TIIS

Texas Institute for Implementation Science
Conference and Workshop

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Lorne Bain Distinguished Professor
in Public Health and Medicine
Professor of Health Promotion and
Behavioral Sciences
Director, Center for Health Promotion
and Prevention Research

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Center for Health Promotion
& PREVENTION RESEARCH

CCTS

THE UNIVERSITY OF TEXAS
HEALTH SCIENCE CENTER AT HOUSTON

Center for Clinical and Translational Sciences

IN PARTNERSHIP WITH
THE UNIVERSITY OF TEXAS
M. D. ANDERSON CANCER CENTER
AND
MEMORIAL HERMANN HOSPITAL SYSTEM

Date	
September 15, 2020 2-3pm CT	**Introduction to Implementation Science** Maria Fernandez, PhD & Bijal Balasubramanian, PhD
September 29, 2020 2-3pm CT	**Improving Technical Assistance and Improving Readiness to Implement Evidence-based Interventions: Stepping Over the Gap Between Research and Practice!** Abe Wandersman, PhD
October 27, 2020 2-3pm CT	Lecture and discussion with Geoff Curran, PhD
December 1, 2020 2-3pm CT	Lecture and discussion with J.D. Smith, PhD

Introduction to Implementation Science

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School of Public Health

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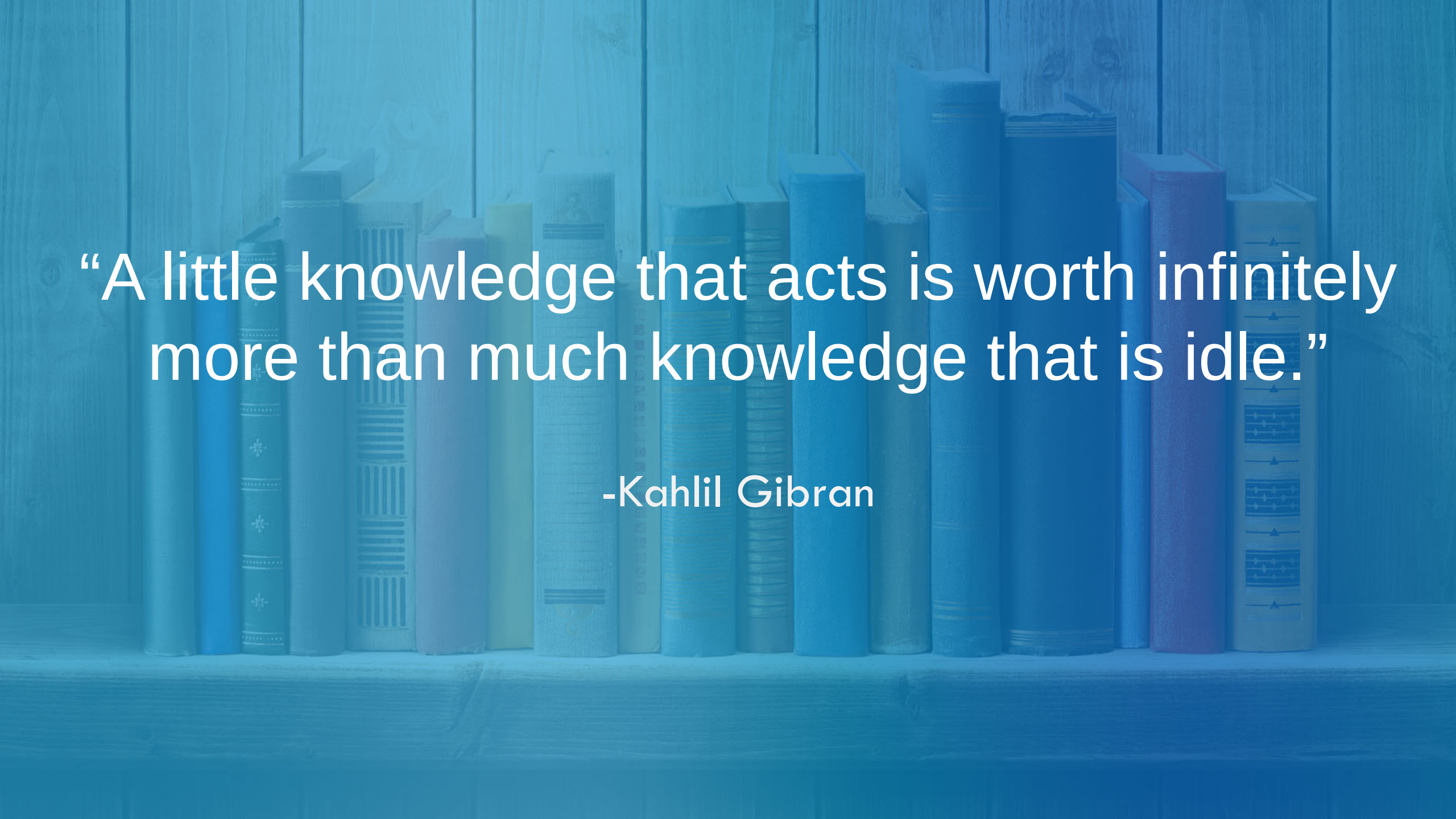
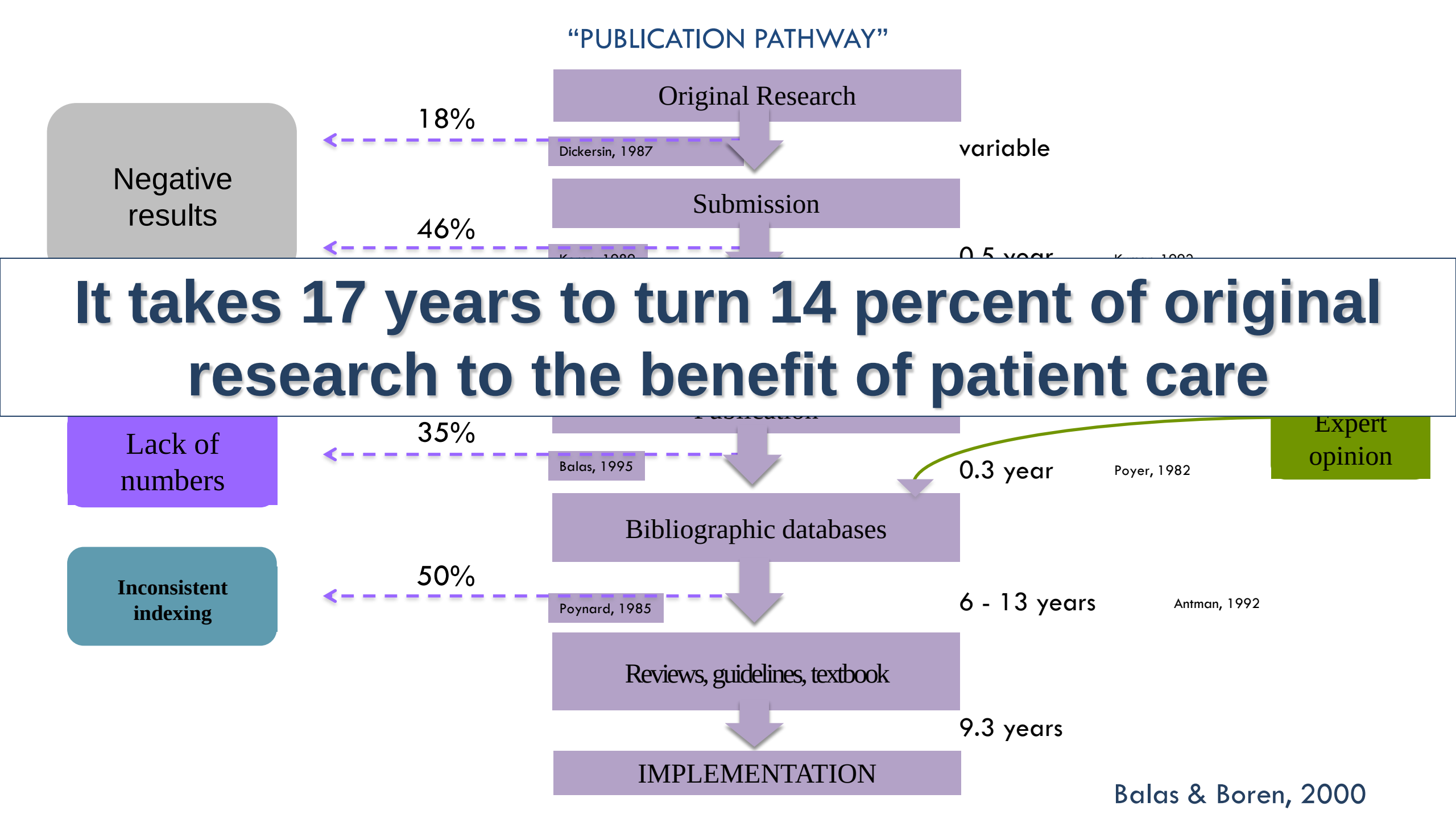

“A little knowledge that acts is worth infinitely more than much knowledge that is idle.”
-Kahlil Gibran


"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 Practice

"The latest research shows that we really should do something with all this research."

