DISSEMINATION AND IMPLEMENTATION IMPLEMENTATION RESEARCH

CHALLENGES AND OPPORTUNITIES

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Selected slides from David Chambers, DPhil, Brian Mittman, PhD, Rinad Beidas, PhD, and Enola Procter, PhD, MSW

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

-Kahlil Gibran

Closing the Gap

"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)

- The field of Implementation Research seeks to close this gap:

    "supports the movement of evidence-based interventions and approaches from the experimental, controlled environment into the actual delivery contexts where the programs, tools, and guidelines will be utilized, promoted, and integrated into the existing operational culture" (Rubenstein, 2006)

Dissemination and Implementation Research

☐ **Dissemination is** "the targeted distribution of information and intervention materials to a specific public health or clinical practice audience."

    ☐ how, when, by whom, and under what circumstances evidence spreads throughout the agencies, organizations, front line workers and consumers of public health and clinical services

☐ **Implementation is** "the use of strategies to adopt and integrate evidence-based health interventions and change practice patterns within specific settings."

    ☐ Seeks to understand the behavior of healthcare professionals and support staff, healthcare organizations, healthcare consumers and family members, and policymakers in context as key influences on the adoption, implementation and sustainability of evidence-based interventions and guidelines

• From: NIH PAR 16-238: Dissemination and Implementation Research in Health (R01); Adapted from Lomas (1993)

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.

Research to Action

□ Researchers: I don't have the training or interest in approaches to enhance dissemination of research products; grant funding does not support such activities.

□ Practitioners: The responsibility for summarizing and making research products useful lay elsewhere. But if they were easy to find and use we would do it.

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

Implementation Science

BioMed Central

Research article

Open Access

Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science
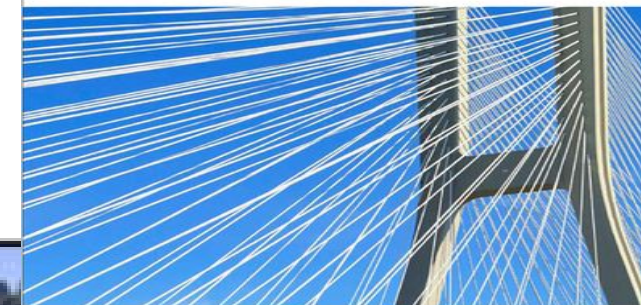
Laura J Damschroder*[1], David C Aron[2], Rosalind E Keith[1], Susan R Kirsh[2], Jeffery A Alexander[3] and Julie C Lowery[1]

DISSEMINATION AND IMPLEMENTATION RESEARCH IN HEALTH

Translating Science to Practice

EDITED BY

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GRAHAM A. COLDITZ

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OXFORD

Seattle Implementation Research Conference

WASHINGTON, DC
AUGUST 15-17, 2011

GiC Global Implementation Confer
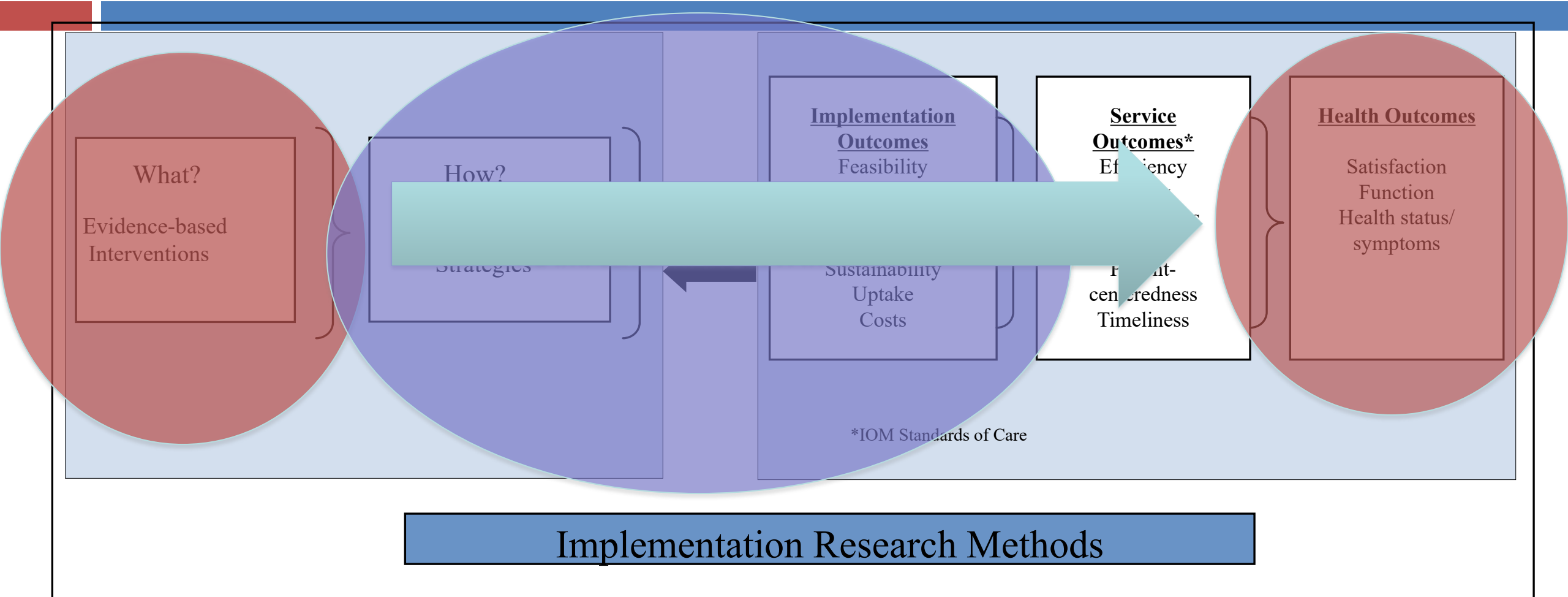
The Science and Practice of Using Science in Practice

