

Implementation Science 101

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Poll Question #1

I need the most help with:

1. Selecting a study design
2. Defining my implementation strategies
3. Figuring out my model
4. Designing my evaluation
5. Understanding what implementation science is all about



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Objectives

- To provide a brief overview of implementation science
 - Definitions
 - Rationale, goals
 - Key components of implementation research
 - Study design options
 - Implementation strategies
 - Theories and frameworks
 - Mixed methods evaluations



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Implementation Science: Definitions

- The study of ways to promote the systematic uptake of research findings and other evidence-based practices into routine practice. This includes the study of influences on healthcare professional and organizational behavior. (Eccles & Mittman, 2006)
- An effort specifically designed to get best practice findings and related products into routine and sustained use via appropriate *uptake interventions* (Curran et al., 2012)
 - *Active* approach, focusing on *stimulating change*



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Implementation Science: Definitions (cont.)

- Research that will identify, develop, and refine effective and efficient methods, systems, infrastructures, and strategies to disseminate and implement:
 - Evidence-based health behavior change interventions
 - Prevention, early detection, diagnostic, treatment, symptom management, and quality of life improvement interventions
 - Clinical guidelines, policies, and data monitoring and surveillance reporting tools

Dissemination and Implementation Research in Health (R01)
<http://grants.nih.gov/grants/guide/pa-files/PAR-13-055.html>

