Dissemination & Implementation Models in Health Research & Practice

A workshop on how to plan for, select, combine, adapt, use, and measure Dissemination and Implementation Models in Health

Presented at the 12th Annual Conference on the Science of Dissemination and Implementation in Health (December 4, 2019)

Presented by:

Borsika Rabin, PhD

Rachel Tabak, PhD

Russ Glasgow, PhD

Ross Brownson, PhD

Bryan Ford

ACCORDS Dissemination and Implementation Science Program at the University of Colorado Denver

https://bit.ly/2qLWd0z

Dissemination and Implementation Research Core (DIRC) at the Washington University Institute for Clinical and Translational Science

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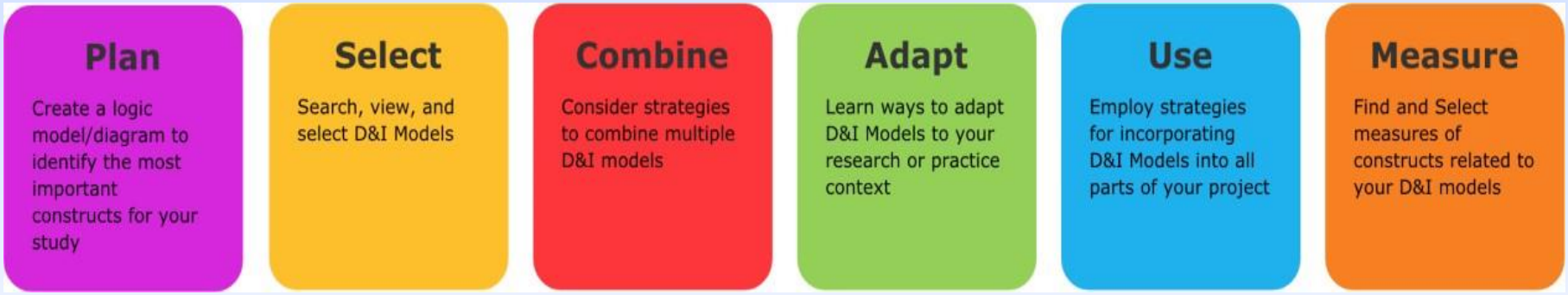
Dissemination and Implementation Science Center (DISC) at UC San Diego

https://bit.ly/2QQdXmk



Topic	Presenter
Section 1: What are D&I models and why are they important?	Borsika Rabin
Section 2: How to create a diagram or roadmap to guide the selection of your D&I model(s)?	Russ Glasgow
Section 3: How do you select D&I model(s)?	Borsika Rabin
Section 4: What are strategies to combine D&I model(s)?	Rachel Tabak
Section 5: What are strategies to adapt D&I model(s)?	Rachel Tabak
Section 6: How do you use D&I model(s) across your project?	Rachel Tabak
Section 7: What are some strategies to choose measures that align with constructs in your D&I model?	Russ Glasgow
Resources for D&I models & website tour	Bryan Ford

WHAT ARE D&I MODELS AND WHY ARE THEY IMPORTANT?

Dissemination and Implementation models defined

Theories present a systematic way of understanding events or behaviors by providing inter-related concepts, definitions, and propositions that explain or predict events by specifying relationships among variables. They are abstract, broadly applicable and not content- or topic-specific.

Frameworks are strategic or action-planning models that provide a systematic way to develop, manage, and evaluate interventions.

Models is used to describe theories and frameworks collectively.

Tabak RG et al, Bridging Research and Practice: Models for Dissemination and Implementation Research *Am J Prev Med*, 2012, 43: 337-350;

Characteristics of strong D&I studies

Strengths of funded proposals:

1. **Significance:** The proposal meets the goal of D&I PAR to improve practice through research
2. **Use of mixed methods:** The proposal utilizes mixed methods (quantitative and qualitative), as encouraged by the PAR.
3. **Sampling strategy and selection criteria:** Regardless of the method, sampling strategies and selection criteria are well-articulated and justified.
4. **Sustainability:** The proposal addresses the sustainability of the project or innovation.
5. **Feasibility and Generalizability:** D&I is concerned with real-world applicability of interventions and innovation. Strong proposals promote interventions that are feasible and practical for real-world settings.
6. **Targeting diverse, underserved and understudied populations and settings.**
7. **Potential for advancing the methods for dissemination and implementation.**
8. **Community Collaboration:** To be relevant to real-world settings, D&I research must foster collaboration with communities and community-based organizations.
9. **Strong Study Teams:** Proposals feature strong, experienced, inter-disciplinary study teams.
10. **Conceptual frameworks:** proposals present relevant and specific frameworks, theories or models to guide their work.