Dissemination and Implementation of Evidence-Based Practices in Child and Adolescent Mental Health

EDITED BY

RINAD S. BEIDAS AND PHILIP C. KENDALL

OXFORD

CENTER FOR SCIENTIFIC REVIEW
DISSEMINATION AND IMPLEMENTATION RESEARCH IN HEALTH STU
ROSTER

Studying Implementation

| What?

Evidence-based Interventions | How?

Strategies | Implementation Outcomes
Feasibility

Sustainability
Uptake
Costs | Service Outcomes*
Efficiency

Patient-centeredness
Timeliness | Health Outcomes

Satisfaction
Function
Health status/ symptoms |

*IOM Standards of Care

Implementation Research Methods

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

Types of D&I Research Questions

- Questions about factors influencing adoption, implementation, and sustainability of evidence based programs, policies, practices.
  - Testing of models or frameworks; relationships between constructs; predictors of implementation outcomes; measurement studies

Types of D&I Research Questions (cont.)

- Questions related to the development and evaluation of strategies (or groups of strategies) to increase adoption, implementation, and sustainability.

- Questions related to scale-up

- Questions related to sustainability

Distinguishing clinical research from implementation research

Study feature \ Study type	Clinical research	Implementation research
Aim: evaluate a / an …	clinical intervention	implementation strategy
Typical intervention	drug, procedure, therapy	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

How to Increase Implementation?
Often a Haphazard Process

ISLAGIATT principle

"It Seemed Like A Good Idea At The Time"

Martin Eccles via Jeremy Grimshaw's (2012) Presentation at KT Summer Institute

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

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

Implementation Strategy Types/Taxonomies

From Powell 2012

- Plan Strategies
- Educate Strategies
- Finance Strategies
- Restructure Strategies
- Quality Management Strategies
- Attend to Policy Context Strategies

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]

Updated Compilation

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]

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

Powell, et al. 2015; 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 (forthcoming)

Evidence-Base for Implementation Strategies

- Several strategies found to be effective under some, but not all circumstances

- Most strategies result in modest improvements

- Passive approaches (e.g., "train and pray") are generally ineffective

- Mixed-evidence regarding the effectiveness of multi-faceted implementation strategies (Grimshaw et al., 2006; Squires et al., 2014; Wensing et al., 2009)

Where can I find them?

- Reviews & Compilations
- Key Textbooks
- Treatment and Strategy Manuals
- Literature Searches
- Learning from Positive Deviants

- Develop your own….

Stages of Research and Phases of D&I

Landsverk et al: Dissemination & Implementation Research in Health. Oxford, 2012
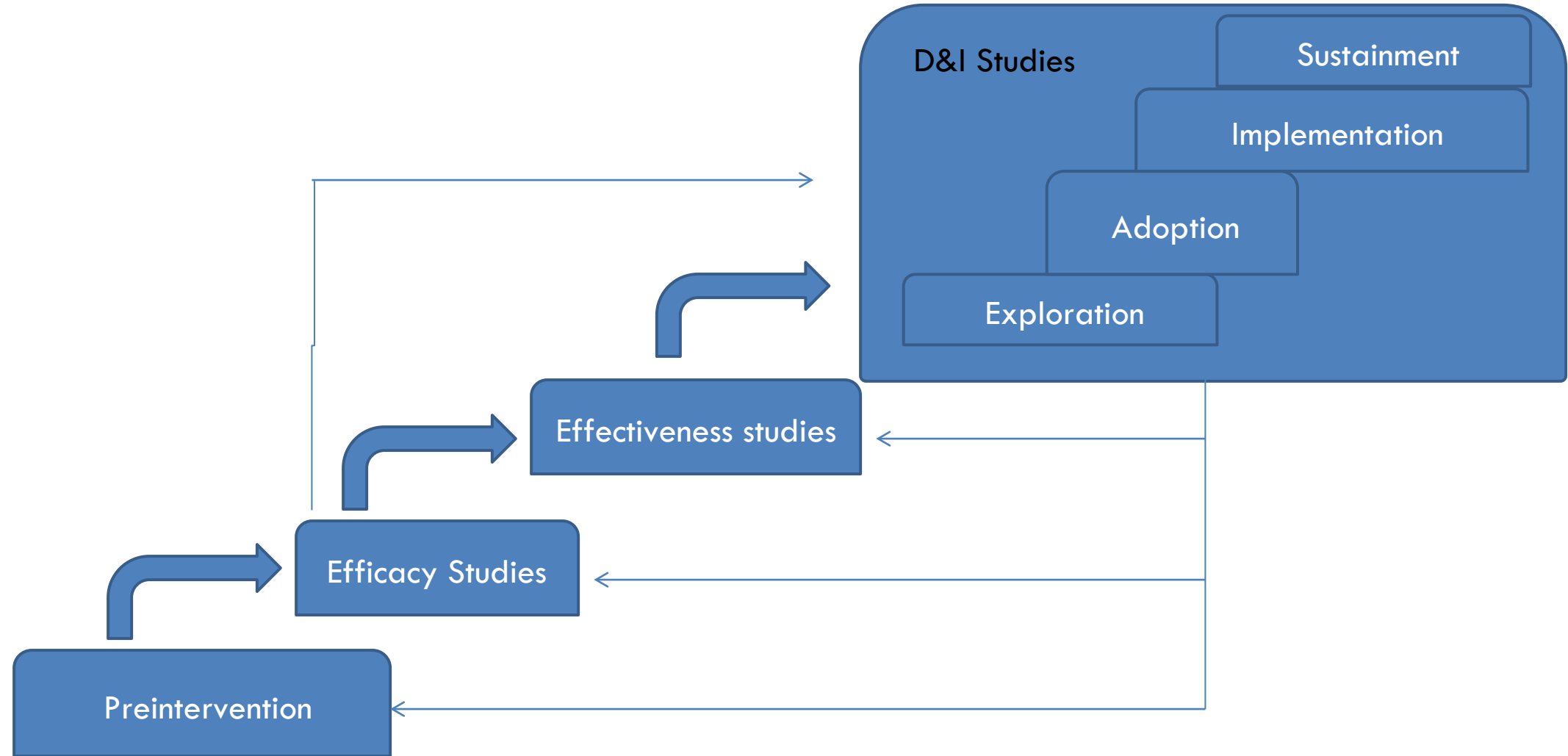
Shortcomings of a sequential model

