IMPLEMENTATION SCIENCE

Rinad S. Beidas, PhD

Associate Professor
Departments of Psychiatry; Medical Ethics & Health Policy; Medicine

Perelman School of Medicine UNIVERSITY of PENNSYLVANIA

PENN CENTER FOR MENTAL HEALTH

PISCE@LDI

ARCHlab ACCELERATING RESEARCH-TO-PRACTICE IN COMMUNITY HEALTH

Interested in #impsci? Follow me!

@rsbeidas

Agenda

Part 1: Lecture → **Part 2: Discussion Questions** → **Part 3: Small group work**

| Have you have heard the term "implementation science before?" | Do you feel you have a good handle on what implementation science is? | Goal: For you to have a good handle by the end of this talk. |

Tell me about you!

- Your background/interests

- One thing that is helping you get through COVID-19

- What is one question you have about imp sci that you hope to have answered today?

BACKGROUND

Part 1

WHY I THINK THIS IS IMPORTANT

My path to implementation science emerged from a clinical observation that I couldn't ignore

child&adolescent
anxiety disorders clinic

COPING CAT

"Emma" came to see me after seeing other therapists who didn't use EBP. She felt hopeless and uncertain she would ever enjoy the activities she used to enjoy.

I came to the startling conclusion that kids were not receiving cognitive behavioral therapy in community settings and it changed the trajectory of my career

Implementation science seemed like a potential solution to my observation

My observation was not idiosyncratic to my experience – it reflects a broader field wide issue

The Guardian

Young people's mental health is a 'worsening crisis'. Action is needed

Mary O'Hara

In both the UK and US, services for young people are being cut, leaving those from marginalised groups at greatest risk of suicide

Tue 31 Jul 2018 13.04 EDT

In child psychiatry, treatment developers have been prolific. As of 2016, 689 randomized controlled trials for common youth psychiatric disorders have been conducted, and we have 100s of evidence-based practices.

Yet we know that usual care generally doesn't reflect these EBPs, and that effect sizes are attenuated in the "real world."

Okamura et al., 2019, *J Beh Health Serv Res*; Weisz et al., 2013, *JAMA Psychiatry*

There are research-to-practice gaps all around us

Citrus can prevent scurvy (1601)
Introduced on ships (1785)

What are some research-to-practice gaps that are particularly relevant to your specialties?
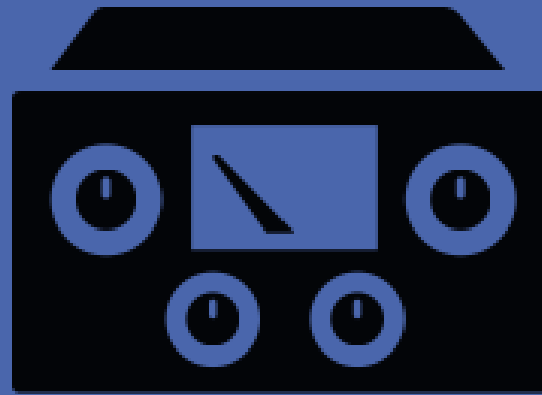
Implementation science is about making sure that people are getting the things that work in the community and ultimately moving the needle in health

Implementation science is the scientific study of methods to promote systematic uptake of proven clinical treatments, practices, organizational, and management interventions into routine practice, and hence to improve health (Eccles et al., 2012)

Implementation science has its own set of assumptions and foci

Implementation science is about "clinician" behavior change within organizational constraints

Context is not seen as a nuisance

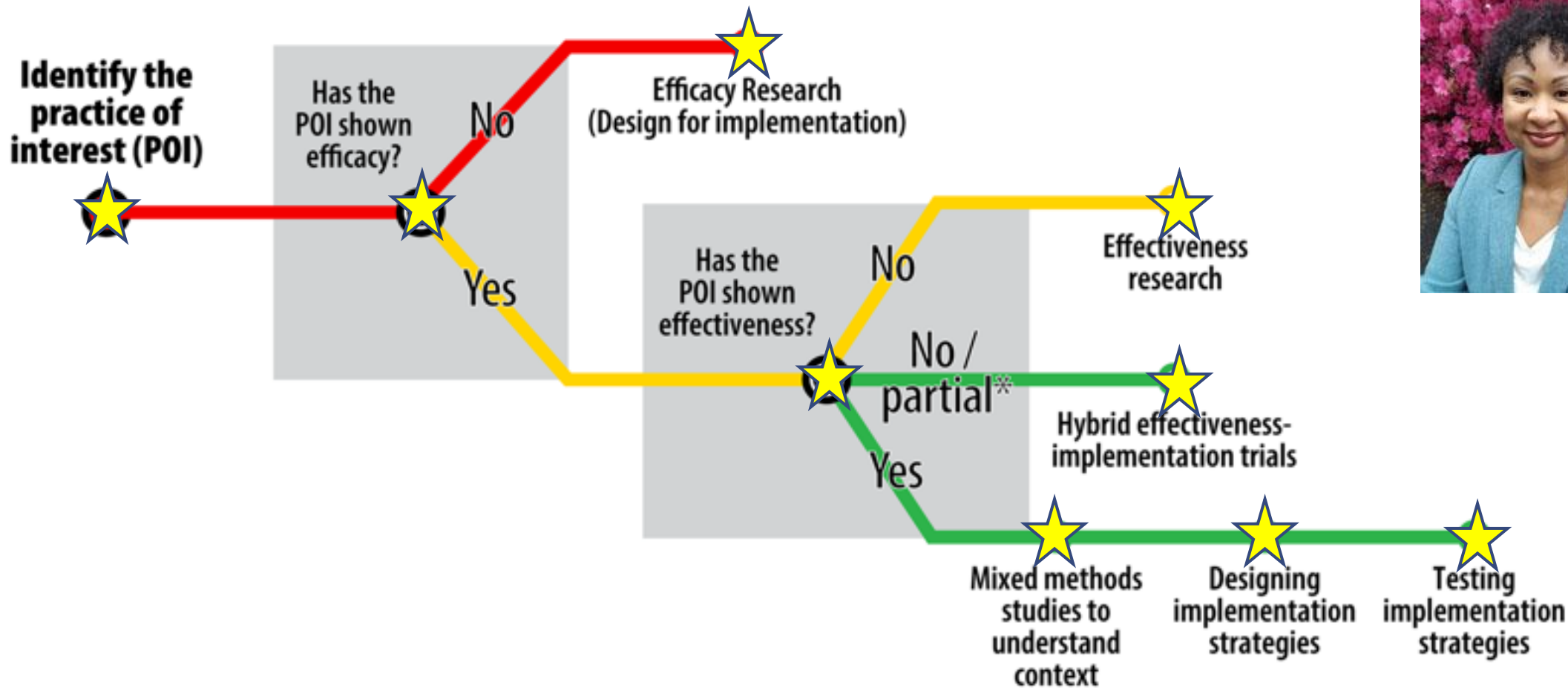There is an evidence-based "thing" to be implemented

We have a set of specific frameworks, methods, and outcomes in our toolkit

Implementation science has its own set of questions of interest

Can clinicians implement EBPs in their settings?

What supports are needed for clinicians to implement EBPs effectively?

What contextual factors are associated with clinician practice?

Identify the practice of interest (POI)

Has the POI shown efficacy?
No → Efficacy Research (Design for implementation)
Yes ↓

Has the POI shown effectiveness?
No → Effectiveness research
No / partial* → Hybrid effectiveness-implementation trials
Yes → Mixed methods studies to understand context → Designing implementation strategies → Testing implementation strategies

Graphic has been tested with colorblindness filters to ensure readibility.

* In some cases it may be appropriate to move forward with a hybrid Type 1 trial in the absence of effectiveness evidence (e.g., very strong efficacy, indirect evidence supportive of potential effectiveness in context of interest, and/or strong momentum supporting implementation in a health care context).