+2 weaknesses of proposals not discussed:

1. The proposal fails to clearly articulate its overall significance, aims, relevance to the field of D&I, or generalizability to broader settings and populations.
2. **The proposal fails to adequately articulate its framework, theoretical background and conceptual models.**

Content analysis of funded NCI IS grants:http://cancercontrol.cancer.gov/IS/pdfs/DandI-PAR-Grant-FundedContentAnalysis.pdf

10 key ingredients of D&I research proposals #1-6

Proposal Ingredient	Key Question	Review Criteria
1. The care gap or quality gap	The proposal has clear evidence that a gap in quality exists?	Significant impact
2. The evidence based treatment to be implemented	Is the evidence for the program, treatment, or set of services to be implemented demonstrated?	Significance innovation
3. Conceptual model and theoretical justification	The proposal delineates a clear conceptual framework/theory/model that informed the design and variables being tested?	Approach innovation
4. Stakeholder priorities, engagement in change	Is there a clear engagement process of the stakeholders in place?	Significance impact Approach Environment
5. Setting's readiness to adopt new services/treatments/ programs	Is there clear information that reflects the settings readiness, capacity, or appetite for change, specifically around adoption of the proposed evidence-based treatment?	Impact Approach Environment
6. Implementation and strategy/process	Are the strategies to implement the intervention clearly defined, and justified conceptually?	Significance impact innovation

Proctor et al. Implementation Science 2012, 7:96

D&I Models: Significance

What can they do:

- Ensure inclusion of essential D&I strategies
- Enhance the interpretability of study findings
- Provide systematic structure for the development, management, and evaluation of interventions/D&I efforts
- Models suggest what is important to measure
- Provide explanation why an intervention works (or doesn't work)

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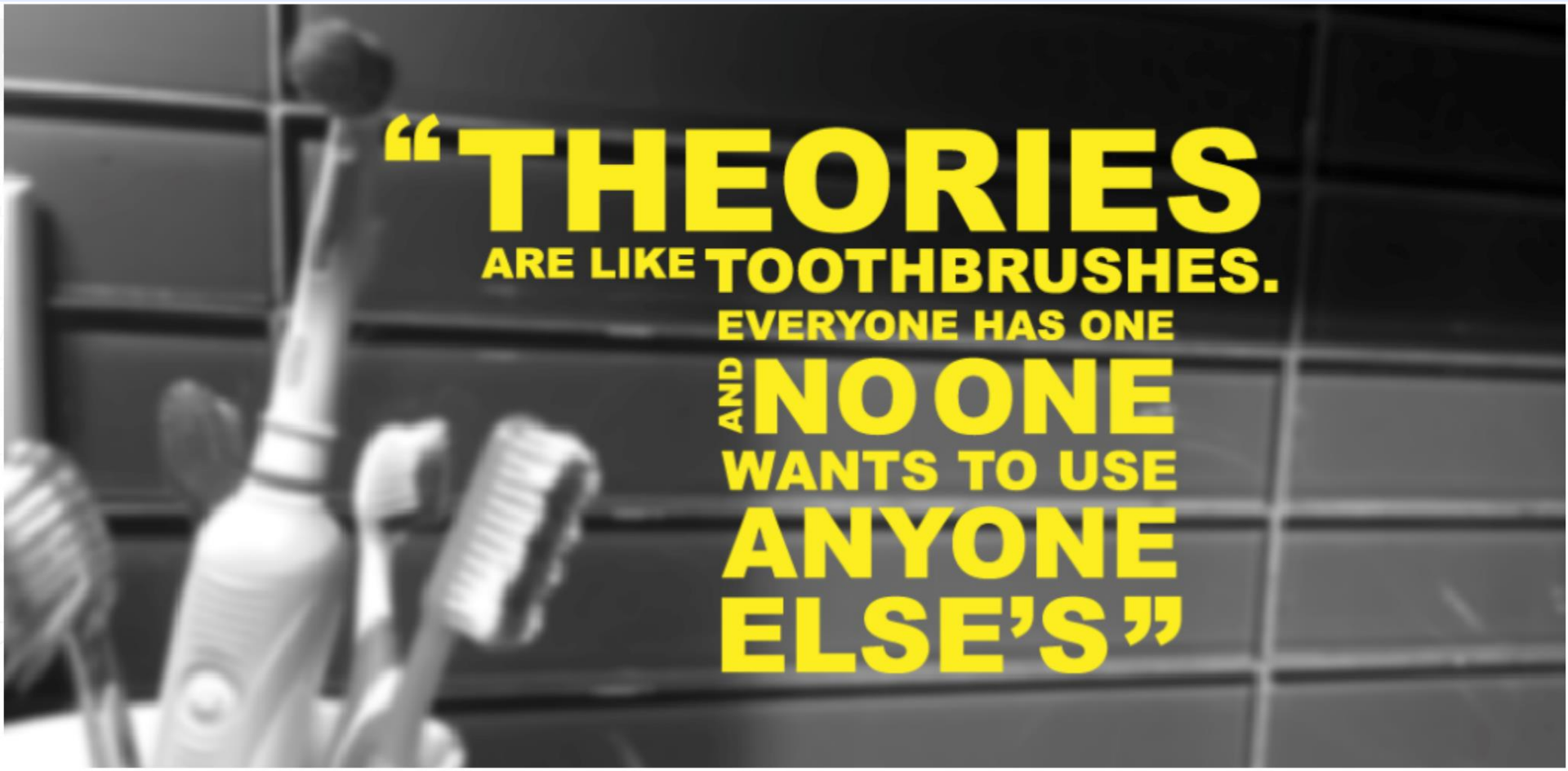
HOW TO CREATE A DIAGRAM OR ROADMAP TO GUIDE THE SELECTION OF YOUR D&I MODEL(S)?



