Practical use of dissemination and implementation outcomes, theories, and research designs

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Research objectives

To support innovative approaches to identifying, understanding, and overcoming barriers to the adoption, adaptation, integration, scale-up and sustainability of evidence-based interventions, tools, policies, and guidelines.

# Implementation Outcomes

**Table 1: Taxonomy of implementation outcomes**

<table>
<thead>
<tr>
<th>Implementation outcome</th>
<th>Level of analysis</th>
<th>Theoretical basis</th>
<th>Other terms in literature</th>
<th>Salience by implementation stage</th>
<th>Available measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceptability</td>
<td>Individual provider</td>
<td>Rogers: “complexity” and to a certain extent “relative advantage”</td>
<td>Satisfaction with various aspects of the innovation (e.g., content, complexity, comfort, delivery, and credibility)</td>
<td>Early for adoption</td>
<td>Survey</td>
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<td></td>
<td>Individual consumer</td>
<td></td>
<td></td>
<td>Ongoing for penetration</td>
<td>Qualitative or semi-structured interviews</td>
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<td></td>
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<td></td>
<td>Late for sustainability</td>
<td>Administrative data</td>
</tr>
<tr>
<td>Adoption</td>
<td>Individual provider</td>
<td>RE-AIM: “adoption” Rogers: “trialability” (particularly for early adopters)</td>
<td>Uptake; utilization; initial implementation; intention to try</td>
<td>Early to mid</td>
<td>Administrative data</td>
</tr>
<tr>
<td></td>
<td>Organization or setting</td>
<td></td>
<td></td>
<td></td>
<td>Observation</td>
</tr>
<tr>
<td>Appropriatepness</td>
<td>Individual provider</td>
<td>Rogers: “compatibility”</td>
<td>Perceived fit; relevance; compatibility; suitability; usefulness; practicability</td>
<td>Early (prior to adoption)</td>
<td>Survey</td>
</tr>
<tr>
<td></td>
<td>Individual consumer</td>
<td></td>
<td></td>
<td></td>
<td>Qualitative or semi-structured interviews</td>
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<td></td>
<td>Organization or setting</td>
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<td></td>
<td>Focus groups</td>
</tr>
<tr>
<td>Feasibility</td>
<td>Individual provider</td>
<td>Rogers: “compatibility” and “trialability”</td>
<td>Actual fit or utility; suitability for everyday use; practicability</td>
<td>Early (during adoption)</td>
<td>Survey</td>
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<tr>
<td></td>
<td>Organization or setting</td>
<td></td>
<td></td>
<td></td>
<td>Administrative data</td>
</tr>
<tr>
<td>Fidelity</td>
<td>Individual provider</td>
<td>RE-AIM: part of “implementation”</td>
<td>Delivered as intended; adherence; integrity; quality of program delivery</td>
<td>Early to mid</td>
<td>Observation</td>
</tr>
<tr>
<td></td>
<td>Organization or setting</td>
<td></td>
<td></td>
<td></td>
<td>Checklists</td>
</tr>
<tr>
<td>Implementation Costs</td>
<td>Provider or providing</td>
<td>TCU Program Change Model: “costs” and “resources”</td>
<td>Marginal cost; cost-effectiveness; cost-benefit</td>
<td>Early for adoption and feasibility</td>
<td>Self-report</td>
</tr>
<tr>
<td></td>
<td>institution</td>
<td></td>
<td></td>
<td></td>
<td>Administrative data</td>
</tr>
<tr>
<td>Penetration</td>
<td>Organization or setting</td>
<td>RE-AIM: necessary for “reach”</td>
<td>Level of institutionalization? Spread? Service access?</td>
<td>Mid for penetration</td>
<td>Case audit</td>
</tr>
<tr>
<td>Sustainability</td>
<td>Administrators</td>
<td>RE-AIM: “maintenance” Rogers: “confirmation”</td>
<td>Maintenance; continuation; durability; incorporation; integration; institutionalization; sustained use; routinization;</td>
<td>Late</td>
<td>Checklists</td>
</tr>
<tr>
<td></td>
<td>Organization or setting</td>
<td></td>
<td></td>
<td></td>
<td>Semi-structured interviews</td>
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</tbody>
</table>

*Fig. 1 Types of outcomes*
An Implementation Science Outcome Model

Individual/Patient Level
Those Intended to Benefit

Staff/Organizational Level

Ingredient 3: Conceptual Model—Outcomes

You can’t get to practical without practice: co-production of evidence

• **Integration of scientific and community/clinical systems** to address questions that are scientifically innovative *and* have practical implications for stakeholders.

• A process of developing sustainable program, practice, or policy approaches **using a vertical and horizontal systems approach**.

• Research synthesis focuses on **evidence-based principles (i.e., active ingredients)** rather than products.

• Organizational or system governance, values, resources, strategies and structure are leveraged to **design for scale and sustainability**.

