Overview of Implementation Science

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6/2/2022

UTHealth
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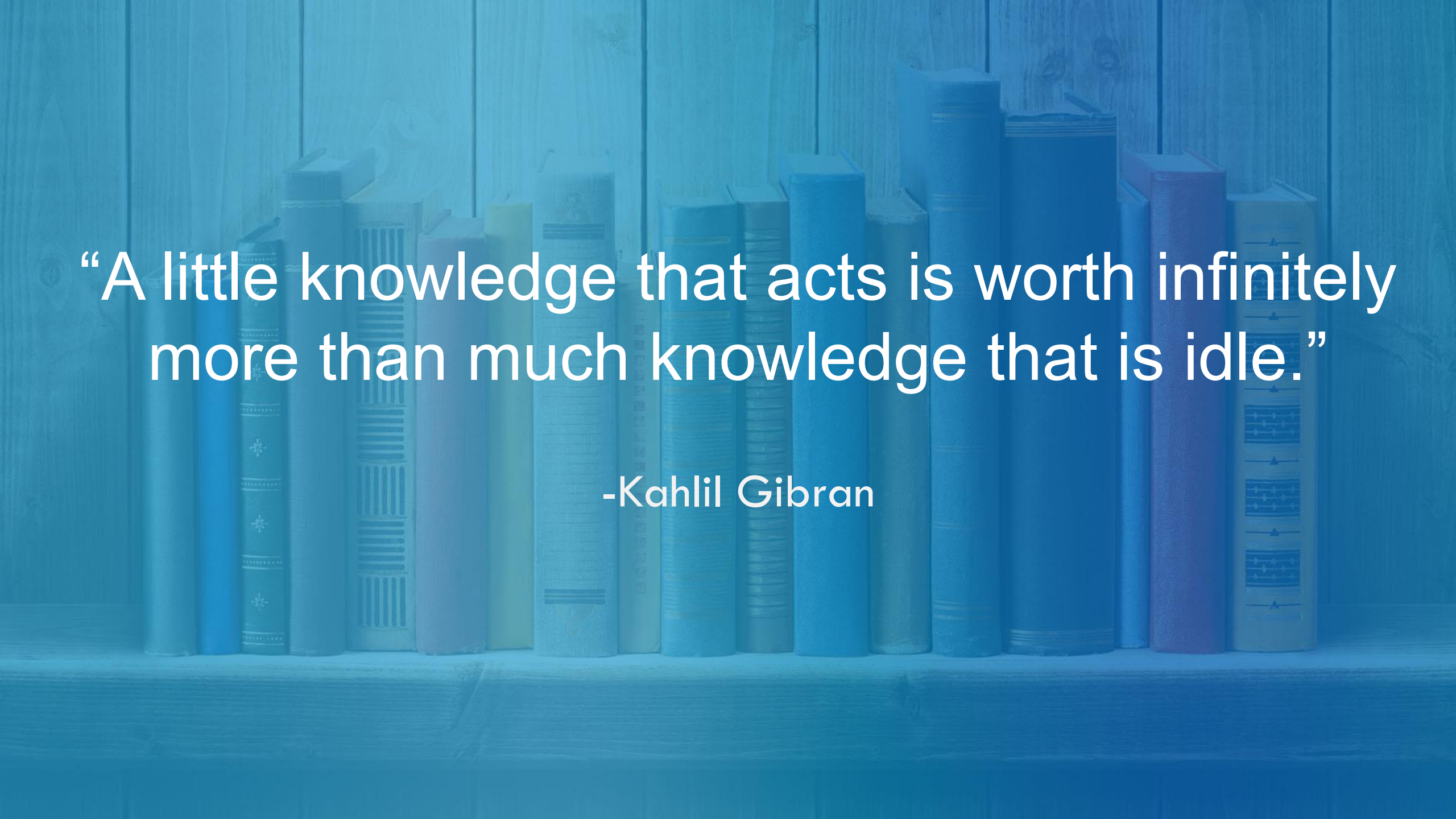
Health Science Center at Houston
School of Public Health


“A little knowledge that acts is worth infinitely more than much knowledge that is idle.”
-Kahlil Gibran

What has already been covered in part I?

- Introduction to Implementation Science
- Implementation Research Questions and Specific Aims
- Implementation Outcomes
- Implementation Strategies
- Theories, Frameworks and Models
- NCI Funding Opportunities
- Breakout sessions

To access the recordings on our SecureStor from Part I please email Sidra Beg at Sidra.S.Beg@uth.tmc.edu

What we will cover in part II:

- Overview of Implementation Science
- Implementation Science in Global Context
- Implementation Science and Quality Improvement
- NCD Services integration in to PHC, models and research
- Planning your Implementation Research Study
- Identifying Barriers and Facilitators to Implementation
- Participatory Planning and Community Engagement
- Study Designs and Methods
- Developing Implementation Strategies using Implementation Mapping

Intervention Impact

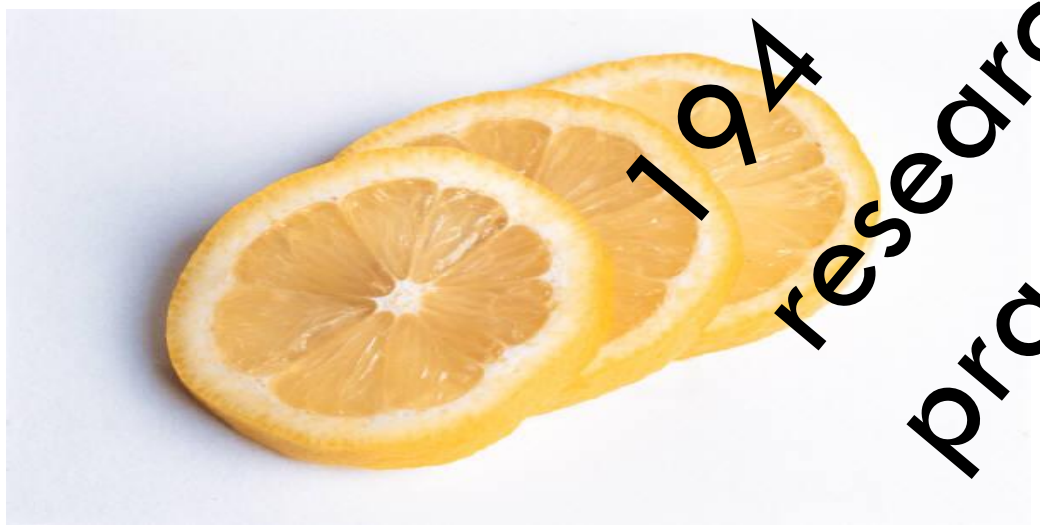
The ultimate impact of an intervention depends on:

- Effectiveness of the intervention
- Reach in the population

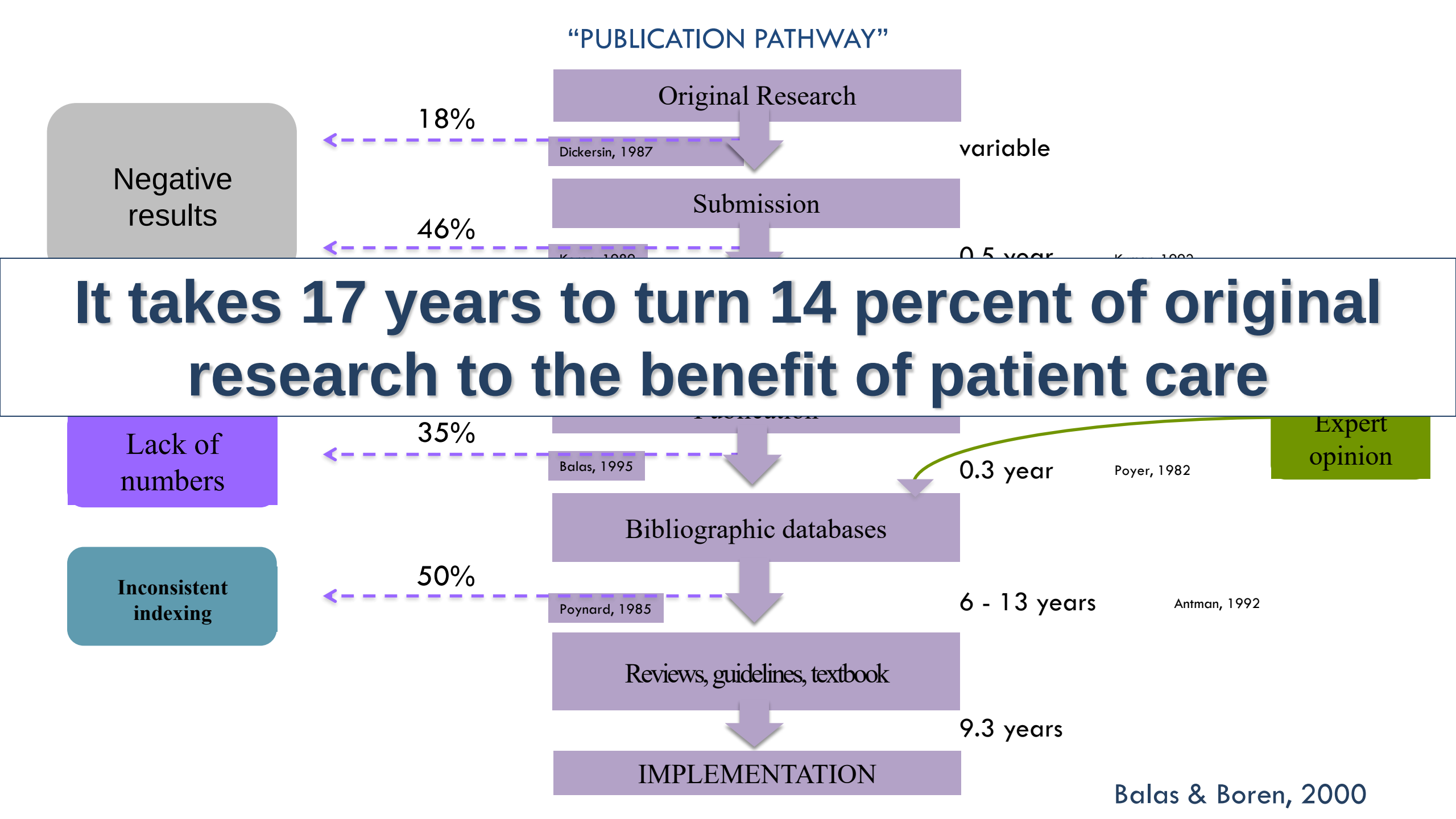
https://catchinfo.org/

The case of lemon juice

- Lemon juice was shown to be effective in preventing scurvy in 1601.
  - Not introduced into sailors diets on ships until 1795!!



194 research-practice gap!