Cara Lewis via Anne Sales via ????

Starting to Think About Best Model(s)

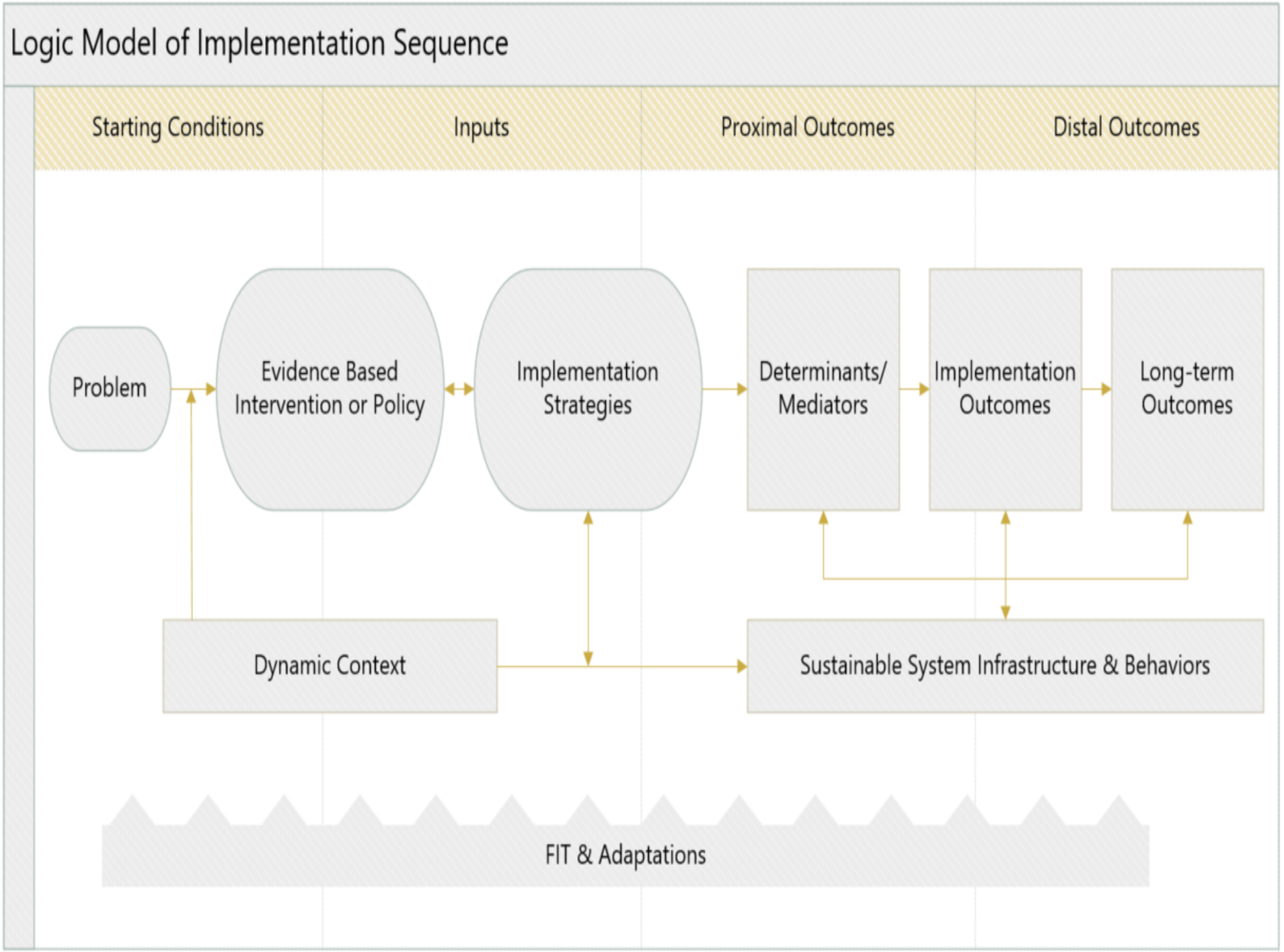
- Hard to go directly to selecting a theory or model
- What to Do?