Lane-Fall, Curran, & Beidas (2019). *BMC Medical Research Methodology.*

APPLICATIONS

Part 2

HOW TO DO IMPLEMENTATION SCIENCE?

Case Study: Increasing firearm safety promotion in pediatric primary care

Plain language

SAFE Firearm is the thing

Implementation strategies are the stuff we do to try to help people/places do SAFE Firearm

Main implementation outcomes are how well clinicians do SAFE Firearm

Curran (2020). *Imp Sci Comm.*

Critical tools

- Frameworks
- Understanding context
- Implementation strategies
- Implementation outcomes
- Implementation designs
- Partnership

Using frameworks to guide your work

Bridging Research and Practice
Models for Dissemination and Implementation Research

Rachel G. Tabak, PhD, Elaine C. Khoong, BS, David A. Chambers, DPhil, Ross C. Brownson, PhD

ELSEVIER

Check for updates

Journal of Clinical Epidemiology 100 (2018) 92–102

Journal of Clinical Epidemiology

REVIEW

Scoping review identifies significant number of knowledge translation theories, models, and frameworks with limited use

Lisa Strifler[a,b], Roberta Cardoso[a], Jessie McGowan[c], Elise Cogo[a], Vera Nincic[a], Paul A. Khan[a], Alistair Scott[a], Marco Ghassemi[a], Heather MacDonald[a], Yonda Lai[a], Victoria Treister[a], Andrea C. Tricco[a,d], Sharon E. Straus[a,e,*]

[a]Li Ka Shing Knowledge Institute, St. Michael's Hospital, 209 Victoria Street, East Building, Toronto, Ontario, M5B 1W8, Canada
[b]Institute of Health Policy Management & Evaluation, University of Toronto, 4th Floor, 155 College Street, Toronto, Ontario, M5T 3M6, Canada
[c]School of Epidemiology, Public Health and Preventive Medicine, University of Ottawa, 600 Peter Morand Crescent, Ottawa, Ontario, K1G 5Z3, Canada
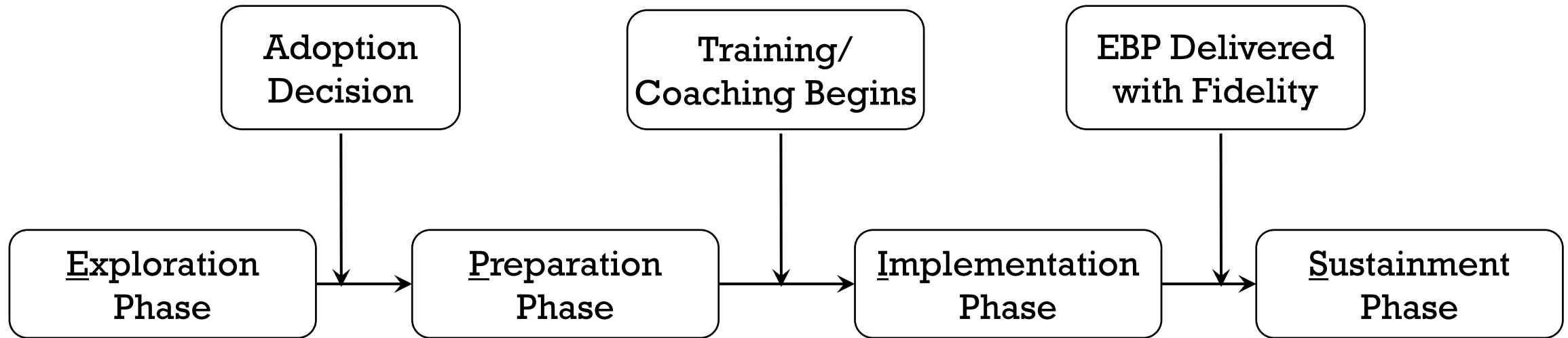[d]Epidemiology Division, Dalla Lana School of Public Health, University of Toronto, 6th Floor, 155 College Street, Toronto, Ontario, M5T 3M7, Canada
[e]Department of Geriatric Medicine, University of Toronto, 27 King's College Circle, Toronto, Ontario, M5S 1A1, Canada

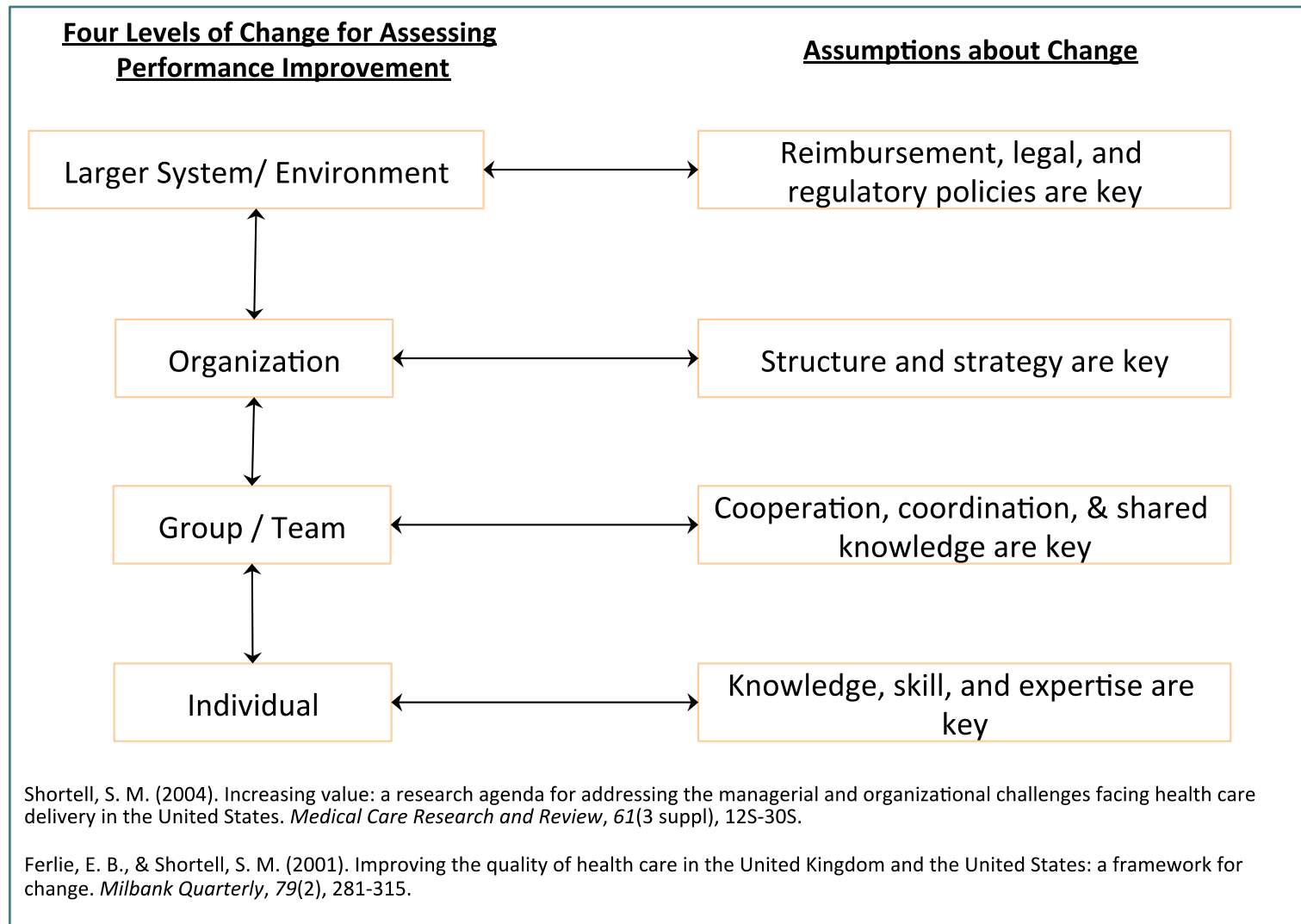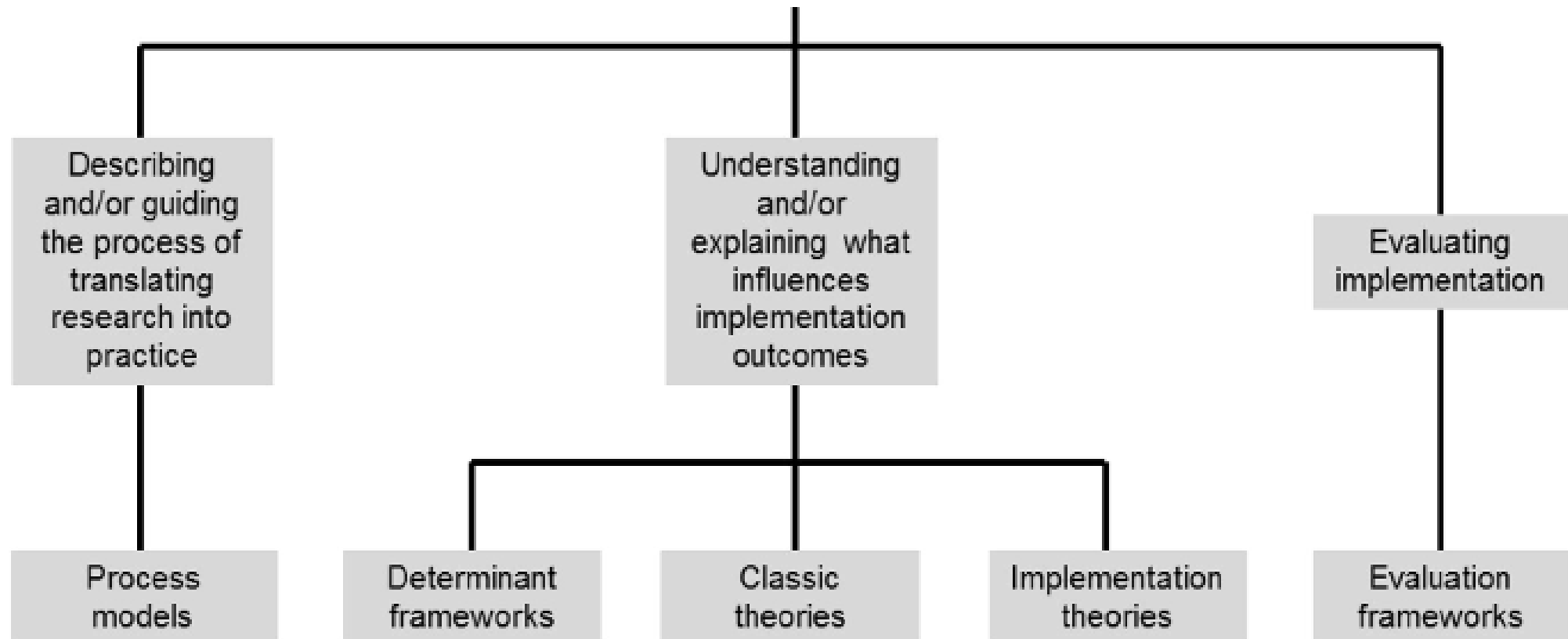Accepted 6 April 2018; Published online 13 April 2018

