INTRODUCTION TO IMPLEMENTATION SCIENCE

Joanna C Moullin
SUMMARY

- Background and terminology
- Core implementation concepts
- Implementation research & design
- Application
- Resources
EVIDENCE PATHWAY

- Definition
- Evaluation
  - Development & testing
- Service
- Communication
  - Diffusion & Dissemination
- Awareness
- Sustainment
  - Implementation
EVIDENCE PATHWAY

- Definition
- Evaluation
- Service
- Communication
- Awareness
- Gap
- Sustainment
- Implementation
- Development & testing
- Diffusion & Dissemination
EVIDENCE PATHWAY

Integrated Implementation

Definition
Evaluation
Development & testing
Service

Communication
Diffusion & Dissemination
Awareness

Sustainment

Implementation
RE-AIM FRAMEWORK

ADOPTION

REACH

IMPLEMENTATION (FIDELITY)

EFFECTIVENESS

MAINTENANCE (sustainability)

“Individuals cannot benefit from interventions they do not experience”

Schroeder, J.A (2011)

http://www.re-aim.hnfe.vt.edu/
# IMPORTANCE OF IMPLEMENTATION

<table>
<thead>
<tr>
<th>Innovation</th>
<th>Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effective</td>
<td>Effective: Actual benefits</td>
</tr>
<tr>
<td></td>
<td>Not effective: Inconsistent; unsustainable; poor outcomes</td>
</tr>
<tr>
<td>Not effective</td>
<td>Effective: Poor outcomes</td>
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<tr>
<td></td>
<td>Not effective: Poor outcomes; possibly harmful</td>
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Institute of Medicine 2009.
The study of how evidence-based or evidence-informed practices and innovations are adopted, replicated, and scaled up in diverse practice settings

**Diffusion**: Letting it happen
- Focus on the innovation and its adoption

**Dissemination**: Helping it happen
- Focus on practitioner and contextual readiness to understand and use the innovation

**Implementation** (Application): Making it happen
- Focus on how to use the innovation as intended to achieve outcomes

*Knowledge Translation (transfer, exchange)*
Disciplines: Sociology, Political Science, Business, Communications

Theories: Cognitive, Behavioural, Organisational

- Complexity theory and systems thinking to cross ecological models

Similarities and draws from:

- Improvement science (Continuous quality improvement)
- Quality improvement including Six Sigma, Lean thinking etc.
- Change management, organisational change
- Quality of care
<table>
<thead>
<tr>
<th></th>
<th>Health services research</th>
<th>Implementation research</th>
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<tbody>
<tr>
<td><strong>Aim</strong></td>
<td>Understand processes and factors associated with health</td>
<td>Understand processes and factors associated with implementation</td>
</tr>
<tr>
<td><strong>Intervention</strong></td>
<td>Clinical intervention</td>
<td>Implementation intervention</td>
</tr>
<tr>
<td></td>
<td>INNOVATION / SERVICE</td>
<td>STRATEGY / PROGRAM</td>
</tr>
<tr>
<td><strong>Determinants</strong></td>
<td>Health behaviour determinants</td>
<td>Determinants of practice</td>
</tr>
<tr>
<td></td>
<td>DETERMINANTS / BEHAVIOURS</td>
<td>FACTORS / INFLUENCES</td>
</tr>
<tr>
<td><strong>End-user</strong></td>
<td>Patient</td>
<td>Implementer</td>
</tr>
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</table>
IMPLEMENTATION CONCEPTS

In basic terms implementation success is impacted by

✔ What is to be implemented (the innovation)

✔ Where and for whom is the innovation to be implemented (the context)

✔ How and by whom is the innovation to be implemented (the implementation program)

Active Implementation Frameworks: http://nirn.fpg.unc.edu/learn-implementation/implementation-defined
GENERIC IMPLEMENTATION FRAMEWORK

What is to be implemented
1. Innovation

Where and for whom is the innovation to be implemented
2. Context

How and by whom is the innovation to be implemented
3. Process
4. Factors
5. Strategies
6. Evaluations

Moullin JC, Sabater-Hernandez D, Benrimoj SI. 2013
WHAT IS TO BE IMPLEMENTED?

Any Innovation (or any research evidence)
- Novel behaviour or group of behaviours (practice)
- New technology
- Clinical practice guideline or decision aid
- Program or service

<table>
<thead>
<tr>
<th>Fidelity</th>
<th>Adaptation</th>
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<tbody>
<tr>
<td>Service is delivered as it was designed and intended.</td>
<td>Service is adjusted, individualised for the context.</td>
</tr>
<tr>
<td>➢ Only the service as it was studied is known to be effective</td>
<td>➢ The service may not be or unable to be used if not adapted</td>
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WHERE AND FOR WHOM IS THE INNOVATION TO BE IMPLEMENTED