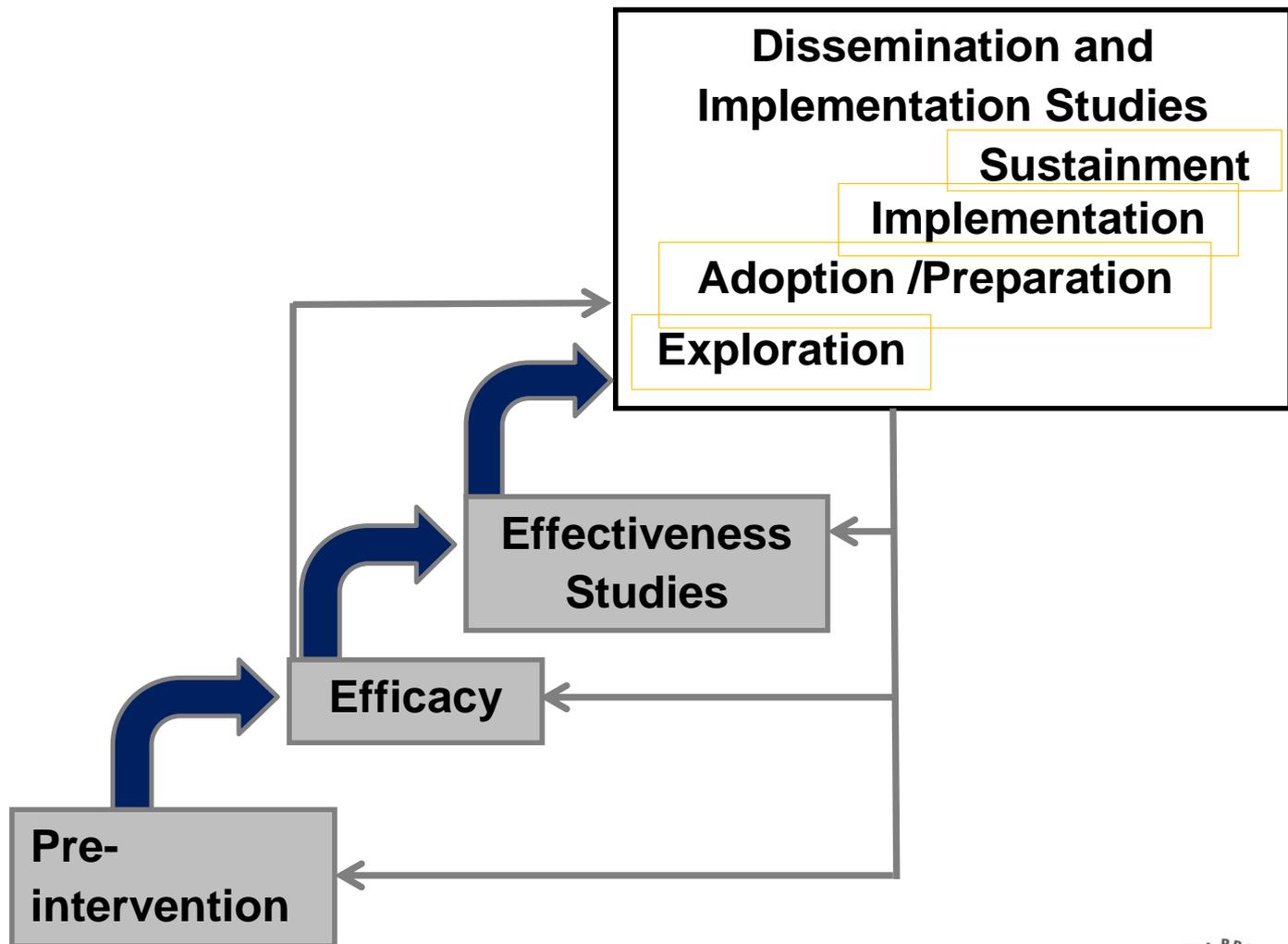


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Health-Related Research Implementation



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Brownson, Colditz, Proctor, 2012



Implementation Science: NIH Rationale

- Despite extensive investment in research, little \$ spent on how to ensure that research results inform and improve health quality, delivery of services and the utilization and sustainability of evidence-based tools and approaches
- Essential that healthcare providers, patients, families, caregivers, communities and healthcare settings have empirically-supported strategies to integrate scientific knowledge and effective interventions into everyday use

<http://grants.nih.gov/grants/guide/pa-files/PAR-13-055.html>



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Implementation Science: Goals

1. Develop reliable strategies for improving health-related processes and outcomes; facilitate widespread adoption of these strategies
2. Produce insights and generalizable knowledge regarding implementation processes, barriers, facilitators, strategies
3. Develop, test and refine implementation theories and hypotheses; methods and measures



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Key Components of Implementation Research

- Design of implementation research studies
 - What are the options?
 - What are the challenges?
- Implementation strategies
 - What are they and what do you do with them?
- Conceptual models/theoretical frameworks
 - Why do you need one and what do you do with it?
- Mixed methods evaluation
 - What is important to measure/assess and how do you measure it?



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Study Design: Start with a Question

Typical progression of questions:

- What should be done to address X problem?
- Is an evidence-based practice (EBP) being used?
 - If not, why not?
- What factors influence the EBP being used or potentially being used?
- What else needs to be done to facilitate the use of the EBP?
- How do you know that what you've done is effective?



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Curran et al., 2012



Study Designs: Key Differences

- All research designs are possible in implementation research
 - RCTs, comparative effectiveness, quasi-experimental, pilot, etc.
- But, your implementation research will assess several *implementation outcomes*

Proctor et al., 2010:

- Acceptability
- Adoption
- Appropriateness
- Costs
- Feasibility
- Fidelity
- Penetration
- Sustainability

RE-AIM

- Reach
- Effectiveness
- Adoption
- Implementation
- Maintenance

Glasgow et al., 1999



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Study Designs: Key Differences (cont.)

And, your units of analysis might be different

- Units of randomization are often much larger (sites/clinics vs individuals)
 - May need many sites
- Units beyond individual patients are often measured
 - Climate measures
 - Performance of an entire clinic
- Units of analysis may go back and forth between individual and larger groups



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Hybrid Study Designs:

Blending Implementation and Effectiveness Research

| Study Characteristic | Hybrid Type I | Hybrid Type II | Hybrid Type III |
|-------------------------------|--|---|--|
| Research Questions (examples) | <p><u>Primary Question:</u> Will a clinical treatment work in this setting/these patients?</p> <p><u>Secondary Question:</u> What are the potential barriers/facilitators to a treatment's implementation?</p> | <p><u>Primary Questions:</u> Will a clinical treatment work in this setting/these patients?</p> <p>Does the implementation method show promise?</p> | <p><u>Primary Question:</u> Which method works better in facilitating implementation of a clinical treatment? Which core components are critical?</p> <p><u>Secondary Question:</u> Is the treatment effective in this setting/these patients?</p> |

Curran et al., 2012

For more info:

<http://www.hsrd.research.va.gov/cyberseminars/catalog-archive.cfm> [search "hybrid"]



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Implementation Strategies

What are they?

- Methods or techniques used to enhance the adoption, implementation, and sustainability of a clinical practice or program (Curran et al. 2012)



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Examples of Implementation Strategies