- Traditional clinical effectiveness research tends to declare victory early and is considered finished when effects are shown in one or more settings
- Traditional Implementation research tends to buy into the fantasy that the innovation is ready for dissemination

This results in:

- Endless RCTs of innumerable tweaks for various specific applications.....each followed by an implementation study
- Long loops and a long time to public health impact

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‡

Objectives: This study proposes methods for blending design components of clinical effectiveness and implementation research. Such blending can provide benefits over pursuing these lines of research independently; for example, more rapid translational gains, more effective implementation strategies, and more useful information for decision makers. This study proposes a "hybrid effectiveness-implementation" typology, describes a rationale for their use, outlines the design decisions that must be faced, and provides several real-world examples.

Results: An effectiveness-implementation hybrid design is one that takes a dual focus a priori in assessing clinical effectiveness and implementation. We propose 3 hybrid types: (1) testing effects of a clinical intervention on relevant outcomes while observing and gathering information on implementation; (2) dual testing of clinical

Much has been written about the nature of health care science-to-service gaps both in general[1-3] and relative specifically to health promotion[4] and numerous medical specialties.[5-9] Thus far, the literature indicates that gaps between research and practice can result from multiple factors, including educational/knowledge deficiencies and/or disagreements,[10,11] time constraints for practitioners,[12,13] lack of decision support tools and feedback mechanisms,[13] poorly aligned incentives,[14] and a host of other organizational climate and cultural factors.[2,15,16]

In addition to these provider-level and systems-level barriers to rapid translation, Glasgow et al[4] and others[17-20] argue that the time lag between research discovery and routine uptake is also inflated by the dominant developmental approach; that is, one that encourages delimited, step-wise progressions of research through clinical efficacy research, then

Effectiveness-Implementation Hybrid Designs

Why Hybrid Trial Designs?

- The **speed** of moving research findings into routine adoption can be improved by considering *hybrid designs* that combine elements of effectiveness and implementation research

- Don't wait for "perfect" effectiveness data before moving to implementation research

- We can "backfill" effectiveness data while we test implementation strategies

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

Traditional Research Pipeline
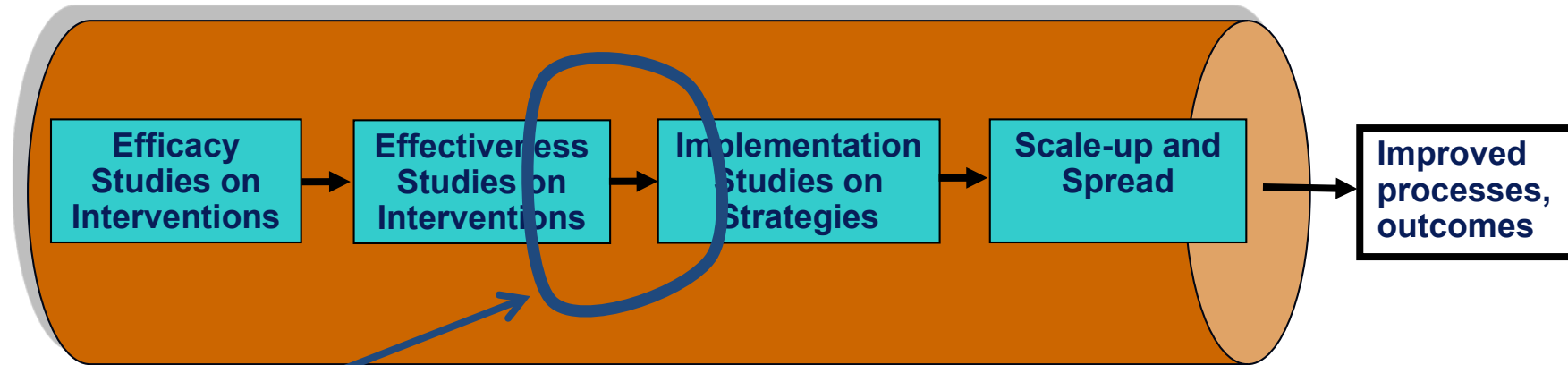
Spatially speaking, hybrids "fit" in here…

Types of Hybrids

Effectiveness Research - - - - → **Implementation Research**

Hybrid Type 1 **Hybrid Type 2** **Hybrid Type 3**

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 and Frameworks in D&I Science

Theories vs Frameworks

- ## Theories
  - ◘ describe a way of understanding events or behaviors
  - ◘ provide descriptions of interrelated concepts or constructs that explain or predict events or behaviors by spelling out the relationships between variables
  - ◘ not content specific; they are generic, abstract, and broadly applicable.