1. Do what you have always done (safe default):
    - Talk with others
    - Refer to some list or website

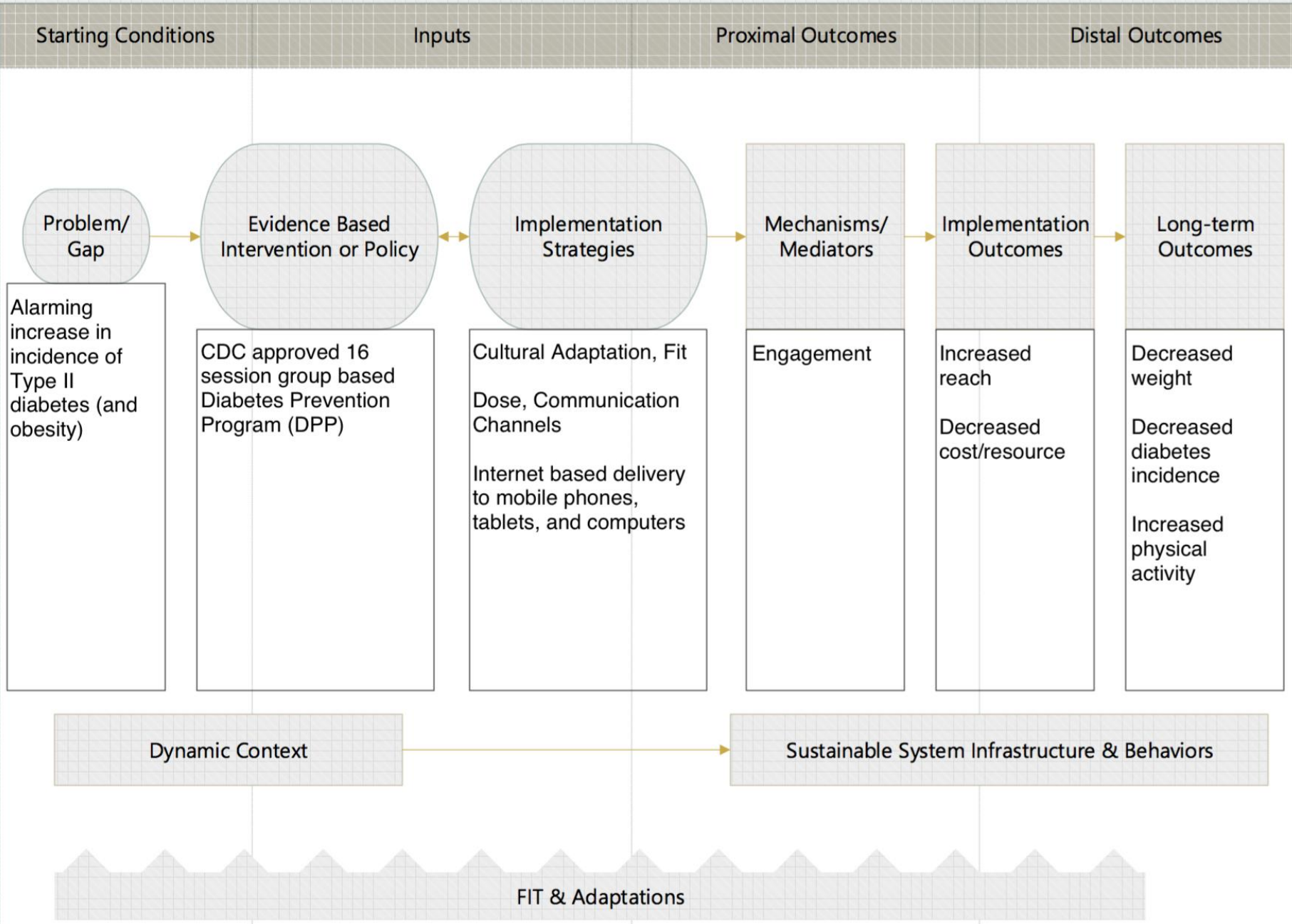
2. Another possible approach: **Drawing a picture or logic model diagram**

Thinking Through the Purpose

- Make a diagram, picture or logic model
- Logic model is a "hypothesized description of the chain of causes and effects leading to an outcome" (Wikipedia)
- Depiction of the relationship between your programs inputs and its intended effects
- A graphical display of what you think will happen (or a roadmap)


Logic Model of Implementation Sequence
Starting Conditions
Inputs
Proximal Outcomes
Distal Outcomes
Problem
Evidence Based Intervention or Policy
Implementation Strategies
Determinants/ Mediators
Implementation Outcomes
Long-term Outcomes
Dynamic Context
Sustainable System Infrastructure & Behaviors
FIT & Adaptations

Logic Model of Implementation Science Project: Diabetes Prevention Project



Identifying the Key Constructs Involved

- By a construct, we mean a concept or element in your theory, intervention, implementation strategy, or hypothesized outcome(s).
- Examples of constructs relevant to implementation science include: compatibility, inner context, audit and feedback, facilitation, sustainability
- More to come on constructs and measures

IMPLEMENTATION PROJECT LOGIC MODEL WORKSHEET

for : Diabetes Prevention Project

Use this worksheet in tandem with the logic model diagram to help plan your implementation study

1.) **PROBLEM:** A clearly defined problem or gap in the existing evidence

- [x] Dissemination
- [ ] Implementation
- [ ] Policy
- [ ] Individual Level
- [ ] Org. Level
- [ ] System Level
- [ ] Context-inner setting
- [ ] Context-outer setting
- [ ] Pt/Target Audience

Other Key Constructs and Notes:

- Alarming increase in incidence of Type II diabetes (and obesity)
- The evidence-based Diabetes Prevention Program has been successfully implemented as a low-cost group program by many different community organizations, and as an online group program with moderate costs by a corporation.