"Closing the gap between research discovery and program delivery is both a complex challenge and an absolute necessity if we are to ensure that all populations benefit from the Nation's investments in new scientific discoveries."

(National Institutes of Health)

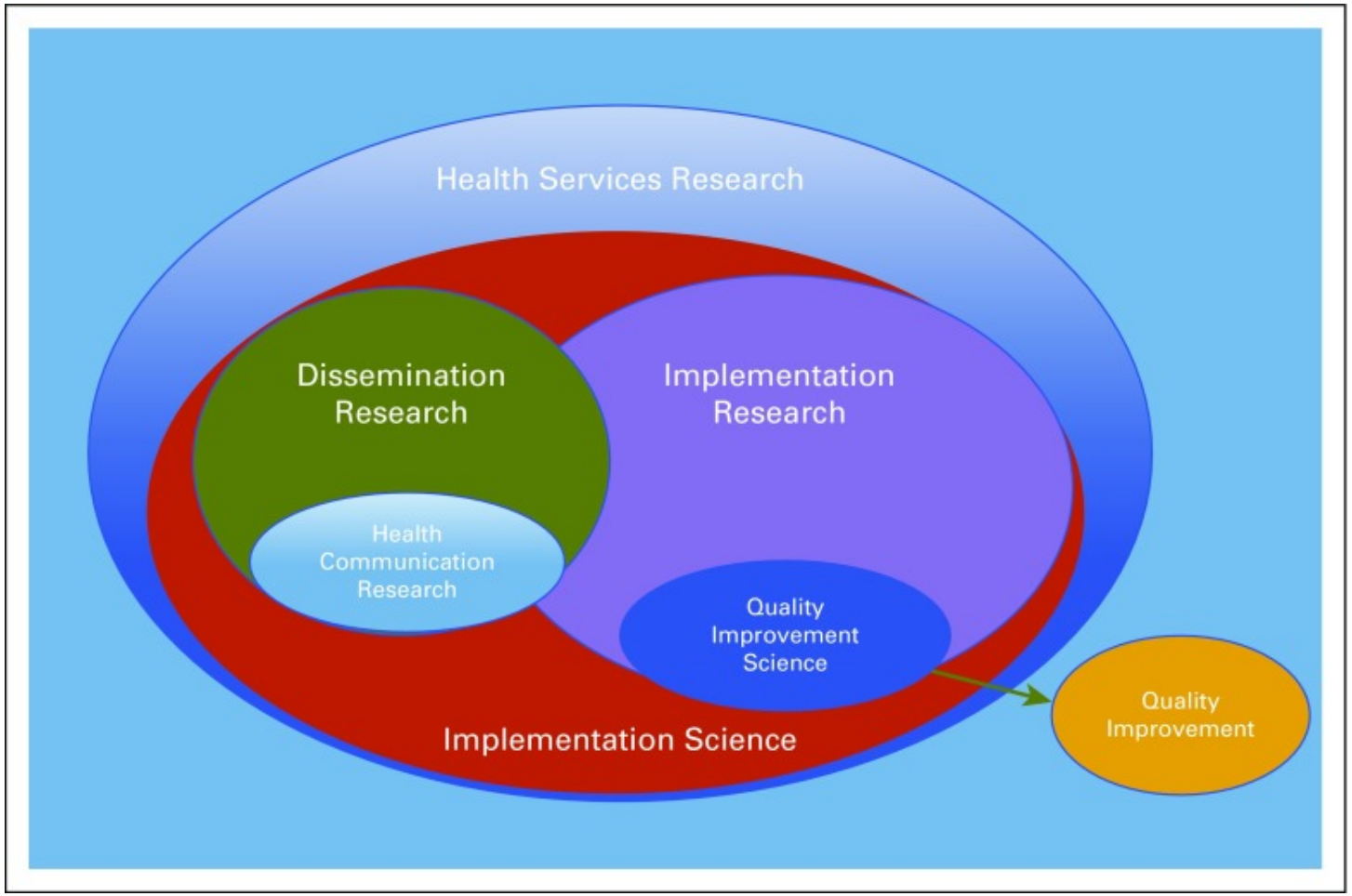
Definitions: Dissemination & Implementation Research

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.

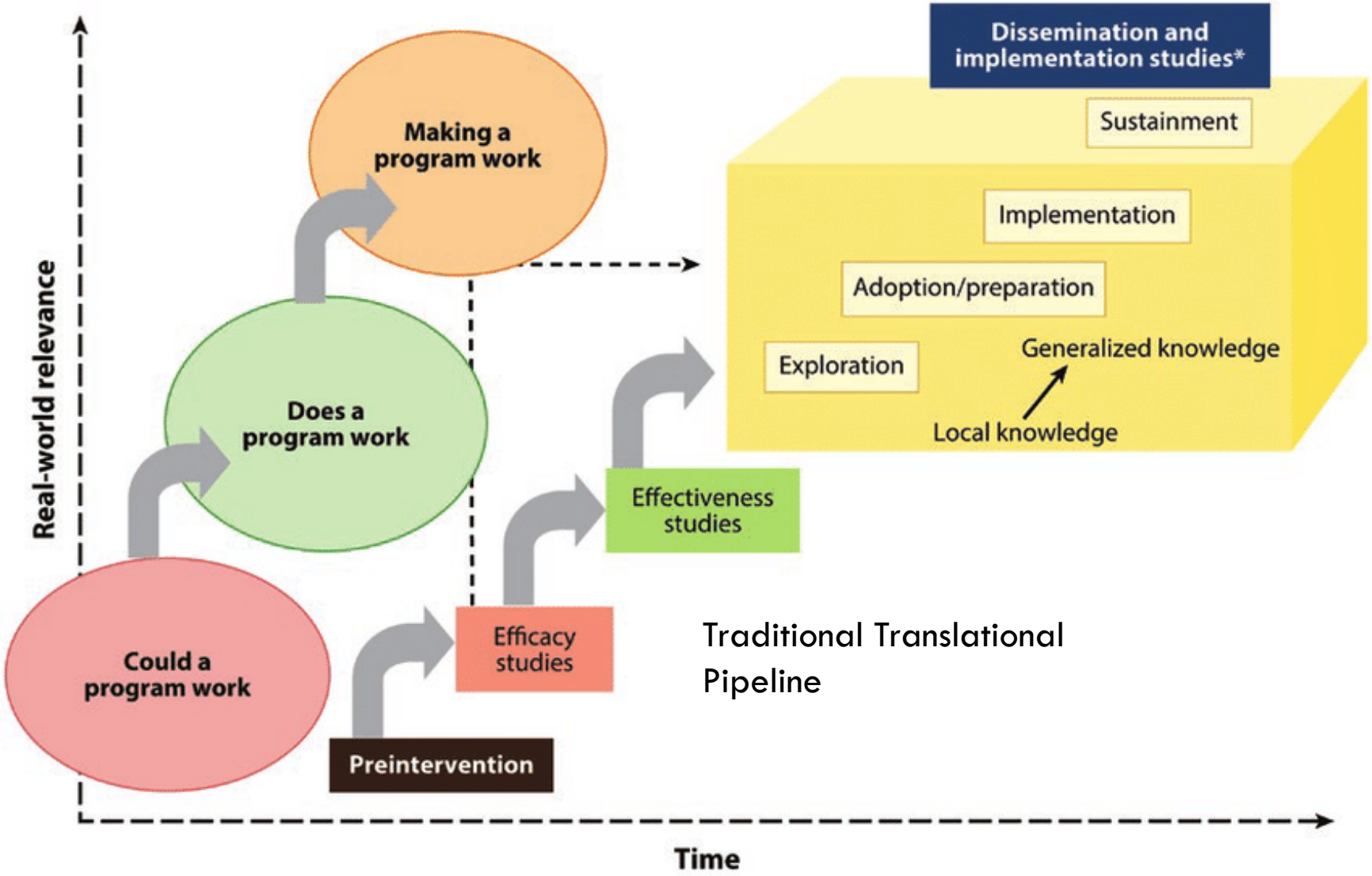
Dissemination research is the scientific study of targeted distribution of evidence (knowledge, interventions, practices, policies) to a specific public health or clinical practice audience. The intent is to understand how best to spread and sustain evidence-based interventions.