- Education
- Clinical support tools
- Technical Assistance
- Stakeholder engagement
- Performance monitoring/feedback
- Opinion Leaders/champions
- Continuous Quality Improvement/Plan Do Study Act (PDSA) cycles
- Formative Evaluation
- Evidence-based quality improvement
- Training/coaching/supervision
- Facilitation

see Powell et al., 2015



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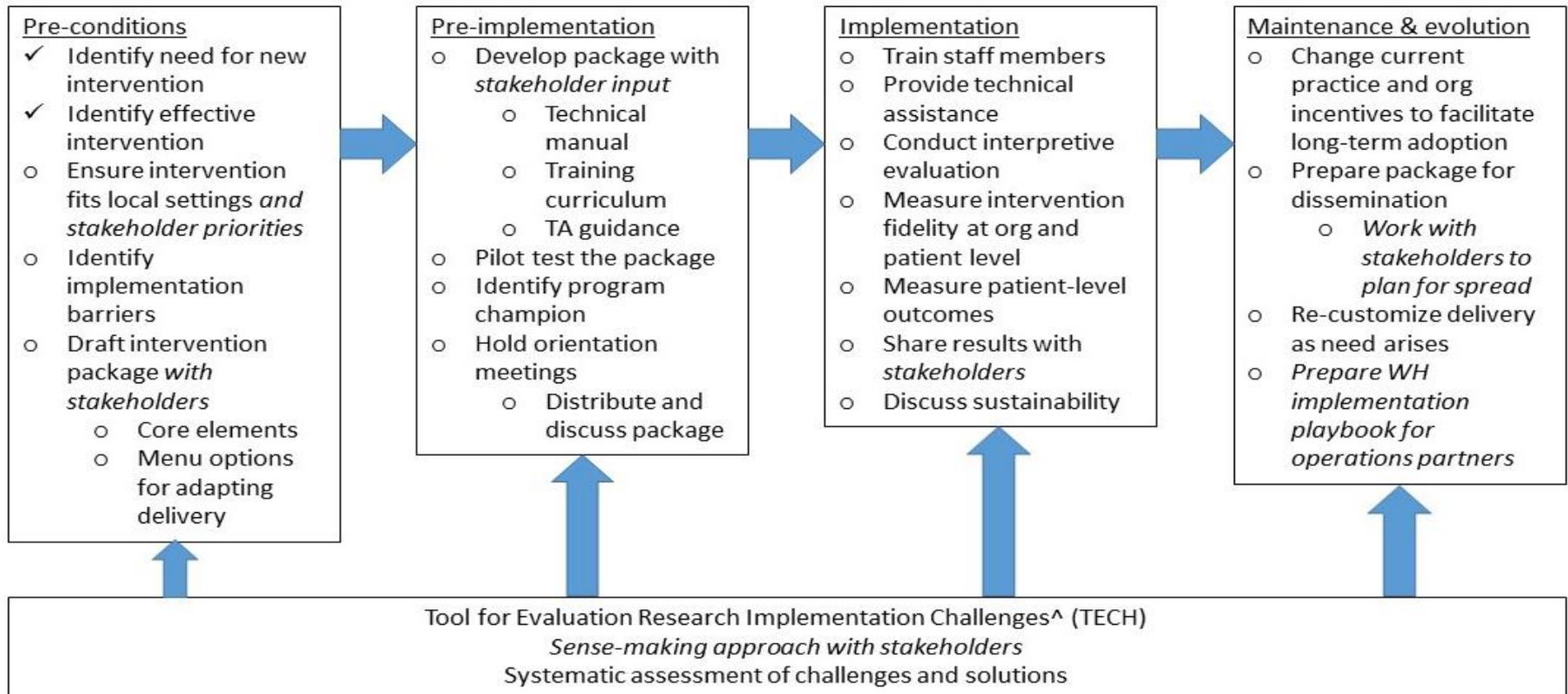
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Examples of Implementation Strategies: EMPOWER QUERI (QUE 15-280)

Replicating Effective Programs (REP) framework*

featuring *multilevel stakeholder engagement* and the Tool for Evaluation Research Implementation Challenges (TECH)



*Adapted from Kilbourne et al., 2007; [^]Simpson et al., 2013



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Implementation Strategies: Some Considerations

- How did you select your strategy (rationale)
- How complex is the strategy
 - Discrete – involve 1 process or action
 - Multifaceted – use 2 or more discrete strategies
 - Blended – multiple strategies targeting different levels are interwoven/packaged
- Who/what is the target of the strategy
 - Patients, Providers, Administrators, Unit, Clinic, Organization, Community...
- Who will deploy the strategy
 - Top-down, bottom-up
- When will the strategy be used (what phase(s))
- How much of the strategy is needed (dose)
- How often will the strategy be used (frequency)



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Theories and Frameworks

- Theory: 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 (Tabak et al., 2012)
- Frameworks: strategic or action-planning models that provide a systematic way to develop, manage, and evaluate interventions (Tabak et al., 2012)
- Frameworks often contain theories; theories don't typically have frameworks
- You may need a theory *and* a framework!
 - Theory of how your intervention will change xyz
 - Framework to guide implementation
 - Your “conceptual model” may contain both



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Why Do You Need A Model?

