Implementation Science:
An Introduction

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Poll Question #1

What is your level of familiarity with Implementation Science?

- Not at all familiar
- Beginner (e.g., heard a lecture on Implementation Science)
- Intermediate (e.g., taken a course on Implementation Science)
- Advanced (e.g., published a paper on Implementation Science)
Research to Practice Gap in Health Care

- Balas & Boren 2000
- Grant et al. 2003
- Morris et al. 2011

17 Years...
Effectiveness does not Equal Public Health Impact

BAUER & KIRCHNER 2020

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Implementation Science focuses on the “how” question.
Pettibone et al. (2018)
Expanding the Concept of Translational Research: Making a Place for Environmental Health Sciences
Implementation Science: NIH Definition

Implementation science (IS) is the study of methods to promote the adoption and integration of evidence-based practices, interventions, and policies into routine health care and public health settings to improve our impact on population health.

https://cancercontrol.cancer.gov/is/about
“The intervention/practice/innovation is **THE THING**

- **Effectiveness** research looks at whether **THE THING** works
- **Implementation** 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**
- Main implementation outcomes are **HOW MUCH** and **HOW WELL** they **DO THE THING**”
Applying Implementation Science to Environmental Health: Example

Educational intervention (i.e., THE THING) to help the local community identify and avoid common sources of lead exposure
Effectiveness research helps investigators evaluate if the educational intervention works by measuring blood lead levels among community members that used the thing.
Implementation research can help investigators figure out how to help the community DO THE EDUCATIONAL INTERVENTION (i.e., THE THING) to have the greatest impact on public health.
Implementation researchers identify and study strategies like e.g., holding community meetings so individuals can learn about THE THING; forming a community advisory board that provides researchers feedback on the implementation process and improvements.

So, this is the stuff we do (i.e., implementation strategies) to help the community DO THE EDUCATIONAL INTERVENTION.
Seventy-Three Implementation Strategies
Example ERIC Strategies
(Powell 2015)

- Build a coalition (partners in the implementation process)
- Conducting educational meetings
- Conducting educational outreach visits
- Create a learning collaborative around the innovation
- Facilitation
- Identify and prepare champions
- Identify early adopters
- Inform local opinion leaders (i.e., those influential in the implementation setting)
- Using advisory boards and workgroups
HOW MUCH and HOW WELL the community DOES THE THING

Implementation Outcomes
Proctor et al. 2011

- Adoption/Uptake
- Sustainability
- Feasibility
- Acceptability
- Penetration
- Costs
- Fidelity
- Appropriateness
A study that proposes to compare two personal air monitoring devices to measure levels of PM2.5 in two communities bordering a major industrial complex. Community A will receive one type of air monitor; community B will receive another type of air monitor. Outcomes will evaluate how well the two monitors accurately measure levels of air pollution in each community.

Is this effectiveness research or implementation research?
A study that tests different strategies to improve the uptake of an intervention that has shown to improve the environmental health literacy of communities exposed to high levels of heavy metals

Is this effectiveness research or implementation research?
Hybrid Designs: Enhancing Translation Potential

- **Hybrid 1:**
  - Effectiveness
  - Implementation

- **Hybrid 2:**
  - Effectiveness - Implementation

- **Hybrid 3:**
  - Implementation
    - Effectiveness

Curran et al. (2012). Effectiveness-implementation hybrid designs: combining elements of clinical effectiveness and implementation research to enhance public health impact *Med Care*. 
Individual-Community-Organization- & System-levels

See Tabak et al. (2013) p. 5

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Theories, Models and Frameworks (Nilsen 2015)

- **Process Models**
  - Guide the implementation process (e.g., Exploration, Preparation, Implementation, Sustainment (EPIS) Framework)
    - [https://episframework.com](https://episframework.com)
- **Determinant Frameworks**
  - Implementation outcomes are impacted by barriers and facilitators (e.g., Consolidated Framework for Implementation Research (CFIR))
    - [https://cfirguide.org/](https://cfirguide.org/)
- **Evaluation Frameworks**
  - Help researchers frame implementation success (e.g., Reach, Effectiveness, Adoption, Implementation & Maintenance (RE-AIM))
    - [https://www.re-aim.org/](https://www.re-aim.org/)
Integrating Implementation Science into the Superfund Research Program Systems Approach

2020 SRP Strategic Plan

Reviews on Environmental Health 2021; 10.1515/reveh-2020-0073
Objective One

- Promoting Interaction between SRP and Its Stakeholders

- Stakeholder engagement is crucial in Implementation Science and inherently requires the participation of multiple stakeholders in the implementation process.
Objective One

- Prioritizing critical research areas: “move away from one-size-fits all approaches in environmental health research and incorporate more comprehensive approaches that draw on different methods”

- Implementation Science fundamentally draws upon multiple methods to address the complexities and contextual nuances in the implementation process
Objective Two

- Goal of encouraging investigator-initiated research translation

- Implementation Science has the potential to use strategies to move SRP innovations into real world settings to mitigate exposure and increase uptake of new technologies
Objective Two

- Goal of focusing Community Engagement Cores to engage in prevention and intervention activities

- Public health impact = Implementation Science + Community Engaged Research approaches (see Blachman-Demner et al. 2017)
Objective Three

- Goal of promoting transdisciplinary science
  - SRP support of research that identifies barriers/facilitators to effective prevention/intervention activities

- Implementation Science is transdisciplinary in nature with a focus on identifying barriers/facilitators to the uptake of innovations
NIH Funding Opportunity Announcements in Implementation Science

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 Clinical Trial Not Allowed)
Demonstrating a clear gap
Identifying the evidence-based intervention, practice, policy *(THE THING)*
Conceptual models/theory (research question(s), measures and outcomes)
Stakeholder engagement
Setting/community readiness for implementation
Clearly identified implementation strategies *(THE STUFF WE DO)*
Team experience
Feasibility of design/methods
Measurement/analysis: identifying *implementation outcomes* /link to theory/model
Policy implications: describing the link between implementation of *(THE THING)* with policy
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References


- Tabak RG, Khoong EC, Chambers D, Brownson RC. Models in dissemination and implementation research: useful tools in public health services and systems research. Front Public Health Serv Syst Res 2013; 2(1). DOI: 10.13023/FPHSSR.0201.08