"PUBLICATION PATHWAY"
Original Research
18%
Dickersin, 1987
variable
Negative results
Submission
46%
0.5 year
It takes 17 years to turn 14 percent of original research to the benefit of patient care
Lack of numbers
35%
Balas, 1995
Expert opinion
0.3 year
Poyer, 1982
Bibliographic databases
Inconsistent indexing
50%
Poynard, 1985
6 - 13 years
Antman, 1992
Reviews, guidelines, textbook
9.3 years
IMPLEMENTATION
Balas & Boren, 2000

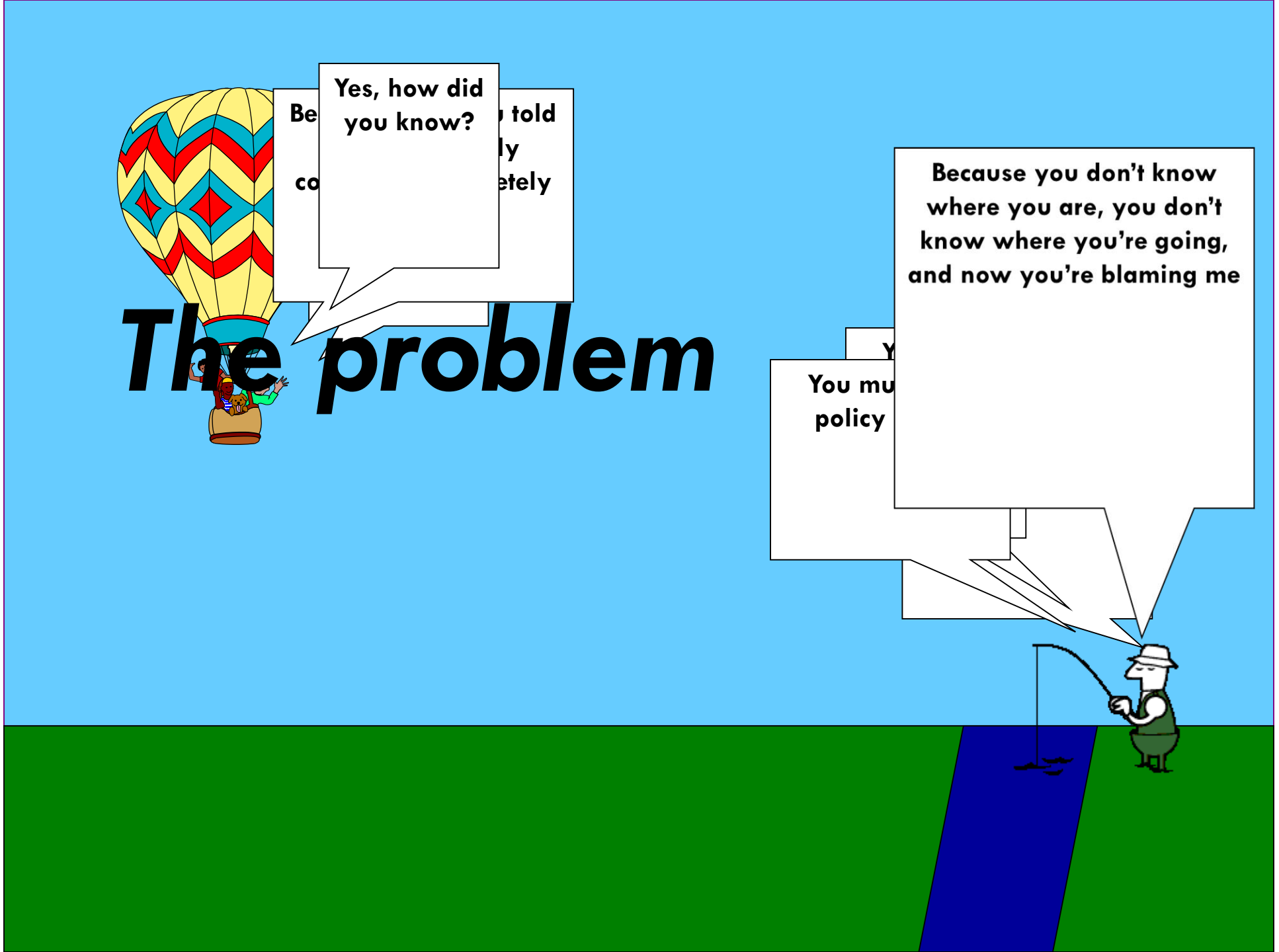
Research to Action

Who is responsible?

Researchers/ program developers, implementers, health service providers, funders, politicians?

A barrier to translation of intervention research findings for public health benefit is that developers (often researchers) practitioners, and policy makers believe that the responsibility for dissemination lies elsewhere.

National Cancer Institute, Center for the Advancement of Health and Robert Wood Johnson Foundation. Designing for dissemination: Conference summary report. 2002. http://dccps.cancer.gov/d4d/d4d_conf_sum_report.pdf


Yes, how did you know?
told
ly
etely
Because you don't know where you are, you don't know where you're going, and now you're blaming me

The problem

Definitions: Implementation & Dissemination

- ***Dissemination*** refers to the distribution of an innovation or intervention to a specific audience.
- ***Implementation*** refers to the integration of a new innovation or intervention within a specific setting or context.

Implementation Science

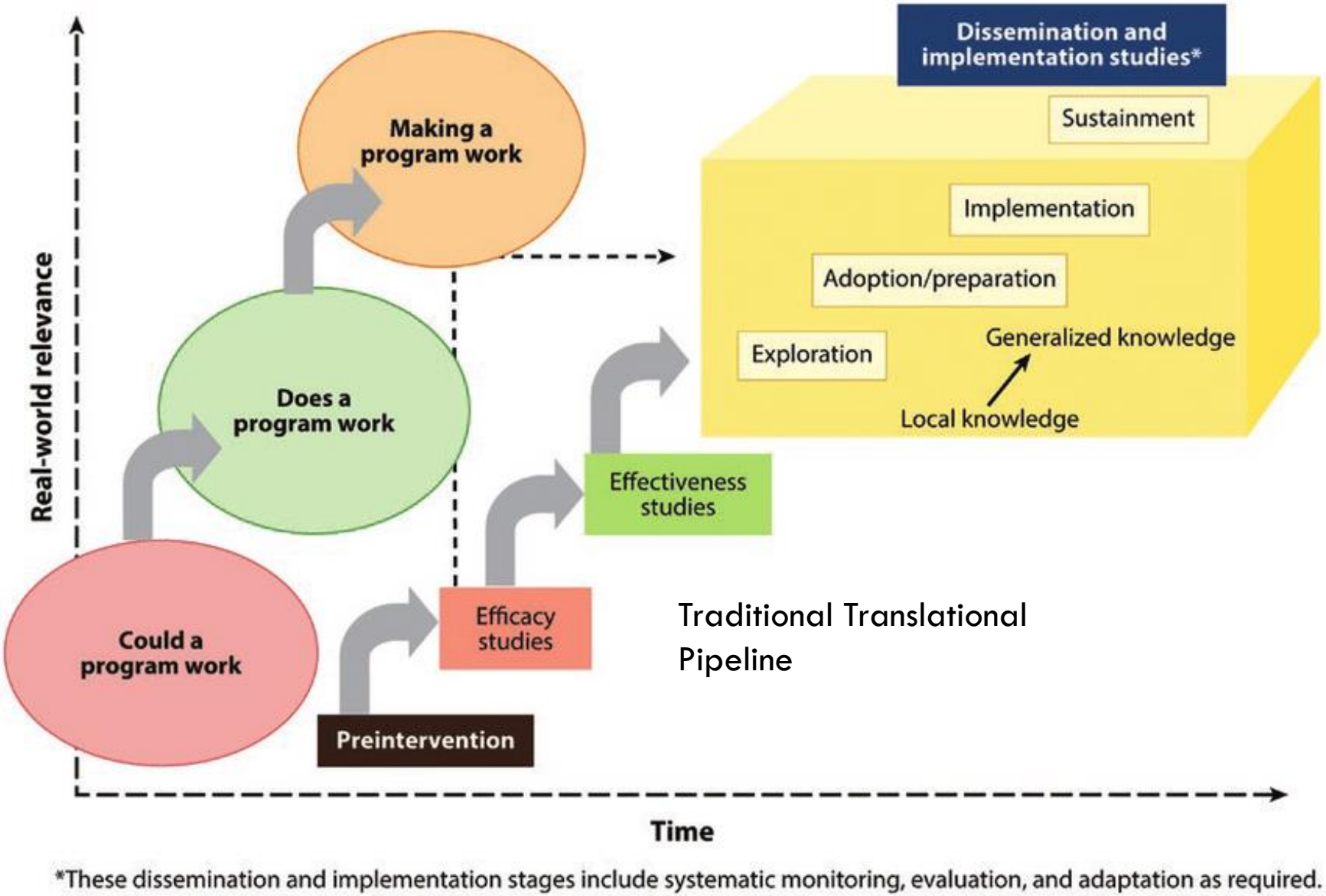
- Study of methods and strategies that facilitate the uptake of evidence-based interventions into regular use.
- Seeks to systematically close the gap between what we know and what we do.

Aims of Implementation Science

1. Helps develop effective strategies for implementing evidence-based practices, of which improve health-related processes & outcomes.
2. Produces generalizable knowledge regarding selected strategies by understanding the different processes, barriers, and facilitators that can influence either success or failure.
3. Aids in the development, testing and refining of relevant theories, conceptual frameworks, as well as measures to advance implementation science.

Reference:

Kirchner, J. E., Smith, J. L., Powell, B. J., Waltz, T. J., & Proctor, E. K. (2019). Getting a clinical innovation into practice: An introduction to implementation strategies. *Psychiatry Research*, 112467. doi: 10.1016/j.psychres.2019.06.042



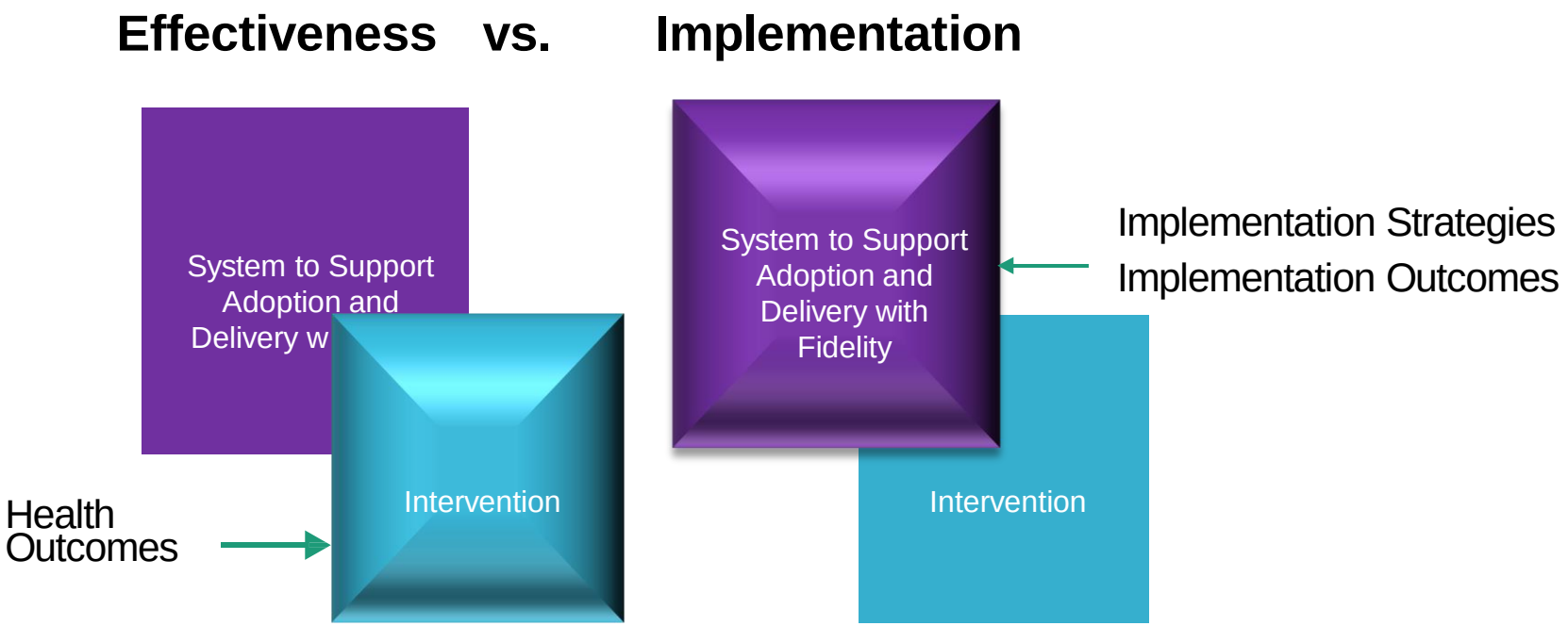
Traditional Translational Pipeline

*These dissemination and implementation stages include systematic monitoring, evaluation, and adaptation as required.