2.) **EVIDENCE BASED INTERVENTION:** Identify key constructs related to key components (key functions) of the intervention

- [x] Cost
- [ ] Relative Advantage
- [ ] Dose
- [ ] Acceptability
- [ ] Trialability
- [x] Complexity

Other Key Constructs and Notes:

CDC approved 16 session group based Diabetes Prevention Program (DPP)

3.) **IMPLEMENTATION STRATEGIES:** Identify key constructs related to the implementation strategy(s)

- [ ] Fit
- [ ] Dose
- [ ] Compatibility
- [ ] Champion
- [x] Communication Channels
- [ ] Stakeholders

Other Key Constructs and Notes:

Internet based delivery to mobile phones, tablets, and computers

General Comments:

We need to engage stakeholders further in our communities to see in our target population, what is used more - mobile phones, tablets, or computers - as we may not have enough money in this dissemination research project to make this compatible with all of these types of devices - that would be a later step.

4.) **MECHANISMS:** Identify key constructs related to hypothesized mediating mechanisms

- [ ] Process
- [ ] Knowledge
- [ ] Goals
- [x] Engagement
- [ ] Knowledge Transfer
- [ ] Readiness

Other Key Constructs and Notes:

Online delivery of program needs to engage individuals well - we know from in-person delivery of the Diabetes Prevention Program that the level of program engagement moderates outcomes.

5.) **IMPLEMENTATION OUTCOMES:** Identify key constructs related to implementation success

- [ ] Outcomes QI
- [x] Reach
- [x] Cost
- [ ] Adoption
- [ ] Maintenance/Sustainability
- [ ] Adaptation & Evolution
- [ ] Fidelity

Other Key Constructs and Notes:

6.) **LONG TERM OUTCOMES:** Identify key constructs in order to select measures determining success

- [x] Outcomes - Health/QoL
- [ ]
- [ ] Fidelity
- [ ]
- [x] Maintenace/Sustainability
- [ ]

Other Key Constructs and Notes:

Decreased weight, improved control of average blood sugar levels (decreased hemoglobin A1c) across our community

General Comments:

Hard to fully measure the level of engagement that is part of our hypothesized mechanism - some measure of this could be how frequently participants engage with the online content - number of clicks through to resources, and other mobile health measures of online content engagement.

HOW DO YOU SELECT D&I MODEL(S)?

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Abstract

Context—Theories and frameworks (hereafter called models) enhance dissemination and implementation (D&I) research by making the spread of evidence-based interventions more likely. This work organizes and synthesizes these models by: (1) developing an inventory of models used in D&I research; (2) synthesizing this information; and (3) providing guidance on how to select a model to inform study design and execution.

Evidence acquisition—This review began with commonly cited models and model developers and used snowball sampling to collect models developed in any year from journal articles, presentations, and books. All models were analyzed and categorized in 2011 based on three author-defined variables: construct flexibility, focus on dissemination and/or implementation activities (D/I), and the socio-ecological framework (SEF) level. Five-point scales were used to rate construct flexibility from broad to operational and D/I activities from dissemination-focused to implementation-focused. All SEF levels (system, community, organization, and individual) applicable to a model were also extracted. Models that addressed policy activities were noted.

Evidence synthesis—Sixty-one models were included in this review. Each of the five categories in the construct flexibility and D/I scales had/contained at least four models. Models were distributed across all levels of the SEF; the fewest models (n=8) addressed policy activities. To assist researchers in selecting and utilizing a model throughout the research process, the authors present and explain examples of how models have been used.

Conclusions—These findings may enable researchers to better identify and select models to inform their D&I work.

NIH Public Access
Author Manuscript
Nurs Outlook. Author manuscript; available in PMC 2011 November 1.

Published in final edited form as:
Nurs Outlook. 2010 ; 58(6): 287–300. doi:10.1016/j.outlook.2010.07.001.

A Thematic Analysis of Theoretical Models for Translational Science in Nursing: Mapping the Field

Sandra A. Mitchell, CRNP, PhD, AOCN[1], Cheryl A. Fisher, RN-BC, EdD[1], Clare E. Hastings, RN, PhD, FAAN[1], Leanne B. Silverman, BA[1], and Gwenyth R. Wallen, RN, PhD[1]
[1]Clinical Center, National Institutes of Health, Bethesda, MD

Abstract

Background—The quantity and diversity of conceptual models in translational science may complicate rather than advance the use of theory.

Purpose—This paper offers a comparative thematic analysis of the models available to inform knowledge development, transfer, and utilization.