Estabrooks & Glasgow, 2006; Cairey & Oliver, 2017
Co-Production of Research: A Process Model/Integrated Research-Practice Partnerships

Evidence-Based Strategies

Tested in
- Multiple Settings
- Critical Elements: Peer Sharing, Group feedback, Sense of Distinction, Group goal setting, Group Roles
- Diverse Samples

Fit

Design Fit
- Walk Kansas
- Re-invention of intervention retaining critical elements but reducing contact

Demonstration Project

Delivery Sites

Organization
- Cooperative Extension
- Extension Office
- Agents
  - Office Staff Engagement
  - Limited Staff Time
  - Available Resources
  - Space Limits
  - Current Health Programs
  - Scheduling & Cost of Delivery

Ingredient 3: Conceptual Model—Process

Estabrooks, Bradshaw, Dzewaltowski, & Smith-Ray, ABM, 2008; Estabrooks & Glasgow, AJPM, 2006
Estabrooks et al., *Annals of Behavioral Medicine, 2008*
Diffusions of Innovation: An Explanatory Model

**Ingredient 3: Conceptual Model—Explanatory**

*Downey et al., Health Promotion Practice, 2012*
Ingredient 3: Conceptual Model—Process

Estabrooks, Harden, Almeida, Hill, Johnson, Greenawald, in progress
Who is involved?

- Interdisciplinary Obesity Researchers
- Central and Regional Health System Administrators
- Inter-professional Program Delivery Staff

Ingredient 4: Demonstrate Stakeholder Priorities and engagement in change
Carilion Healthy Lifestyle Study
Problem Prioritization & Research Questions

• Problem Prioritization (Ingredient 1: Quality Gap)
  • 68% of patients have a BMI >25 (target population) and ask nurse care coordinators about weight loss.
  • Patient education handouts to support weight loss.
  • Nursing leadership would like a systematic approach

• Research Questions
  • What is the best way to increase evidence-based weight management support through Care Coordinators?
    • How feasible is it?
    • Can an adapted evidence-based approach help patients lose a clinically meaningful amount of weight?
Carilion Healthy Lifestyle Study
Strategy Selection & Adaptation

• Strategy selection (Ingredient 2: EB Intervention)
  • Clinical Intervention—lifestyle intervention that can be reimbursed—DPP Lifestyle Intervention
  • Implementation strategy—consultee centered approach.

• Strategy Adaptation (Ingredient 6: Implementation Strategy)
  • DPP materials moved to telephone and one-on-one sessions (scripted, manualized, and process evaluation tools).
  • Integrate counseling tools into electronic health record.
  • Consultee centered approach developed from principles (completely ‘new’ intervention) and integrating evidence-based 5 A’s principles—to facilitate goal setting, barrier resolution, and feedback
Carilion Healthy Lifestyle Study
Integration Trial (Ingredient 8: Design Feasibility)

- Quasi Experimental Type
- 3 HEI Design
- 3 Regions
- 2 received 1, 2 hour CME
- 1 received CME plus, 1 month, 3 month, 6 month, and 12 month follow-up integrated in regular staff meetings
- Intervention region purposefully selected to not be health system ‘hub’ region

Carilion NRV Care Coordinator Action Plan

Why do we think it is important to help our patients?
- To improve the health of patients and the community
- To help prevent and manage chronic diseases, such as diabetes
- To improve patients’ quality of life and happiness
- To improve patients’ self-confidence
- To provide motivation and accountability for patients to help.

Our plan to engage patients in the Healthy Lifestyles program will be:

- Recruit 13 patients over the next month.
- Recruit 40 patients over the next 3 months.
- Recruit 79 patients over the next 6 months.
- Recruit 157 patients over the next 12 months.

What are our 3 biggest obstacles that could get in the way of achieving our goal?
1. Time—both to fit in 30-45 minute sessions and interruptions during sessions
2. Provider Support
3. Patient Commitment

What can you do to get past these obstacles? (Write 3 strategies for each obstacle)

**Time:**
1. Schedule during time when providers are not seeing patients (e.g., 1-1:45)
2. Block of protected slots on schedule
3. Schedule provider ‘drop-offs’ at another time so they don’t interrupt sessions

**Provider Support:**
1. Highlight role of changes in weight and related outcomes on score card indicators
2. Using weekly provider meetings to provide education and share program fliers
3. Schedule provider ‘drop-offs’ at another time so they don’t interrupt sessions
4. Share success stories with providers
5. Conduct one-on-one meetings with providers

**Patient Commitment**
1. Use program contract
2. Write BMI on schedule
3. Send patient a letter
4. Make the sessions convenient

What tools do we have that can help us meet our goals?

- **People** who will support us: Other care coordinators; care coordinator leadership; weight loss program partners.
- **Materials** that can help: Workbook, lesson plans, call scripts, program evaluations
- **Resources** that we can use: Clinic space, appendices from workbook
Carilion Healthy Lifestyle Study Evaluation

Nurse Training Outcomes

Patient Outcomes

Ingredient 9: Measurement and Analysis

My Healthy Action Plan

“The most important thing I will do today is to make a commitment to myself and develop a personal plan of action to achieve a healthy weight!”
Carilion Healthy Lifestyle Study
Decision Making (Ingredient 10: Policy Environment Support)

Clinical intervention
• Effective and feasible
• Additional program adaptations needed
• Changes to EHR coding would improve the efficiency of reporting
• Decision to maintain implementation and continue to scale across clinics.