Landsverk et al: Dissemination & Implementation Research in Health. Oxford, 2012

Brown CH, Curran G, Palinkas LA, et al. An overview of research and evaluation designs for dissemination and implementation. Annu Rev Public Health. 2017;38:1–22.

Implementation Research Has a Different Emphasis



Smith & Hasan, 2020, *Psychiatry Research*

Distinguishing Clinical/Public Health Research from Implementation Research

Study feature \ Study type	Clinical / Public Health research	Implementation research
Aim: evaluate a / an …	clinical intervention, health promotion intervention, policy	implementation strategy
Typical intervention	drug, procedure, therapy, prevention program	organizational practice change, training
Typical outcomes	symptoms, health outcomes, patient behavior	adoption, adherence, fidelity, level of implementation
Typical unit of analysis, randomization	Patient, community member	clinic, team, facility, school

Implementation Science in Simple Terms

- The intervention/practice/innovation is **THE THING**
- Effectiveness research looks at whether THE THING works
- D&I research looks at how best to help people/places **DO THE THING**
- *Implementation strategies* are the stuff we do to try to help people/places **DO THE THING**
- Implementation outcomes are **HOW MUCH** and **HOW WELL** they **DO THE THING**

Curran, 2020, *Implementation Science Communications*

THE THING = Consensus Treatment Plans (CTPs)

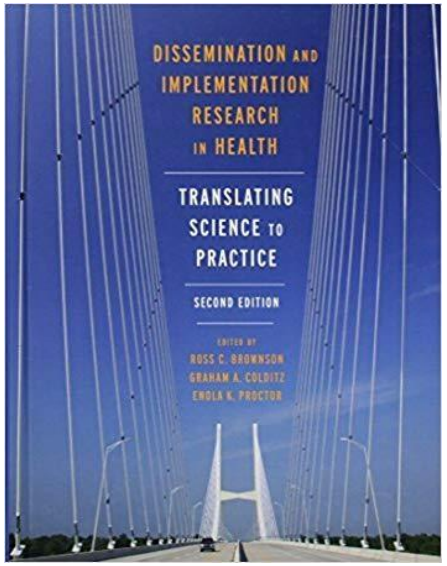
Wensing *et al. Implementation Science* (2020) 15:42
https://doi.org/10.1186/s13012-020-01006-x

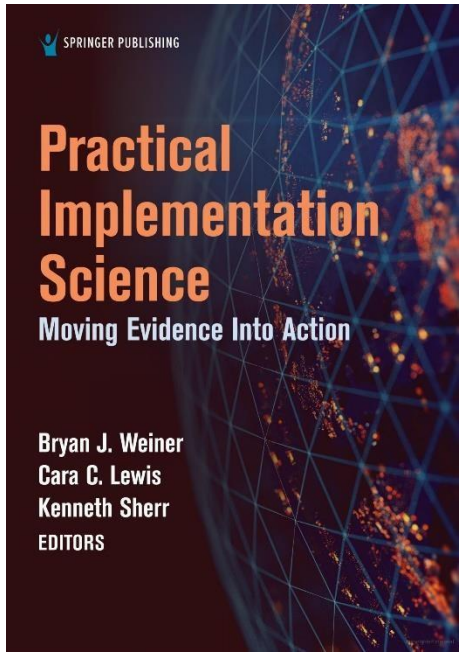
Implementation Science

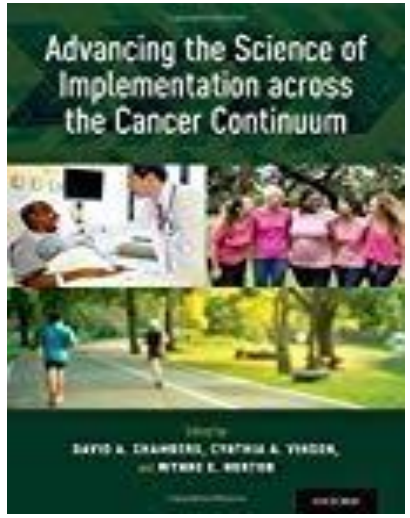
EDITORIAL Open Access

Implementation science in times of Covid-19

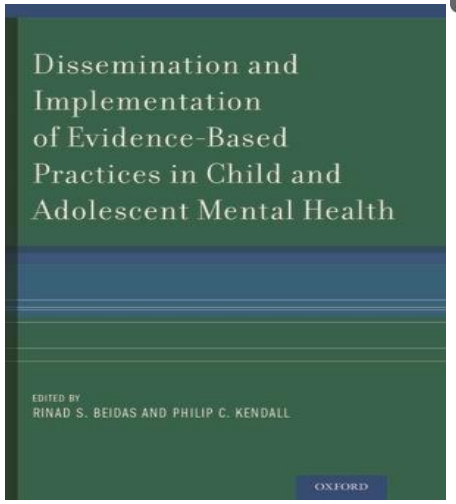
Michel Wensing[1,2*], Anne Sales[3,4], Rebecca Armstrong[5] and Paul Wilson[6,7]







SIRC
SOCIETY FOR IMPLEMENTATION RESEARCH COLLABORATION



Viewpoint

Implementation Research & Practice

Considering the intersection between implementation science and COVID-19

Implementation Research and Practice
Volume 1: Jan-Dec 2020 1–4

DOI: 10.1177/0020764020925994
journals.sagepub.com/home/irp
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David A Chambers

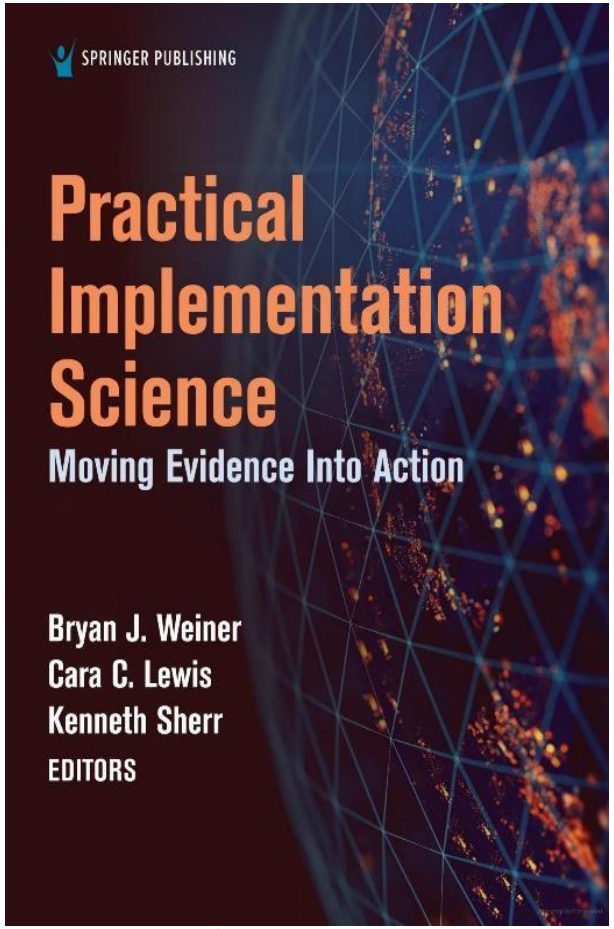
NIH National Institutes of Health

AcademyHealth

Practical Implementation Science

Moving Evidence into Action

Bryan J. Weiner, Ph.D.
Cara C. Lewis, Ph.D.
Kenneth Sherr, Ph.D.
Editors



Chapter 5: Understanding barriers and facilitators for implementation across settings

Maria E. Fernandez, Laura Damschroder, Bijal Balasubramanian

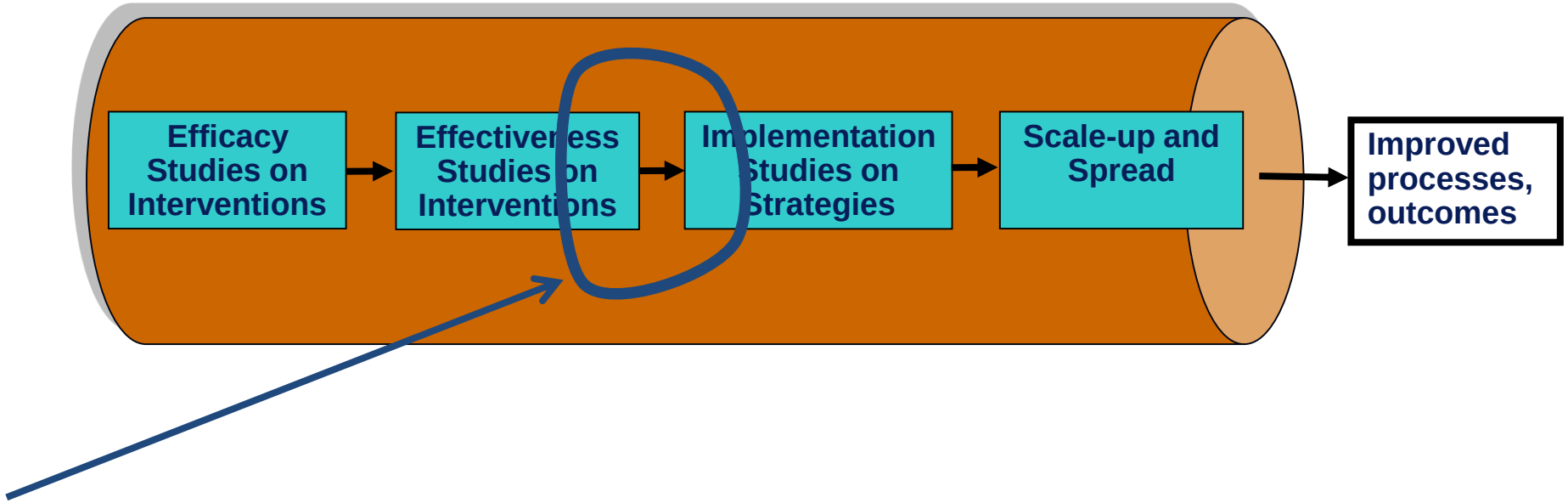
SPRINGER PUBLISHING COMPANY

Types of Evidence-Based Interventions (EBIs) that can be implemented and disseminated

- Clinical Practice Guidelines
- Clinical Innovations (e.g. new screening technology)
- Health Promotion Programs (Packaged programs)
- Policies
- Strategies (USPSTF Community Guide Recommendation; e.g. mass media, one on one, provider reminders)

Fernández ME, Mullen PD, Leeman J, Walker TJ. Evidence-Based Cancer Practices, Programs, and Interventions. In: *Advancing the Science of Implementation across the Cancer Continuum*. 2018, Oxford Press.