Common Element: Multiphase

Source. Aarons et al. (2011), Administration and Policy in Mental Health and Mental Health Services Research
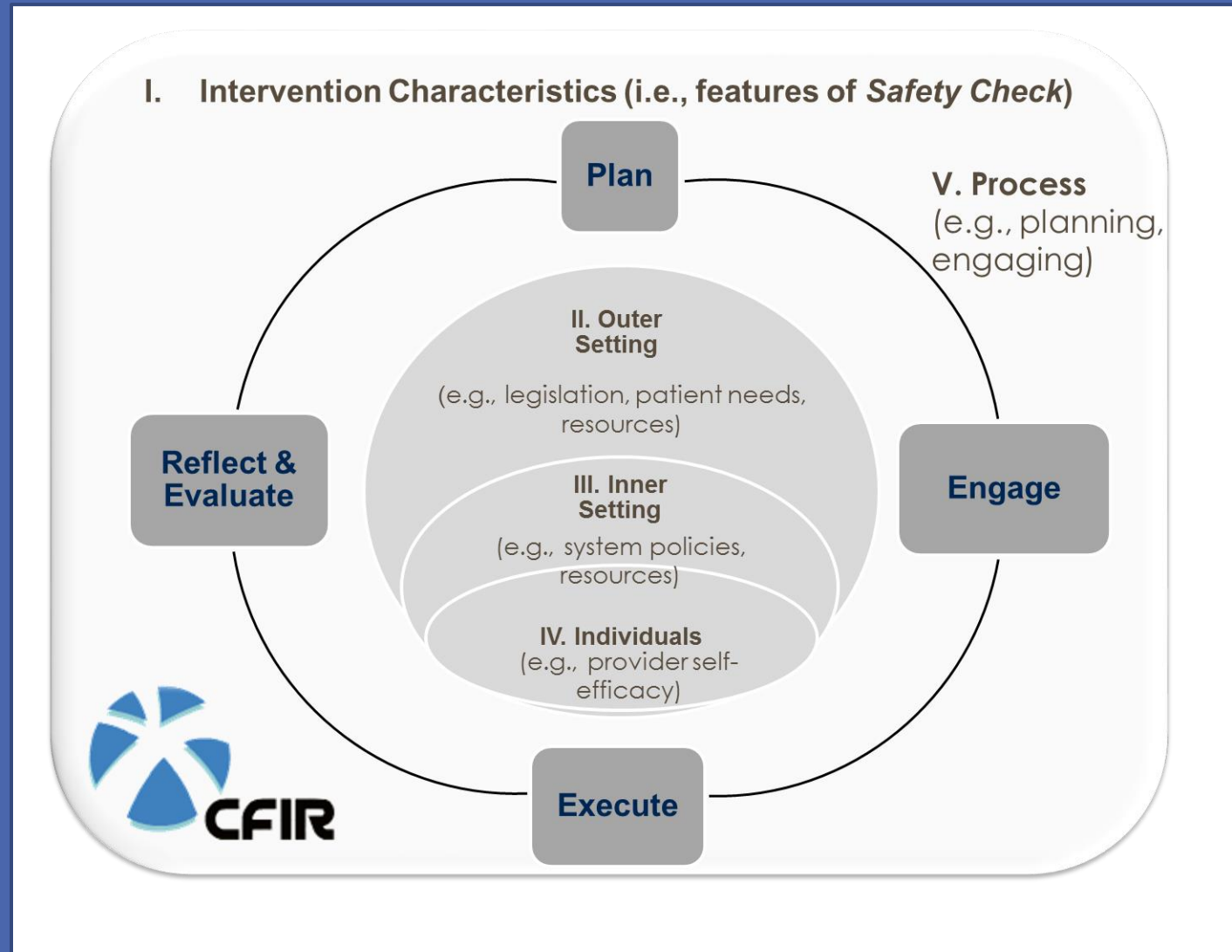
Common Element: Multilevel

Four Levels of Change for Assessing Performance Improvement

Assumptions about Change

Larger System/ Environment ⟷ Reimbursement, legal, and regulatory policies are key

Organization ⟷ Structure and strategy are key

Group / Team ⟷ Cooperation, coordination, & shared knowledge are key

Individual ⟷ Knowledge, skill, and expertise are key

Shortell, S. M. (2004). Increasing value: a research agenda for addressing the managerial and organizational challenges facing health care delivery in the United States. *Medical Care Research and Review*, *61*(3 suppl), 12S-30S.

Ferlie, E. B., & Shortell, S. M. (2001). Improving the quality of health care in the United Kingdom and the United States: a framework for change. *Milbank Quarterly*, *79*(2), 281-315.

