

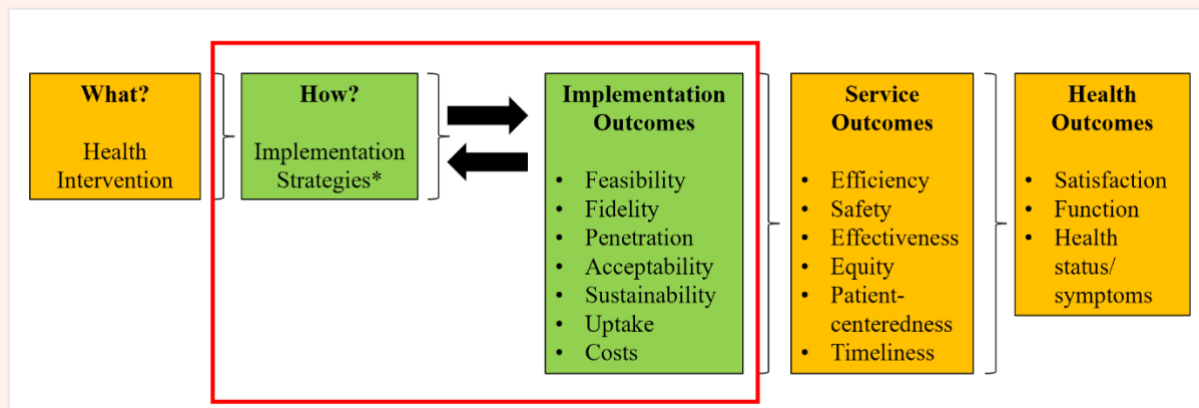
AN INTRODUCTION TO IMPLEMENTATION RESEARCH

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1) Why do we need implementation research?

- Health interventions conducted in clinical research often poorly implemented or even not implemented at all in clinical practice (1). As a result, many clinical research may not produce the expected or intended health benefits to the community in real life.
- Even when effectively implemented, these “evidence-based interventions” might not successfully produce the expected health benefits (2).
- This is mainly because clinical researchers usually focus only on the measurement of services and health outcomes (e.g., effectiveness, patients’ satisfaction, symptomology, etc) but neglect the implementation strategies and the of implementation outcomes in their research methodology (Figure 1).
- As a solution, implementation research is introduced to ensure that health interventions are properly and effectively implemented in real world setting.



**Implementation strategies are defined as methods to enhance the adoption of a health intervention such as the use of job aids, provider education, or audit procedures.*

Figure 1: Implementation research methodology

2) What is the solution?

- Implementation research, also known as implementation science, dissemination research, or translational research, is defined as a scientific study of methods and strategies that facilitate the uptake of evidence-based practices and interventions into routine practices, and, hence, to improve the quality and effectiveness of healthcare and services (3).

- In simple words, implementation research closes the gap between “what we know” and “what we do” (often referred to as the know-do gap).
- Implementation research aims to identify and address barriers that slow or prevent the uptake of proven health interventions and evidence-based practices.

3) Who are the stakeholders in implementation research?

- Different from a “conventional” clinical research, implementation research focuses not only on the outcomes for patients but put great emphasis on the research benefits to the healthcare providers, organisation, and health policies.
- The conduct of an implementation research requires transdisciplinary teams that includes patients, community nurses, research assistants, clinicians, funders, policy-makers, etc.

4) How to conduct an implementation research?

- Various theoretical frameworks have been used to guide implementation research. Specifically, these theoretical frameworks are used to:
 - ✓ Describe or guide the process of implementing research into practices
 - ✓ Understand and/or explain what influences implementation outcomes
 - ✓ Evaluate implementation strategies (4)
- Commonly used theoretical frameworks are:
 - ✓ Consolidated Framework for Implementation Research (CFIR) framework (Figure 2). It classifies 39 implementation constructs into five domains, namely the
 1. outer setting,
 2. intervention characteristics,
 3. inner setting,
 4. implementation process, and
 5. characteristics of individuals,which are considered to be influential moderators or mediators of implementation outcomes (5).
 - ✓ Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) framework (Figure 3). As the name suggests, this framework consists of five domains, namely
 1. Reach,
 2. Effectiveness,
 3. Adoption,
 4. Implementation, and
 5. Maintenance.Through these domains, the implementation of intervention can be assessed at both the individual (i.e., end-user) and organizational (i.e., delivery agent) levels (6).