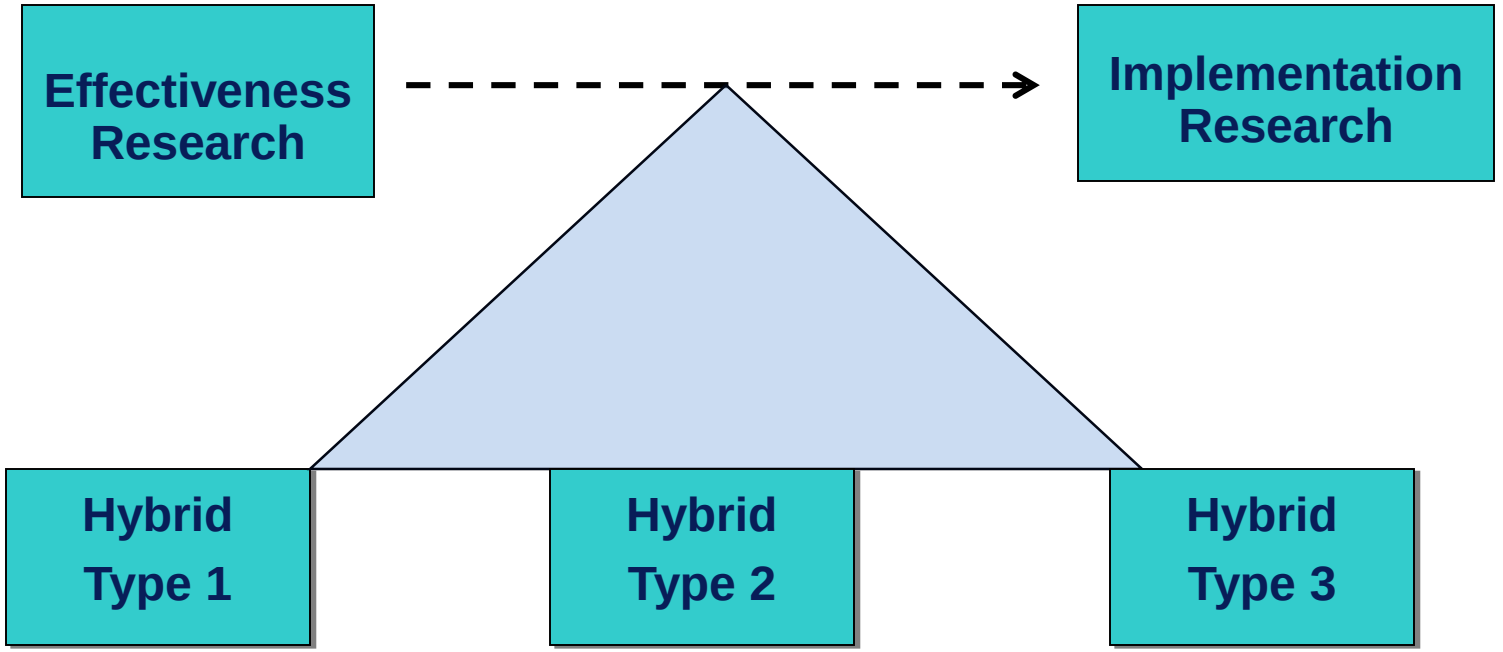
Traditional Research Pipeline



***Spatially* speaking, hybrids "fit" in here…**

Based on a presentation by: Geoffrey M. Curran, PhD, Brian S. Mittman, PhD, Sara Landes, PhD, Jeffrey M. Pyne, MD, David Chambers, DPhil

Types of Hybrids



Hybrid Type 1: test clinical/prevention intervention, observe/gather information on implementation

Hybrid Type 2: test clinical/prevention intervention, test/study implementation strategy

Hybrid Type 3: test implementation strategies, observe/ gather information on clinical/prevention outcomes

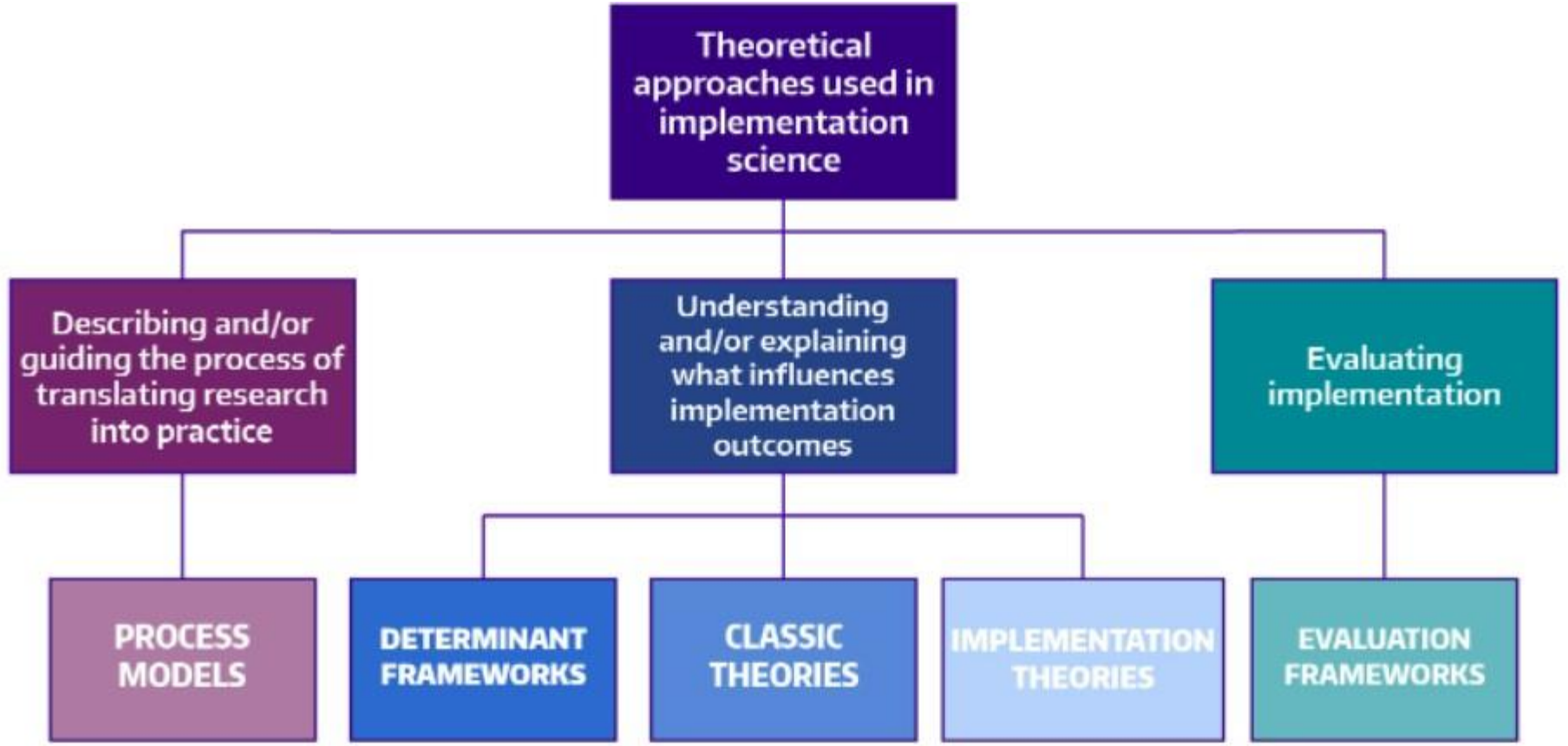
From Curran, G. et al. (2012); Medical Care, 50(3), 217-226

Theories vs Frameworks

What can they do:

- Provide systematic structure for the development, management, and evaluation of interventions/D&I efforts
- Can inform the selection/development of essential implementation strategies
- Enhance the interpretability of study findings
- Provide guidance what is important to measure
- Provide explanation why an intervention works (or doesn't work)
- Provide an opportunity to advance our understanding of the field of D&I Science

Implementation Science Models and Frameworks

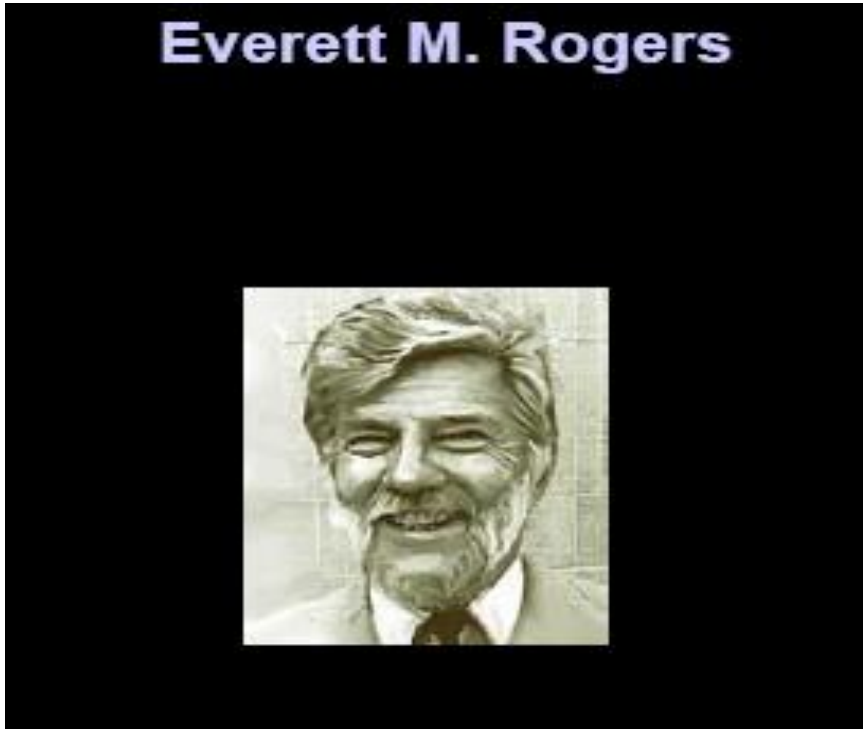


Adapted from: Nilsen P. Making sense of implementation theories, models and frameworks. *Implement Sci*. 2015;10(1):1-13.

