

# Introduction to Implementation Science

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A row of approximately 15 books of various colors and sizes is lined up on a wooden shelf. The entire image is overlaid with a semi-transparent blue filter. The books are arranged in a slightly uneven line, with some taller than others. The background is a light-colored wood grain.

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

-Kahlil Gibran

# Intervention Impact

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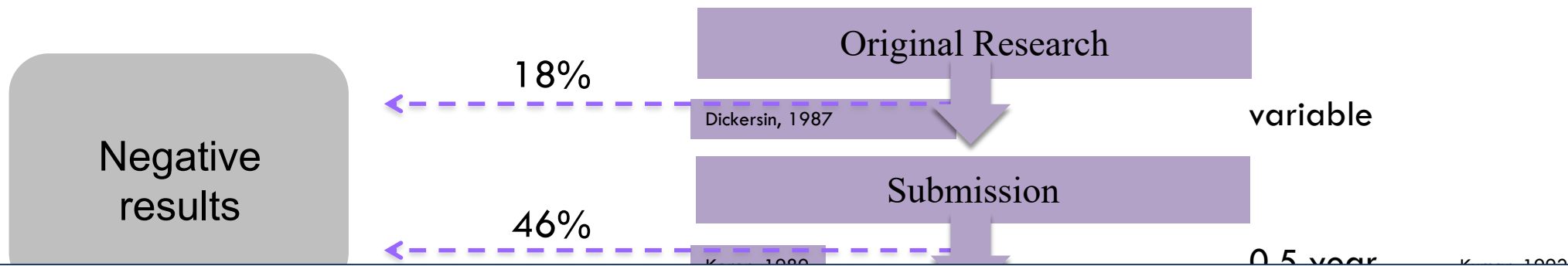
The ultimate impact of an intervention depends on:

- Effectiveness of the intervention
- Reach in the population

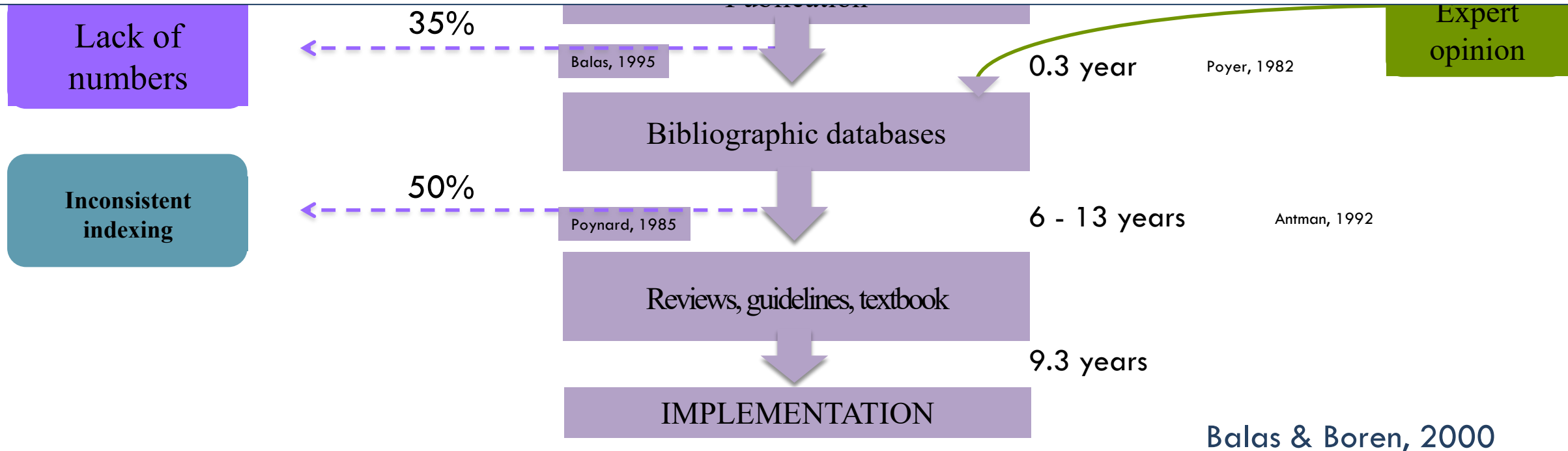


<https://catchinfo.org/>

# "PUBLICATION PATHWAY"



**It takes 17 years to turn 14 percent of original research to the benefit of patient care**



# Research to Action

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## 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.



