Thinking about implementation: some general frameworks and guidelines

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What is implementation science?

"the scientific study of methods to promote the systematic uptake of research findings and other evidence-based practices into routine practice, and, hence, to improve the quality and effectiveness of health services"

Eccles MP, Mittman BS. (2006) Welcome to implementation science. Implementation Science, 1(1).

Part of the translational science spectrum



Why is it needed?

- Previously, assumed "if we build it, they will come"
- Reality: it takes 17 years for evidence to be routinized into practice
- Funders are asking for it
 - IS addresses the lack of research impact

Concepts and Assumptions

- Evidence
 - The *what* of implementation: a robust solution
- Implementation 'methods'
 - The how of implementation: mechanism of action
- Practice, which entails Context
 - Practice: the where/who of implementation
 - Context not so easily localized, and heterogeneously conceptualized
 - Culture, resources, leadership, infrastructure, economic climate, etc.



What does it look like?

Fundamentals of Implementation Research

IR Characteristic	Application for use
Systematic	 The systematic study of how a specific set of activities integrate an evidence-based public health intervention within specific settings and how health outcomes vary across communities Balances relevance with rigor, strictly adhering to norms of scientific inquiry
Multidisciplinary	 Analysis of biological, social, economic, political, system, and environmental factors that impact implementation Interdisciplinary collaborations between behavioral and social scientists, clinicians, epidemiologists, statisticians, engineers, business analysts, policy makers, and stakeholders
Contextual	 It is relevant to local specifics and need Generates generalizable knowledge that can be applied across contexts Culture, community
Complex	 Dynamic and adaptive Multi-scale: occurs at multiple levels of health care systems and community practices Analyzes multi-component programs and policies Non-linear, iterative, evolving

Models and frameworks

- Measure implementation of X
 - Re-AIM
- Frameworks describing implementation
 influencers for X
 - CFIR

CFIR

Consolidated framework for implementation research



Table 4 Recommendations for applying the CIFR in implementation research

Recommendation	Rationale
Consider how to most meaningfully use the CFIR across different phases of implementation (pre-, during, or post-implementation).	Explicit use and reporting of CFIR constructs at various phases of implementation would allow comparisons across phases.

researchers can operationalize CFIR

How

Report how CFIR constructs were selected for assessment.

Help to ensure rigor of implementation studies (i.e., that the most salient implementation-related factors were investigated) and promotes the ability to compare research over time and across contexts.

Increase use of CFIR to investigate Investigation of outcomes allows for more robust comparisons across studies to identify which constructs influence outcomes and under what

conditions.

Integrate the CFIR more holistically into the research process.

Integrating the CFIR into research question development and data collection efforts early-on will strengthen research and applicability of findings.

Re-AIM

Dimension ^a	Level
Reach (proportion of the target population that participated in the intervention)	Individual
Efficacy (success rate if implemented as in guidelines; defined as positive outcomes minus negative outcomes)	Individual
Adoption (proportion of settings, practices, and plans that will adopt this intervention)	Organization
Implementation (extent to which the intervention is implemented as intended in the real world)	Organization
Maintenance (extent to which a program is sustained over time)	Individual and organization

Glasgow, R. E., Vogt, T. M., & Boles, S. M. (1999). Evaluating the public health impact of health promotion interventions: the RE-AIM framework. *American Journal of Public Health*, *89*(9), 1322–1327.

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TABLE 1-Inclusion of RE-AIM Elements Across All Articles Included in Review by Dimension and Evaluation Criteria: 1999-2010

	RE-AIM Dimension and Evaluation Criteria Reported	Average Inclusion,
	Reach (n = 65) all 4 criteria reported	0.0
	Exclusion criteria (% excluded or characteristics)	61.5
	Percentage of individuals who participate, based on valid denominator	83.1
	Characteristics of participants compared with nonparticipants; to local sample	58.5
	Use of qualitative methods to understand recruitment	12.3
Ном	Effectiveness (n = 55) all 6 criteria reported	1.9
	Measure of primary outcome	89.1
rosoarchors	Measure of primary outcome relative to public health goal Measure of broader outcomes or use of multiple criteria (e.g., measure of quality of life or potential negative outcome)	
researchers		
Neasure of robustness across subgroups (e.g., moderation analyses) Measure of short-term attrition (%) and differential rates by patient characteristics or treatment group		48.2
		43.6
oporationalized	Use of qualitative methods/data to understand outcomes	7.3
operationalized	Adoption-setting level (n = 58) all 4 criteria reported	0.0
	Setting exclusions (% or reasons or both)	39.7
RE-AIIVI	Percentage of settings approached that participate (valid denominator)	56.9
	Characteristics of settings participating (both comparison and intervention) compared with either (1) nonparticipants or (2) some relevant resource data	37.9
	Use of qualitative methods to understand setting level adoption	3.5
	Adoption-staff level (n = 53) all 4 criteria reported	0.0
	Staff exclusions (% or reasons or both)	11.3
	Percent of staff offered that participate	35.9
	Characteristics of staff participants vs nonparticipating staff or typical staff	17.0
	Use of qualitative methods to understand staff participation/staff level adoption	9.4
	Implementation (n = 64) all 6 criteria reported	1.6
	Percent of perfect delivery or calls completed (e.g., fidelity)	76.6
	Adaptations made to intervention during study (not fidelity)	14.1
	Cost of intervention-time	14.1
	Cost of intervention-money	23.4
	Consistency of implementation across staff/time/settings/subgroups (not about differential outcomes, but process)	35.9
	Use of qualitative methods to understand implementation	15.6
	Maintenance-individual level (n = 46) all 6 criteria reported	2.2
	Measure of primary outcome (with comparison with a public health goal) at ≥ 6 mo follow-up after final treatment contact	63.0
	Measure of primary outcome ≥ 6 mo follow-up after final treatment contact	56.5
	Measure of broader outcomes (e.g., measure of quality of life or potential negative outcome) or use of multiple criteria at follow-up	32.6
	Robustness data-something about subgroup effects over the long-term	26.1
Carlia at al. 2012	Measure of long-term attrition (%) and differential rates by patient characteristics or treatment condition	28.3
Gaglio et al. 2015	Use of qualitative methods data to understand long-term effects	4.4
	Maintenance-setting level (n = 51) all 4 criteria reported	0.0
	If program is still ongoing at \geq 6 mo posttreatment follow-up	41.2
	If and how program was adapted long-term (which elements retained after program completed)	7.8
	Some measure/discussion of alignment to organization mission or sustainability of business model	15.7
	Use of qualitative methods data to understand setting level institutionalization	5.9