Diffusion of Innovation Theory

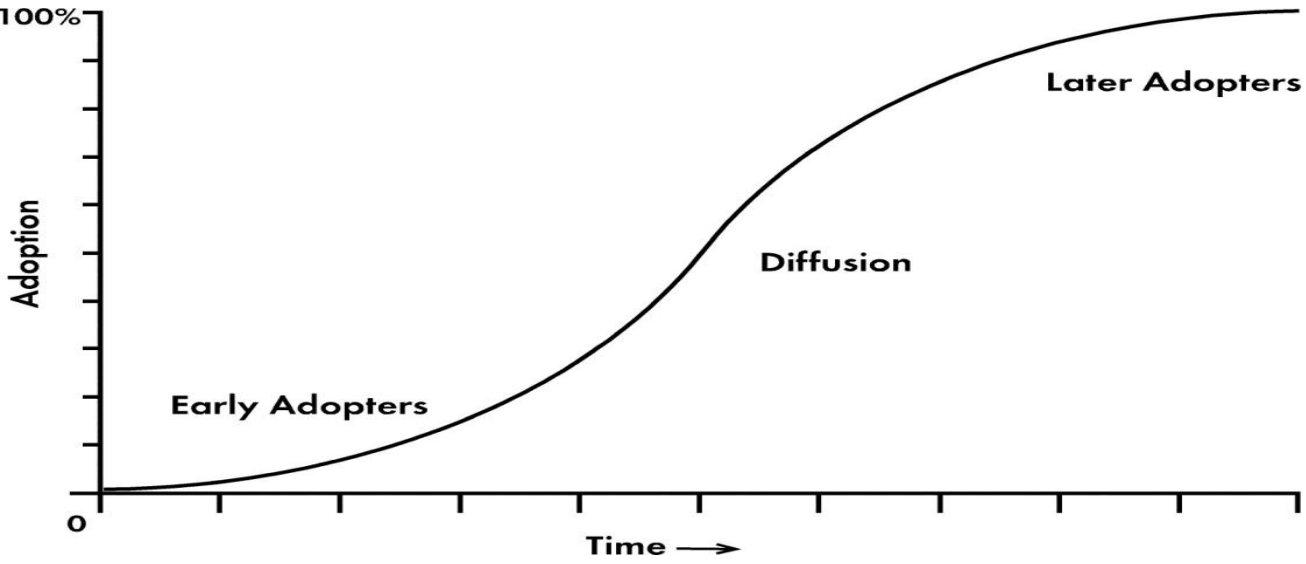
The process of communicating innovation through certain channels over time through members of a social system.

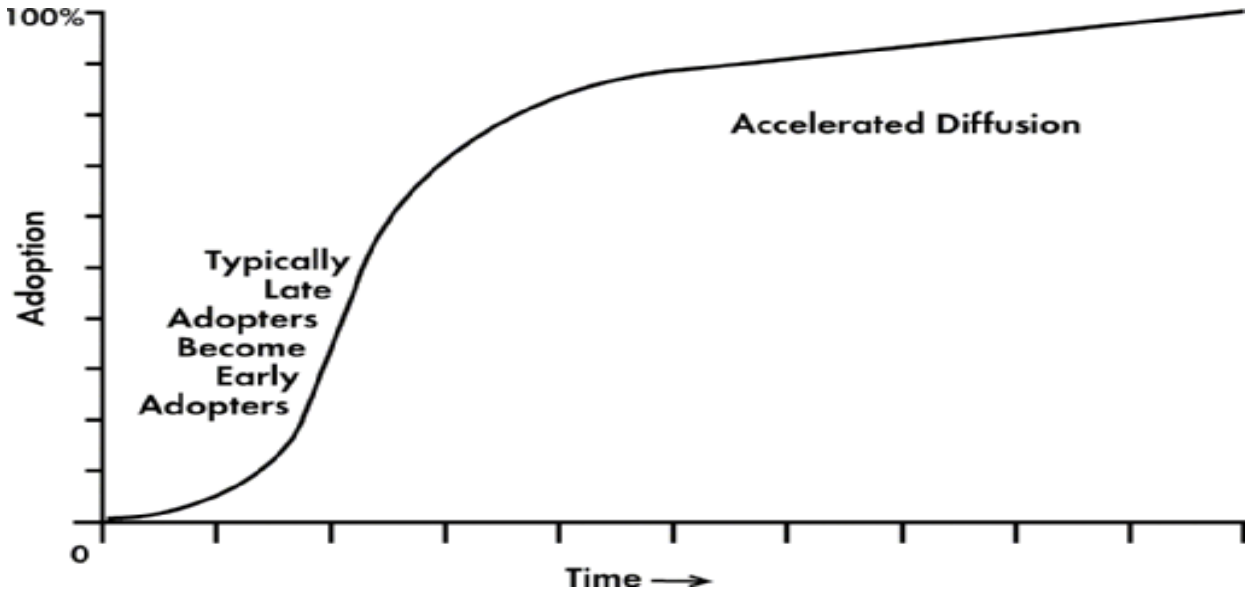
- How new ideas, products, and behaviors become norms
- All levels: individual, interpersonal, community, and organizational
- Success determined by: nature of innovation, communication channels, adoption time, social system



Source: Everett M. Rogers, *Diffusion of Innovations*, 4th ed. (New York: The Free Press, 1995).

Diffusion Curves

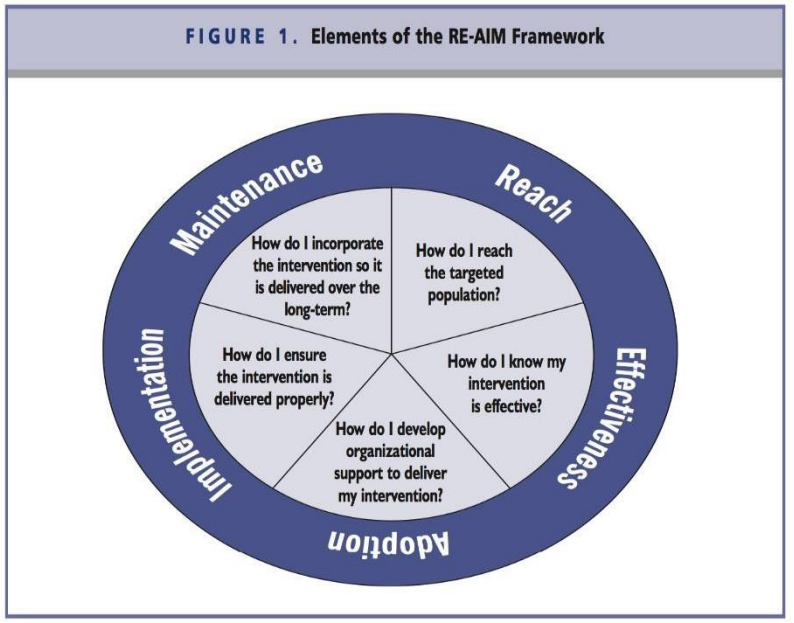




What is RE-AIM?

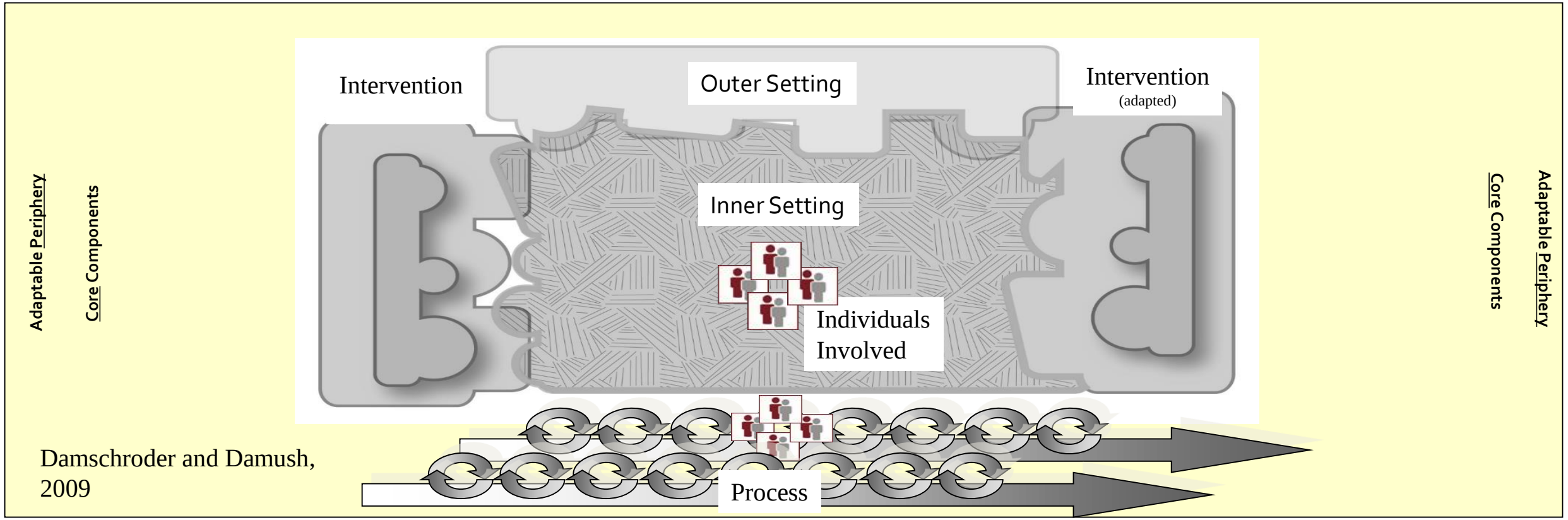
- **RE-AIM is an acronym that consists of five elements:**
  - Reach the target population
  - Efficacy or effectiveness
  - Adoption by target settings or institutions
  - Implementation - consistency of delivery of intervention
  - Maintenance of intervention effects in individuals and populations over time

RE-AIM



Glasgow RE, Harden SM, Gaglio B, Rabin BA, Smith ML, Porter GC, et al. RE-AIM planning and evaluation framework: adapting to new science and practice with a twenty-year review. Front Public Health. (2019) 7:64.

Consolidated Framework for Implementation Research (CFIR)



Damschroder L, Aron D, Keith R, Kirsh S, Alexander J, Lowery J. Fostering implementation of health services research findings into practice: A consolidated framework for advancing implementation science. *Implementation Science* 2009; 4:50.

Implementation Strategies Are…

Methods or techniques used to enhance the adoption, implementation, and/or sustainability of a clinical or public health program or practice

OR

The '**how to**' component of changing healthcare or public health practice.