Method—Literature searches identified 47 models for knowledge translation. Four thematic areas emerged: (1) evidence-based practice and knowledge transformation processes; (2) strategic change to promote adoption of new knowledge; (3) knowledge exchange and synthesis for application and inquiry; (4) designing and interpreting dissemination research.

Discussion—This analysis distinguishes the contributions made by leaders and researchers at each phase in the process of discovery, development, and service delivery. It also informs the selection of models to guide activities in knowledge translation.

Conclusions—A flexible theoretical stance is essential to simultaneously develop new knowledge and accelerate the translation of that knowledge into practice behaviors and programs of care that support optimal patient outcomes.

Keywords

Translational science; evidence-based practice; knowledge translation; dissemination research; theory

Wilson *et al. Implementation Science* 2010, **5**:91
http://www.implementationscience.com/content/5/1/91

IMPLEMENTATION SCIENCE

SYSTEMATIC REVIEW **Open Access**

Disseminating research findings: what should researchers do? A systematic scoping review of conceptual frameworks

Paul M Wilson[1*], Mark Petticrew[2], Mike W Calnan[3], Irwin Nazareth[4]

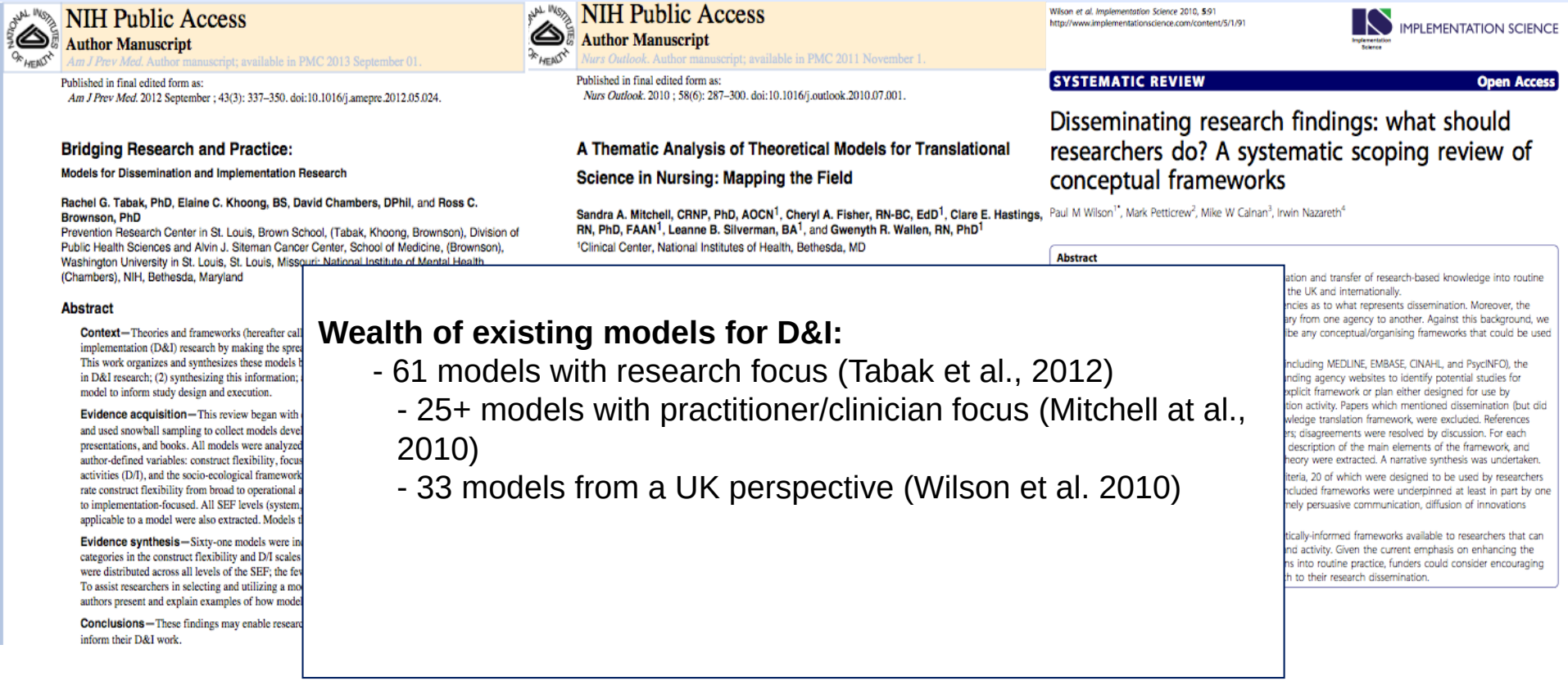
Abstract

Background: Addressing deficiencies in the dissemination and transfer of research-based knowledge into routine clinical practice is high on the policy agenda both in the UK and internationally.
However, there is lack of clarity between funding agencies as to what represents dissemination. Moreover, the expectations and guidance provided to researchers vary from one agency to another. Against this background, we performed a systematic scoping to identify and describe any conceptual/organising frameworks that could be used by researchers to guide their dissemination activity.