Note. RE-AIM = Reach, Effectiveness, Adoption, Implementation, and Maintenance.

Review papers (FYI)

- Models for dissemination and implementation research (Tabak et al., 2012
- Theoretical domains framework (Michie et al., 2005)
- measurement resources for D&I research (Rabin et al., 2016; Chaudoir et al., 2013)
- Implementation strategies (Leeman et al., 2017)
- Outcomes for IS; review of instruments (Lewis et al., 2015)

Examples of IS aims

- Data from this study provide information about the specific ad hoc adaptations clinicians used to implement brief CBT in a mental health integrated primary care setting. Knowledge of the scope of potential adaptations will inform implementation planning for brief EBPs to better balance intervention fidelity with real-world implementation delivery. (Mignogna et al, 2018)
- This study's goals were to understand organizational responses to the HAC policy, including internal and external influences that moderated the success or failure of QI efforts (Wald et al., 2012)
- To estimate the program reach (number and representativeness) and implementation rates (i.e., adoption of occupational sun protection policies and delivery of sun safety education) achieved by the *SSW-IP* and *SSW-T* in a model of national distribution to public safety and public works industries (sample grants PDF)
- To evaluate processes and determinants of Eban implementation and Eban clinical effectiveness to strengthen the clinical intervention and its implementation by: (hamilton et al., 2014)
 - Assessing acceptability of the intervention, and barriers and facilitators to its implementation;
 - Examining key determinants of fidelity;
 - Understanding how the project's implementation strategies and tools affect adoption, fidelity, and effectiveness; and
 - Examining key determinants of sustainability.

Example of recent funded grant

- AIM 1. To determine civil surgeons' adherence to new CDC guidelines, specifically the percentage of civil surgeons who: 1) screen using a blood test, 2) report LTBI-positive GCAs to the health department, and 3) inform GCAs of their LTBI diagnosis.
- AIM 2. To determine the effect of the implementation of the new CDC guidelines on LTBI treatment rates among GCAs. HYPOTHESIS: Higher implementation fidelity to these new guidelines will result in greater initiation and completion of LTBI treatment among GCAs.
- AIM 3. To explore facilitators and potentially modifiable barriers to guideline adherence among civil surgeons.
- This is an evaluation of a new policy, and the goal is not to assume it will be adopted without problems.
- Hybrid implementation and effectiveness design: will determine the EFFECT of guidelines on TB treatment rates, and hypothesizes that higher fidelity doctors will be linked to higher treatment rates

IS in Nursing

- **Aim 2.** Identify CNL implementation characteristics that are sufficient and necessary to achieve outcomes.
- <u>Hypothesis:</u> Specific patterns of CNL care model structures and processes will be consistently present in units with improved outcomes.
- <u>Approach</u>: Already collected data (surveys, interviews) will be used to identify, characterize, and measure CNL implementation in each clinical unit. Qualitative Comparative Analysis will be used to identify CNL implementation and practice characteristics that are consistently present in units with improved outcomes (sufficient conditions) and thresholds that must be in place for outcomes to occur (necessary conditions).

Summary

- IS research is about how what you want to develop and test can be routinized into practice
 - Hint, it won't happen by itself
- The earlier this addressed, the more chances for ultimate adoption
- Can be as simple as asking people their opinions
 - If we can develop X, what are your thoughts about it? What makes you excited or nervous about it? What would be the barriers to adoption?

Exercise!

- Break into teams/chat rooms 15 minutes
- Identify 1 CFIR and 1 Re-AIM concept
- Develop an EBP (real, made up) and consider the following in relation to the EBP rollout into practice
 - HOW (including measurement)
 - WHY (why these concepts? What do you hope to find out by using them?
- Report out
 - Be prepared to report out your findings to the class in a short 2-3 minute summary

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