# Definitions: Implementation & Dissemination

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- **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.

# What creates lasting impact?

More than Efficacy/Effectiveness



Glasgow, Vogt, & Boles (1999)



# Definitions

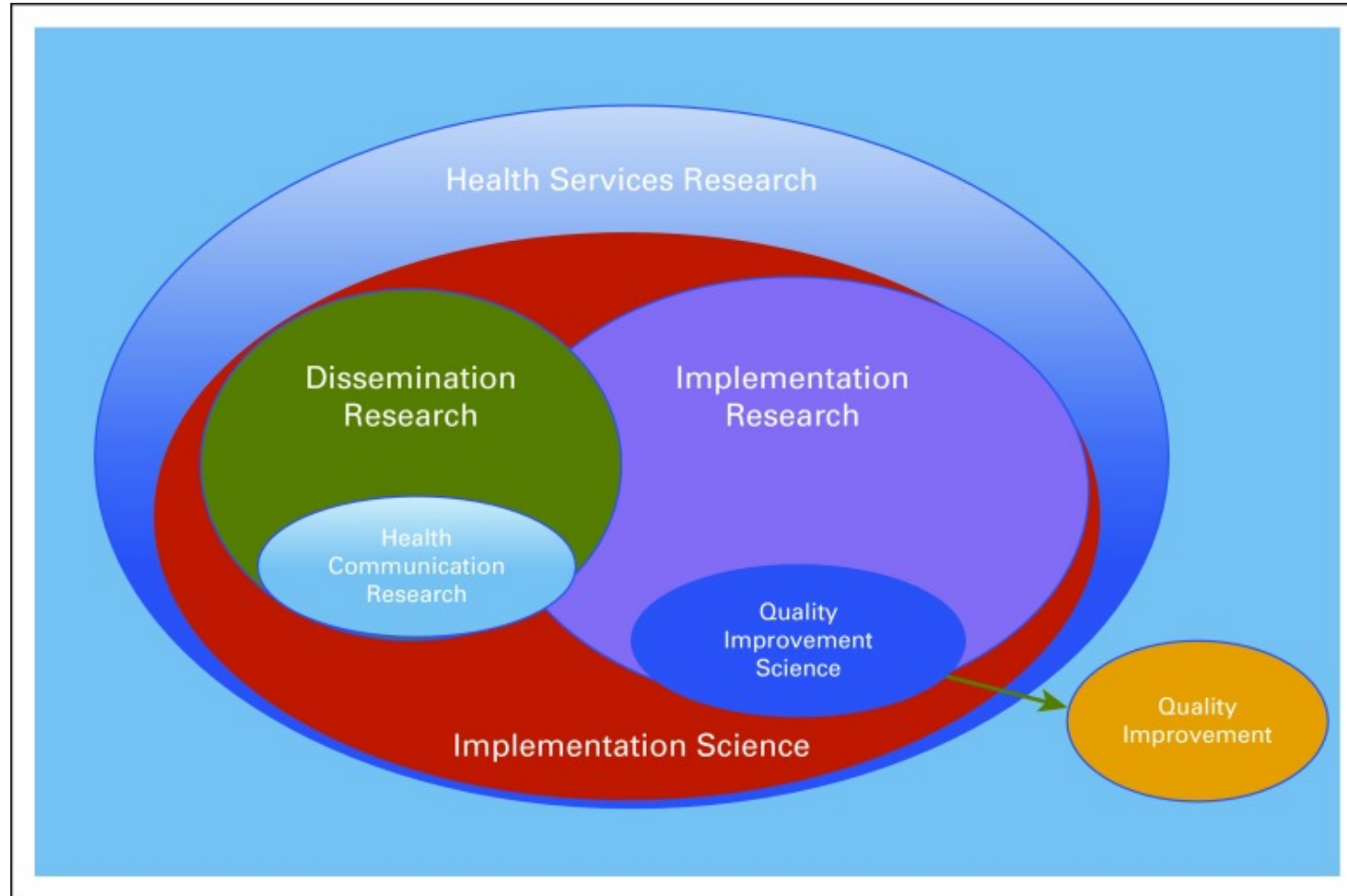
**Implementation Science** is the study of methods to promote the integration of research findings and evidence into healthcare policy and practice.