Ecological model of context

- System
- Local setting
- Organisational
- Individuals
- Context Domains

Mendel et al. 2008; Wandersman et al. 2008; Durlak and Dupree 2008
HOW AND BY WHOM IS THE INNOVATION TO BE IMPLEMENTED

Crux of Implementation Science

- Implementation is not a single event but a process
- Is non-linear however is often divided into stages
- Stages may further be broken down into steps

- At each stage implementation is affected by factors, strategies and evaluations
STAGES

- **Exploration (appraisal)**: Appraisal of the service concluding with a decision to either accept/adopt or reject.
- **Preparation (planning)**: Preparation of the service, staff, setting and system ready for delivery.
- **Operation (Implementation)**: Process of commencing to use and integrating a service within a setting.
- **Sustainability (continuation)**: Integration and continuation of service delivery, maintenance of service setting, including system capacity & persistence of service outcomes.

Adoption decision

Initiation of service delivery

Continued delivery, capacity, and service benefits
STAGES

Preparation (planning)

Exploration (appraisal)

Operation (implementation)

Sustainability (continuation)
FACTORS

- Also termed barriers or facilitators
- Effect the implementation process either positively or negatively
- Assess factors at every stage of the implementation process for every domain
- Detailed checklists and questionnaires for determining and classifying factors exist
STRATEGIES

- Strategies are targeted towards building competency/ability, a supportive pharmacy environment and leadership for ongoing implementation and sustainability.
- Tailored interventions are determined to utilise the facilitators and overcome barriers during for each step of the process.
WHAT WE KNOW DOES NOT WORK

Single implementation strategies are not enough:

• Laws and policy changes
• Funding
• Access to or communication (diffusion and dissemination) of information
• Training alone
• Implementation without changing support roles and functions

A combination of multiple strategies across all levels affecting the implementation process are needed.
Then What Does Work?

Must consider context and influencing factors unique to each implementation effort and each setting

Multi-component individualised implementation interventions

Moving towards evidence-based strategies

• Training

• Coaching/facilitation
  • Supervision “More practice, less preach” (role-play over modelling )
    (Bearman et al. & The Research Network on Youth Mental Health 2013)

• Feedback-systems

• Reminders

• Leadership (as well as champions and opinion leaders)

Grol R & Grimshaw J 2003; Scott et al 2012
EVALUATIONS

• Indicators of the movement through the stages
• Formative process evaluation
• Measures of the factors and change in factors (e.g. skills and return on investment)
• Evaluation of the strategies and interventions (implementation program)
• Measurement of implementation and service outcomes
EVALUATIONS

LEVEL OF PROVISION

- REACH -
Number of services performed and number ongoing as percent of potentially eligible participants (a) invited (b) commenced but stopped (d) declined

- FIDELITY -
The extent to which the service is performed as originally designed. Components of fidelity include adherence, dose, quality, patient responsiveness, program differentiation, adaptation.
LEVEL AS SERVICE PROVIDER

- ROUTINISATION -
Degree the new service has become a part of everyday practice.

- INSTITUTIONALISATION -
Support and conditions that encourage, assist and enable service delivery.
RECAP

Six core concepts of implementation

Implementation involves

(1) an innovation,
(2) a multi-level context,
(3) a complex multi-stage process,

Influenced by a range of

(4) factors
(5) strategies
(6) and evaluations (formative and summative).
IMPLEMENTATION RESEARCH

“Seeks to understand the processes and factors that are associated with successful integration of evidence-based interventions within a particular setting”

(Rabin 2008, p. 119)

Grant proposals request

- Dissemination and knowledge translation strategies
- Evaluations of real-world impact
- Maybe in the future an implementation plan?

“State of the science (what researchers collectively know) and the state of the art (what practitioners collectively do) co-existed more or less autonomously, each realm of activity having left effect on the other”

(Dearing & Kee 2012, p. 55.)
IMPLEMENTATION RESEARCH

Scientific investigations that support the movement of innovations into routine care resulting in recommendations for faster take-up of improvements and spread by different people. Includes addressing the level to which health interventions, such as professional services, can fit within real-world public health and clinical service systems.

STUDY DESIGN

- Mixed Methods
- Hybrid design
- Stepped-Wedge
- Comparative-effectiveness

- Pragmatic
- Participatory Action Research
- Intervention mapping
- Analyses: Realist evaluation, social network analysis
<table>
<thead>
<tr>
<th>Cross-over design</th>
<th>Stepped-Wedge</th>
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<tbody>
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<td>X</td>
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1 2 3 4 5
Implementation outcomes: The effects of deliberate and purposive actions to implement new treatments, practices, and services
RESEARCH QUESTIONS

• When is an organization ready to implement a new innovation?
• What supports and systems are needed for effective implementation?
• What organizational and contextual factors support or impede effective implementation?
• What dosage and quality of the service must be provided to produce meaningful impacts?
• What strategies are effective for engaging participants in services?
• How can innovations be adapted for replication in diverse practice settings and with different populations?
## RESEARCH VARIABLES FOR HYPOTHESES