Adapted from : NIH PAR 16-238: Dissemination and Implementation Research in Health (R01)
Dissemination & Implementation: Overview. (n.d.). Retrieved from https://www.div12.org/implementation/overview/ (Society of Clinical Psychology/American Psychological Association)

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.



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.

Intervention Impact

The ultimate impact of an intervention depends on:

- Effectiveness of the intervention
- Reach in the population

https://catchinfo.org/

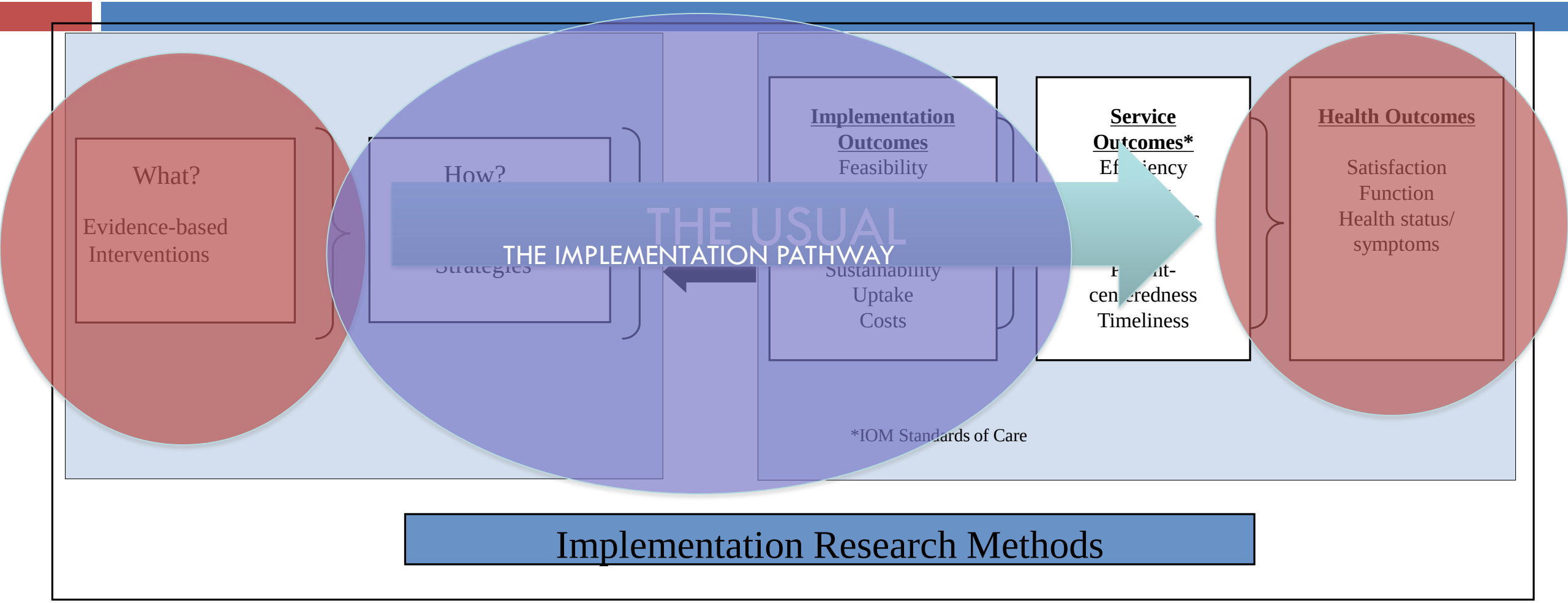
Distinguishing Clinical/Public Health Research from Implementation Research

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

Distinguishing Clinical Research from Implementation Research

Study feature \ Study type	Clinical research	Implementation research
Aim: evaluate a / an …	clinical intervention	implementation strategy
Typical intervention	Statin prescription for those at increased risk of ASCVD	Facilitation/coaching clinicians/staff in ASCVD calculator use and creating new prescribing workflows
Typical outcomes	Prevention of CVD events (heart attack, stroke)	adoption, adherence, fidelity, level of implementation
Typical unit of analysis, randomization	Patient	Primary care clinic

Studying Implementation



Adapted from Proctor et al 2009 Admin. & Pol. in Mental Health Services

Implementation and Dissemination Challenges

- Organizational and leadership support
- Limited involvement of stakeholders and policy makers
- Limited knowledge among practitioners of existing evidence-based interventions (EBIs)
- Concerns about fit with previous practices and with client needs
- Researcher focused studies and designs /little attention to external validity

Reference:
Dissemination & Implementation: Overview. (n.d.). Retrieved from https://www.div12.org/implementation/overview/
Society of Clinical Psychology/American Psychological Association

Escoffery, Hannon, Maxwell, Vu, Leeman et al. 2015

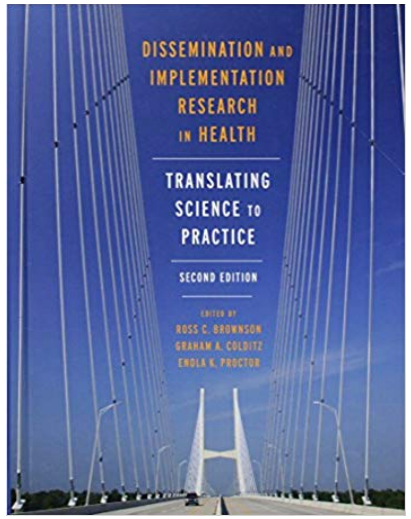
Wensing *et al. Implementation Science* (2020) 15:42
https://doi.org/10.1186/s13012-020-01006-x

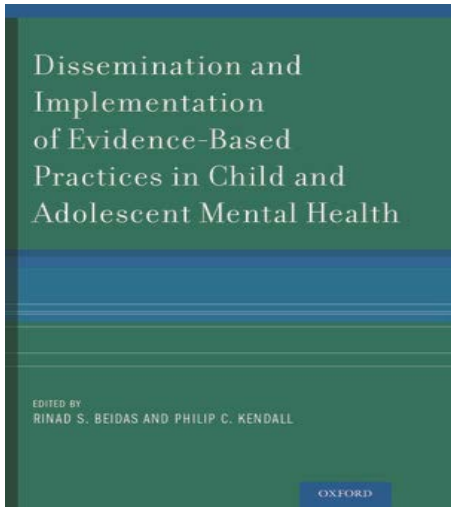
Implementation Science

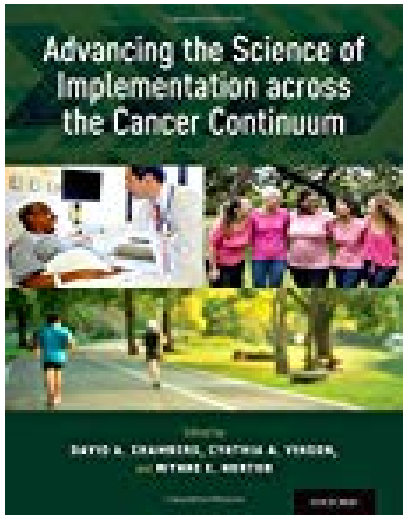
EDITORIAL Open Access

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

5th Biennial Conference:
September 12-14, 2019

Viewpoint

Implementation Research & Practice

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

Considering the intersection between implementation science and COVID-19

David A Chambers

NIH National Institutes of Health

AcademyHealth

Dec 15-17, 2020 - Virtual

2020 Conference Theme:
Dissemination and Implementation Science in a Dynamic, Diverse, and Interconnected World: Meeting the Urgent Challenges of our Time.

Focus of Implementation Science

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

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 STRATEGIES

Definitions in the Literature

Author and Citation	Term	Definition
Powell et al.[15]	Implementation Strategy	A systematic intervention process to adopt and integrate evidence-based health innovations into usual care.
Curran et al.[16]	Implementation Intervention	A method or technique to enhance adoption of a "clinical" intervention. Examples include an electronic clinical reminder, audit/feedback, and interactive education.
	Implementation Strategy	A "bundle" of implementation interventions. Many implementation research trials test such bundles of implementation interventions.
Mazza et al.[17]	Implementation Strategy	A purposeful procedure to achieve clinical practice compliance with a guideline recommendation.
Proctor et al.[19]	Implementation Strategy	Methods or techniques used to enhance the adoption, implementation, and sustainability of clinical program or practice.