Making sense of it all

Nilsen (2015)

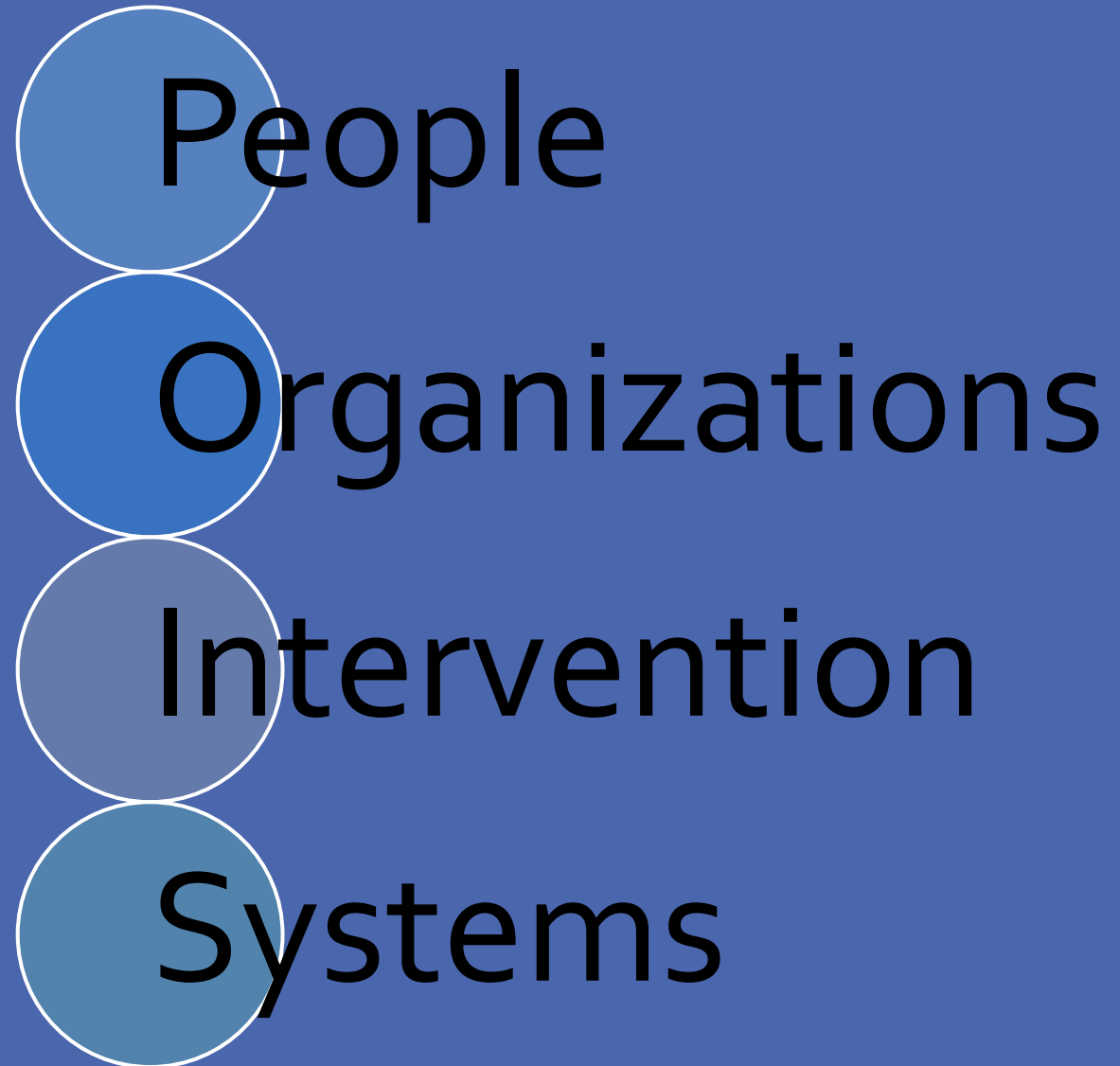# Example: Determinant Framework
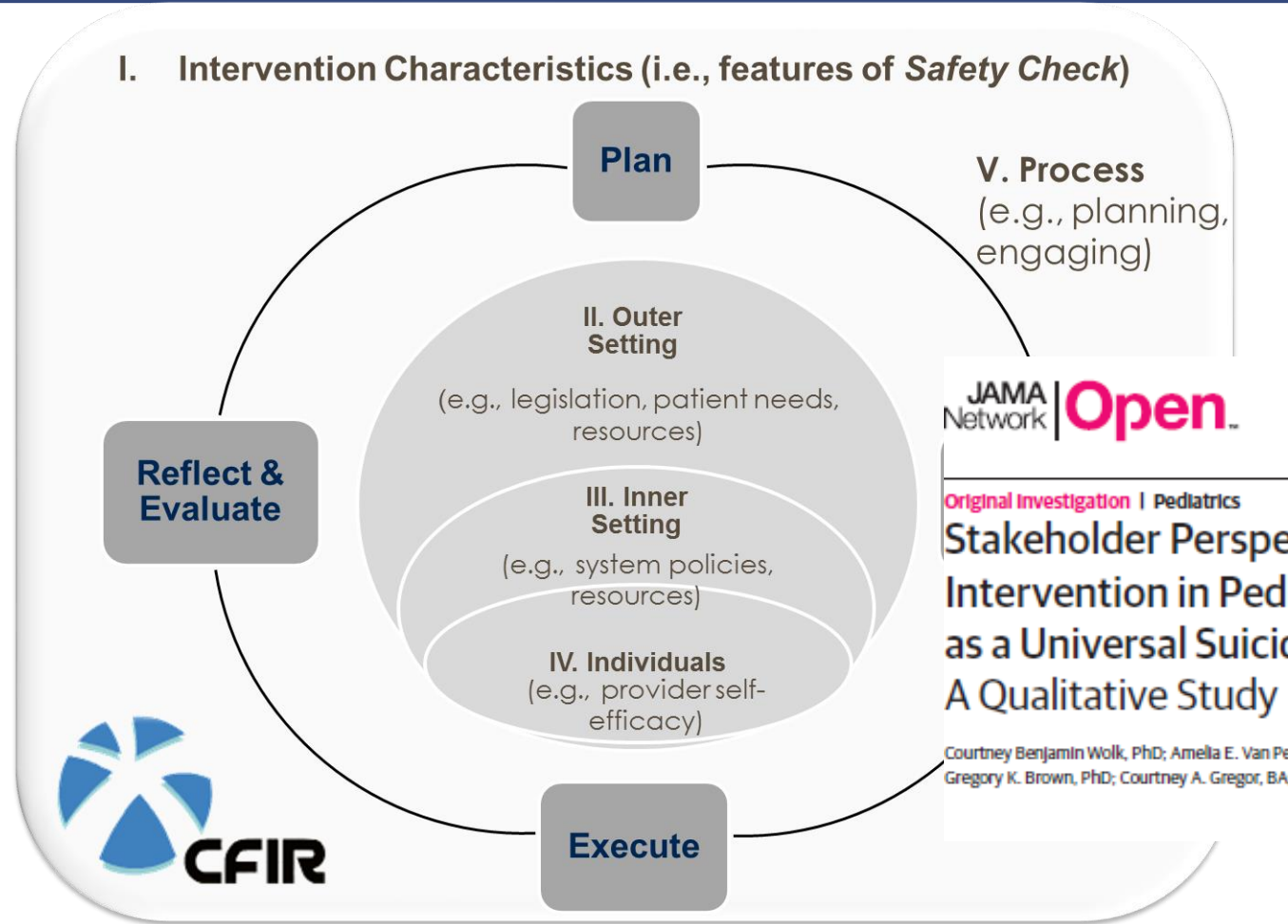