- In implementation research, you are attempting to *change* something(s)
 - Need a theory of how that change will occur
- Your theory of how change will occur drives what you decide to do:
 - What/who to target (may have multiple targets)
 - How to foster change (may have/need multiple strategies)
- Change is a *process*: a model can help you parse out your process, e.g., into phases
- Models can enhance interpretability of study findings



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Frameworks & Phases: A Heuristic

| Framework | Phases of Implementation Research (& Evaluation) | | | |
|---|--|-------------------------------|-----------------------|---------------------------|
| | <i>Pre-baseline</i> | <i>Baseline</i> | <i>During</i> | <i>After & beyond</i> |
| CFIR (Damschroder) | Planning | Engaging | Executing | Reflecting & Evaluating |
| Program Change Model (Simpson) | Strategic planning | Exposure & Adoption | Implementation | Practice |
| Ottawa Model (Graham & Logan) | | Assess | Monitor | Evaluate |
| Replicating Effective Practices (Kilbourne) | Pre-conditions | Pre-implementation | Implementation | Maintenance & Evolution |
| Dynamic Adaptation Process (Aarons) | Preparation | Adaptation | Delivery | Outcome/feedback |
| Evidence-based Practice Implementation (Aarons et al.) | Exploration | Adoption Decision/Preparation | Active Implementation | Sustainment |

How Do You Find a Model?

- Look for guidance in:
 - Studies that focus on your target of change
 - Studies that use a model similar to what you have in mind
 - Original articles on models
 - Systematic reviews of D&I models
- Talk to implementation scientists



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How Do You Choose a Model?

Main considerations (see Tabak et al., 2012):

1. Construct flexibility
 - Broad or operational (detailed, step-by-step)?
2. Dissemination and/or implementation
 - Which type of research are you doing?
3. Socioecologic framework
 - What level(s) are you interested in: individual, organization, community, system?
4. Also consider whether you want to use an existing model or develop a new model
5. Examine whether the model you're interested in has *measures* associated with it



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What Models Can You Choose From?

- 61 models in Tabak et al. (2012) review
- 25 implementation frameworks in Meyers et al. (2012) review
 - = many models from which to choose!
- Some commonly used models:
 - PARIHS, CFIR, ISF, RE-AIM, PRECEDE/PROCEED, PRISM, GTO, PCM, ARC, PRISM, REP, etc!



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What Do You Do With a Model(s)?

- Identify model EARLY in process of developing project/writing grant
- Discuss each component of the model and how you will go about addressing it
 - Activities
 - Measures
 - Analysis
- Refer back to your model throughout the course of implementation
- Draw on your model for interpretation and presentation of study findings
- Compare and contrast your results with others who have used the same model (if applicable)



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Mixed Methods Evaluation

What is it?

- Formative evaluation=rigorous assessment process designed to identify potential and actual influences on the progress and effectiveness of implementation efforts (Stetler et al, 2006)
- Evaluation=systematic assessment of program results; valuable learning strategy to enhance knowledge about the logic of the underlying programs (*Handbook of Practical Program Evaluation*)



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Evaluation Methods: Some Considerations

- How did you select your methods (rationale)
- How complex are your methods
 - Qualitative
 - Quantitative
 - Team, expertise, timing, resource, IRB considerations
- From whom and where will you collect data
 - Patients, Family Members, Providers, Staff, Administrators, Stakeholders...
 - What settings/what methods
- When will which methods be used and why (what phase(s))
- How much data do you need
- How often will you collect data
- How and when will you use the data
 - How and when will you analyze the data



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Evaluation Methods: An Example

EMPOWER QUERI Evaluation Activities and Measures by REP Phase

| Pre-Conditions | Pre-Implementation | Implementation | Maintenance & Evolution |
|--|---|--|---|
| <ul style="list-style-type: none"> • TECH[^] • Field notes • Key stakeholder* interviews • ICS, ILS, ICBS, PCIS, MORE • Patient qualitative interviews | <ul style="list-style-type: none"> • TECH • Field notes | <ul style="list-style-type: none"> • TECH • Field notes • Key stakeholder interviews • Patient interviews | <ul style="list-style-type: none"> • TECH • Field notes • Key stakeholder interviews |
| | | Impact-focused evaluation <ul style="list-style-type: none"> • Referral monitoring • Engagement • Retention • Patient measures | |

[^]TECH=Tool for Evaluation Research Implementation Challenges; *Providers & administrators



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Supporting Practice and Research Collaboration

Design + Evaluation Considerations: How and When Evaluation Data Will Be Used

- Process Evaluation:
 - Identify influences on process of implementation or clinical intervention prior to, during, and/or after study
 - *No data fed back during study*
 - Typical of Hybrid Type 1 designs
- Formative Evaluation:
 - Identify influences on process of implementation or clinical intervention prior to, during, and after study
 - *Data used to optimize implementation or clinical intervention processes during study*
 - Typical of Hybrid Types 2 & 3 designs



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Characteristics to consider measuring/assessing

*Your model will help you select characteristics to assess (what do you need to know?)

