Implementation Science

Association for Academic Surgery
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Angela M. Ingraham, MD, MS
University of Wisconsin
ingraham@surgery.wisc.edu
@AngieIngrahamMD
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• No financial disclosures

• Acknowledgement:
  – Heather Neuman, MD, MS, FACS
Overview

- Definitions/context
- Impact
- Conceptual model of Implementation Research
- Couple important concepts
- Models for Implementation Research
- Additional Resources
Definitions

- **Dissemination Research**
  - Study of targeted distribution of information and intervention materials to a specific public health or clinical practice audience
  - Understand how best to spread and sustain knowledge and the associated evidence-based interventions

- **Implementation Research**
  - Study of the use of strategies to adopt and integrate evidence-based health interventions into clinical and community settings

Adapted from “A Brief Introduction to Implementation Science” by D. Chambers, DPhil
Putting it in context

<table>
<thead>
<tr>
<th>Quality Improvement</th>
<th>Implementation Science</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Focus</strong></td>
<td>A specific patient-level problem within a single healthcare system</td>
</tr>
<tr>
<td><strong>Goal</strong></td>
<td>To fix the specific problem within a single healthcare system</td>
</tr>
<tr>
<td><strong>Approach</strong></td>
<td>Design and trial strategies to improve the problem</td>
</tr>
<tr>
<td><strong>Models</strong></td>
<td>Toyota Lean, Six Sigma</td>
</tr>
</tbody>
</table>
The big picture

Adapted from “A Brief Introduction to Implementation Science” by D. Chambers, DPhil
Overview

- Definitions/context
- **Impact**
- Conceptual model of Implementation Research
- Couple important concepts
- Models for Implementation Research
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Importance

• Evidence-based health intervention…
  – Is only so good as how and whether…
• It is adopted?
• Providers are trained to deliver it?
• Trained providers choose to deliver it?
• Eligible patients receive it?
• Degree to which access/engagement/quality/sustainability exist?

Adapted from “A Brief Introduction to Implementation Science” by D. Chambers, DPhil
Impact

On average, it takes **17 years** for evidence based practices to be incorporated into routine care.

Lack of awareness
Competing demands
Limited resources and skills
Misalignment of priorities

Efficacy and effectiveness trials $\rightarrow$ Sustained application in routine care

“What is Implementation Science? Implications for Conducting Antimicrobial Stewardship Research” by Heather Schacht Reisinger, PhD Dan Livorsi, MD
Implementation Scientists

• Want to know:
  – Why evidence-based practices are adopted
  – How they’re adapted to fit a specific context
  – How the pace of adoption can be accelerated

-“What is Implementation Science? Implications for Conducting Antimicrobial Stewardship Research” by H. Reisinger, PhD and D. Livorsi, MD
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Conceptual model of implementation research

Implementation Research in Mental Health Services: an Emerging Science with Conceptual, Methodological, and Training challenges

Enola K. Proctor · John Landsverk · Gregory Aarons · David Chambers · Charles Glisson · Brian Mittman
• Frames core elements of implementation research
• Distinguishes two required strategies:
  – Evidence-based intervention strategies
  – Separate strategies for implementing interventions in usual care
• Implementation strategies are key component to be manipulated
• Differential effects on three outcomes
  – Ultimate goal - improve clinical outcomes
• “Intermediate outcomes” - important, particularly in relation to implementation strategies
  – Improving acceptability of interventions may be a worthy goal itself
• Call for multilevel implementation strategies
  – Explicitly mentions levels of implementation context
Overview

• Definitions/context
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• **Couple important concepts**
• Models for Implementation Research
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• Expected effect of an intervention is presumed to decrease over time as practitioners adapt the delivery of the intervention.
Voltage Drop

- Effect of an intervention is presumed to decrease as testing moves from Efficacy to Effectiveness to Dissemination and Implementation
Overview

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- Identified 109 models → 61 included in review

<table>
<thead>
<tr>
<th>Category</th>
<th>Variable definition</th>
<th>Anchor definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construct flexibility</td>
<td>Definition/flexibility of model constructs</td>
<td>1 = Broad: loosely outlined and defined constructs; allows researchers greater</td>
</tr>
<tr>
<td></td>
<td></td>
<td>flexibility to apply the model to a wide array of D&amp;I activities and contexts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 = Operational: detailed, step-by-step actions for completion of D&amp;I research</td>
</tr>
<tr>
<td></td>
<td></td>
<td>processes</td>
</tr>
<tr>
<td>Dissemination and/or implementation</td>
<td>Focus on dissemination and/or implementation activities</td>
<td>Donly: Focus on active approach of spreading evidence-based interventions to the</td>
</tr>
<tr>
<td>(D/I)</td>
<td></td>
<td>target audience via determined channels using planned strategies</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D=I: Equal focus on dissemination and implementation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I-only: Focus on process of putting to use or integrating evidence-based interventions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>within a setting</td>
</tr>
<tr>
<td>Socioecologic framework</td>
<td>Level of the framework at which the model operates</td>
<td>Individual: Personal characteristics</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Organization: Hospitals, service organizations, factory</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Community: Local government, neighborhood</td>
</tr>
<tr>
<td></td>
<td></td>
<td>System: Hospital system, government</td>
</tr>
</tbody>
</table>
Bridging Research and Practice
Models for Dissemination and Implementation Research