- ## Frameworks
  - ◘ conceptual structures or scaffolds that can provide a systematic way to develop, manage, and evaluate interventions.

- While conceptually different, both theories and frameworks can be used to enhance D&I research

Caveats to use of Models for D&I

☐ There is no comprehensive model sufficiently appropriate for every study or program

☐ Not all models are well operationalized

☐ Models should be considered dynamic

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

Tabak et al. review

- Identified 109 models

- Exclusions
  - 26 focus on practitioners
  - 12 not applicable to local level dissemination
  - 8 end of grant knowledge translation
  - 2 duplicates

- Included 61 models

- Categories: Construct Flexibility, Socio-ecological Framework, D *vs.* I

Tabak, Khoong, Chambers, Brownson, *AJPM, 2012*

Nilsen Review (2015)

Conducted a narrative review of selective literature to identify key theories, models and frameworks used in implementation science.

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

4/20/2017

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

Examples of Implementation Frameworks

Diffusion of Innovation

RE-AIM

Consolidated Framework for Implementation Research

Diffusion of Innovation Theory

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

Everett M. Rogers

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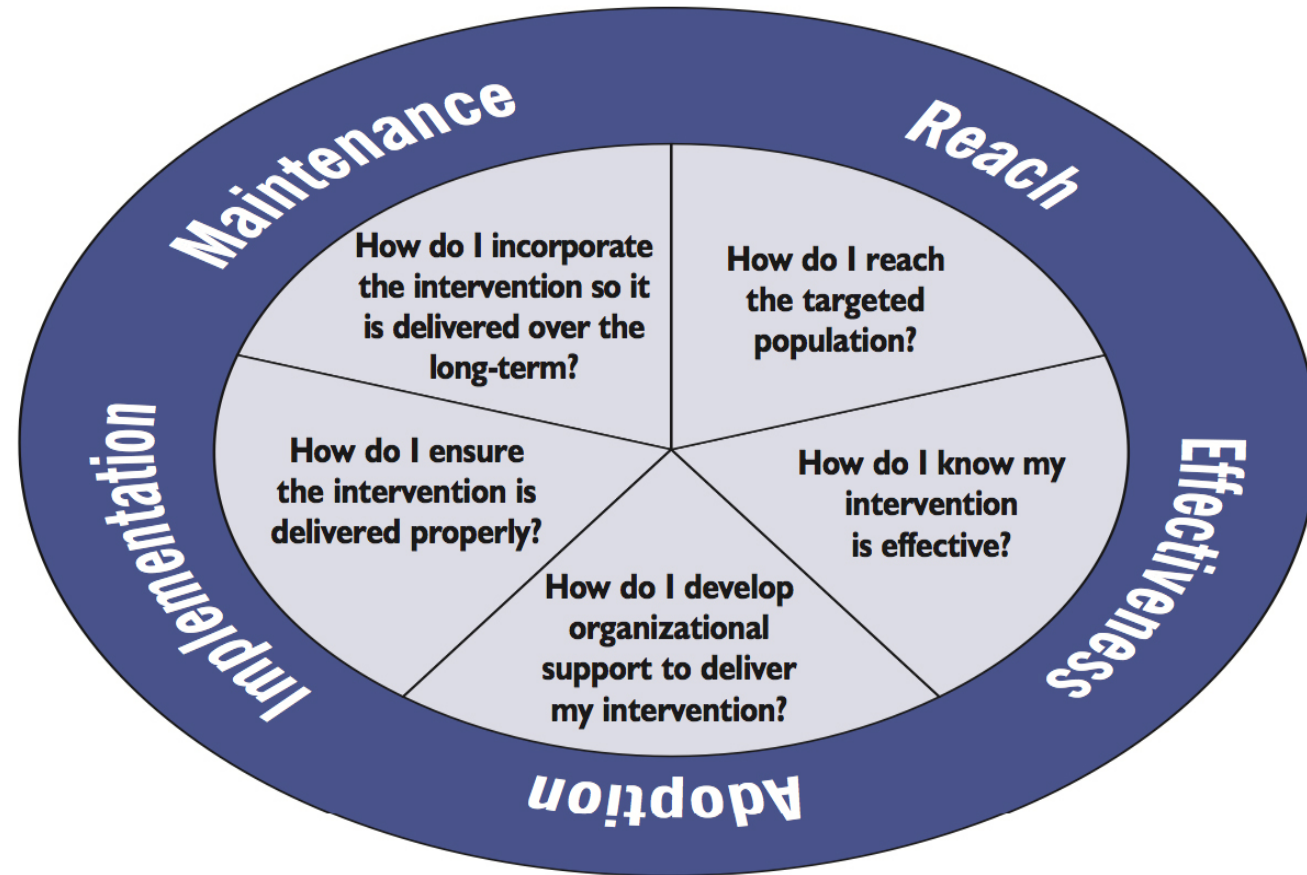
Source: Everett M. Rogers, *Diffusion of Innovations*, 4th ed. (New York: The Free Press, 1995).