Powell, B.J., Garcia, K.G., Fernandez, M.E. Implementation Strategies in *Optimizing the Cancer Control Continuum*, Eds. David Chambers, Cynthia Vinson, and Wynne Norton (2018)

Types of Implementation Strategies

Implementation Strategies

- *Discrete* - Single action or process (e.g., institute system of reminders)
- *Multifaceted* - Combination of multiple discrete strategies (e.g., training + reminders)
- *Blended* - Multifaceted strategies that have been protocolized and (often) branded (e.g., ARC)

Powell et al., 2012; Procter 2011

The "ERIC Strategies" Implementation Strategy Types/Taxonomies

Expert consensus "on a common nomenclature for implementation strategy terms, definitions, and categories that can be used to guide implementation research and practice in mental health service settings"

mplementation Science (2015) 10:21
DOI 10.1186/s13012-015-0209-1

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]

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

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]

Powell, et al. 2012; Powell, 2015; Waltz

Types of Implementation Strategies

- Use Evaluative and Iterative Strategies
- Provide Interactive Assistance
- Adapt and Tailor to Context
- Develop Stakeholder Interrelationships
- Train and Educate Stakeholders
- Support Clinicians
- Engage Consumers
- Utilize Financial Strategies
- Change Infrastructure

Challenges in Selecting Implementation Strategies

- Some compilations may be less relevant for certain settings (clinical vs public health or community 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 make it difficult to provide clear guidance

Waltz TJ, Powell, BJ, Fernández ME, Abadie, B, Damschroder, LJ. Choosing implementation strategies to address contextual barriers: Diversity in recommendations and future directions. *Implementation Science,* 2019, 14(1):42.

Implementation Strategies: A Research Agenda

PERSPECTIVE ARTICLE
Front. Public Health, 22 January 2019 | https://doi.org/10.3389/fpubh.2019.00003

Enhancing the Impact of Implementation Strategies in Healthcare: A Research Agenda

Byron J. Powell[1,2,3*],  Maria E. Fernandez[4], Nathaniel J. Williams[5], Gregory A. Aarons[6], Rinad S. Beidas[7,8,9], Cara C. Lewis[10], Sheena M. McHugh[11] and Bryan J. Weiner[12]

1. Specify & test mechanisms
2. Improve description, tracking, and reporting
3. Increase economic evaluations
4. Enhance methods for developing, selecting and tailoring strategies

THEORIES, FRAMEWORKS, AND MODELS IN IMPLEMENTATION SCIENCE

Dissemination and Implementation models defined

- 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.

Tabak RG et al, Bridging Research and Practice: Models for Dissemination and Implementation Research *Am J Prev Med*, 2012,

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

Nilsen's Categories

- Process models- describing or guiding the process of translating research to practice
- Frameworks for understanding or explaining what influences implementation outcomes
  - Determinants frameworks
  - Classic theories
  - Implementation theories
- Evaluation frameworks

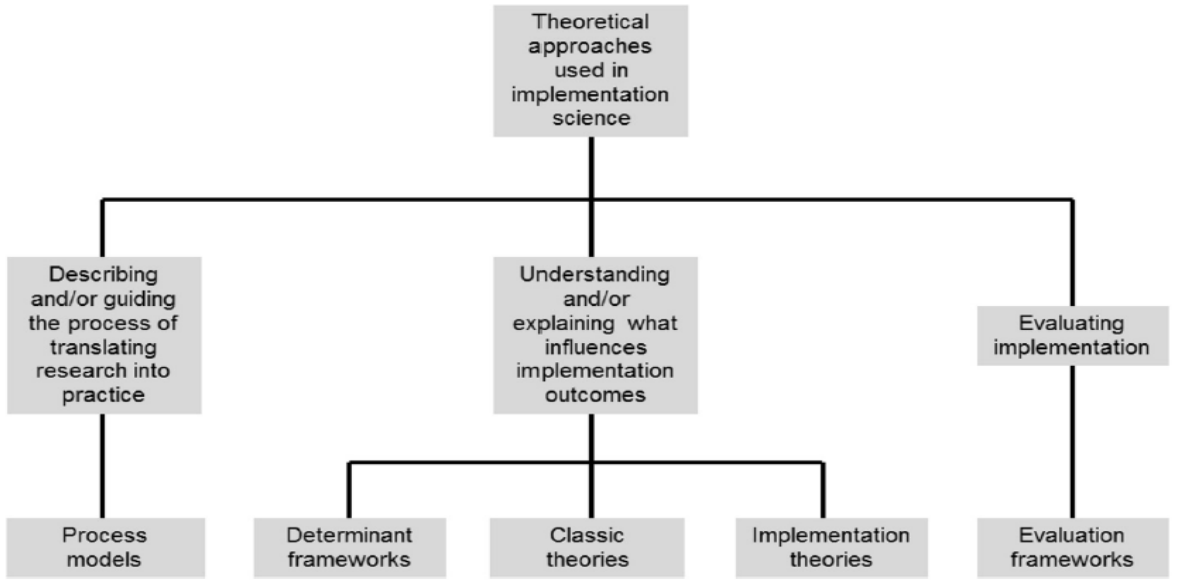


Figure 1 Three aims of the use of theoretical approaches in implementation science and the five categories of theories, models and frameworks.

Nilsen,P. (2015) Making sense of implementation theories, models and frameworks. Implementation Science. 10:53.

Examples of Implementation Models

RE-AIM

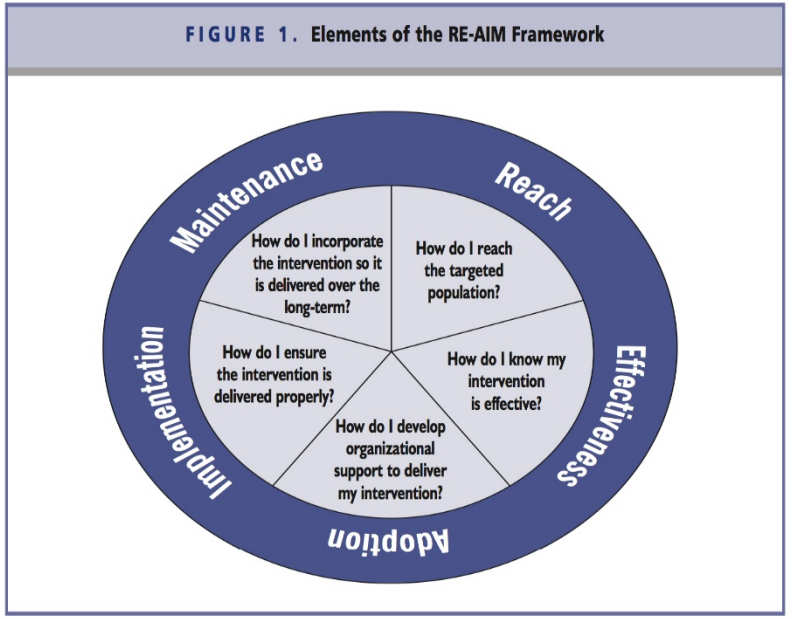
Consolidated Framework for Implementation Research

Interactive Systems Framework

What is RE-AIM?

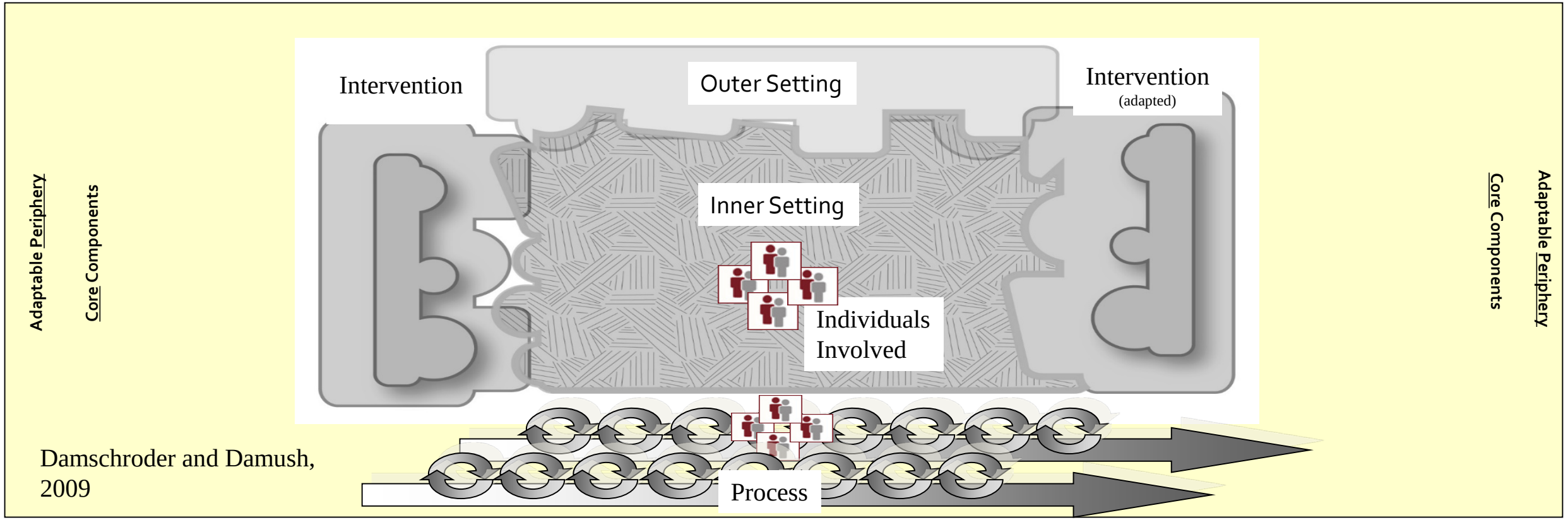
- **RE-AIM is an acronym that consists of five elements:**
  - Reach the target population
  - Efficacy or effectiveness
  - Adoption by target settings or institutions
  - Implementation - consistency of delivery of intervention
  - Maintenance of intervention effects in individuals and populations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