Damschroder et al, 2009, *Imp Sci*

Context Matters
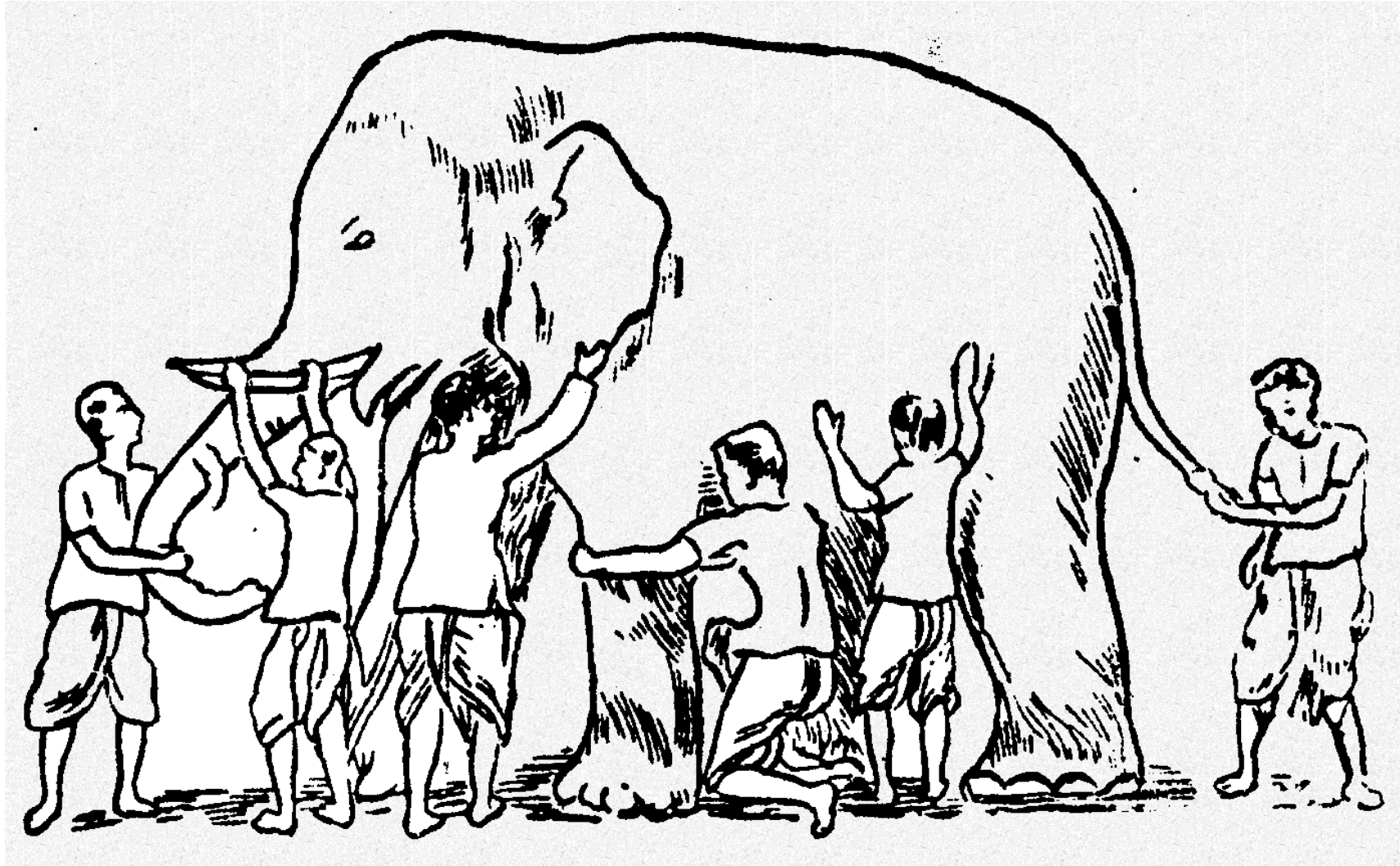
Assessing Barriers and Facilitators

Determinants: "Factors that might prevent or enable improvements in practice" (Flottorp et al, 2013)

What are things that make it hard or easy to implement EBPs in your setting?

People

Organizations

Intervention

Systems

Example: Determinant Framework

I. Intervention Characteristics (i.e., features of *Safety Check*)

Plan

V. Process
(e.g., planning, engaging)

II. Outer Setting
(e.g., legislation, patient needs, resources)

Reflect & Evaluate

III. Inner Setting
(e.g., system policies, resources)

IV. Individuals
(e.g., provider self-efficacy)

Execute

CFIR

JAMA Network | Open

Original Investigation | Pediatrics

Stakeholder Perspectives on Implementing a Firearm Safety Intervention in Pediatric Primary Care as a Universal Suicide Prevention Strategy
A Qualitative Study

Courtney Benjamin Wolk, PhD; Amelia E. Van Pelt, MPH; Shari Jager-Hyman, PhD; Brian K. Ahmedani, PhD; John E. Zeber, PhD; Joel A. Fein, MD, MPH; Gregory K. Brown, PhD; Courtney A. Gregor, BA; Adina Lieberman, MPH; Rinad S. Beidas, PhD

Damschroder et al 2009

Barriers and Facilitators
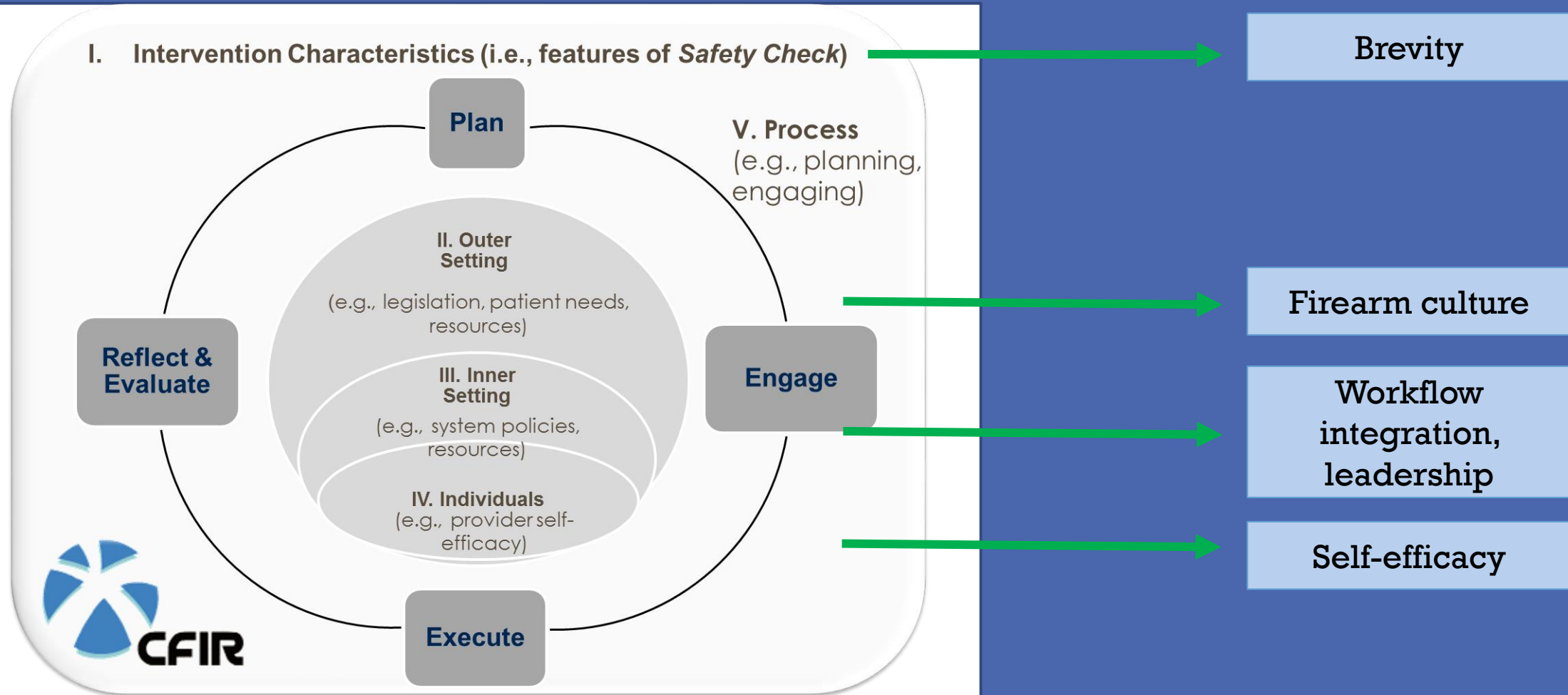
Damschroder et al 2009

