The Role of Economic Evaluation in Implementation Science

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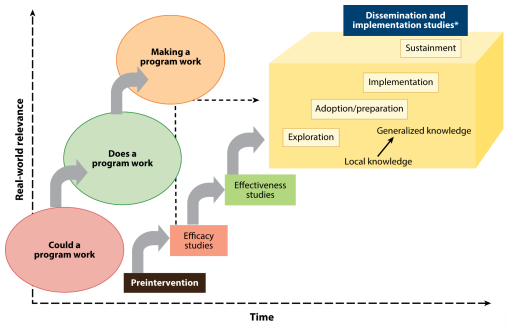
Implementation Science

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, M. P., & Mittman, B. S. (2006). Welcome to implementation science. Implementation Science 1, 1.



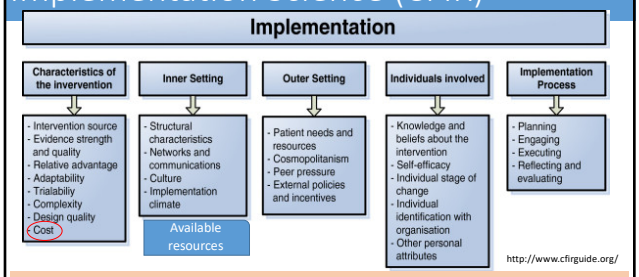
*These dissemination and implementation stages include systematic monitoring, evaluation, and adaptation as required.

Brown CH, et al. 2017.
Annu. Rev. Public Health. 38:1–22

IS Frameworks

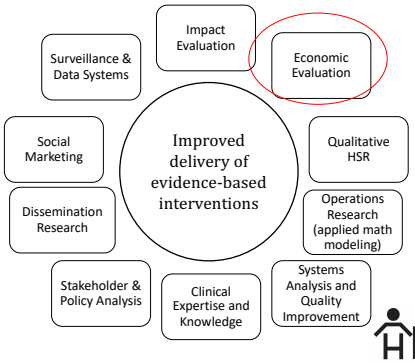
- >90 implementation frameworks and models
- No definitive theory of implementation or no single framework is commonly accepted in the field – but common themes emerge from frameworks

Consolidated Framework For Implementation Science (CFIR)



Costs of intervention and costs associated with implementing that intervention, including investment, supply, and opportunity costs. It is important to differentiate this construct from available resources (part of inner setting). In many contexts, costs are difficult to capture and available resources may have a more direct influence on implementation.

Framework for the field of implementation science

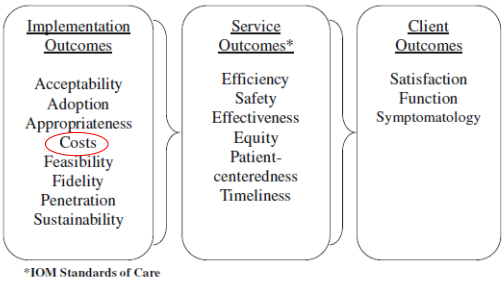


Widely-used implementation science framework

- Glasgow → RE-AIM (1999)
  - **Reach:** What percent and types of patients are reached.
  - **Effectiveness:** For whom among the patients reached is the intervention effective? In improving what outcomes? With what unanticipated consequences?
  - **Adoption:** In what percent and types of settings/staff/population is this approach adopted?
  - **Implementation:** How consistently are different parts of this intervention implemented? At what cost to different parties?
  - **Maintenance:** How well are the intervention components and their effects maintained over time?

Glasgow, R. (1999). Evaluating the public health impact of health promotion interventions: The RE-AIM Framework. *AJPH*, 89(9).

Conceptual Framework for Implementation Outcomes



Proctor et al

Implementation science (IS) outcomes

- **Acceptability**: the perception among implementation stakeholders that a given treatment/service innovation is agreeable or satisfactory
- **Adoption:** Uptake of a practice/intervention (provider's perspective)
- **Appropriateness:** Perceived fit/relevance of intervention for a given practice setting or perceived fit to address a particular issue (provider, or consumer perspective)
- **Feasibility:** Extent to which a new intervention can be successfully carried out within a given healthcare setting (eg existence of sufficient resources/staff)

Implementation science outcomes (2)

- **Fidelity**: degree to which intervention was implemented as intended by program developers (eg adherence to protocol, quality of delivery). *Important concern for researchers seeking to transfer intervention from clinical trial to real-world setting.*
- **Penetration:** Intervention coverage among eligible persons/patients
- **Sustainability:** Extent to which new intervention is maintained/institutionalized within healthcare setting's ongoing, stable operations
- **Implementation cost**: incremental cost of implementing intervention within healthcare setting

Implementation cost

- Costs of implementing intervention depends on
  - *Unit cost of intervention:* Supplies & resources needed
  - *Implementation strategy:* Type of provider delivering intervention, ongoing training or supervision needed,
  - *Location of service delivery:* Solo practice vs. tertiary health center—affects overhead costs & how intervention is delivered
- Implementation costs depend on other IS measures
  - Adoption
  - Penetration

  Measures not available in RCT
- Implementation costs inform other IS measures
  - Feasibility
  - Sustainability

Measuring costs within IS studies

- Cost collection methods similar to those for costing within a RCT
  - Microcosting, time in motion studies, staff interviews
- Costs are collected at several stages of intervention implementation (start up, fully scaled up, etc).
- Ongoing changes in IS interventions are common to optimize coverage
  - Eg. Community mobilization may be added if intervention demand is low (penetration)
  - Intervention delivery may be modified in response to provider feedback about staff time need to administer intervention (feasibility)
- Therefore costs change as intervention is adapted
- Challenges of accurately measuring costs of changing intervention

Uses of costs collected in IS studies

- Intervention costs from RCTs commonly used for **cost-effectiveness analyses** (CEAs).

Incremental cost effectiveness ratio (ICER)

$$\text{ICER} = \frac{\text{Cost}_{\text{Intervention}} - \text{Cost}_{\text{Comparator}}}{\text{Effectiveness}_{\text{Intervention}} - \text{Effectiveness}_{\text{Comparator}}}$$

$$\frac{\text{Increase in costs}}{\text{Increase in effectiveness}}$$

- Effectiveness from RCTs is often obtained from models to estimate DALYs or QALYs: **health outcomes**
- IS outcomes are **process outcomes**: acceptability, fidelity etc. IS literature often uses term CEA for cost per process outcome, eg unit of fidelity. Differs from traditional CEAs.

Measurement of implementation outcomes

- Wide array of measurement approaches in literature
  - Acceptability can be measured through previously developed scales (eg Evidence-Based Practice Attitude Scale (EBPAS)) or semi-structured interviews
  - Adoption can be measured through pre/post surveys of healthcare provider activities and/or standardized interview techniques
  - Fidelity can be measured through intervention adherence, quality metrics, or "dose" of intervention delivered. Scales for unity of fidelity have also been developed.

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Uses of costs collected in IS studies (2)

- **Budget impact analyses** (BIAs): assess cost and health impact of intervention to address affordability & sustainability.
- BIAs estimate change in expenditure after implementing intervention (including costs offset by intervention).
- Intended users of BIA are those who manage or allocate healthcare budgets (Eg. Ministry of Health).
- BIAs have limited generalizability to other settings but are intended for use in specific healthcare setting where they are conducted
- Conducted from provider perspective (different from CEAs)
- Society for Pharmacoeconomics and Outcomes Research (ISPOR) published their Task Force's guidelines on best practices for BIAs

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Thank you!

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