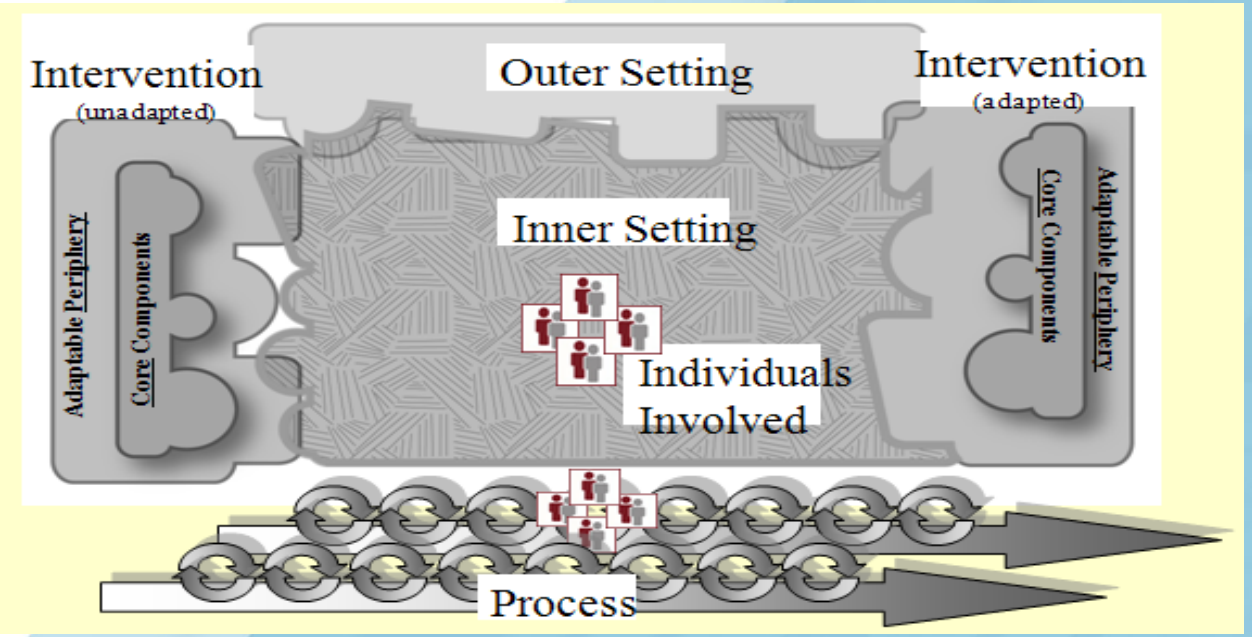
Damschroder L, Aron D, Keith R, Kirsh S, Alexander J, Lowery J. Fostering implementation of health services research findings into practice: A consolidated framework for advancing implementation science. *Implementation Science* 2009; 4:50.

Consolidated Framework for Implementation Research (CFIR)

Composed of 5 Major Domains

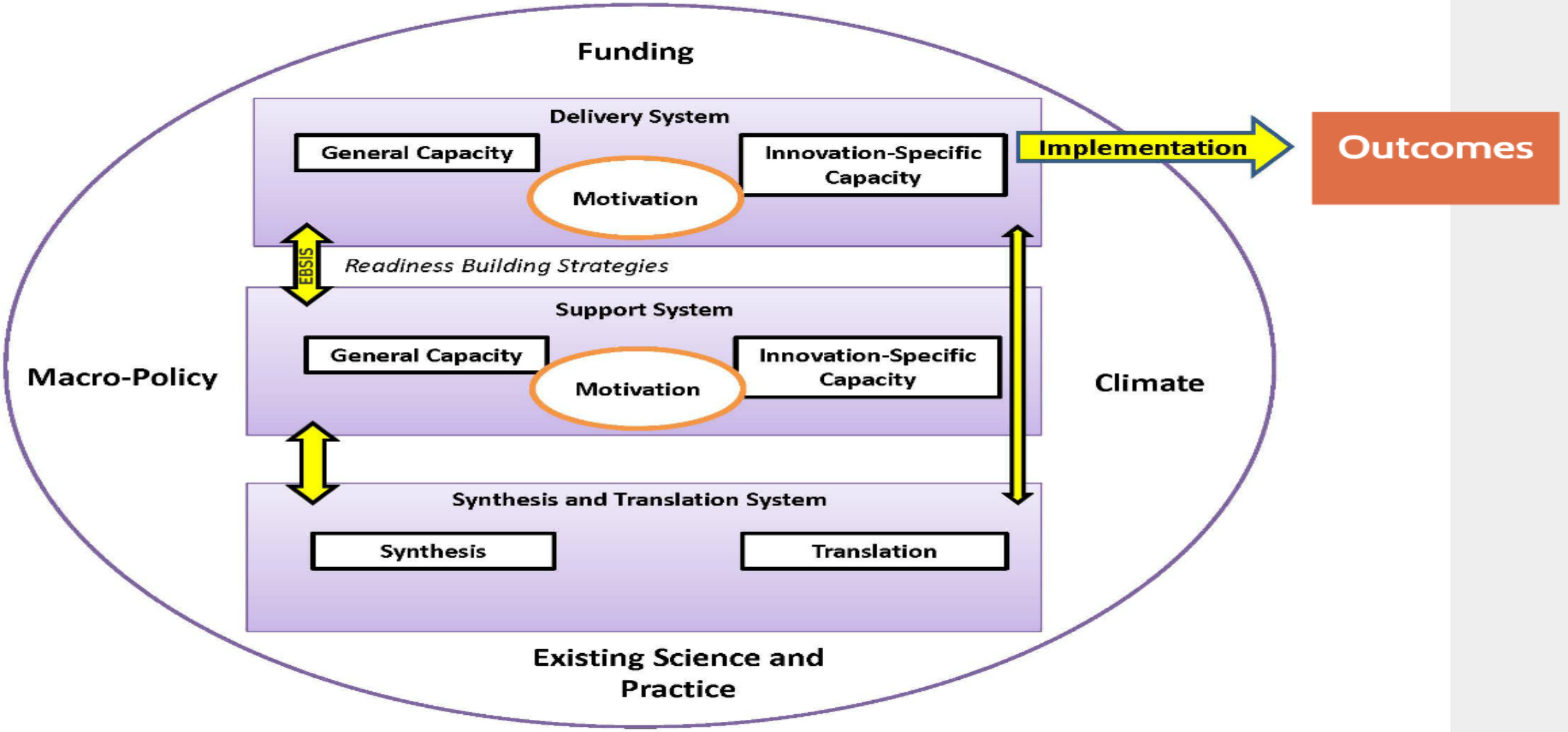
Intervention characteristics	**Inner Setting**
Outer Setting	**Characteristics of the Individuals involved**

Process of implementation

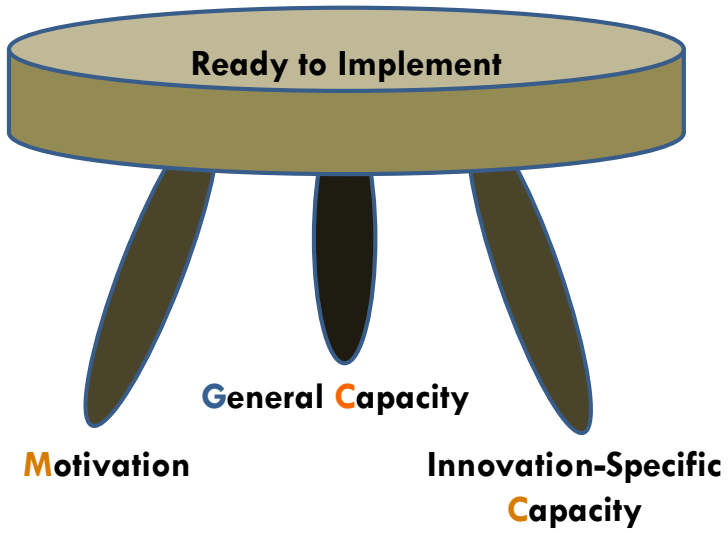


Damschroder L, Aron D, Keith R, Kirsh S, Alexander J, Lowery J. Fostering implementation of health services research findings into practice: A consolidated framework for advancing implementation science. *Implementation Science* 2009; 4:50.