Implementation Strategies – our interventions
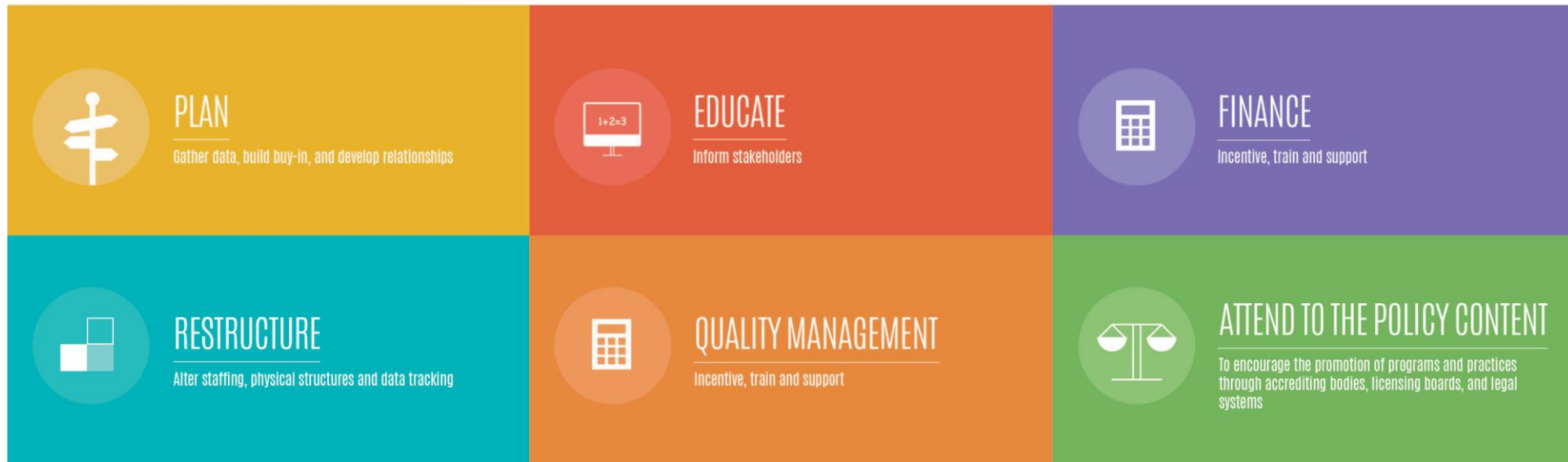
Powell et al 2012

Latest thinking in implementation strategies

IMPLEMENTATION SCIENCE

RESEARCH   **Open Access**

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

Byron J Powell[1*], Thomas J Waltz[2], Matthew J Chinman[3,4], Laura J Damschroder[5], Jeffrey L Smith[6], Monica M Matthieu[6,7], Enola K Proctor[8] and JoAnn E Kirchner[6,9]

IMPLEMENTATION SCIENCE

SHORT REPORT   **Open Access**

CrossMark

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

Thomas J. Waltz[1,2*], Byron J. Powell[3], Monica M. Matthieu[4,5,10], Laura J. Damschroder[2], Matthew J. Chinman[6,7], Jeffrey L. Smith[5,10], Enola K. Proctor[8] and JoAnn E. Kirchner[5,9,10]

Which implementation strategies are most effective?

Strategy Review	Number of Trials	Effect Sizes
Printed Educational Materials	14 Randomized Trials 31 ITS	Median absolute improvement 2.0% (range 0% to 11%)
Educational Meetings	81 Randomized Trials	Median absolute improvement 6% (IQR 1.8% to 15.3%)
Educational Outreach	69 Randomized Trials	Median absolute improvement in prescribing behaviors 4.8% (IQR 3% to 6.6%), other behaviors 6% (IQR 3.6% to 16%)
Local Opinion Leaders	18 Randomized Trials	Median absolute improvement 12% (6% to 14.5%)
Audit and Feedback	140 Randomized Trials	Median absolute improvement 4.3% (IQR .5 to 16%)
Computerized Reminders	28 Randomized Trials	Median absolute improvement 4.2% (IQR .8 to 18.8%)
Tailored Interventions	26 Randomized Trials	Meta-Regression using 15 trials. Pooled odds ratio of 1.56 (95% CI, 1.27 to 1.93, $p < .001$)

Thank you to Byron Powell courtesy of Grimshaw et al 2012

Methods to enhance designing and tailoring strategies

Methods to Improve the Selection and Tailoring of Implementation Strategies

Byron J. Powell, PhD
Rinad S. Beidas, PhD
Cara C. Lewis, PhD
Gregory A. Aarons, PhD
J. Curtis McMillen, PhD
Enola K. Proctor, PhD
David S. Mandell, ScD

Journal of Behavioral Health Services Research (2017)

Context

Theory

Stakeholder preference

How we designed our implementation strategies

JAMA Network | **Open**

Stakeholder Perspectives on Implementing a Firearm Safety Intervention in Pediatric Primary Care as a Universal Suicide Prevention Strategy
A Qualitative Study

Courtney Benjamin Wolk, PhD; Amelia E. Van Pelt, MPH; Shari Jager-Hyman, PhD; Brian K. Ahmedani, PhD; John E. Zeber, PhD; Joel A. Fein, MD, MPH; Gregory K. Brown, PhD; Courtney A. Gregor, BA; Adina Lieberman, MPH; Rinad S. Beidas, PhD

Figure 1. Implementation Science Framework (Proctor et al., 2010; Damschroder et al., 2009)
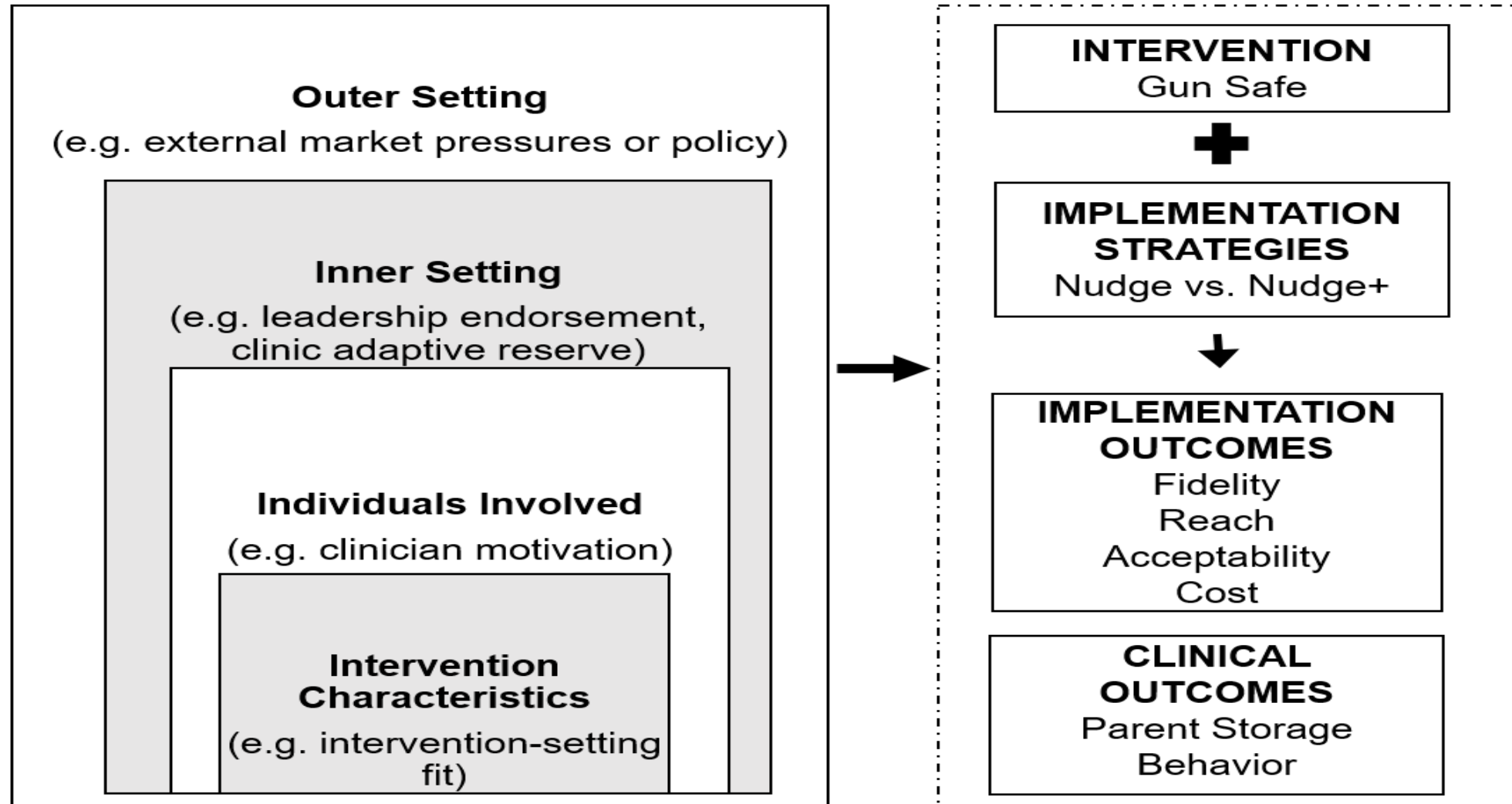
What do we know about implementation strategies?