Rachel G. Tabak, PhD, Elaine C. Khoong, BS, David A. Chambers, DPhil,
Ross C. Brownson, PhD

Table 2. Categorization of D&I models for use in research studies

<table>
<thead>
<tr>
<th>Model</th>
<th>Dissemination and/or Implementation</th>
<th>Construct flexibility: broad to operational</th>
<th>Socioecologic Level</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diffusion of Innovation</td>
<td>D-only</td>
<td>1</td>
<td>System</td>
<td>x</td>
</tr>
<tr>
<td>RAND Model of Persuasive Communication and</td>
<td>D-only</td>
<td>1</td>
<td>Community</td>
<td>x</td>
</tr>
<tr>
<td>Diffusion of Medical Innovation</td>
<td></td>
<td></td>
<td>Organization</td>
<td>x</td>
</tr>
<tr>
<td>Effective Dissemination Strategies</td>
<td>D-only</td>
<td>2</td>
<td>Individual</td>
<td>x</td>
</tr>
<tr>
<td>Model for Locally Based Research Transfer</td>
<td>D-only</td>
<td>2</td>
<td>Policy</td>
<td>x</td>
</tr>
<tr>
<td>Development</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Streams of Policy Process</td>
<td>D-only</td>
<td>2</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>A Conceptual Model of Knowledge Utilization</td>
<td>D-only</td>
<td>3</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Conceptual Framework for Research</td>
<td>D-only</td>
<td>3</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Knowledge Transfer and Utilization</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Finding the Right Implementation Models

http://dissemination-implementation.org

Dissemination & Implementation Models in Health Research & Practice

This interactive website was designed to help researchers and practitioners to select the D&I Model that best fits their research question or practice problem, adapt the model to the study or practice context, fully integrate the model into the research or practice process, and find existing measurement instruments for the model constructs. The term “Models” is used to refer to both theories and frameworks that enhance dissemination and implementation of evidence-based interventions more likely.

Select
Search, view, and select D&I Models

Adapt
Read strategies for adapting D&I Models to research or practice context

Integrate
Read strategies for incorporating D&I Models into the full spectrum of your project

Measure constructs
Find a list of constructs and links to measurement tools associated with the D&I Models

Adapted from “A Brief Introduction to Implementation Science” by D. Chambers, DPhil
More than Efficacy/Effectiveness

Evaluating the Public Health Impact of Health Promotion Interventions: The RE-AIM Framework

Ross Glasgow, MS, PhD

Russell E. Glasgow, PhD, Thomas M. Vogt, MD, MPH, and Shawn M. Boles, PhD
## RE-AIM

### Reach
Absolute number, proportion, and representativeness of individuals who participate.

**Research Questions**
What proportion of states have statewide protocols or triage guidelines?

### Effectiveness
The impact of an intervention on outcomes (including potential negative effects)

**Research Questions**
Have there been any unexpected outcomes or negative effects associated with existing protocols?
If so, what implementation factors may be related to negative effects and how can negative effects be avoided?

- Increase the number of states with statewide protocols or triage guidelines for EMS personnel during mass casualty situations
RE-AIM

- Increase the number of states with statewide protocols or triage guidelines for EMS personnel during mass casualty situations

<table>
<thead>
<tr>
<th>RE-AIM Dimension</th>
<th>Research Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Adoption</strong></td>
<td>What states have adopted protocols and how do they compare to others that have not?</td>
</tr>
<tr>
<td>The absolute number, proportion, and representativeness of those who carry out the intervention</td>
<td>What factors influence the decision to adopt protocols?</td>
</tr>
<tr>
<td><strong>Implementation</strong></td>
<td>What challenges had to be overcome when adopting protocols?</td>
</tr>
<tr>
<td>Consistency of delivery, time and cost of program, and what adaptations to the program are made in various settings</td>
<td>How and why do protocols vary across states?</td>
</tr>
<tr>
<td><strong>Maintenance</strong></td>
<td>Do protocols or guidelines require government approval for renewal?</td>
</tr>
<tr>
<td>Extent to which a program or policy becomes institutionalized</td>
<td></td>
</tr>
</tbody>
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Other Resources

- https://cancercontrol.cancer.gov/IS/sample-grant-applications.html

Examples of Funded Grants

- https://www.academyhealth.org/events/site/11th-annual-conference-science-dissemination-and-implementation-health
Thank you