Interactive Systems Framework



$R=MC^2$



Readiness

=

Motivation

x

Capacity (Innovation-Specific)

x

Capacity (General)

WANDERSMAN CENTER

- **Motivation**: Degree to which we want the innovation to happen, given all priorities
- **Innovation-specific capacity**: The human, technical and fiscal conditions important to the successful implementation of a particular innovation.
- **General capacity**: Pertains to aspects of organizational functioning (e.g., culture, climate, staff capacity, leadership)

(Scaccia, Cook, Lamont, Wandersman, Castellow, Katz, & Beidas, 2015)

What to ask yourself when selecting a model/framework

- What is/are the research questions I'm seeking to answer?
- What level(s) of change am I seeking to explain?
- What characteristics of context are relevant to the research questions?
- Are measures available?
- Are there specific theories/frameworks/models that relate to different aspects of the proposed research (determinants, outcomes, adaptation)?

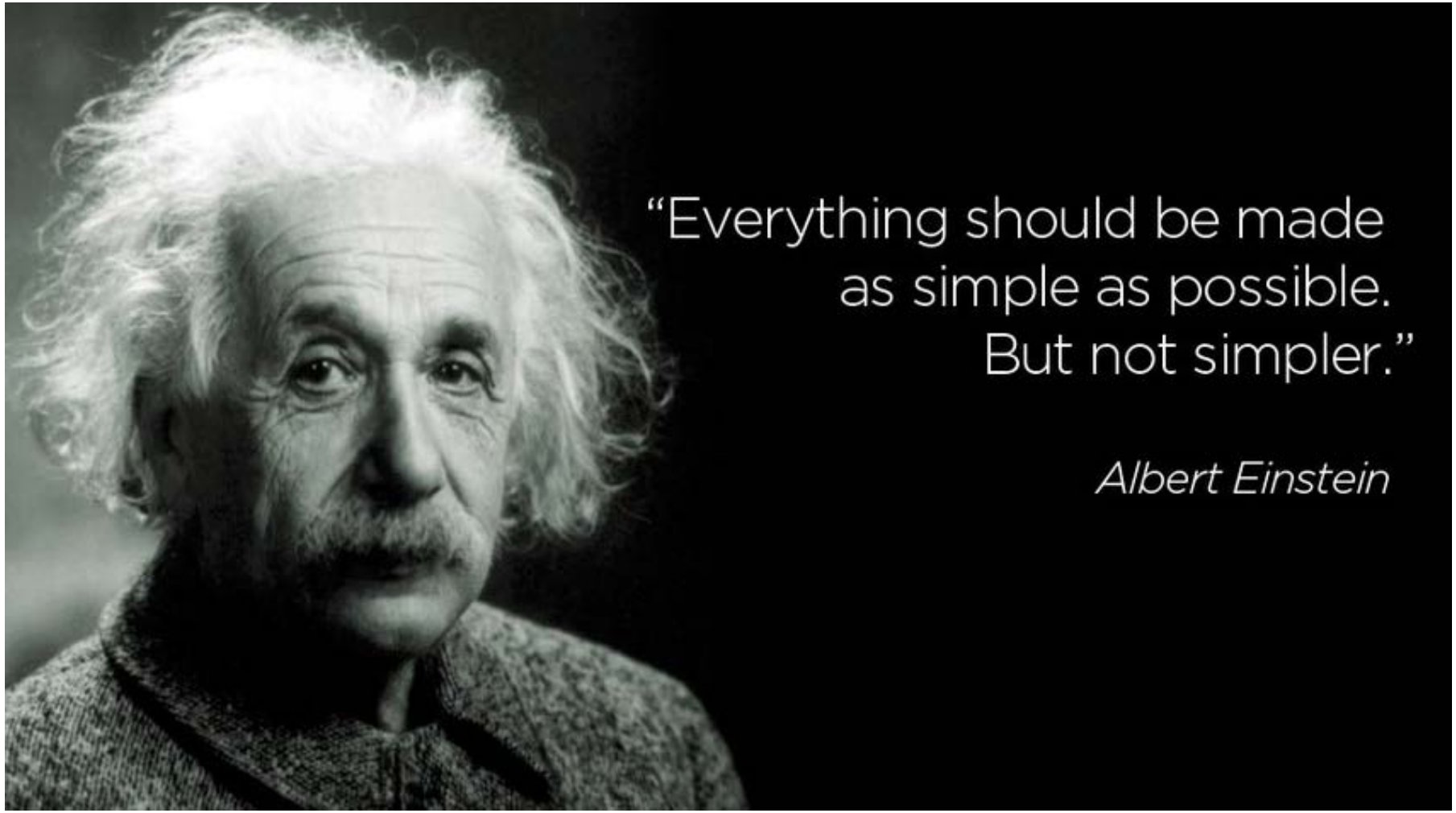
Adapted from Chambers, 2014 (Chapter Two) in Beidas & Kendall (eds), OUP.

What if I need to develop an implementation strategy?

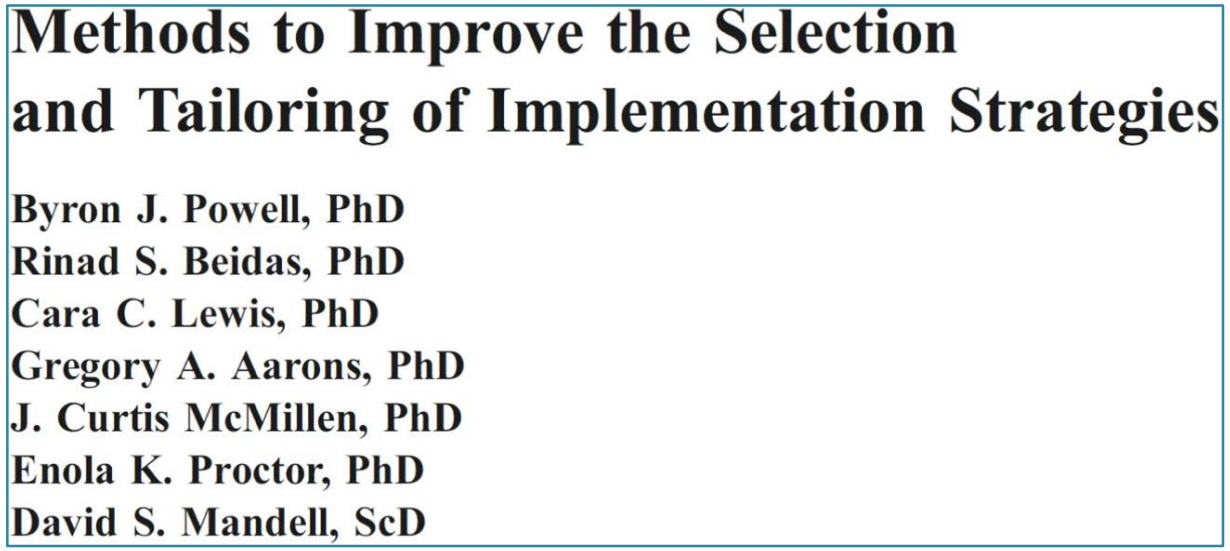
A two step process:

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…



Enhance Methods for Designing and Tailoring Strategies



- 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:

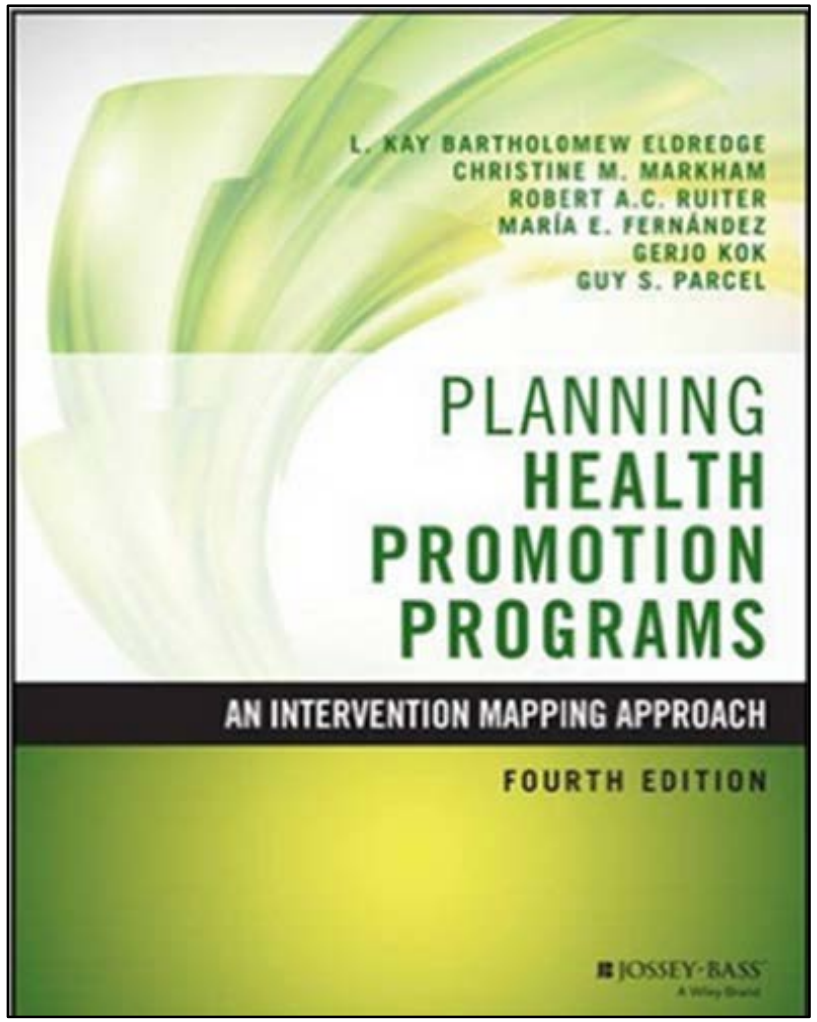
A Systematic Approach for Intervention Development, Implementation and Adaptation

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)

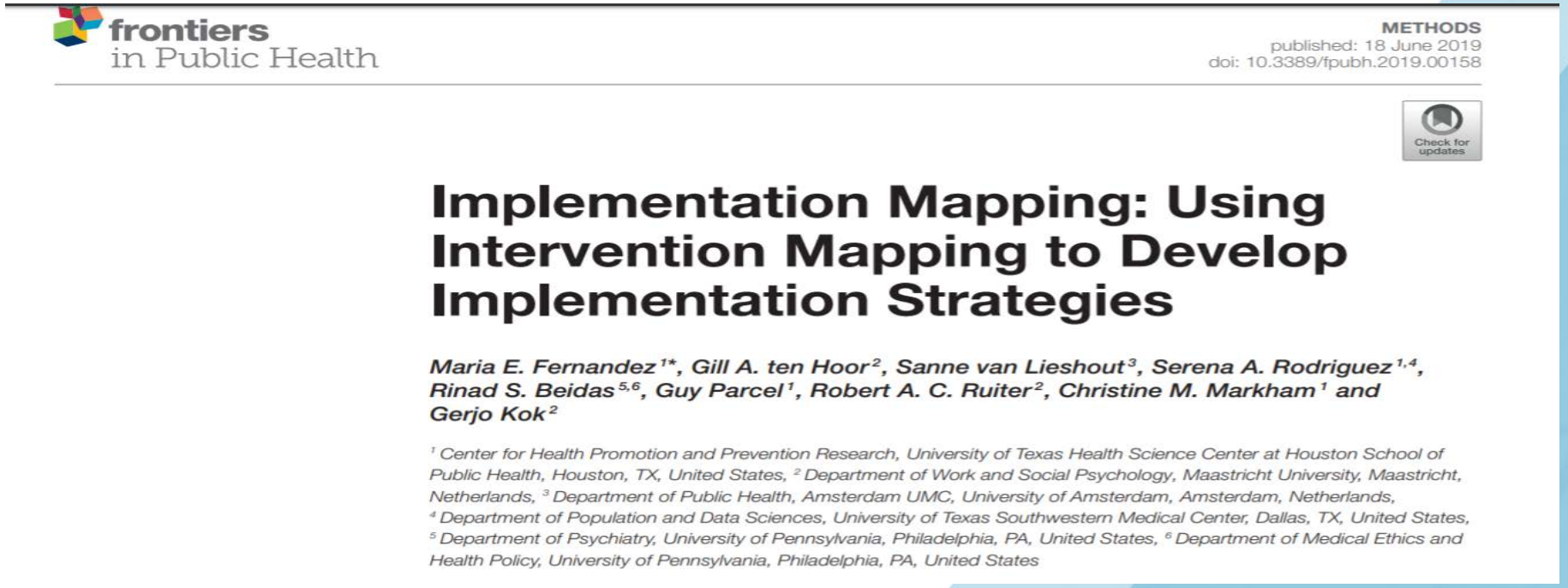
3. Using IM processes to adapt existing evidence-based interventions



Bartholomew Eldredge, LK, Markham, CM, 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.

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

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

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

Implementation Mapping Tasks

Task 1. Conduct a needs and assets assessment and identify adopters and implementers

Task 2. Identify adoption and implementation outcomes, performance objectives, and determinants; create matrices of change.

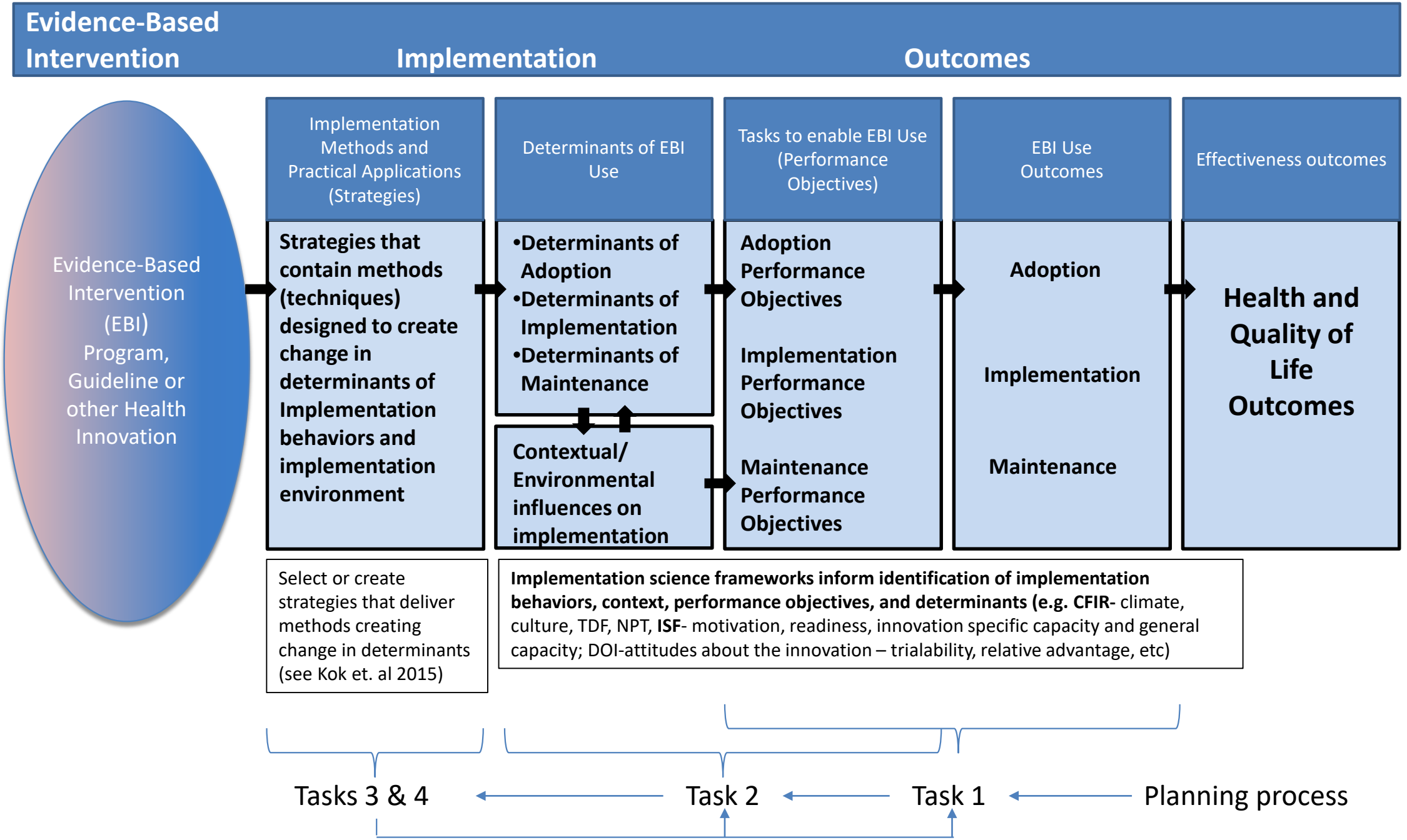
Task 3. Choose theoretical methods; Select or create implementation strategies.