There is a taxonomy of implementation strategies and some promising approaches – and some coming down the pike – but we still don't know what works. We DO know that training and pray doesn't work.

How to evaluate implementation studies

ORIGINAL PAPER

Outcomes for Implementation Research: Conceptual Distinctions, Measurement Challenges, and Research Agenda

Enola Proctor · Hiie Silmere · Ramesh Raghavan ·
Peter Hovmand · Greg Aarons · Alicia Bunger ·
Richard Griffey · Melissa Hensley

IMPLEMENTATION SCIENCE

SYSTEMATIC REVIEW   Open Access

CrossMark

Outcomes for implementation science: an enhanced systematic review of instruments using evidence-based rating criteria

Cara C. Lewis[1,2]*, Sarah Fischer[1], Bryan J. Weiner[3], Cameo Stanick[4], Mimi Kim[5,6] and Ruben G. Martinez[7]

Implementation Science

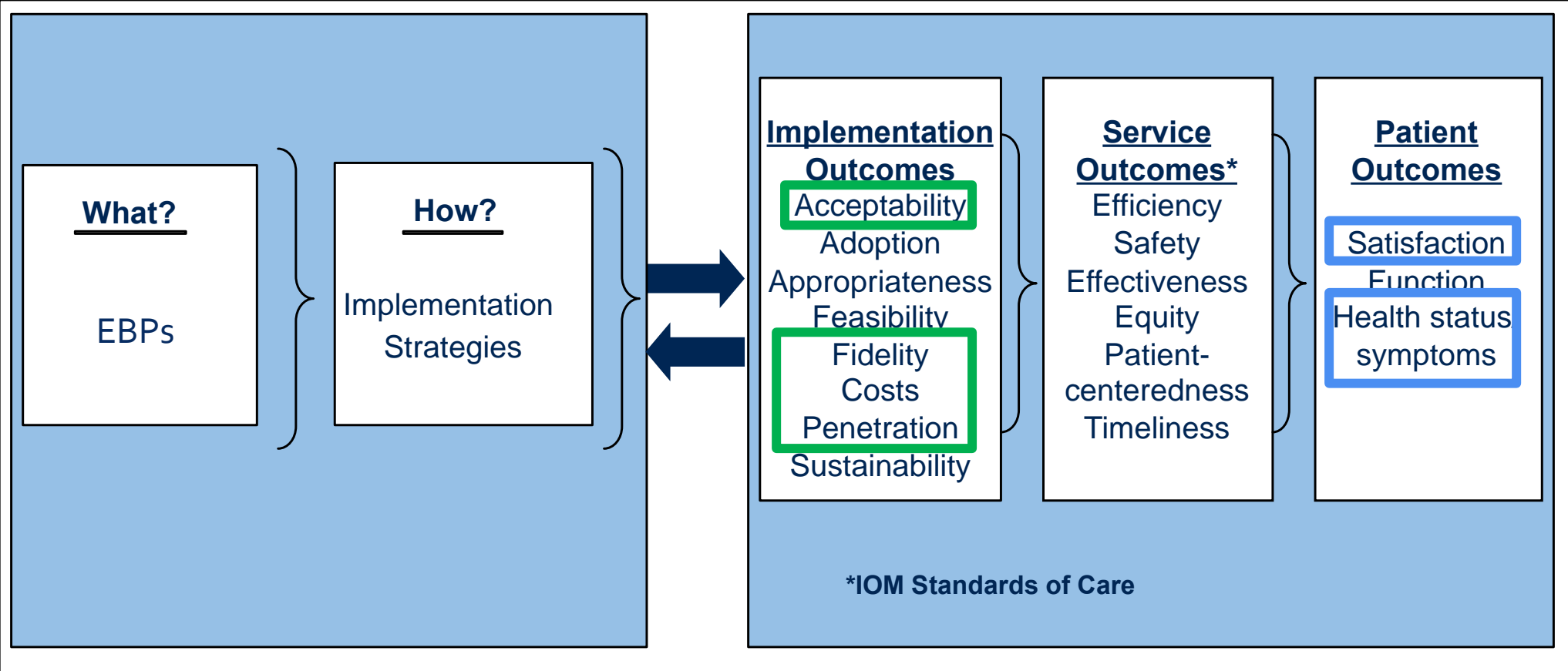RESEARCH   Open Access

CrossMark

Psychometric assessment of three newly developed implementation outcome measures

Bryan J. Weiner[1]*, Cara C. Lewis[2,3,4], Cameo Stanick[5], Byron J. Powell[6], Caitlin N. Dorsey[2], Alecia S. Clary[6], Marcella H. Boynton[7] and Heather Halko[8]

Example: Evaluation Framework

Proctor et al 2009

What should I measure in an implementation study?
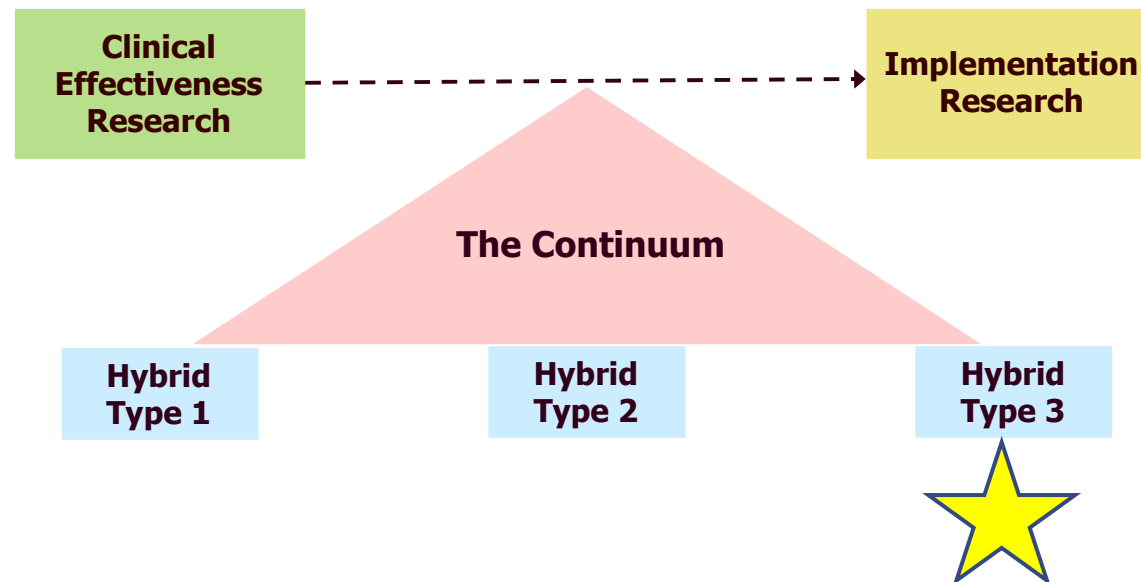
Not JUST patient/clinical outcomes!
Process, process, process.