Key: How to make the "right thing to do"

the "easy thing to do…" Carolyn Clancy, Former Director of AHRQ

Adapted from Proctor, Powell, & McMillen, 2013

Developing & Refining a Compilation of Implementation Strategies

Review

A Compilation of Strategies for Implementing Clinical Innovations in Health and Mental Health

Medical Care Research and Review
69(2) 123-157
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DOI: 10.1177/1077558711430690
http://mcr.sagepub.com
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Byron J. Powell[1], J. Curtis McMillen[2], Enola K. Proctor[1], Christopher R. Carpenter[3], Richard T. Griffey[3], Alicia C. Bunger[4], Joseph E. Glass[1], and Jennifer L. York[3]

Abstract

Efforts to identify, develop, refine, and test strategies to disseminate and implement evidence-based treatments have been prioritized in order to improve the quality of health and mental health care delivery. However, this task is complicated by an implementation science literature characterized by inconsistent language use and inadequate descriptions of implementation strategies. This article brings more depth and clarity to implementation research and practice by presenting a consolidated compilation of discrete implementation strategies, based on a review of 205 sources published between 1995 and 2011. The resulting compilation includes 68 implementation strategies and definitions, which are grouped according to six key implementation processes: planning, educating, financing, restructuring, managing quality, and attending to the policy context. This consolidated compilation can serve as a reference to stakeholders who wish to implement clinical innovations in health and mental health care and can facilitate the development of multifaceted, multilevel implementation plans that are tailored to local contexts.

This article, submitted to *Medical Care Research and Review* on July 11, 2011, was revised and accepted for publication on October 20, 2011.

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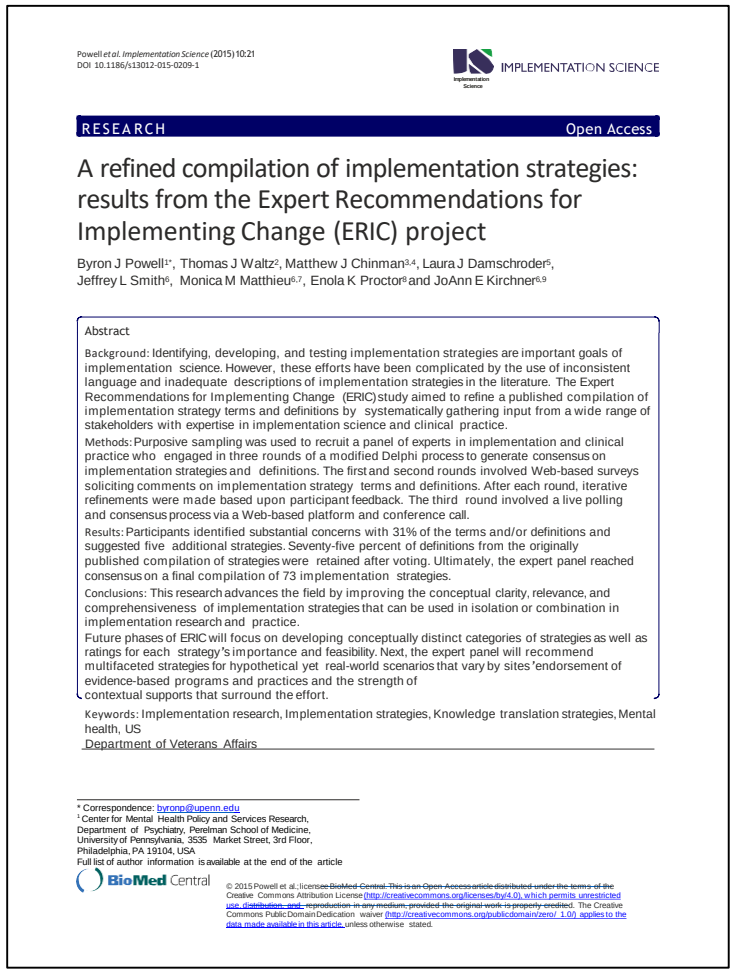

Powell *et al. Implementation Science* (2015) 10:21
DOI 10.1186/s13012-015-0209-1

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]

Abstract

Background: Identifying, developing, and testing implementation strategies are important goals of implementation science. However, these efforts have been complicated by the use of inconsistent language and inadequate descriptions of implementation strategies in the literature. The Expert Recommendations for Implementing Change (ERIC) study aimed to refine a published compilation of implementation strategy terms and definitions by systematically gathering input from a wide range of stakeholders with expertise in implementation science and clinical practice.

Methods: Purposive sampling was used to recruit a panel of experts in implementation and clinical practice who engaged in three rounds of a modified Delphi process to generate consensus on implementation strategies and definitions. The first and second rounds involved Web-based surveys soliciting comments on implementation strategy terms and definitions. After each round, iterative refinements were made based upon participant feedback. The third round involved a live polling and consensus process via a Web-based platform and conference call.

Results: Participants identified substantial concerns with 31% of the terms and/or definitions and suggested five additional strategies. Seventy-five percent of definitions from the originally published compilation of strategies were retained after voting. Ultimately, the expert panel reached consensus on a final compilation of 73 implementation strategies.

Conclusions: This research advances the field by improving the conceptual clarity, relevance, and comprehensiveness of implementation strategies that can be used in isolation or combination in implementation research and practice.
Future phases of ERIC will focus on developing conceptually distinct categories of strategies as well as ratings for each strategy's importance and feasibility. Next, the expert panel will recommend multifaceted strategies for hypothetical yet real-world scenarios that vary by sites' endorsement of evidence-based programs and practices and the strength of contextual supports that surround the effort.

Keywords: Implementation research, Implementation strategies, Knowledge translation strategies, Mental health, US Department of Veterans Affairs

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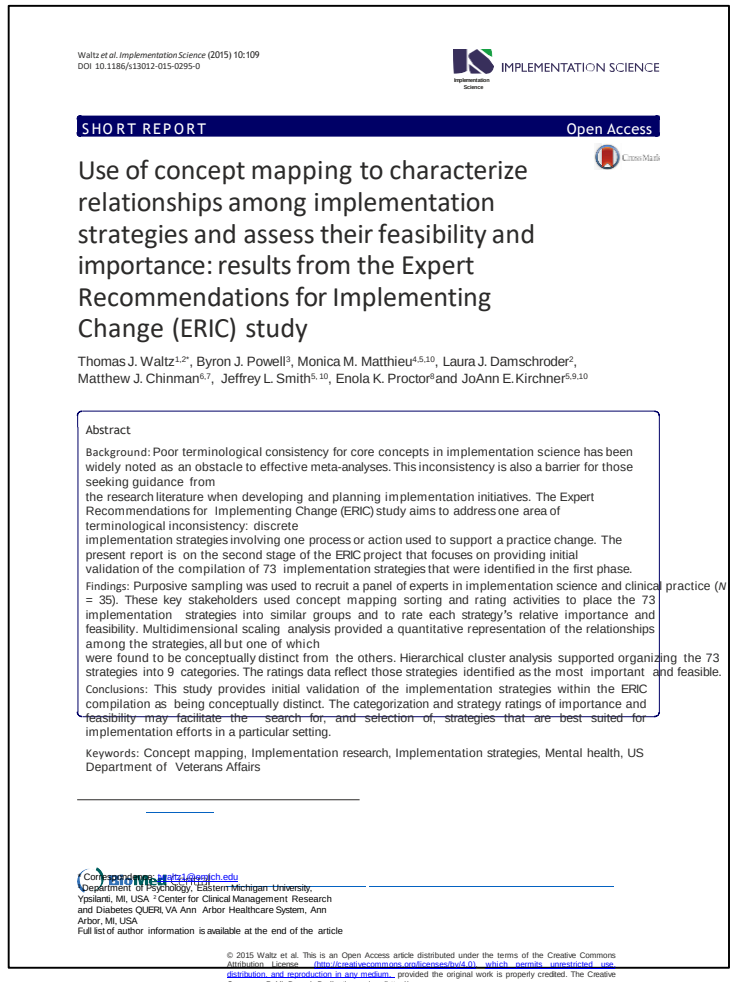

Waltz *et al. Implementation Science* (2015) 10:109
DOI 10.1186/s13012-015-0295-0

IMPLEMENTATION SCIENCE

SHORT REPORT Open Access

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]

Abstract

Background: Poor terminological consistency for core concepts in implementation science has been widely noted as an obstacle to effective meta-analyses. This inconsistency is also a barrier for those seeking guidance from the research literature when developing and planning implementation initiatives. The Expert Recommendations for Implementing Change (ERIC) study aims to address one area of terminological inconsistency: discrete implementation strategies involving one process or action used to support a practice change. The present report is on the second stage of the ERIC project that focuses on providing initial validation of the compilation of 73 implementation strategies that were identified in the first phase.

Findings: Purposive sampling was used to recruit a panel of experts in implementation science and clinical practice (*N* = 35). These key stakeholders used concept mapping sorting and rating activities to place the 73 implementation strategies into similar groups and to rate each strategy's relative importance and feasibility. Multidimensional scaling analysis provided a quantitative representation of the relationships among the strategies, all but one of which were found to be conceptually distinct from the others. Hierarchical cluster analysis supported organizing the 73 strategies into 9 categories. The ratings data reflect those strategies identified as the most important and feasible.

Conclusions: This study provides initial validation of the implementation strategies within the ERIC compilation as being conceptually distinct. The categorization and strategy ratings of importance and feasibility may facilitate the search for, and selection of, strategies that are best suited for implementation efforts in a particular setting.

Keywords: Concept mapping, Implementation research, Implementation strategies, Mental health, US Department of Veterans Affairs

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Challenges in Selecting Implementation Strategies

- While some compilations exist, they may be less relevant for certain settings
- Strategies included in compilations are broad and may represent qualitatively different things (delivery channel, assessments, processes)
- Limitations of the empirical literature in describing strategies
- Underutilization of conceptual models and theories in the literature,
- Variations related to the EBPs and the contexts in which they are implemented

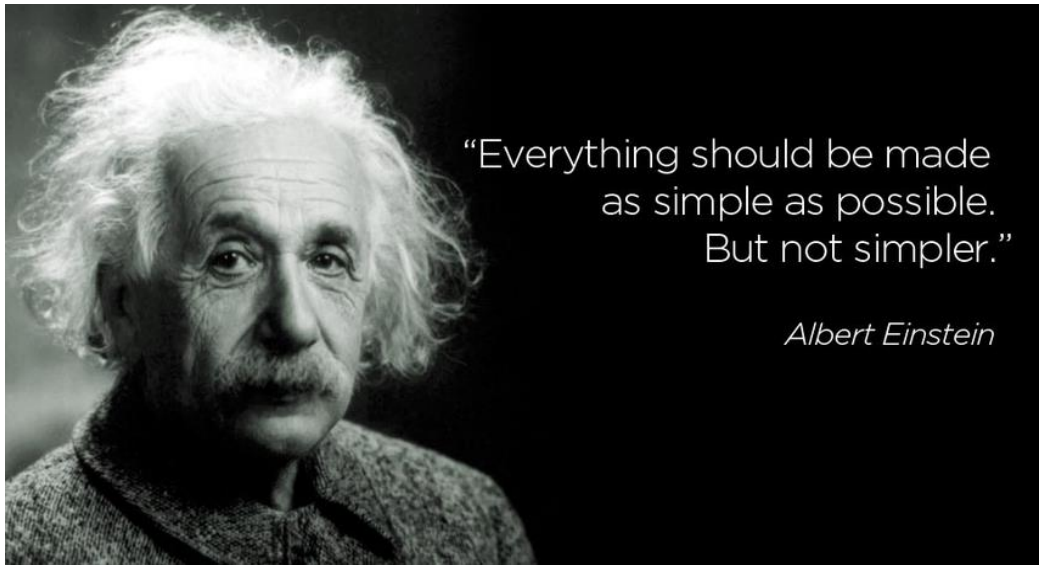
Waltz, et al. 2014; Powell et al. 2017

How do we select or develop implementation strategies?