- ✓ Promoting Action on Research Implementation in Health Services (PARIHS) framework (Figure 4). It comprises of three interacting domains, namely
 1. Evidence (i.e., knowledge from past research, clinical experience, local data, etc);
 2. Context (i.e., the quality of the environment or setting in which the research is implemented); and
 3. Facilitation (i.e., supports offered to help people to change their attitudes, habits, skills, ways of thinking, and working) (7).

Successful implementation is a function of Evidence, Context, and Facilitation.

- ✓ Theory of Planned Behaviour
- ✓ Transtheoretical Model
- ✓ Health Belief Model
- ✓ Socioecological Model

- Application of these theoretical frameworks is meant to facilitate the identification of determinants of implementation, guide the selection of implementation strategies, and inform all phases of the research, including the constructs to be measured and the relationships among constructs to be tested.
- It is best to identify what are the ultimate aims of the intervention when choosing which framework is best suited to the intervention at hand.
- It may be acceptable to use more than one framework to progress implementation evidence into practice.

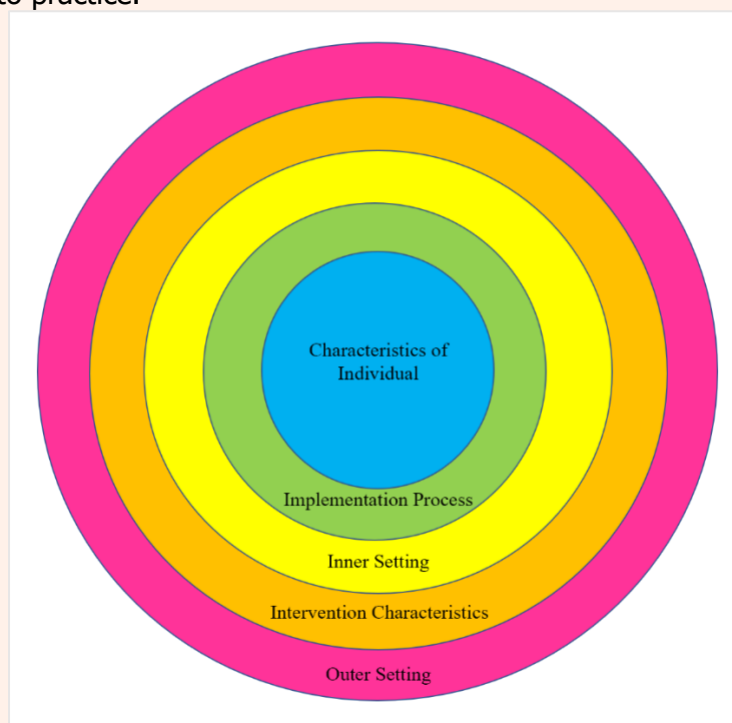


Figure 2: Consolidated Framework for Implementation Research (CFIR) Framework