What types of designs are available?

An Overview of Research and Evaluation Designs for Dissemination and Implementation

C. Hendricks Brown,[1] Geoffrey Curran,[2] Lawrence A. Palinkas,[3] Gregory A. Aarons,[4] Kenneth B. Wells,[5] Loretta Jones,[6] Linda M. Collins,[7] Naihua Duan,[8] Brian S. Mittman,[9] Andrea Wallace,[10] Rachel G. Tabak,[11] Lori Ducharme,[12] David A. Chambers,[13] Gila Neta,[13] Tisha Wiley,[14] John Landsverk,[15] Ken Cheung,[16] and Gracelyn Cruden[1,17]

| Clinical Effectiveness Research | ---→ | Implementation Research |

The Continuum

| Hybrid Type 1 | Hybrid Type 2 | Hybrid Type 3 |

Effectiveness-implementation Hybrid Designs

Combining Elements of Clinical Effectiveness and Implementation Research to Enhance Public Health Impact

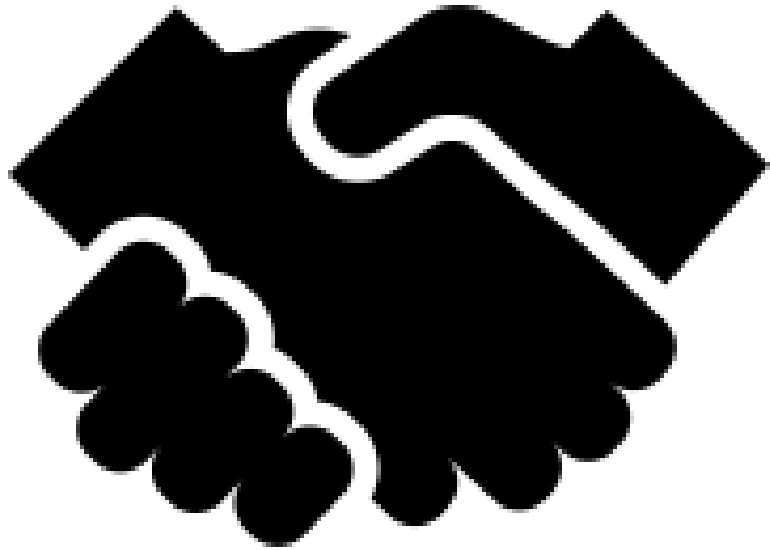Geoffrey M. Curran, PhD,* Mark Bauer, MD,† Brian Mittman, PhD,‡ Jeffrey M. Pyne, MD,* and Cheryl Stetler, PhD‡

Which designs should I use?

Many of the traditional designs from health services research apply here – but there are also some additional approaches that you can apply.

Partnership is the foundation

FUTURE DIRECTIONS

Part 3

What's coming down the pike?

De-implementation	Tests of implementation strategies focused on a mechanistic understanding
Global implementation science	Marrying implementation science, learning health systems, and precision medicine

CONCLUSION

Engaging in a practical implementation?

Make sure you understand the context (i.e., due diligence)

Do not assume that it is a knowledge problem (and that training will be the solution)

Engage your stakeholders and front line folks

Draw from implementation science approaches

There will not be a silver bullet; will necessarily be a multilevel, multipronged approach.

What we want to avoid

" I spent 13 years at NIMH really pushing on the neuroscience and genetics of mental disorders…while I think I succeeded at getting lots of really cool papers published by cool scientists at fairly large costs – I think $20 billon – I don't think we moved the needle in reducing suicide, reducing hospitalizations, improving recovery for the tens of millions of people" (Insel, 2017)
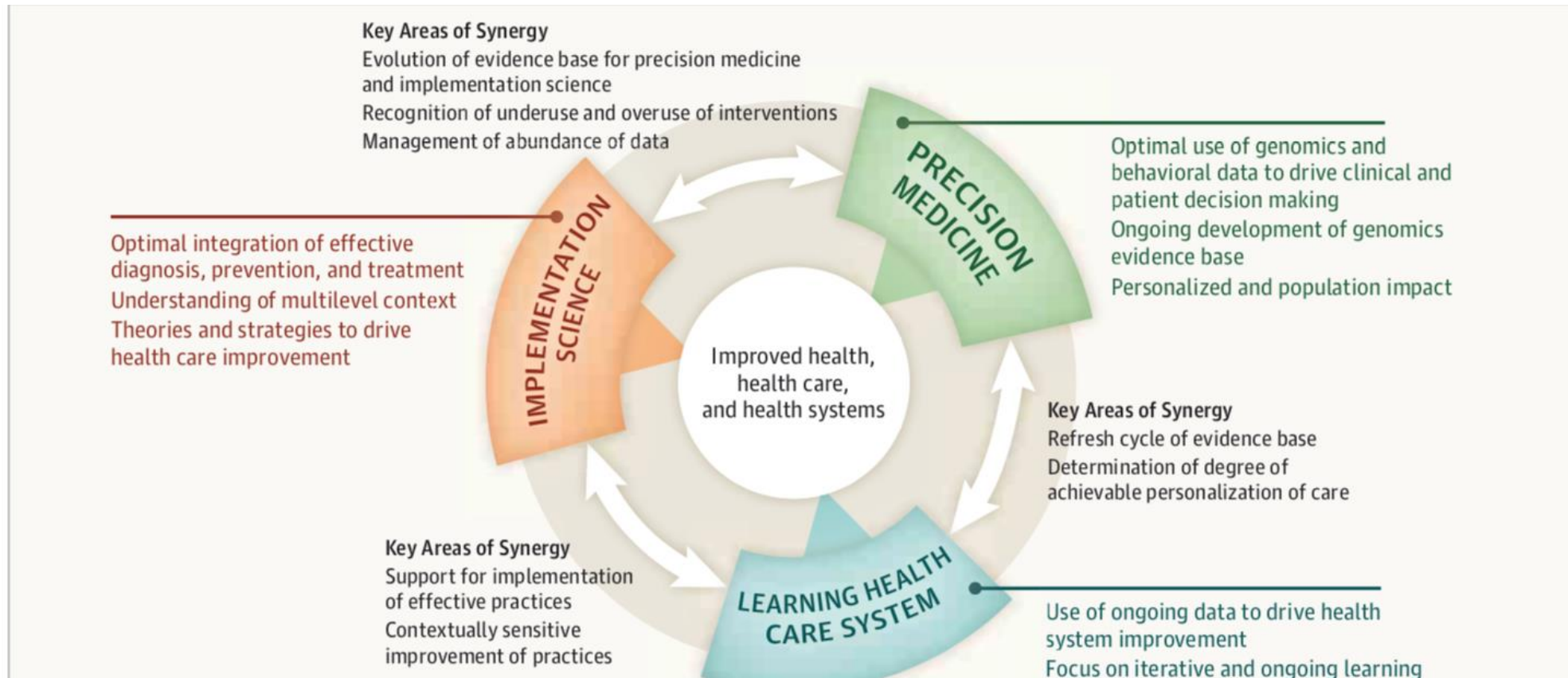
Relevant to us all

Implementation science allows us to move the needle, achieve the promise of scientific discovery, and have impact.

How do implementation science and learning health systems concepts converge and diverge (Chambers, 2016)?

GRATITUDE

My partners in this journey (too many to list) but special shout outs