1. Conduct an assessment of factors that influence implementation processes and outcomes (e.g. characteristics of the innovation, setting, preferences of involved stakeholders, barriers and facilitators)

2. Develop or select and tailor strategies to address these.

It's not that easy



Designing and Tailoring Implementation 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

- Group Model Building
- Conjoint Analysis
- Concept Mapping
- **Intervention Mapping**

Baker et al. (2015); Bosch et al. (2007); Colquhoun et al. (2017); Grol et al. (2013); Powell et al. (2017)

Systematic Planning for Implementation

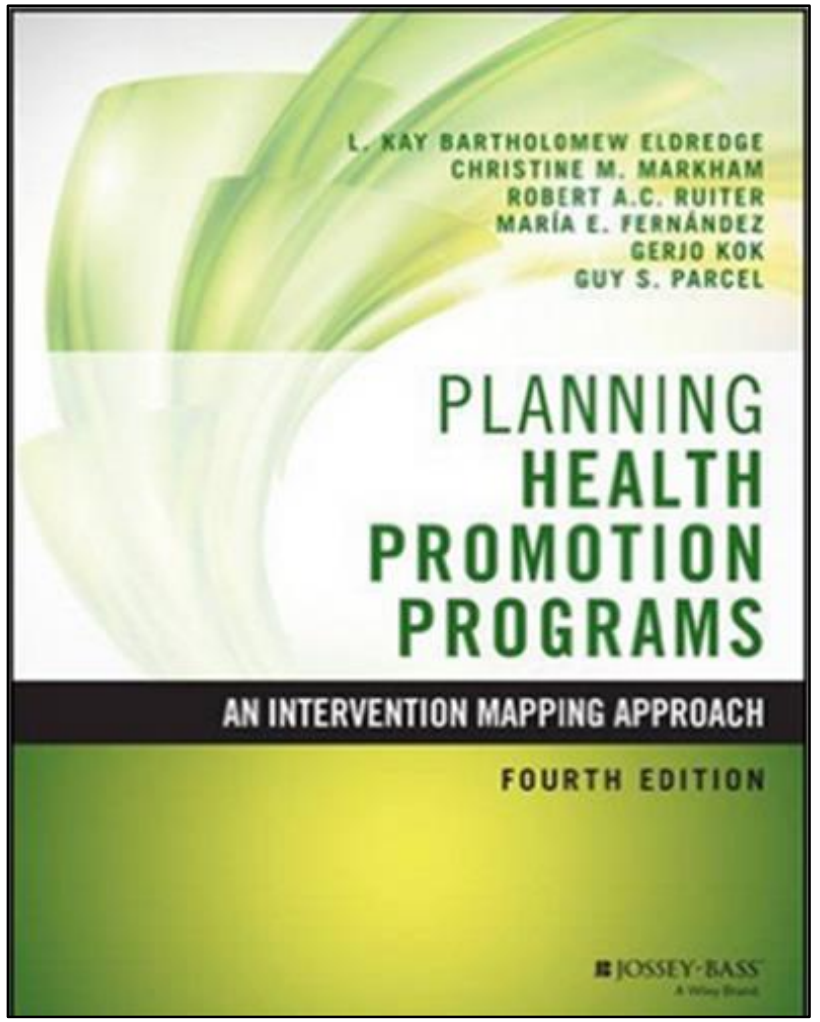
Accelerating and Improving Implementation Using Intervention Mapping

Three ways to use IM for D&I

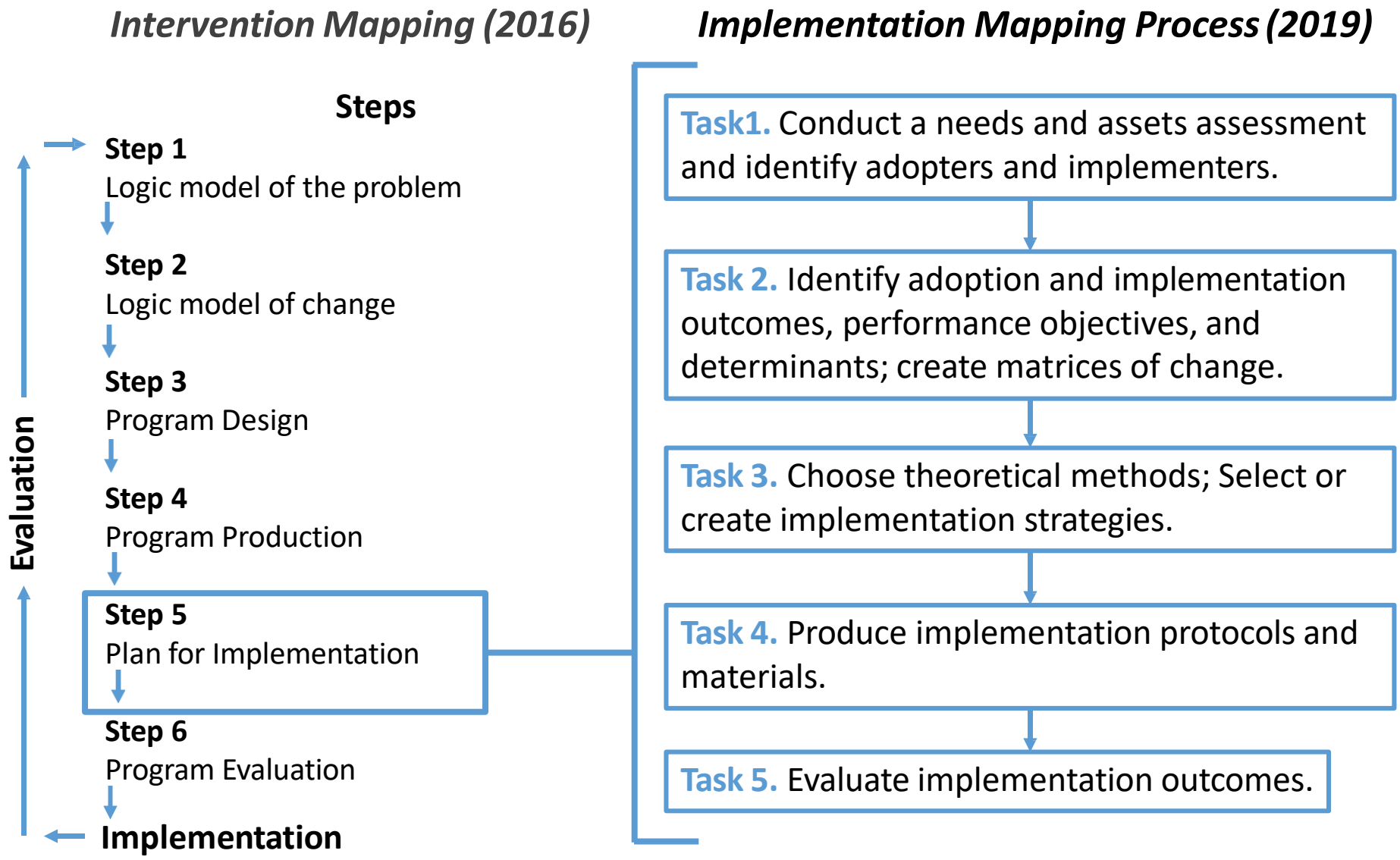
1. Designing programs in ways that enhance its potential for being adopted, implemented, and sustained

2. Designing dissemination interventions (strategies) to influence adoption, implementation and continuation

3. Using IM processes to adapt existing evidence-based interventions



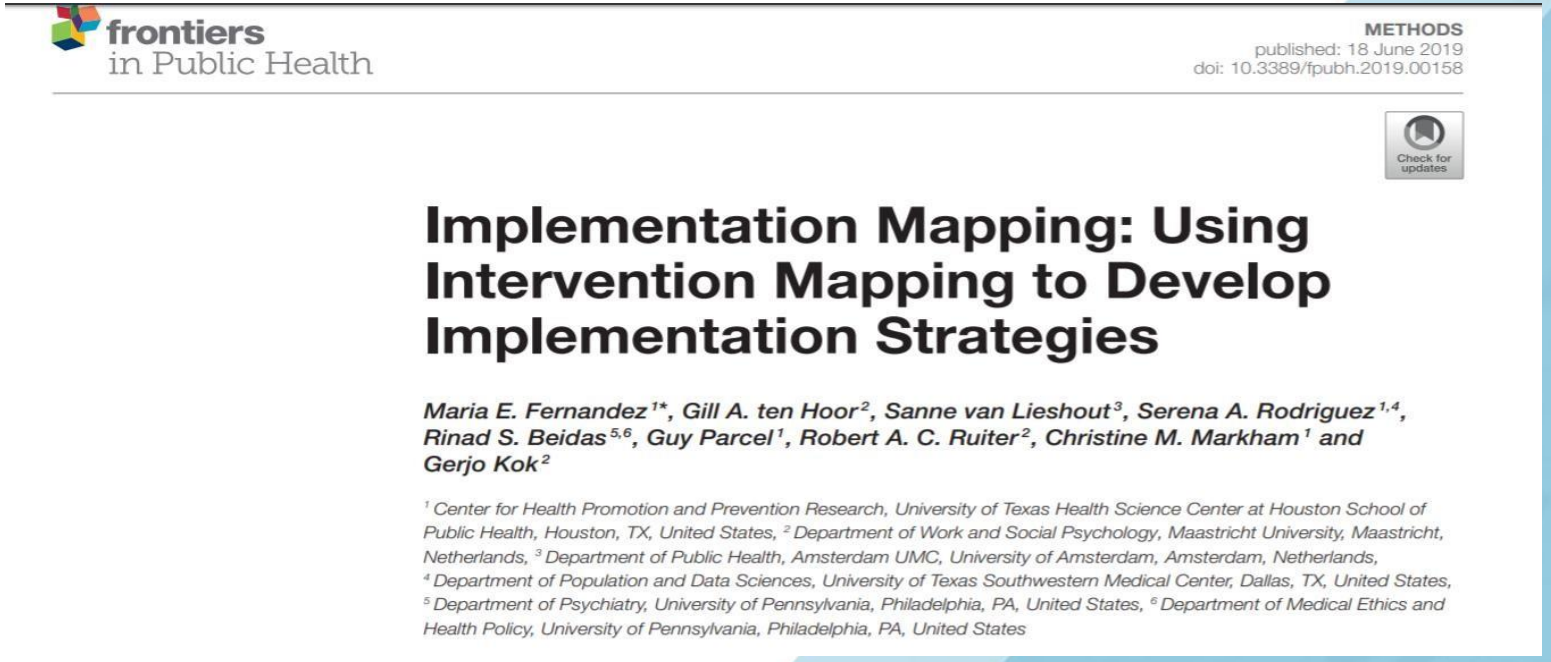
Bartholomew Eldredge, LK, Markham, CM, Ruiter, RAC, Fernández, M.E., Kok, G, Parcel, GS (Eds.). Jan 201). *Planning health promotion programs: An Intervention Mapping approach* (4th ed.). San Francisco, CA: Jossey-Bass.