**Implementation research** is the scientific study of the use of strategies to adopt and integrate evidence-based health interventions into clinical and community settings in order to improve patient/population outcomes.

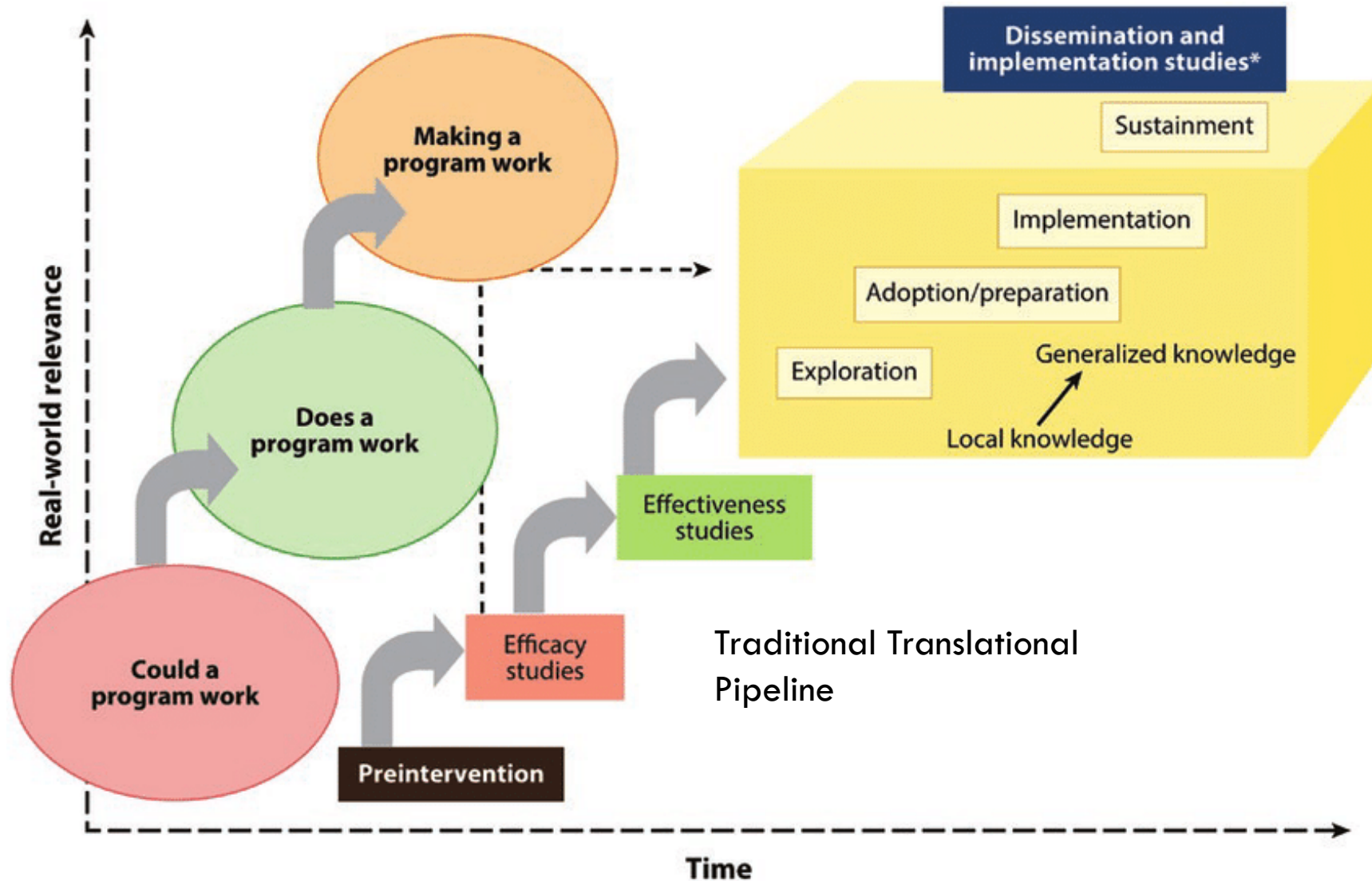
**Dissemination research** is the scientific study of targeted distribution of evidence (knowledge, interventions, practices, policies) to a specific public health or clinical practice audience. The intent is to understand how best to spread and sustain evidence-based interventions.