RE-AIM

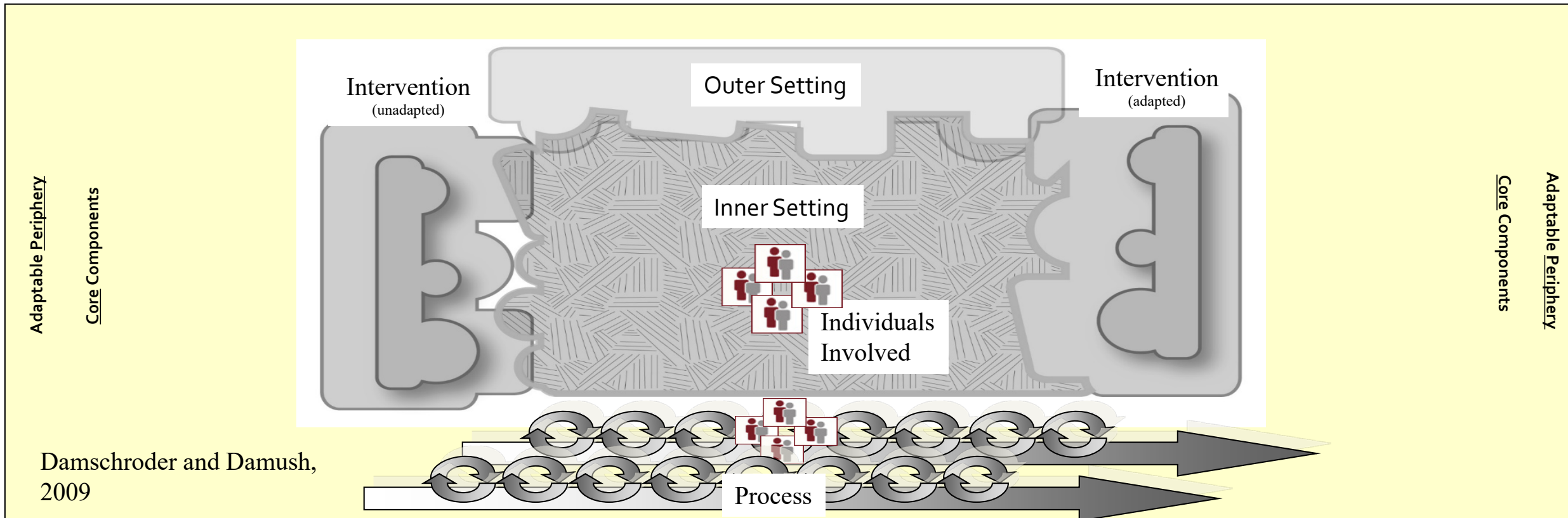FIGURE 1. Elements of the RE-AIM Framework

Glasgow et al, RE-AIM.net, 2011

What is RE-AIM

- **RE-AIM is an acronym that consists of five elements, or dimensions, that relate health behavior interventions:**
  - **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**

Consolidated Framework for Implementation Research (CFIR)

Intervention (unadapted)

Outer Setting

Intervention (adapted)

Adaptable Periphery

Core Components

Core Components

Adaptable Periphery

Inner Setting

Individuals Involved

Damschroder and Damush, 2009

Process

Adapted from : David Chambers, DPhil Associate Director, NIMH D&I Research; American College of Epidemiology D&I Research Workshop 2014

Consolidated Framework for Implementation Research (CFIR)

- "An overarching typology to promote implementation theory development"

- Builds on Greenhalgh et al.'s synthesis of 500 sources, plus newer articles

- Combines Greenhalgh's conceptual model with 18 new models

- "Meta-theoretical" – a synthesis of existing theories, no depiction of inter-relationships, ecologic levels or hypotheses

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
  - Outer setting
  - Inner 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. *Implement Sci* 2009, 4(1):50.
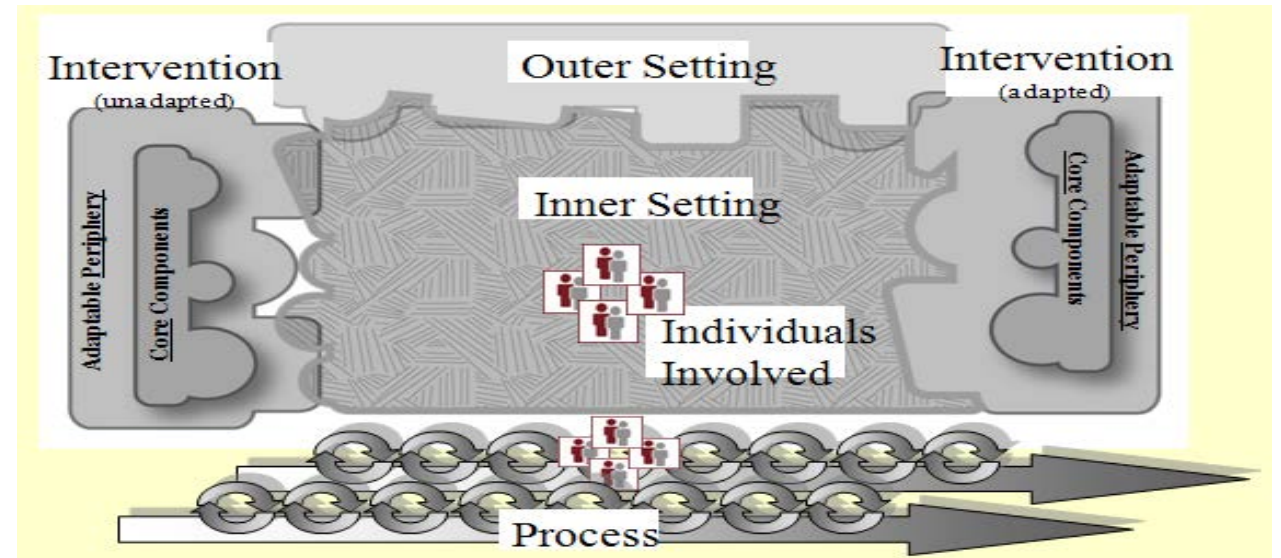
Characteristics of the Intervention