Fernandez Maria E., ten Hoor Gill A., van Lieshout Sanne, Rodriguez Serena A., Beidas Rinad S., Parcel Guy, Ruiter Robert A. C., Markham Christine M., Kok Gerjo. Implementation Mapping: Using Intervention Mapping to Develop Implementation Strategies. *Frontiers in Public Health,* 7, 2019.

What is Implementation Mapping?

The Use of the Intervention Mapping Protocol for planning Implementation Strategies (Implementation Interventions).
Implementation Science + Intervention Mapping **= Implementation Mapping**



frontiers in Public Health

METHODS
published: 18 June 2019
doi: 10.3389/fpubh.2019.00158

Check for updates

Implementation Mapping: Using Intervention Mapping to Develop Implementation Strategies

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Fernández ME, et al.Implementation Mapping: Using Intervention Mapping to Develop Implementation Strategies, *Frontiers in Public Health*, 2019, 7:158. doi: 10.3389/fpubh.2019.00158. eCollection 2019. PMID: 31275915; PMCID: PMC6592155.

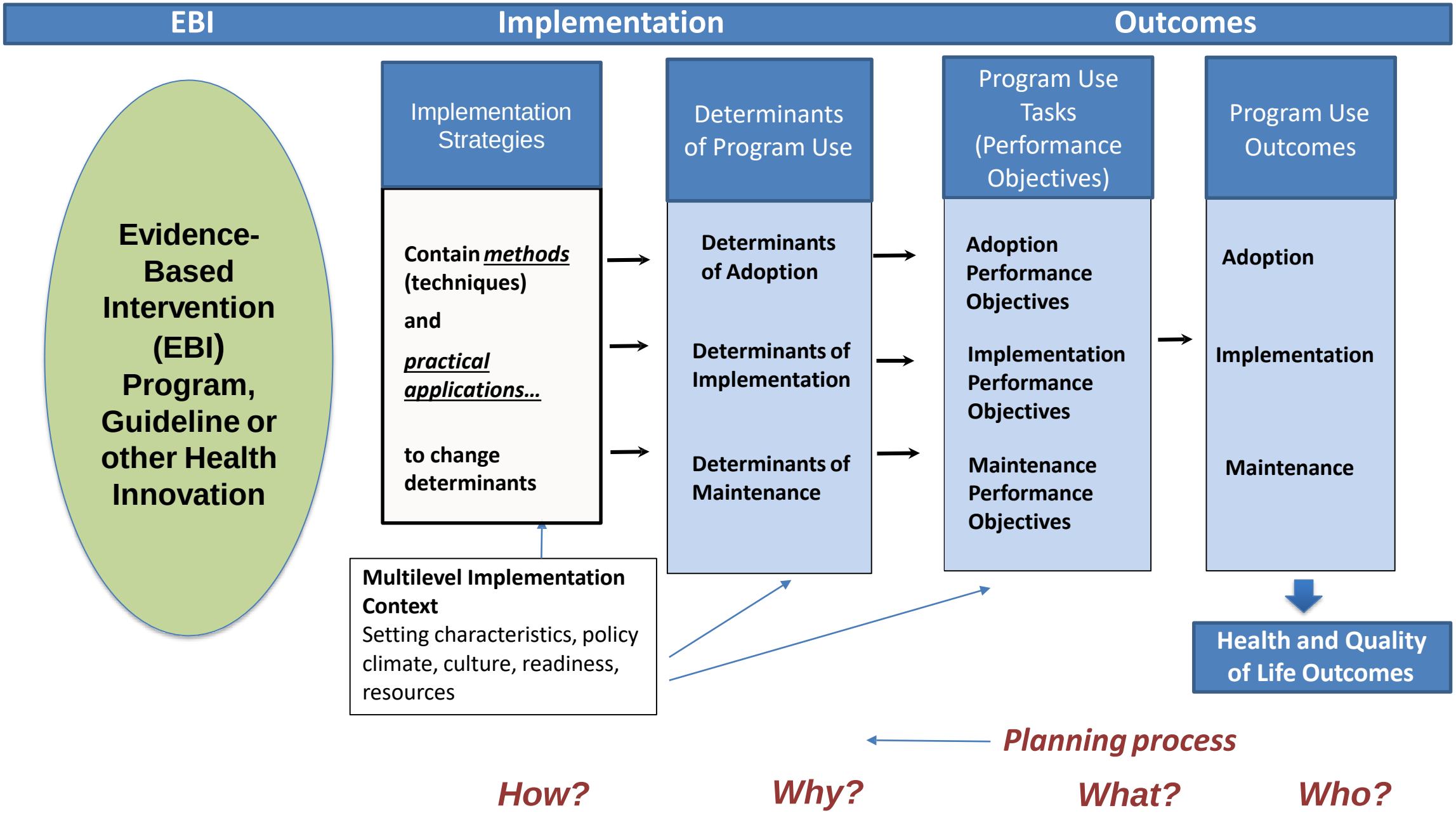
This process can be used…

- For new programs, demonstration, and research projects:
  - Plan for initial implementation to ensure program is used as intended during the evaluation trial
- For programs that have already been implemented and evaluated:
  - Develop an implementation intervention to enhance dissemination or "scale-up" for widespread use

Intervention Mapping guides the D&I planner/researcher to answer the following questions:

- Who will decide to use the program? Who will implement the program? Who will assure that the program continues over time?
- What do they need to do?
- Why would they do it (determinants)?
- How (what methods and strategies) do we influence these adoption, implementation, and maintenance behaviors and conditions?

Implementation Mapping Logic Model



Forthcoming Issue of Frontiers in Public Health

Topic Editors: Maria Fernandez, Byron Powell, & Gill ten Hoor

https://www.frontiersin.org/research-topics/19871/implementation-mapping-for-selecting-adapting-and-developing-implementation-strategies

What is De-Implementation?

De-Implementation Research: Study of how to remove, replace, reduce (frequency and/or intensity) or restrict use of ineffective, untested, harmful, overused, inappropriate, and/or low-value health services and practices delivered to patients by health care providers and health systems.

1. **Ineffective**: Empirical evidence demonstrates that intervention does not work.
2. **Contradicted**: More recent, higher-quality empirical evidence indicates that intervention does not work.
3. **Mixed**: Quality and quantity of evidence is equal in support of and against use of intervention.
4. **Untested**: Little to no empirical evidence about intervention.



Norton, Kennedy, & Chambers, 2017; Norton, Chambers, & Kramer, 2019

D&I Research Needs and Opportunities

- Adaptation of EBIs
- Designing for Dissemination D4D
- Sustainability
- Dissemination and Scale up
- De-Implementation
- Policy Implementation
- Methodological advances: use of big data, adaptive designs
- Implementation of multi-level and complex interventions
- Implementation research to increase health equity

April Oh, Cynthia A Vinson, David A Chambers, Future directions for implementation science at the National Cancer Institute: Implementation Science Centers in Cancer Control, *Translational Behavioral Medicine*

Implementation Science Resource Hub

Implementation Science Funding Announcements

National Institutes of Health

- Dissemination and Implementation Research in Health (R01 Clinical Trial Optional)
- Dissemination and Implementation Research in Health (R21 Clinical Trial Optional)
- Dissemination and Implementation Research in Health (R03)
- Targeted Implementation Science to Achieve 90/90/90 Goals for HIV/AIDS Prevention and Treatment (R21 Clinical Trial Optional)
- Strengthening the HIV Pre-Exposure Prophylaxis (PrEP) Care Continuum through Behavioral, Social, and Implementation Science (R01 Clinical Trial Optional)
- Multi-Site Studies for System-Level Implementation of Substance Use Prevention and Treatment Services (R01 Clinical Trial Optional)

Agency for Healthcare Research and Quality

- Funding Announcements Overview
- Improving Management of Opioids and Opioid Use Disorder (OUD) in Older Adults (R18)

Patient-Centered Outcomes Research Institute

- PCORI: Funding Opportunities

Example Funded Grants

- Selection of NCI-Funded Implementation Science Grants

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

Training Opportunities

Training Institute for Dissemination and Implementation Research in Cancer (TIDIRC)

- 8 free, self-paced modules intended to be an introduction to implementation science methods and approaches regardless of disease area

https://cancercontrol.cancer.gov/is/training-education/training-in-cancer/TIDIRC-open-access

University of Washington

- 11-week, online course covering the fundamentals of Implementation Science (estimated 6-9 hours per week)
- Individuals or site groups can register

https://impsciuw.org/implementation-science/learn/uw-opportunities/

Training Opportunities

Special Programme for Research and Training in Tropical Diseases

- Massive open online course (MOOC) on implementation research
- 5 modules, 6 weeks, multiple languages

https://tdr.who.int/home/our-work/strengthening-research-capacity/massive-open-online-course-(mooc)-on-implementation-research

Cancer Prevention and Control Research Network

- Self-paced, all materials available online

https://cpcrn.org/training

Training Opportunities

THE UNIVERSITY of NORTH CAROLINA at CHAPEL HILL

IMPSCIX

UNC at Chapel Hill

- No cost, self-paced tutorials with a particular focus on research methods applied in dissemination & implementation research

https://impsci.tracs.unc.edu/get-informed/tutorials/

COLUMBIA

COLUMBIA UNIVERSITY
HERBERT IRVING COMPREHENSIVE
CANCER CENTER

Columbia University

- Mini, video-based course introducing implementation science to researchers

https://www.cancer.columbia.edu/research/researchers/community-based-research/implementation-science-mini-course

Training Opportunities

Washington University in St. Louis

- The Institute for Implementation Science Scholars (IS-2) is a mentored training program for investigators interested in applying dissemination and implementation (D&I) methods and strategies to reduce the burden of chronic disease and address health inequities.

https://is2.wustl.edu/apply/

Additional conferences, workshops, and other trainings can be found at:

- https://societyforimplementationresearchcollaboration.org/dissemination-and-implementation-training-opportunities/
- https://impsci.tracs.unc.edu/get-informed/trainings/

Training Opportunities

UTHealth

- D&I Certificate program - in development; should be ready for enrollment to students this Fall, and non-students in the Spring
- Annual Implementation Science Workshop – October 2022
- Recording available from our 2020 workshop: https://sph.uth.edu/research/centers/chppr/workshops/tiis/conference
- Texas Institute for Implementation Science Conference and Workshop

Other online resources:

D&I Models
https://www.nccmt.ca/knowledge-repositories/search/254

https://re-aim.org/

https://cfirguide.org/

https://episframework.com/

https://implementationscience-gacd.org/

https://adphealth.org/irtoolkit/

Summary

- Implementation science can help bridge the gap between research and practice by:
  - Building an actionable and pragmatic knowledge base to help understand determinants of implementation and dissemination;
  - Developing strategies to accelerate and improve scale up and spread of effective innovations to prevent and control chromic disease.
  - Improving healthcare and public health practice to increase population health.

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Thank You!

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