# Implementation Science is Multi-disciplinary



Mitchell SA, Chambers D. Leveraging Implementation Science to Improve Cancer Care Delivery and Patient Outcomes. JOP 2017; 13(8):523-529.



\*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.

# 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

# Implementation Science

## Implementation Science

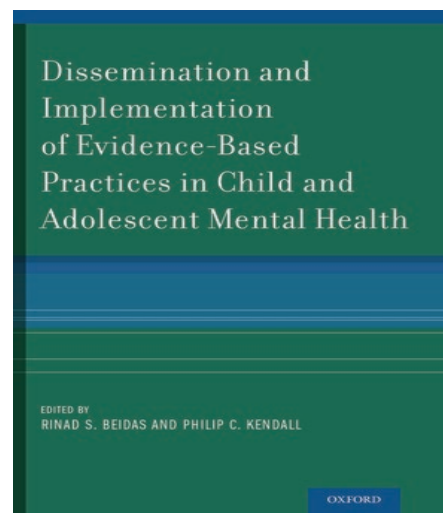
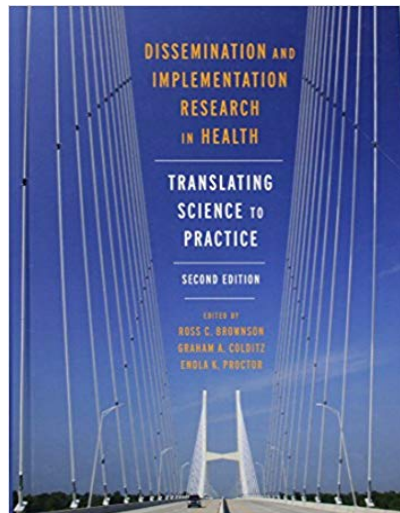
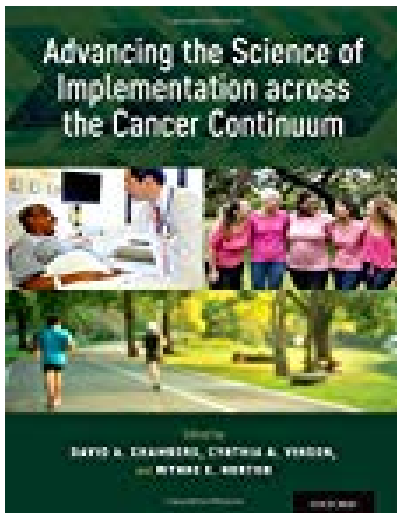


Research article

Open Access

### Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science

Laura J Damschroder\*<sup>1</sup>, David C Aron<sup>2</sup>, Rosalind E Keith<sup>1</sup>, Susan R Kirsh<sup>2</sup>, Jeffery A Alexander<sup>3</sup> and Julie C Lowery<sup>1</sup>



Biennial Society for Implementation Research Conference



[14th Annual Conference on the Science of Dissemination and Implementation in Health](#)  
December 14-16, 2021

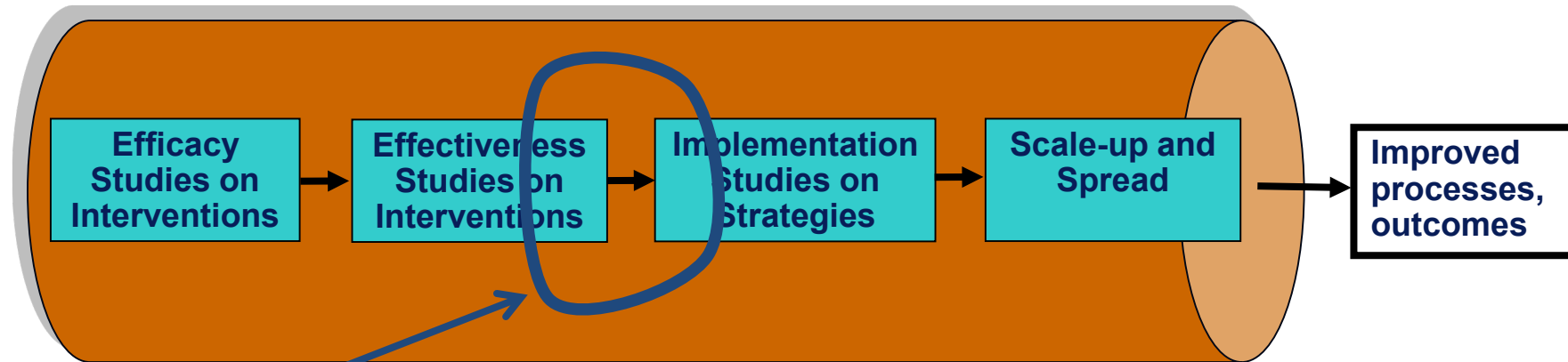
# Distinguishing Clinical/Public Health Research from Implementation Research