Methods: We searched twelve electronic databases (including MEDLINE, EMBASE, CINAHL, and PsycINFO), the reference lists of included studies and of individual funding agency websites to identify potential studies for inclusion. To be included, papers had to present an explicit framework or plan either designed for use by researchers or that could be used to guide dissemination activity. Papers which mentioned dissemination (but did not provide any detail) in the context of a wider knowledge translation framework, were excluded. References were screened independently by at least two reviewers; disagreements were resolved by discussion. For each included paper, the source, the date of publication, a description of the main elements of the framework, and whether there was any implicit/explicit reference to theory were extracted. A narrative synthesis was undertaken.

Results: Thirty-three frameworks met our inclusion criteria, 20 of which were designed to be used by researchers to guide their dissemination activities. Twenty-eight included frameworks were underpinned at least in part by one or more of three different theoretical approaches, namely persuasive communication, diffusion of innovations theory, and social marketing.

Conclusions: There are currently a number of theoretically-informed frameworks available to researchers that can be used to help guide their dissemination planning and activity. Given the current emphasis on enhancing the uptake of knowledge about the effects of interventions into routine practice, funders could consider encouraging researchers to adopt a theoretically-informed approach to their research dissemination.



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Birken *et al. Implementation Science* (2017) 12:124
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Implementation Science

SHORT REPORT Open Access

Criteria for selecting implementation science theories and frameworks: results from an international survey

Sarah A. Birken[1*], Byron J. Powell[1], Christopher M. Shea[1], Emily R. Haines[1,2], M. Alexis Kirk[1,2], Jennifer Leeman[3], Catherine Rohweder[4], Laura Damschroder[5] and Justin Presseau[6,7,8]

Abstract

Background: Theories provide a synthesizing architecture for implementation science. The underuse, superficial use, and misuse of theories pose a substantial scientific challenge for implementation science and may relate to challenges in selecting from the many theories in the field. Implementation scientists may benefit from guidance for selecting a theory for a specific study or project. Understanding how implementation scientists select theories will help inform efforts to develop such guidance. Our objective was to identify which theories implementation scientists use, how they use theories, and the criteria used to select theories.

Methods: We identified initial lists of uses and criteria for selecting implementation theories based on seminal articles and an iterative consensus process. We incorporated these lists into a self-administered survey for completion by self-identified implementation scientists. We recruited potential respondents at the 8th Annual Conference on the Science of Dissemination and Implementation in Health and via several international email lists. We used frequencies and percentages to report results.

Results: Two hundred twenty-three implementation scientists from 12 countries responded to the survey. They reported using more than 100 different theories spanning several disciplines. Respondents reported using theories primarily to identify implementation determinants, inform data collection, enhance conceptual clarity, and guide implementation planning. Of the 19 criteria presented in the survey, the criteria used by the most respondents to select theory included analytic level (58%), logical consistency/plausibility (56%), empirical support (53%), and

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Abstract

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-100 + used in an international sample (Birken et al. 2017)

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in D&I research; (2) synthesizing
model to inform study design and

Evidence acquisition—This r
and used snowball sampling to c
presentations, and books. All mo
author-defined variables: constru
activities (D/I), and the socio-eco
rate construct flexibility from bro
to implementation-focused. All S
applicable to a model were also e

Evidence synthesis—Sixty-o
categories in the construct flexibi
were distributed across all levels
To assist researchers in selecting
authors present and explain exam

Conclusions—These findings
inform their D&I work.

NIH Public Access
Author Manuscript
Nurs Outlook. Author manuscript; available in PMC 2011 November 1.

Published in fi
Nurs Outlook

A Thema
Science i

Sandra A. Mi
RN, PhD, FA
[1]Clinical Cent

J Clin Epidemiol. 2018 Aug;100:92-102. doi: 10.1016/j.jclinepi.2018.04.008. Epub 2018 Apr 13.

Scoping review identifies significant number of knowledge translation theories, models, and frameworks with limited use.

Strifler L[1], Cardoso R[2], McGowan J[3], Cogo E[2], Nincic V[2], Khan PA[2], Scott A[2], Ghassemi M[2], MacDonald H[2], Lai Y[2], Treister V[2], Tricco AC[4], Straus SE[5].

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2 Li Ka Shing Knowledge Institute, St. Michael's Hospital, 209 Victoria Street, East Building, Toronto, Ontario, M5B 1W8, Canada.
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Abstract

OBJECTIVES: To conduct a scoping review of knowledge translation (KT) theories, models, and frameworks that have been used to guide dissemination or implementation of evidence-based interventions targeted to prevention and/or management of cancer or other chronic diseases.

STUDY DESIGN AND SETTING: We used a comprehensive multistage search process from 2000 to 2016, which included traditional bibliographic database searching, searching using names of theories, models and frameworks, and cited reference searching. Two reviewers independently screened the literature and abstracted the data.

