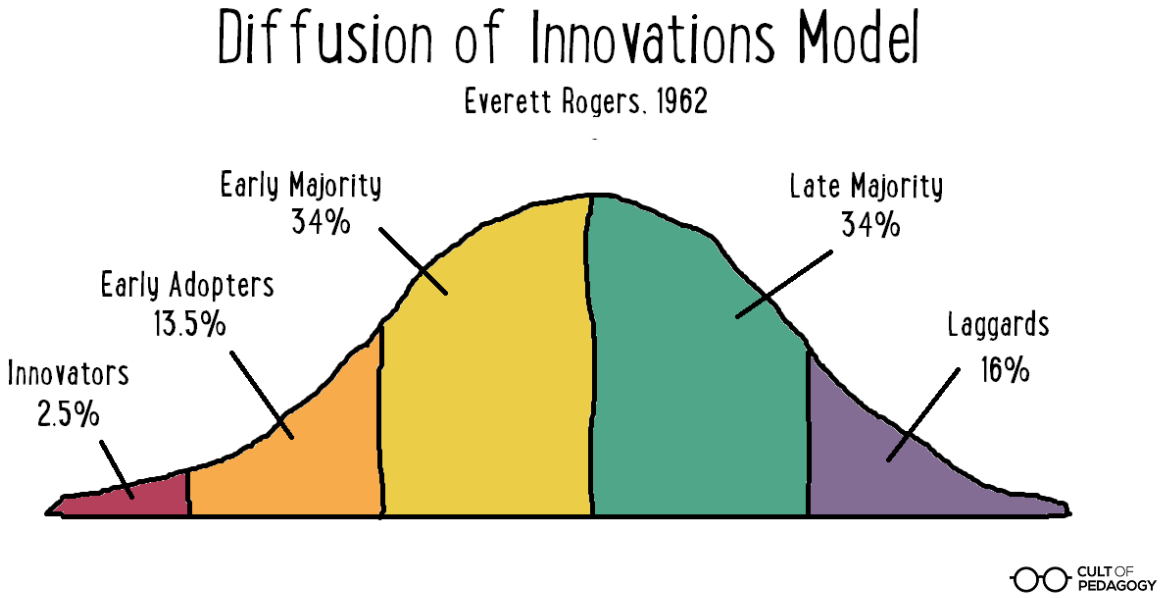
From: https://impsciuw.org/implementation-science/research/frameworks/

Classic theories

Organizational Theory | Behavioral Theories | Diffusion of Innovation

Understanding and/or explaining what influences implementation outcomes

- Theories from external fields that may be useful in understanding implementation
- Psychology, sociology, organisational



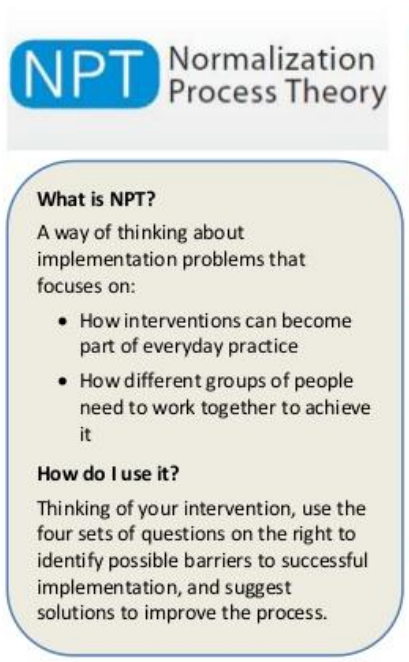
From: https://impsciuw.org/implementation-science/research/frameworks/

Implementation theories

Implementation Climate	Organizational Readiness for Change	Normalization Process Theory

Understanding and/or explaining what influences implementation outcomes

- Theories that have been developed or adapted by implementation researchers from scratch to understand implementation



www.normalizationprocess.org

From: https://impsciuw.org/implementation-science/research/frameworks/

Evaluation frameworks

RE-AIM (Reach, Efficacy, Adoption, Implementation, Maintenance)

Framework for Reporting Adaptations and Modifications-Enhanced (FRAME)

Implementation Outcomes Framework

Stages of Implementation Completion (SIC)

Evaluating implementation

- Specify aspects of implementation that could be evaluated to determine implementation success
- Implementation outcome measures
- Qualitative and quantitative

From: https://impsciuw.org/implementation-science/research/frameworks/

Use the right tool (TMF) for the job

"TMF arise through a lens that is shaped by the service contexts chosen for emphasis and by the contextual levels that serve as primary organizing arenas" (individual, organisational, system, community)

"Frameworks are like tools in your toolbox. A screwdriver is amazing if you are inserting a screw, but if you have a nail it's going to feel like a useless tool"

Aarons GA, et al. Administration and Policy in Mental Health and Mental Health Services Research. 2011 Jan 1;38(1):4-23.