Implementation Strategy
• Improved adoption, reach, and sustainability… an proportion of patients achieving a clinically meaningful weight loss (at 1 year)
• Future training may need adaption to focus on patient engagement and retention strategies
• Training facilitator needed—and job description created, budgeted, posted and hired
Moving outside of the healthcare setting (mostly)

Integrated Research-Practice Partnership

Interdisciplinary Obesity Researchers

Health System Payer

Commercial Program Delivery Staff
Early work of the partnership
Problem Prioritization & Research Questions

- Targeted email, internet, and financial incentive-based workplace weight loss program compared to a primarily self-guided, informational intervention without incentives.
- 28 worksites, ~6400 employees
- Significant impact on reach; non-significant difference in proportion of overweight and obese employees that lost 5% of initial body weight

![Chart showing comparison between IncentaHEALTH and Livin' My Weigh over 6 months, 12 months, 18 months, and 24 months across different worksites.](chart_image)
Weigh and Win
Problem Prioritization & Research Questions

• Problem Prioritization
  • High prevalence of obesity (even in Colorado).
  • Community benefit goal of health systems.
  • Need for scalable interventions (increasing reach at limited incremental costs)

• Research Questions
  • How many people will participate in an incentive, internet, and community-based weight loss program?
  • What proportion will lose a clinically meaningful amount of weight and at what cost?
Weigh and Win
Strategy Selection & Adaptation

• Strategy selection
  • Social cognitive theory targeted approach to behavior change.
  • Light environmental intervention (marketing/kiosks)
  • Behavioral economics to improve reach ($)

• Strategy Adaptation
  • Community marketing rather than worksite.
  • Incentive amounts changed slightly.
  • Kiosks in community settings rather than workplaces
Weigh and Win Integration Trial

• Longitudinal Quasi-Experimental without Control
  • Objective assessment of weight
  • Partnership developed outcomes
Weigh and Win
Evaluation-Reach, Effectiveness, Cost

- 40,308 (79% female; 73% white) between 2011 and 2014
  - Ave Age: 43.9 (SD=13.1)
  - Ave BMI: 32.3 (SD=7.44)
  - Cost per participant $62.50 (BMI<25); $71.50 (BMI>25)

- Weight Loss: Using baseline-value-carried-forward analysis
  - 2.1kg (SD=6.47)
  - 46% of participants losing weight
  - 27% lost 3% of initial body weight
  - 19% lost 5% of initial body weight
  - $373 per 5% weight loss

- African American participants vs Non African American participants:
  - 37% more likely to lose 3% body weight
  - 38% more likely to maintain that WL for > a year
  - $272 per 5% weight loss
Weigh and Win
Decision Making

- Consideration for continued funding Weigh and win:
  
  (a) demonstrated broad reach and may contribute to reducing health disparities experienced by African Americans
  
  (b) had a cost per participant that rates favorably against other commercial weight loss programs
  
  (c) the costs per participant that achieved a clinically meaningful weight loss appear to be modest

- Conclusion was sustained funding for the initiative.

Estabrooks et al., 2017
Practicality and explanatory value of the co-production of evidence model

- Establishing or using existing monitoring and evaluation systems to reduce complexity and increase observability and trailability
- A focus on resources and costs that can document relative advantage
- Engaged implementers and systemic decision makers to ensure compatibility with organizational structure, values, and resources.
- Tailoring the approach to the local context to enhance compatibility of initiative to specific populations and settings
- Systematic use of evidence from practice and research to enhance relative advantage
- Improved infrastructure capacity to support implementation
- Systemic ownership, initiative champions

Rogers, 2003; Milat et al. Narrative Review of Models and Success for Scale Up, 2012
Lessons Learned
Practical use of D&I outcomes, designs, and theory
• Integrated processes provide opportunity to justify decisions that include
  • Using existing data that is likely more generalizable to other settings, but often less precise than traditional research outcomes
  • Identify implementation outcomes that are meaningful for decision making
  • Focus on explanatory processes that align with the extant literature, but are selectively assessed based on setting context
  • Using a variety of research designs and those most compelling for a given practice partner to make sustainability decisions
Summary
10 Ingredients

• Integrated research-practice partnerships that include a horizontal and vertical systems-based approach explicitly address 8/10 key ingredients to writing successful D&I grants

• What’s not explicitly addressed?

  • **Ingredient 5: Settings readiness to adopt a new intervention**
  
  • **Ingredient 7: Team experience with the setting, treatment, implementation process, and review environment.**
Acknowledgements

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  - Kansas State Cooperative Extension
  - Carilion Clinic Dept of Family and Community Medicine and the Chronic Care Coordination Leadership and Nurses
  - Kaiser Permanente Colorado
  - IncentaHealth

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- Funding support from the National Institutes of Health
"We have time for just one long-winded, self-indulgent question that relates to nothing we've been talking about."