Constructs

- Intervention source
- Evidence strength & quality
- Relative advantage
- Adaptability
- Trialability
- Complexity
- Design quality and packaging
- Cost

Inner Setting

Constructs

- Structural characteristics
- Networks & communication
- Culture
- Implementation climate
- Readiness for implementation

Outer Setting

Constructs

- ☐ Patient needs and resources
- ☐ Cosmopolitanism
- ☐ Peer pressure
- ☐ External policy & incentives

Characteristics of Individuals

Constructs

- Knowledge & beliefs about the intervention
- Self-efficacy
- Individual stage of change
- Individual identification with the organization
- Other personal attributes

Process of Implementation

Constructs

- Planning
- Engaging
- Executing
- Reflecting & evaluating

Measurement of CFIR constructs

□ Researcher opportunities:

- ◻ Assess each construct for salience, and adapt and operationalize definitions for each study
- ◻ Discern levels at which each construct should be evaluated and defined (e.g., individuals, teams, units, clinics)
- ◻ Decide how to measure and assess each
- ◻ Consider best timing for measurement given dynamic process of implementation

Interactive Systems Framework
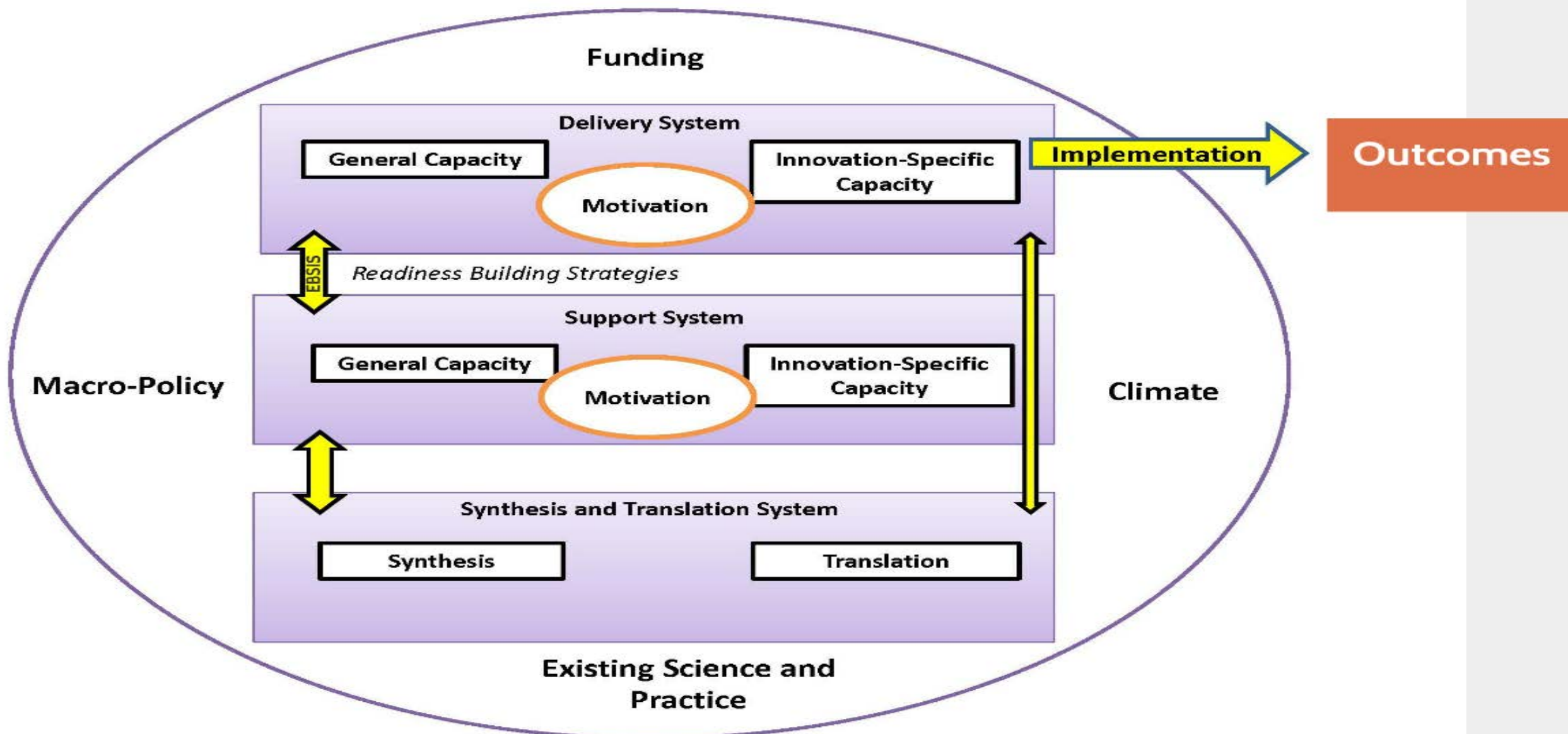
ISF

- ISF provides heuristic for understanding key systems, functions, and relationships relevant to dissemination and implementation process
  - Identifies key stakeholders
  - Determines how key stakeholders can interact
- Provides useful way of organizing existing dissemination and implementation theories from different disciplines
- Suggests important areas for new research on dissemination and implementation
- Suggests activities that could improve dissemination and implementation