The Centre for Implementation: https://thecenterforimplementation.com/

From: https://impsciuw.org/implementation-science/research/frameworks/

Where to start?

1. What stage of implementation are you at: *planning, doing, evaluating?*
2. What is the focus of your project: *individuals and how they behave, teams and how people work together, organisational aspects, process of change, other?*
3. What is the purpose of the project: *evaluation, context assessment?*
4. What is the complexity/socioecological level of the intervention? *individual, team, organisational level change?*
5. What level of guidance is required: *practical, conceptual, both?*
6. What is your role in the project: *implementor, researcher?*
7. What resources are available for data collection and analysis
8. What is the content area and/or context of your project

Where to start?

D&I Models Webtool

Explore D&I TMFs

Plan

Select

Combine

Adapt

Use

Assess

Explore Models:

Type In name...

Explore D&I TMFs

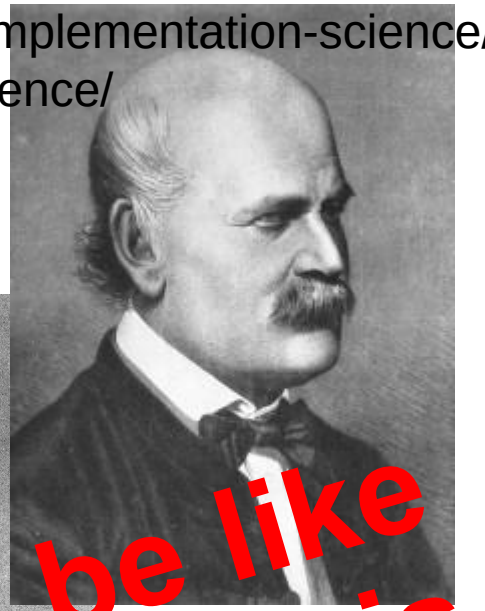
You can search for D&I TMFs by entering a keyword OR by selecting from the categories below.

Model	D &/or I	Socio-Ecological Levels	Field of Origin	Times Cited
A Model for Evidence-Based Practice				
ACE Star Model of Knowledge Transformation	D>I	▪ Individual ▪ Organization ▪ Community	Nursing	44
Active Implementation Framework	I-Only	▪ Individual ▪ Organization ▪ Community	Education	1870
Adaptation in dissemination and implementation science	I-Only	▪ Individual ▪ Organization ▪ Community	Health Disparities	39

https://dissemination-implementation.org/tool/explore-di-models/

A cautionary tale: Ignaz Semmelweis (1818-1865)

https://impsciuw.org/implementation-science/learn/topics-in-implementation-science/



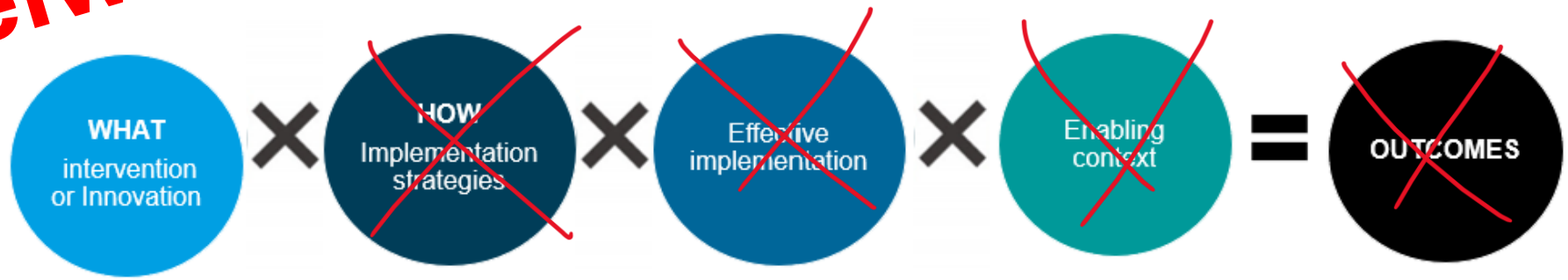
Wikimedia: unknown authour

Don't be like Semmelweis

Semmelweis didn't consider the *how*—how to get people on board, how to change their behaviour, how to address their scepticism.

Semmelweis didn't consider the *context* —how he could have understood and address the prevailing barriers

What would you have done differently?



For more topics on Implementation Science via University of Washington

Resources for steps of Implementation Science via University of Washington

AusHSI Australian Centre for Health Services Innovation

QUT Centre for Healthcare Transformation

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