Practice/intervention-related characteristics:

- Nature of the evidence
- Complexity
- Adaptability
- Relative advantage
- Cost



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Characteristics to consider measuring/assessing (cont.)

Context:

- Culture/Climate
 - Readiness for change
- Leadership
- Structure and infrastructure
 - Space, resources, etc.



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Characteristics to consider measuring/assessing (cont.)

People

- Knowledge, attitudes, and beliefs about practice
- Self-efficacy
- Individual readiness
- Commitment to organizational mission
- Degree of burnout



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Some Parting Thoughts

- Implementation research is messy, unpredictable, nonlinear
- Implementation research is a team sport
 - Interdisciplinary team is a must
- Implementation research will make you question many things you thought you knew
- Your conceptual model is your friend, and it might evolve
- Publish early and often
- The field is still young: define your terms and concepts
- Seek guidance from experienced implementation scientists



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Poll Question #2

Now I need more help with:

1. Selecting a study design
2. Defining my implementation strategies
3. Figuring out my model
4. Designing my evaluation
5. Putting together a team



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Implementation Science: Selected Resources

Information

- VA Quality Enhancement Research Initiative (QUERI):
www.queri.research.va.gov
- QUERI Implementation Guide:
<http://www.queri.research.va.gov/implementation/default.cfm>
- Implementation Network e-Newsletter

Trainings

- NIH/VA Implementation Research Institute
- Training Institute for Dissemination and Implementation Research in Health (TIDIRH)
- Archived Enhancing Implementation Science (EIS) and other HSR&D cyberseminars: <http://www.hsrd.research.va.gov/cyberseminars/catalog-archive.cfm>

Conferences

- NIH Conference on the Science of Dissemination & Implementation
- Seattle Implementation Research Conference



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Implementation Science: A Handful of Key Articles

- Hybrid designs: Curran GM, Bauer M, Mittman B, Pyne JM, Stetler C. Effectiveness-implementation hybrid designs: combining elements of clinical effectiveness and implementation research to enhance public health impact. *Med Care*. 2012 Mar;50(3):217-26.
- Implementation models:
- Damschroder LJ, Aron DC, Keith RE, Kirsh SR, Alexander JA, Lowery JC. Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. *Implement Sci*. 2009 Aug 7;4:50.
- Meyers DC, Durlak JA, Wandersman A. The quality implementation framework: a synthesis of critical steps in the implementation process. *Am J Community Psychol*. 2012 Dec;50(3-4):462-80.
- Tabak RG, Khoong EC, Chambers DA, Brownson RC. Bridging research and practice: models for dissemination and implementation research. *Am J Prev Med*. 2012 Sep;43(3):337-50.
- Implementation evaluation: Stetler CB, Legro MW, Wallace CM, Bowman C, Guihan M, Hagedorn H, Kimmel B, Sharp ND, Smith JL. The role of formative evaluation in implementation research and the QUERI experience. *J Gen Intern Med*. 2006 Feb;21 Suppl 2:S1-8.
- Implementation strategies: Powell BJ, Waltz TJ, Chinman MJ, Damschroder LJ, Smith JL, Matthieu MM, Proctor EK, Kirchner JE. A refined compilation of implementation strategies: results from the Expert Recommendations for Implementing Change (ERIC) project. *Implement Sci*. 2015 Feb 12;10(1):21.
- Implementation outcomes: Proctor E, Silmere H, Raghavan R, Hovmand P, Aarons G, Bunger A, Griffey R, Hensley M. Outcomes for implementation research: conceptual distinctions, measurement challenges, and research agenda. *Adm Policy Ment Health*. 2011 Mar;38(2):65-76.
- Sustainability: Wiltsey Stirman S, Kimberly J, Cook N, Calloway A, Castro F, Charns M. The sustainability of new programs and innovations: a review of the empirical literature and recommendations for future research. *Implement Sci*. 2012 Mar 14;7:17.
- Implementation grant-writing: Proctor EK, Powell BJ, Baumann AA, Hamilton AM, Santens RL. Writing implementation research grant proposals: ten key ingredients. *Implement Sci*. 2012 Oct 12;7:96.



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THANK YOU!

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