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

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

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

# Traditional Research Pipeline

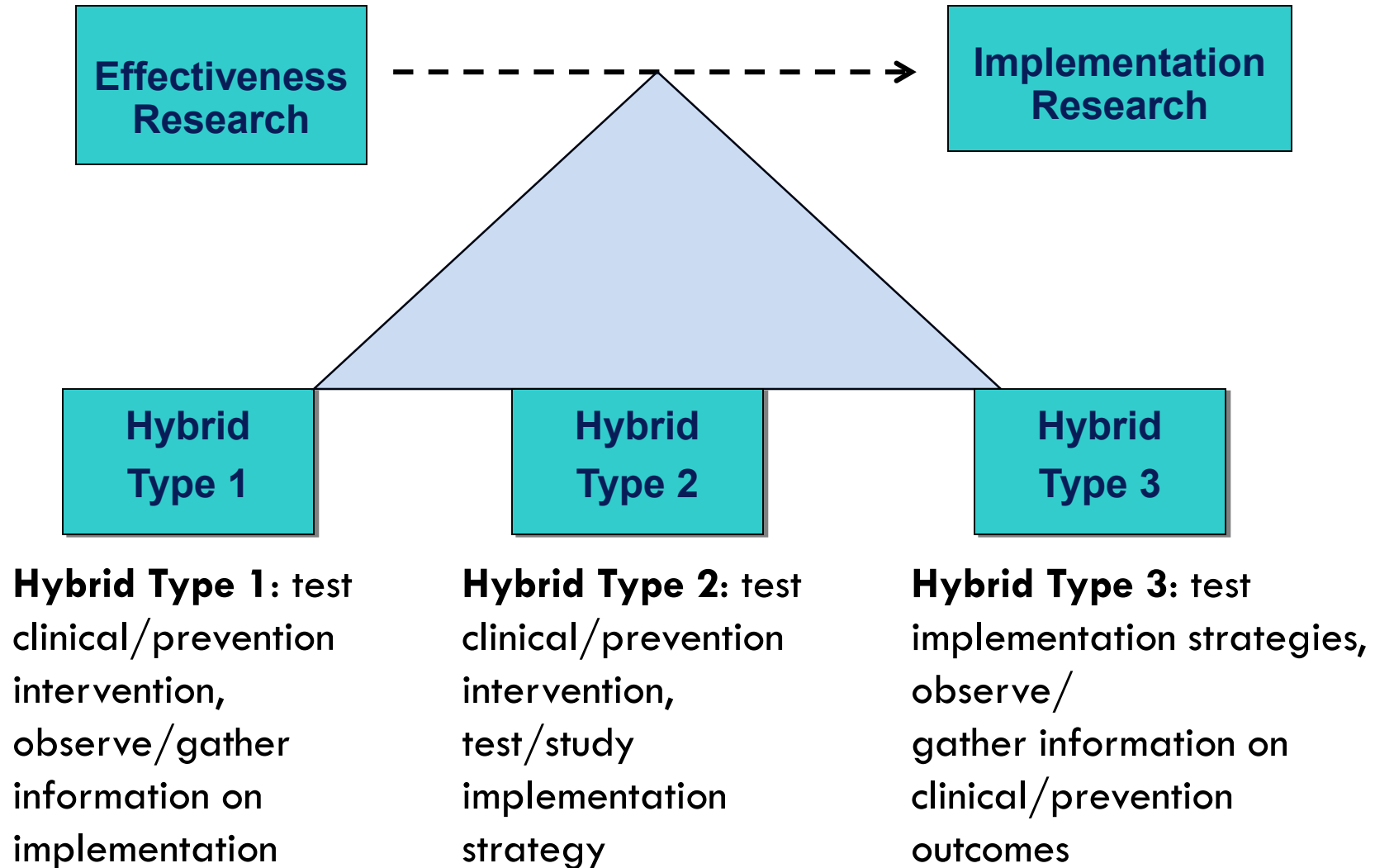


***Spatially speaking, hybrids “fit” in here...***

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



# Dissemination & Implementation Research Approaches

## **Mixed-Methods**

A mixture of both qualitative and quantitative research methods in a single study.

## **Pragmatic Trials**

Trials that evaluate the effectiveness of interventions in real-life practice conditions or routine settings.

## **Natural Experiment**

Individuals within the population are exposed to different levels of the experiment naturally.

## **Hybrid Designs**

A dual focus in assessing clinical effectiveness and implementation.

# Dissemination and Implementation models

- Theories present a systematic way of understanding events or behaviors by providing inter-related concepts, definitions, and propositions that explain or predict events by specifying relationships among variables. They are abstract, broadly applicable and not content- or topic-specific.