A Heuristic

$$Readiness_i =$$

$$Motivation_i \; x \; General \; Capacity \; x$$

$$Innovation\text{-}Specific \; Capacity_i$$

$$R = MC_2$$

- Scaccia, J.P., Cook, B.S., Lamont, A., Wandersman, A., Castellow, J., Katz, J., & Beidas, R. (2015). A practical implementation science heuristic for organizational readiness: R=MC2. *Journal of Community Psychology* Vol. 43, No. 4, 484–501.

- Wandersman, A., Duffy, J., Flaspohler, P., Noonan, R., Lubell, K., Stillman, L., et al. (2008). Bridging the gap between prevention research and practice: The Interactive Systems Framework for Dissemination and Implementation. American Journal of Community Psychology, 41, 171-181.

General Capacities

Types of General Capacities (non-exhaustive)	Authors
Culture	Drzensky et al., 2012; Glisson, 2007; Glisson & Schoenwald, 2005; Hemmelgarn et al., 2006
Climate	Aarons et al., 2011; Beidas et al., 2013; Damschroder et al., 2009; Glisson, 2007; Greenhalgh et al., 2004, Hall & Hord, 2010; Lehman et al., 2002
Organizational Innovativeness	Damschroder et al., 2009; Fetterman & Wandersman, 2005; Greenhalgh et al., 2004; Klein & Knight, 2005; Rafferty et al., 2013; Rogers, 2003
Resource Utilization	Armstrong et al., 2006; Greenhalgh et al., 2004; Klein et al., 2001; Rogers, 2003; Simpson, 2002
Leadership	Aarons & Sommerfield, 2012; Becan, Knight, & Flynn, 2012; Beidas et al., 2013; Fixsen et al., 2005; Grant, 2013; Rafferty et al., 2013; Simpson et al., 2002
Structure	Damschroder et al., 2009; Flaspohler et al., 2008; Greenhalgh et al., 2004, Lehman et al., 2002; Rafferty et al., 2013; Rogers, 2003
Staff Capacity	Flaspohler et al., 2008; McShane & Van Glinow, 2009; Simpson et al., 2002

Innovation-Specific Capacities

Types of Innovation-Specific Capacities; (non-exhaustive)	Authors
Innovation-Specific knowledge, skills, and abilities	Wandersman, Chien, & Katz, 2012; Fixsen et al., 2005; Greenhalgh et al., 2004; Simpson, 2002
Program Champion	Atkins et al., 2008; Damshroder et al., 2009; Greenhalgh et al., 2004; Gladwell, 2002; Grant, 2013; Rafferty et al., 2013; Rogers, 2003
Specific Implementation Supports	Aarons et al., 2011; Beidas et al., 2013; Damshroder et al., 2009; Fetterman & Wandersman, 2005; Greenhalgh et al., 2004; Hall & Hord, 2010; Rogers, 2003; Schoenwald & Hoagwood, 2001; Weiner et al., 2008.
Interorganizational Relationships	Aarons et al., 2011; Flaspohler et al., 2004; Powell et al., 2012

Motivation for Innovation

Types of Motivations (non-exhaustive)	Authors
Relative Advantage	Armenakis et al., 1993; Damschroder et al., 2009; Hall & Hord, 2010; Rafferty et al., 2013; Rogers, 2003; Weiner, 2009
Compatibility	Chinman et al., 2004; Durlak & Dupre, 2008; Fetterman & Wandersman, 2005; Greenhalgh et al., 2004; Rogers, 2003; Simpson, 2002
Complexity	Damschroder & Hagedorn, 2011; Fixsen et al., 2005; Greenhalgh et al., 2004; Meyers, Durlak & Wandersman, 2012; Wandersman et al., 2008.
Trialability	Armenakis et al., 1993; Greenhalgh et al., 2004; Rapkin et al., 2012; Rogers, 2003
Observability	Beutler, 2001; Chinman et al., 2004; Damschroder et al., 2009; Ford et al., 2008; Rossi, Lipsey, & Freeman, 2004
Priority	Armenakis & Harris, 2009; Greenhalgh et al., 2004; Flaspohler et al., 2008

Developing strategies to increase adoption, implementation, and maintenance

Intervention Mapping: A Systematic Approach for Program, Development, Implementation and Adaptation

