Overview of Implementation Science

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“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!!
It takes 17 years to turn 14 percent of original research to the benefit of patient care.
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.

Where am I?

You're 30 yards above the ground in a balloon. You must be a researcher. Yes, how did you know?

Because what you told me is absolutely correct but completely useless. You must be a policy maker. Yes, how did you know?

Because you don't know where you are, you don't know where you're going, and now you're blaming me.
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:
Traditional Translational Pipeline

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

Implementation Research Has a Different Emphasis

Effectiveness vs. Implementation

System to Support Adoption and Delivery with Fidelity

Implementation Strategies
Implementation Outcomes

System to Support Adoption and Delivery with Fidelity

Health Outcomes

Intervention

Intervention

Smith & Hasan, 2020, Psychiatry Research
<table>
<thead>
<tr>
<th>Study feature</th>
<th>Clinical / Public Health research</th>
<th>Implementation research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aim: evaluate a / an …</td>
<td>clinical intervention, health promotion intervention, policy</td>
<td>implementation strategy</td>
</tr>
<tr>
<td>Typical intervention</td>
<td>drug, procedure, therapy, prevention program</td>
<td>organizational practice change, training</td>
</tr>
<tr>
<td>Typical outcomes</td>
<td>symptoms, health outcomes, patient behavior</td>
<td>adoption, adherence, fidelity, level of implementation</td>
</tr>
<tr>
<td>Typical unit of analysis, randomization</td>
<td>Patient, community member</td>
<td>clinic, team, facility, school</td>
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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)
Implementation science in times of Covid-19

Michel Wensing¹,², Anne Sales³,⁴, Rebecca Armstrong⁵, and Paul Wilson⁶,⁷

Viewpoint

Considering the intersection between implementation science and COVID-19

David A Chambers
Chapter 5: Understanding barriers and facilitators for implementation across settings

Maria E. Fernandez, Laura Damschroder, Bijal Balasubramanian
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)

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
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

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

Diffusion Curves

- Early Adopters
- Later Adopters
- Accelerated Diffusion

Typically, late adopters become early adopters.
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

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

A Refined Compilation of Implementation Strategies: Results from the Expert Recommendations for Implementing Change (ERIC) Project

Byron J. Powell, Thomas J. Water, Matthew J. Chinman, Laura J. Damstroede, Jeffrey Smith, Monica M. Mathieu, Erika A. Proctor, and Julian E. Kirschner

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 strategies and define and describe by consensus 208 implementation strategies in a single large document that would be a valuable resource for researchers, practitioners, and educational institutions.

Methods: Various Pospisil 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 consensus on implementation strategy terms and definitions. After each round, iterative refinements were made based on participant feedback. The third round involved a live polling and consensus process via a shared-based platform and included online and in-person meeting.

Results: The panel agreed on 200 implementation strategies and suggested five additional strategies. Survey five percent of definitions from the originally published compilation of strategies were refined after rating. 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: (1) strategy importance and feasibility, (2) expert panel recommendations and ongoing consensus iterations that may be due to other elements of evidence-based programs and practice, and the strength of consensus supports for each strategy.

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

Research 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

Thomaster J. Water, Byron J. Powell, Monica M. Mathieu, Laura J. Damstroede, Matthew J. Chinman, Jeffrey Smith, Erika A. Proctor, Julian E. Kirschner

Abstract

Background: Prior terminological consistency for core concepts in implementation science has been widely noted as an obstacle to effective meta-analysis. An inconsistency is also a barrier for those seeking guidance from implementation science literature in developing and planning implementation initiatives. The Expert Recommendations for Implementing Change (ERIC) study aims to address one area of terminological discrepancy: consensus 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.

Methods: Inconsistency sampling was used to recruit a panel of experts in implementation science and organizational change to provide perspectives on implementation strategies in similar groups and to evaluate each strategy’s relative importance and feasibility. Multi-item and rating scales provided a quantitative representation of the relationships among the strategies, without one of which they would not be correctly classified from the others. Hierarchical cluster analysis supported organizing the 73 strategies into five categories. The ratings data reflect these strategies identified as the most important and feasible strategies.

Conclusions: This study provides initial validation of the implementation strategies within the ERIC compilation framework. This consistent and strategy change in implementation and implementation artifacts in sustainable setting.

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

Review Open Access

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


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 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 208 sources published between 1995 and 2011. The resulting compilation includes 78 implementation strategies and definitions, which are grouped according to 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 individual contexts.
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

“Everything should be made as simple as possible. But not simpler.”

Albert Einstein
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

**Step 1.** Logic model of the problem

**Step 2.** Logic model of change

**Step 3.** Program Design

**Step 4.** Program Production

**Step 5.** Plan for Implementation

**Step 6.** Program Evaluation

**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.

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What is Implementation Mapping?


Implementation Science + Intervention Mapping = Implementation Mapping

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

EBI | Implementation | Outcomes
---|---|---
Evidence-Based Intervention (EBI) Program, Guideline or other Health Innovation

**Implementation Strategies**
- Contain *methods* (techniques) and *practical applications*...
- to change determinants

**Determinants of Program Use**
- Determinants of Adoption
- Determinants of Implementation
- Determinants of Maintenance

**Program Use Tasks (Performance Objectives)**
- Adoption
- Implementation Performance Objectives
- Maintenance
- Maintenance Performance Objectives

**Program Use Outcomes**
- Adoption
- Implementation
- Maintenance

Health and Quality of Life Outcomes

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**Planning process**

Forthcoming Issue of Frontiers in Public Health

Research Topic
Implementation Mapping for Selecting, Adapting and Developing Implementation Strategies

Submit your abstract
Submit your manuscript
Participate

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

National Cancer Institute
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
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 (QUD) 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

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