- Frameworks are strategic or action-planning models that provide a systematic way to develop, manage, and evaluate interventions.
- Models is used to describe theories and frameworks collectively.

# D&I Models: Significance

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

# 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)

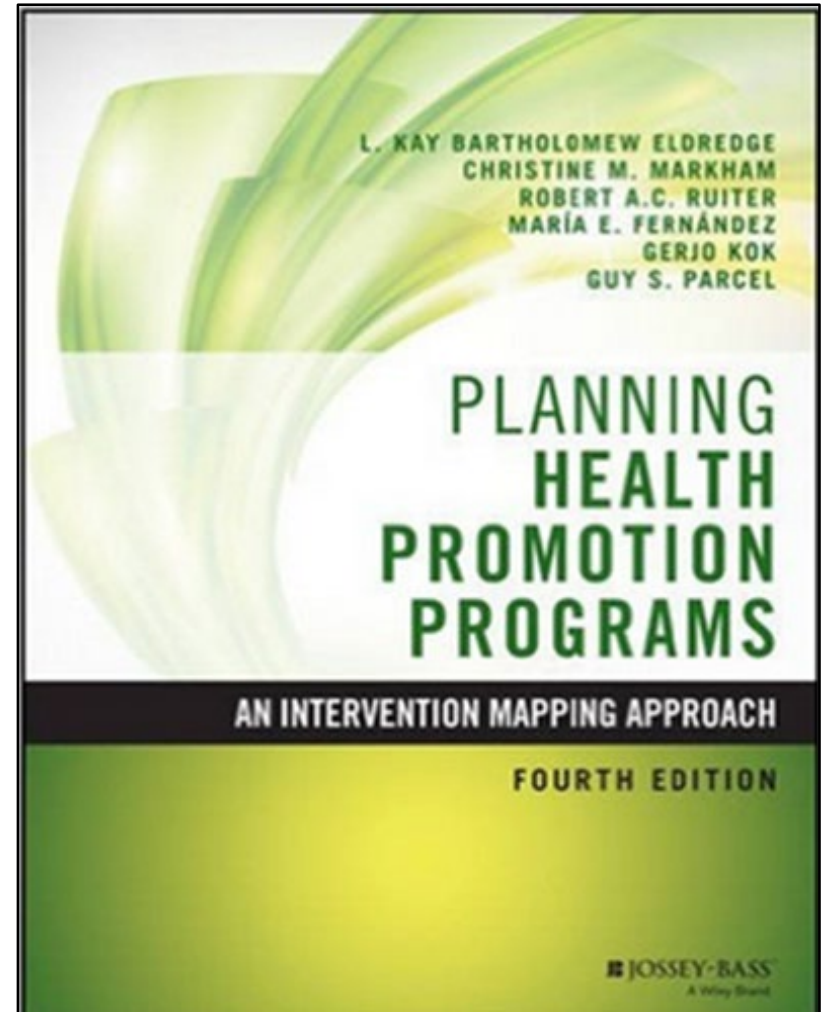
# Intervention Mapping:

A Systematic Approach for Intervention Development, Implementation and Adaptation

## Three ways to use IM for D&I

1. Designing multi-level interventions in ways that enhance its potential for being adopted, implemented, and sustained
2. Designing implementation strategies to influence adoption, implementation and continuation (Implementation Mapping)
3. Using IM processes to adapt existing evidence-based interventions

Bartholomew Eldredge, LK, Markham, CM, Ruiters, RAC, Fernández, M.E., Kok, G, Parcel, GS (Eds.). Jan 2011). *Planning health promotion programs: An Intervention Mapping approach* (4th ed.). San Francisco, CA: Jossey-Bass.