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 2016). *Planning health promotion programs: An Intervention Mapping approach* (4th ed.). San Francisco, CA: Jossey-Bass.
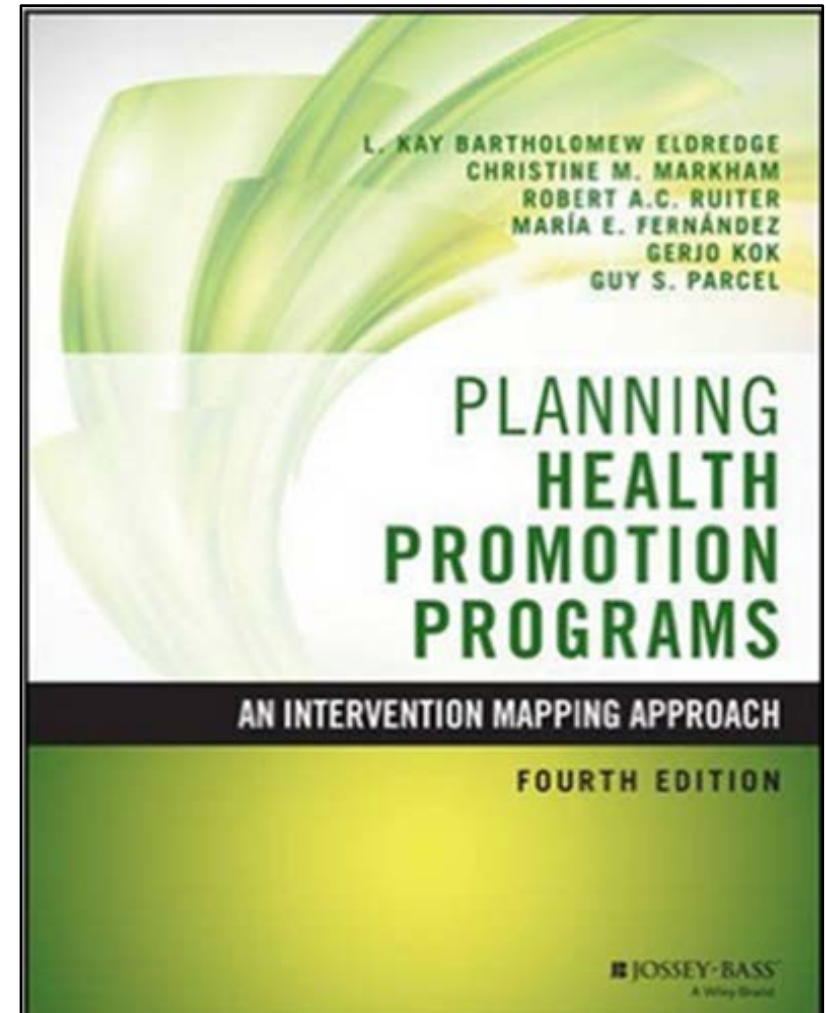
Intervention Mapping guides the D&I planner/researcher to answer the following questions:

- Who will decide to adopt and use the program? Which stakeholders will decision makers need to consult?

- Who will make resources available to implement the program?

- Who will implement the program? Will the program require different people to implement different components?

- Who will ensure that the program continues as long as it is needed?
- 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?

EBI AND IMPLEMENTATION INTERVENTION TARGETS AND OUTCOMES

Program	Implementation	Outcomes

Theory - & Evidence- Based Program, Policy, Practice (EBP)

Context and setting

Program components for target population and environmental agents

Theory Based Change Methods and Practical Applications

Delivery

Implementation Intervention

Delivers Methods designed to create change in determinants of Implementation behaviors and implementation environment

Multi-level Implementation Context Setting characteristics, policy climate, culture, readiness, resources

Determinants of Program Use

Determinants of Adoption: knowledge; perception of EBA

Determinants Implementation: skills; outcome expectations; collective-efficacy

Determinants of Maintenance: beliefs, skills

Program Use Tasks (Performance Objectives)

Adoption POs: e.g. Clinic leaders review & discuss EBA

Implementation POs: e.g. Nurses deliver education to patients

Maintenance POs: Coordinator adjusts workflow to accommodate patient education prior to provider visit

Program Use Outcomes

Adoption

Implementation

Maintenance

Impact on Health and Quality of Life Outcomes

Funding Opportunities

Current Funding Announcements

NIH: PAR # 16-236; 237, 238 (R03, R01, R21)

- NCI leads (16 ICs total, including FIC, NIMH, NHLBI, NHGRI, as well as OBSSR)
- Organizes the D&I research agenda across NIH
- 147 grants funded through NIH since 2006 (46 NCI grants over 9 years)
  - 25 NCI R01s; 5 R03s; 16 R21s
- 2010 CSR standing review committee

D&I Areas of Research Ripe for Exploration

- Sustainability of EBPs in a Changing Context

- Adaptability/Evolution of EBPs over time

- Impact of dissemination strategies on practice change

- Scaling up practices across health plans, systems, and networks

- De-Implementation/Exnovation

- Adaptive designs (implementation as a step-wise approach)

- Real-time feedback/monitoring on EBPs

- Use of big data

David Chambers, 2014

Growing Resources

→ Training Programs (e.g. TIDIRH, IRI, MT-DIRC, KT Canada, Universities)

→ Research Infrastructure (CIPRS, CPCRN, HMORN, Other Centers, CTSA Cores)

→ Measurement Tools (GEM-IS, SIRC, SIC, RE-AIM)

→ The Next Generation (100s of trainees)

→ *Implementation Science*

→ Brownson, Colditz, Proctor (Eds.) *Dissemination and Implementation Research in Health, 2012*

→ ***Annual D&I Meeting December 4-6, 2017*** **Marriott Crystal gateway, Arlington VA**

D&I RESOURCES

- http://dissemination-implementation.org
- http://gem-beta.org
- http://www.societyforimplementation researchcollaboration.org
- http://cancercontrolplanet.cancer.gov
- http://rtips.cancer.gov/rtips/index.do
- https://researchtoreality.cancer.gov
- https://impsci.tracs.unc.edu/