<table>
<thead>
<tr>
<th>Variable 1</th>
<th>Variable 2</th>
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<tbody>
<tr>
<td>‘x’ implementation strategy</td>
<td>“y” implementation process indicator (rate &amp;/or attainment of implementation stages)</td>
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<tr>
<td></td>
<td>‘y’ implementation impact indicator (factor)</td>
</tr>
<tr>
<td></td>
<td>“y” implementation outcome (Fidelity, reach or integration &amp;/or support)</td>
</tr>
<tr>
<td>“x” implementation impact indicator</td>
<td>“y” implementation outcomes (Fidelity or Reach or Integration &amp;/or support) or “y” service outcomes</td>
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<tr>
<td>e.g. x = Implementation climate (or constituents of Culture/Climate/Perception etc.)</td>
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<tr>
<td>e.g. Perception (awareness/acceptance/ understanding) of the service (by pharmacy staff, members of the local community &amp;/or other health care professionals)</td>
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<tr>
<td>e.g. Organisational Capacity/Readiness</td>
<td></td>
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<tr>
<td>“x” implementation outcome</td>
<td>- Rate of movement and attainment of implementation stages</td>
</tr>
<tr>
<td>e.g. x = fidelity or reach</td>
<td>- Patient outcomes</td>
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<tr>
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<td>- Economic, clinical and humanistic outcomes</td>
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REPORTING: STRATEGY

1. Name
2. Define
3. Specify

Seven components specification for measurement and reproducibility

I. Actor
II. Action
III. Action targets
IV. Temporality (when)
V. Dose (duration, how often)
VI. Outcomes
VII. Theory/justification

Accurate reporting allows for efficiency, cost and effectiveness testing
SUMMARY

Influencing factors

Strategies and interventions

Implementation Outcome = Service provision + Service provider

Stages:
- Exploration (appraisal)
- Preparation (planning)
- Operation (implementation)
- Sustainability (continuation)

Domains:
- Innovation
- Individuals
- Organisation
- Local context
- System

Evaluations
TAKE HOME MESSAGES

- Implementation is a process not a point or single event

- Involves multiple stakeholders across different contextual levels

- Implementation affects service process, impact and outcomes
RESOURCES

- **World Health Organization (WHO)**
  The Alliance for Health Policy and Systems Research (AHPSR)
  The Implementation Research Platform (IRP)

- **Cochrane Effective Practice and Organisation of Care Group (EPOC)**
  [http://epoc.cochrane.org/](http://epoc.cochrane.org/)

- **Society for Implementation Research Collaboration (SIRC)**

- **National Implementation Research Network (NIRN)**
  [http://nirn.fpg.unc.edu/](http://nirn.fpg.unc.edu/)

- **Knowledge Translation Canada**
  [http://ktclearinghouse.ca/ktcanada](http://ktclearinghouse.ca/ktcanada)

- **Centre for Effective Services (CES) Dublin**
  [http://www.effectiveservices.org/implement/implementation](http://www.effectiveservices.org/implement/implementation)
RESOURCES: initiatives, groups, networks

- European Implementation Collaborative [http://www.implementation.eu/](http://www.implementation.eu/)
- UK Implementation Network (UK-IN) [http://uk-in.org.uk/index.html](http://uk-in.org.uk/index.html)
- Implementation Network [http://www.implementationnetwork.com](http://www.implementationnetwork.com)
- Triangle Implementation Research Group
- California Implementation Symposium
- Global Conference on Research Integration and Implementation
- Canadian Institute of Health Research: [http://www.cihr-irsc.gc.ca/e/39033.html](http://www.cihr-irsc.gc.ca/e/39033.html)
RESOURCES: theories, models, frameworks, tools, guides

- Institute for Healthcare Improvement: Break Through Series [http://www.ihi.org/resources/Pages/IHIWhitePapers/TheBreakthroughSeriesIHIsCollaborativeModelforAchievingBreakthroughImprovement.aspx](http://www.ihi.org/resources/Pages/IHIWhitePapers/TheBreakthroughSeriesIHIsCollaborativeModelforAchievingBreakthroughImprovement.aspx)
- National Collaborating Centre for Methods and Tools [http://www.nccmt.ca/](http://www.nccmt.ca/)
- Centre for Health Education Dissemination and Implementation Research [http://www.research-practice.org/default.aspx](http://www.research-practice.org/default.aspx)
RESOURCES – SOCIAL MEDIA

- **Twitter**
  - @ImplementSci
  - @diportal_unc
  - @CIHR_IRSC
  - @effectiveserv
  - @ColmpC
  - @gic
  - @researchimpact
  - @ImpTriangle
  - @ImplementCollab
  - @KTCanda

  #impsci  #implementation  #impsciau
  #implementationscience  #pharmimp

- **Youtube** “implementation science”

- **LinkedIn**
RESOURCES - BOOKS
THANK YOU

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