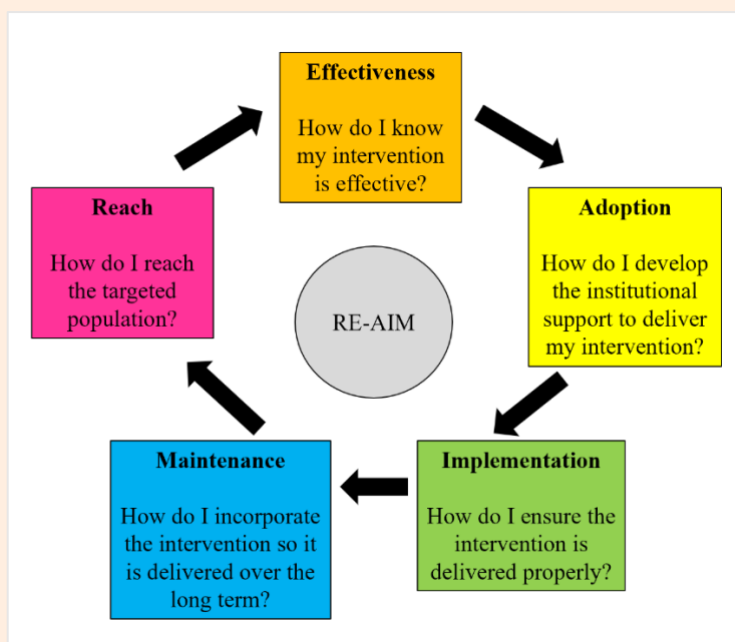


Figure 3: Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) framework

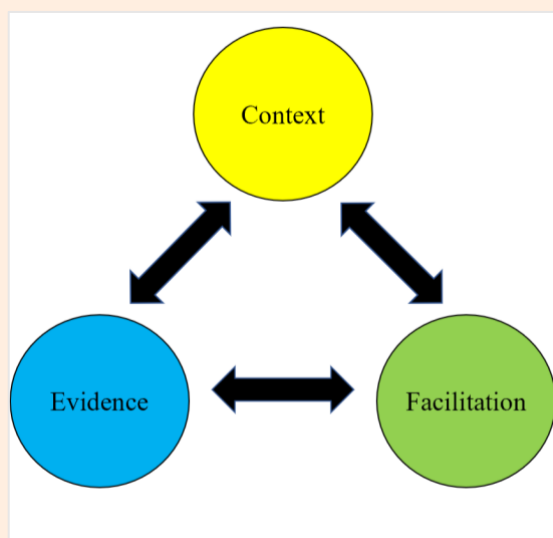


Figure 4: Promoting Action on Research Implementation in Health Services (PARIHS) framework

5) When to apply implementation strategies?

- In implementation research, implementation strategies can be applied in the pre-intervention (pilot) phase, intervention phase, and/or post-intervention (scale-up) phase (Figure 5).

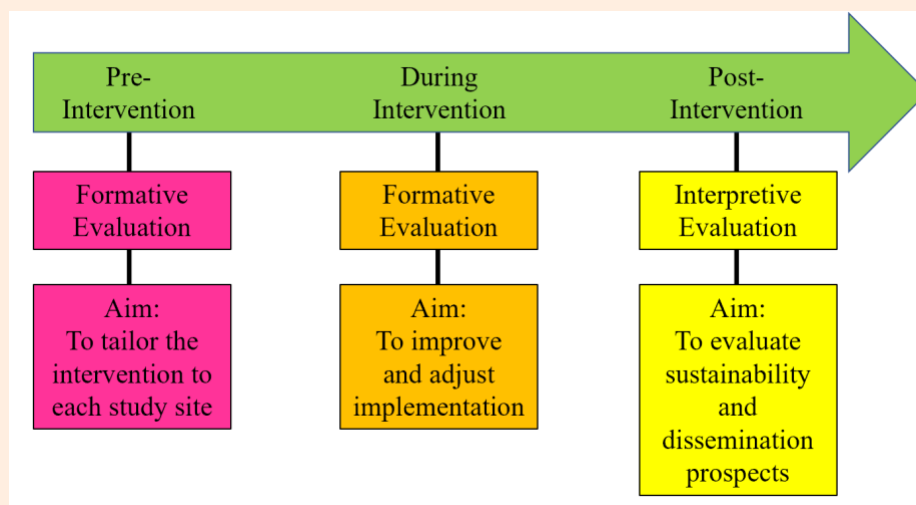


Figure 5: Phases of study when implementation strategies can be applied

6) How to measure implementation outcomes?

Example: "The Effectiveness of Motivational Interview in Improving Adherence to Anti-Hypertensive Medication – A Multicenter Study"

- In the example above, we are interested to know how the health intervention (i.e., motivational interview) can be implemented in real life setting to improve patients' adherence to anti-hypertensive medications.
- In this example, we will incorporate the RE-AIM framework to identify all possible barriers of motivational interviews using a mixed-methods approach. The barriers identified will subsequently allow implementation researchers to adjust and improve the health intervention (Table 1).