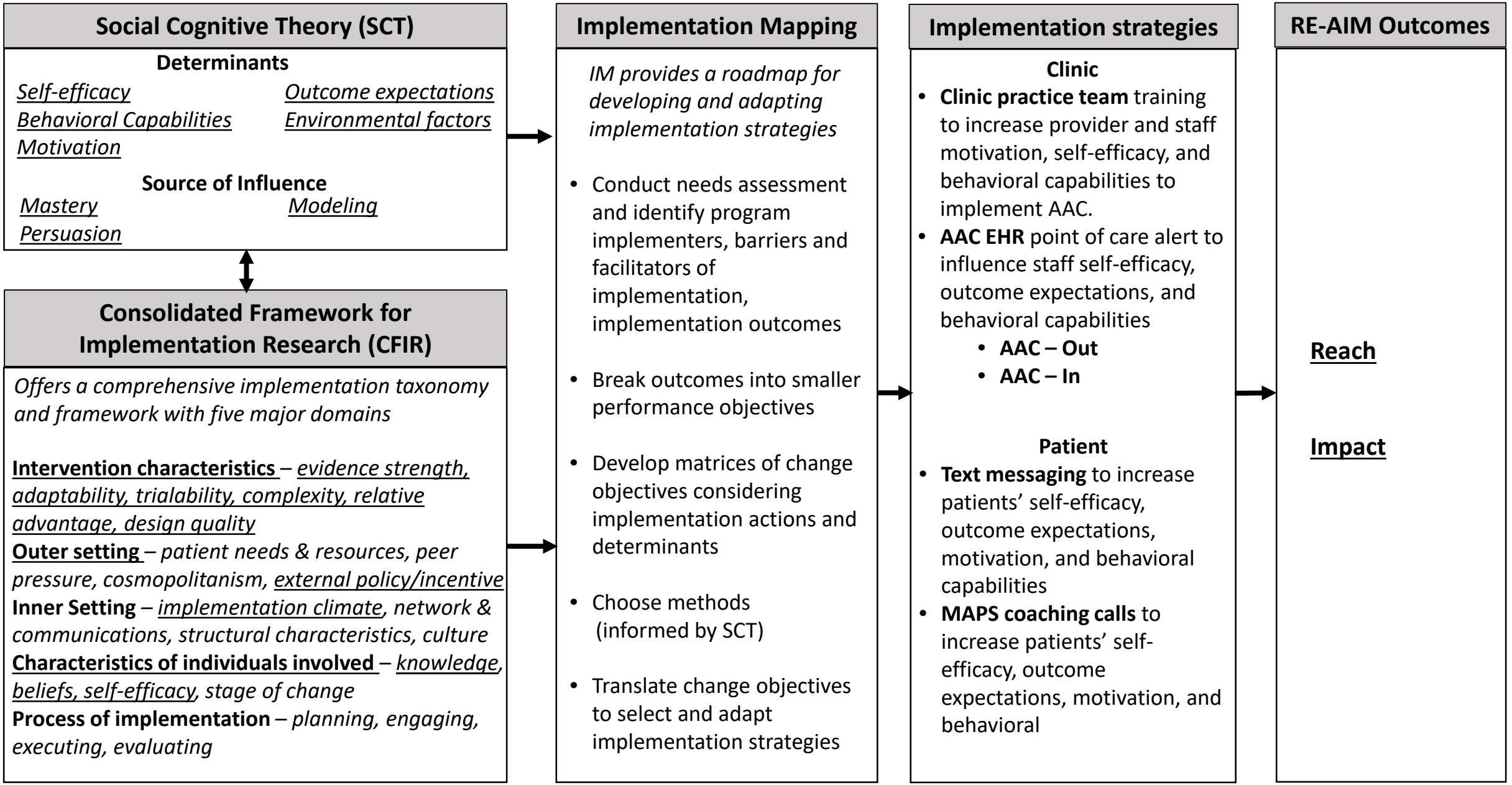
Task 4. Produce implementation protocols and materials.

Task 5. Evaluate Implementation Outcomes 5

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?


Evidence-Based Intervention
Implementation
Outcomes
Evidence-Based Intervention (EBI) Program, Guideline or other Health Innovation
Implementation Methods and Practical Applications (Strategies)
Determinants of EBI Use
Tasks to enable EBI Use (Performance Objectives)
EBI Use Outcomes
Effectiveness outcomes
Strategies that contain methods (techniques) designed to create change in determinants of Implementation behaviors and implementation environment
•Determinants of Adoption
•Determinants of Implementation
•Determinants of Maintenance
Contextual/ Environmental influences on implementation
Adoption Performance Objectives
Implementation Performance Objectives
Maintenance Performance Objectives
Adoption
Implementation
Maintenance
Health and Quality of Life Outcomes
Select or create strategies that deliver methods creating change in determinants (see Kok et. al 2015)
Implementation science frameworks inform identification of implementation behaviors, context, performance objectives, and determinants (e.g. CFIR- climate, culture, TDF, NPT, ISF- motivation, readiness, innovation specific capacity and general capacity; DOI-attitudes about the innovation – trialability, relative advantage, etc)
Tasks 3 & 4
Task 2
Task 1
Planning process



Fernandez ME, Schlechter CR*, et al.. QuitSMART Utah: an implementation study protocol for a cluster-randomized, multi-level Sequential Multiple Assignment Randomized Trial to increase Reach and Impact of tobacco cessation in Community Health Centers. Implementation Science. 2020; 15: 9.

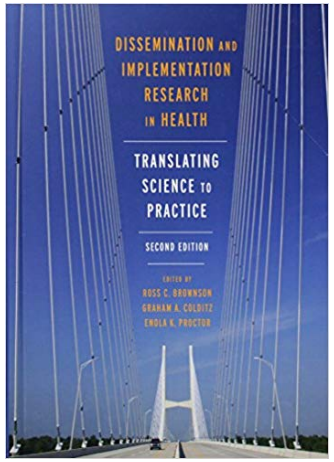
D&I Research Needs and Opportunities

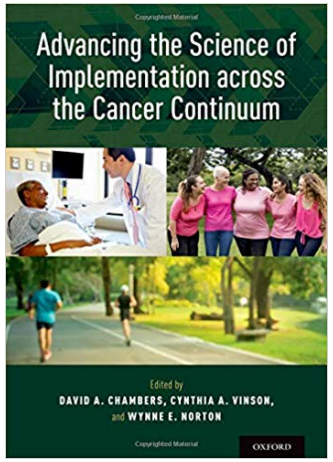
- Adaptation of EBIs
- Designing for Dissemination D4D
- Sustainability
- Dissemination and Scale up
- De-Implementation
- Implementation of precision medicine approaches; genomic medicine
- Methodological advances: use of big data, adaptive designs
- Implementation of multi-level and complex interventions
- 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*

Growing Resources and Opportunities to Share Knowledge

- Training Programs (e.g. TIDIRH, TIDIRC, IRI, KT Canada, Universities)
- Research Infrastructure (CIPRS, CPCRN, HMORN, Other Centers, CTSA Cores)
- Measurement Tools (GEM-IS, SIRC, SIC, RE-AIM)
- *Implementation Science*
- *Implementation Science Research and Practice*
- 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 Meeting in December*
- *Global Implementation Conference (next one is in Colorado; 3-5 May, 2021)*
- *Implementation Science for Cancer Control (ISCC 2020) Sept. 22-23*





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/

Summary

- Implementation science can help bridge the gap by:
  - Building an actionable and pragmatic knowledge base to help understand determinants of implementation and dissemination;
  - Building generalizable knowledge with models and frameworks that can help us understand relationships between constructs; predictors of implementation outcomes; and leverage points for intervening
  - Developing strategies to accelerate and improve scale up and spread of effective cancer control research innovations

- There is much to learn: In the next three seminars the speakers will cover important IS topics including types of IS studies, designing implementation research, building readiness for implementation.

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