# What is Implementation Mapping?

The Use of the Intervention Mapping Protocol for planning Implementation Strategies (Implementation Interventions).

Implementation Science + Intervention Mapping = **Implementation Mapping**



## Implementation Mapping: Using Intervention Mapping to Develop Implementation Strategies

*Maria E. Fernandez<sup>1\*</sup>, Gill A. ten Hoor<sup>2</sup>, Sanne van Lieshout<sup>3</sup>, Serena A. Rodriguez<sup>1,4</sup>, Rinad S. Beidas<sup>5,6</sup>, Guy Parcel<sup>1</sup>, Robert A. C. Ruiter<sup>2</sup>, Christine M. Markham<sup>1</sup> and Gerjo Kok<sup>2</sup>*

<sup>1</sup> Center for Health Promotion and Prevention Research, University of Texas Health Science Center at Houston School of Public Health, Houston, TX, United States, <sup>2</sup> Department of Work and Social Psychology, Maastricht University, Maastricht, Netherlands, <sup>3</sup> Department of Public Health, Amsterdam UMC, University of Amsterdam, Amsterdam, Netherlands, <sup>4</sup> Department of Population and Data Sciences, University of Texas Southwestern Medical Center, Dallas, TX, United States, <sup>5</sup> Department of Psychiatry, University of Pennsylvania, Philadelphia, PA, United States, <sup>6</sup> Department of Medical Ethics and Health Policy, University of Pennsylvania, Philadelphia, PA, United States

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.



# 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.



# 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

# Growing Resources and Opportunities to Share Knowledge

## → Training Programs

- TIDIRC – Training Institute for Dissemination and Implementation Research in Cancer)

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

- Global Alliance for Chronic Disease

<https://implementationscience-gacd.org/training-program/>

- Measurement (SIRC, GRID enabled measures)

- Brownson, Colditz, Proctor (Eds.) *Dissemination and Implementation Research in Health*, 2018

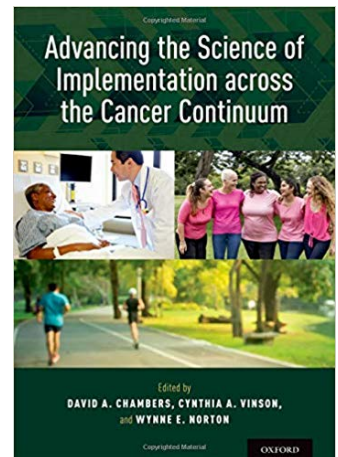
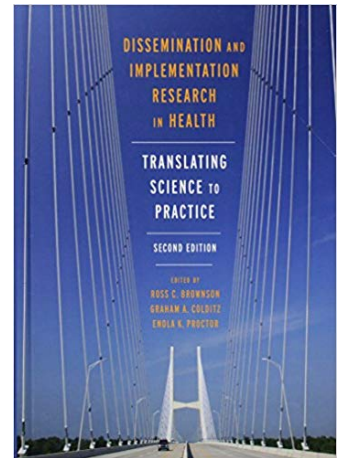
- *Advancing the Science of Dissemination across the Cancer Control Continuum* (2018)

- *Bi-annual meeting of the Society for Implementation Collaboration (SIRC)*

- *Annual D&I Research in Health Conference* - December 14-16, 2021

<https://academyhealth.org/events/site/14th-annual-conference-science-dissemination-and-implementation-health>

- *Global Implementation Conference* <https://gic.globalimplementation.org/>



# 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](#)

# 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 chronic disease.
  - ▣ Improving healthcare and public health practice to increase population health.

# Acknowledgements

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Bryan Wiener, PhD, University of Washington

Russ Glasgow, PhD, University of Colorado