Table 1: The utilization of RE-AIM framework to identify the barriers of motivational interviews

| Domains of RE-AIM | Quantitative Measurement (e.g., questionnaires, measure of clinical outcome, self-evaluation, etc) | Qualitative Measurement (e.g., semi-structured interview, observation, etc) | Barriers Identified |
|--|--|---|---|
| Reach <i>The extent to which an intervention reaches the target population</i> | <ul style="list-style-type: none"> • Determine the proportion of eligible target population who participated in the study • Use questionnaire to identify the reasons of declines across various sites | <ul style="list-style-type: none"> • What are the barriers to participation (i.e., reasons for not participating)? • Why is there a variation in the enrollment and | <ul style="list-style-type: none"> • Some patients refuse to participate due to language barriers • Some working patients refuse to participate due to lack of time |

| | | | |
|--|--|--|---|
| | | decline rate across study sites? | <ul style="list-style-type: none"> Unclear information provided to patients while taking informed consent prior to study |
| <p>Effect</p> <p><i>The extent to which the intervention accomplishes its goals</i></p> | <ul style="list-style-type: none"> Measure the effects of the intervention on participants (e.g., measure any change in blood pressure readings over time, adherence rate to medication, improvement of symptoms, drug level in serum, etc) | <ul style="list-style-type: none"> What are the mechanisms that lead to effectiveness? What explains variation in outcome measures across various sites? | <ul style="list-style-type: none"> Some participants do not fully understand the interview due to low education level Some participants defaulted the motivational interview sessions due to logistic issues |
| <p>Adoption</p> <p><i>To what extent healthcare providers participate in the program</i></p> | <ul style="list-style-type: none"> What is the proportion of healthcare providers participating in the program? | <ul style="list-style-type: none"> Why some of the healthcare providers decline participation? | <ul style="list-style-type: none"> Some doctors cannot cope with the already high patient load Difficult to obtain ethics approval in some study sites Some healthcare centers do not have the required facilities Bad experience from previous study collaboration |
| <p>Implementation</p> <p><i>The extent to which the intervention was properly implemented</i></p> | <ul style="list-style-type: none"> How consistent was delivery of intervention as intended? (fidelity) Do all investigators reach similar level of competency? | <ul style="list-style-type: none"> What were the modifications to the intervention and why did they occur? What were the barriers to fidelity? | <ul style="list-style-type: none"> Study participants have restriction to visit the clinic during the Covid-19 pandemic Conversion of face-to-face motivational interview to interview over phone call due to |

| | | | |
|--|--|---|---|
| | | | <p>the Covid-19 pandemic</p> <ul style="list-style-type: none"> Some investigators unable to deliver the motivational interview effectively due to poor communication skill |
| <p>Maintenance</p> <p>(Usually measured after six months or longer)</p> <p><i>The extent to which an intervention becomes part of routine practices and maintains effectiveness</i></p> | <ul style="list-style-type: none"> Is the intervention sustained after the study period? What proportion of participants drop-out after the study? | <ul style="list-style-type: none"> Which component of the intervention is sustained? What are the barriers to maintain the program? Why participants drop-out after the study? | <ul style="list-style-type: none"> Not enough funding to maintain the motivational interview Both the doctors and patients feel that the motivational interview is time-consuming Doctors have many other administrative commitments Not enough consultation room (space) to deliver the interviews |

7) Conclusion

- Implementation research is a relatively new and yet growing area in scientific investigation. It was introduced to ensure the translation of health interventions to real world.
- Various theoretical frameworks can be utilized to the identify the determinants of implementation, guide the selection of implementation strategies, and inform all phases of the research.
- Challenges in implementation research include the diversity of terminologies associated with implementation research in different part of the world, the presence of multiple theoretical frameworks, as well as the inconsistency or underuse of theoretical frameworks in implementation research.

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