RESULTS: We found 596 studies reporting on the use of 159 KT theories, models, or frameworks. A majority (87%) of the identified theories, models, or frameworks were used in five or fewer studies, with 60% used once. The theories, models, and frameworks were most commonly used to inform planning/design, implementation and evaluation activities, and least commonly used to inform dissemination and sustainability/scalability activities. Twenty-six were used across the full implementation spectrum (from planning/design to sustainability/scalability) either within or across studies. All were used for at least individual-level behavior change, whereas 48% were used for organization-level, 33% for community-level, and 17% for system-level change.

CONCLUSION: We found a significant number of KT theories, models, and frameworks with a limited evidence base describing their use.

Wilson *et al. Implementation Science* 2010, **5**:91
http://www.implementationscience.com/content/5/1/91

IMPLEMENTATION SCIENCE

Birken *et al. Implementation Science* (2017) 12:124
DOI 10.1186/s13012-017-0656-y

Implementation Science

SHORT REPORT Open Access

CrossMark

Criteria for selecting implementation orks: results

-laines[1,2], M. Alexis Kirk[1,2], Jennifer Leeman[3],
B

ementation science. The underuse, superficial or implementation science and may relate to ientation scientists may benefit from guidance how implementation scientists select theories as to identify which theories implementation t theories.

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n 12 countries responded to the survey. They ciplines. Respondents reported using theories llection, enhance conceptual clarity, and guide ey, the criteria used by the most respondents to usibility (56%), empirical support (53%), and

NIH Public Access
Author Manuscript
Am J Prev Med. Author manuscript; available in PMC 2013 September 01.

Published in final edited form as:
Am J Prev Med. 2012 September ; 43(3): 337–350. doi:10.1016/j.amepre.2012.05.024.

Bridging Research and Practice:
Models for Dissemination and Implementation Research

Rachel G. Tabak, PhD, Elaine C. Khoong, BS, David Chambers, DPhil, and Ross C. Brownson, PhD
Prevention Research Center in St. Louis, Brown School, (Tabak, Khoong, Brownson), Division of Public Health Sciences and Alvin J. Siteman Cancer Center, School of Medicine, (Brownson), Washington University in St. Louis, St. Louis, Missouri; National Institute of Mental Health (Chambers), NIH, Bethesda, Maryland

Abstract

Context—Theories and frameworks (hereafter called models) enhance dissemination and implementation (D&I) research by making the spread of evidence-based interventions more likely. This work organizes and synthesizes these models by: (1) developing an inventory of models used in D&I research; (2) synthesizing this information; and (3) providing guidance on how to select a

NIH Public Access
Author Manuscript
Nurs Outlook. Author manuscript; available in PMC 2011 November 1.

Published in final edited form as:
Nurs Outlook. 2010 ; 58(6): 287–300. doi:10.1016/j.outlook.2010.07.001.

A Thematic Analysis of Theoretical Models for Translatic
Science in Nursing: Mapping the Field

Sandra A. Mitchell, CRNP, PhD, AOCN[1], Cheryl A. Fisher, RN-BC, EdD[1], Clare
R

Birken *et al. Implementation Science* (2017) 12:124
DOI 10.1186/s13012-017-0656-y

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Wilson *et al. Implementation Science* 2010, **5**:91
http://www.implementationscience.com/content/5/1/91

IMPLEMENTATION SCIENCE

SYSTEMATIC REVIEW **Open Access**

Disseminating research findings: what should

Implementation Science

SHORT REPORT **Open Access**

CrossMark

mplementation
frameworks: results
survey

Shea[1], Emily R. Haines[1,2], M. Alexis Kirk[1,2], Jennifer Leeman[3],
ustin Presseau[6,7,8]

J Clin Epidemiol. 2018 Aug;100:92-102. doi: 10.1016/j.jclinepi.2018.04.008. Epub 2018 Apr 13.

Scoping review identifies significant number of knowledge translation theories, models, and frameworks with limited use.

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3 School of Epidemiology, Public Health and Preventive Medicine, University of Ottawa, 600 Peter Morand Crescent, Ottawa, Ontario, K1G 5Z3, Canada.
4 Li Ka Shing Knowle
Division, Dalla Lana
5 Li Ka Shing Knowle
of Geriatric Medicin
sharon.straus@uto

Abstract

OBJECTIVES: To condu
dissemination or implen
diseases.

STUDY DESIGN AND S
bibliographic database
independently screened

RESULTS: We found 59
models, or frameworks
used to inform planning
sustainability/scalability
sustainability/scalability
for organization-level, 3

CONCLUSION: We four

Wealth of existing models for D&I:

- 61 models with research focus (Tabak et al., 2012)
- 25+ models with practitioner/clinician focus (Mitchell at al., 2010)
- 33 models from a UK perspective (Wilson et al. 2010)
-100 + used in an international sample (Birken et al. 2017)
-159 KT theories, models, or frameworks (Strifler et al. 2018)

science. The underuse, superficial
ntation science and may relate to
ientists may benefit from guidance
mentation scientists select theories
fy which theories implementation

tation theories based on seminal
f-administered survey for completion
at the 8th Annual Conference on the
onal email lists. We used frequencies

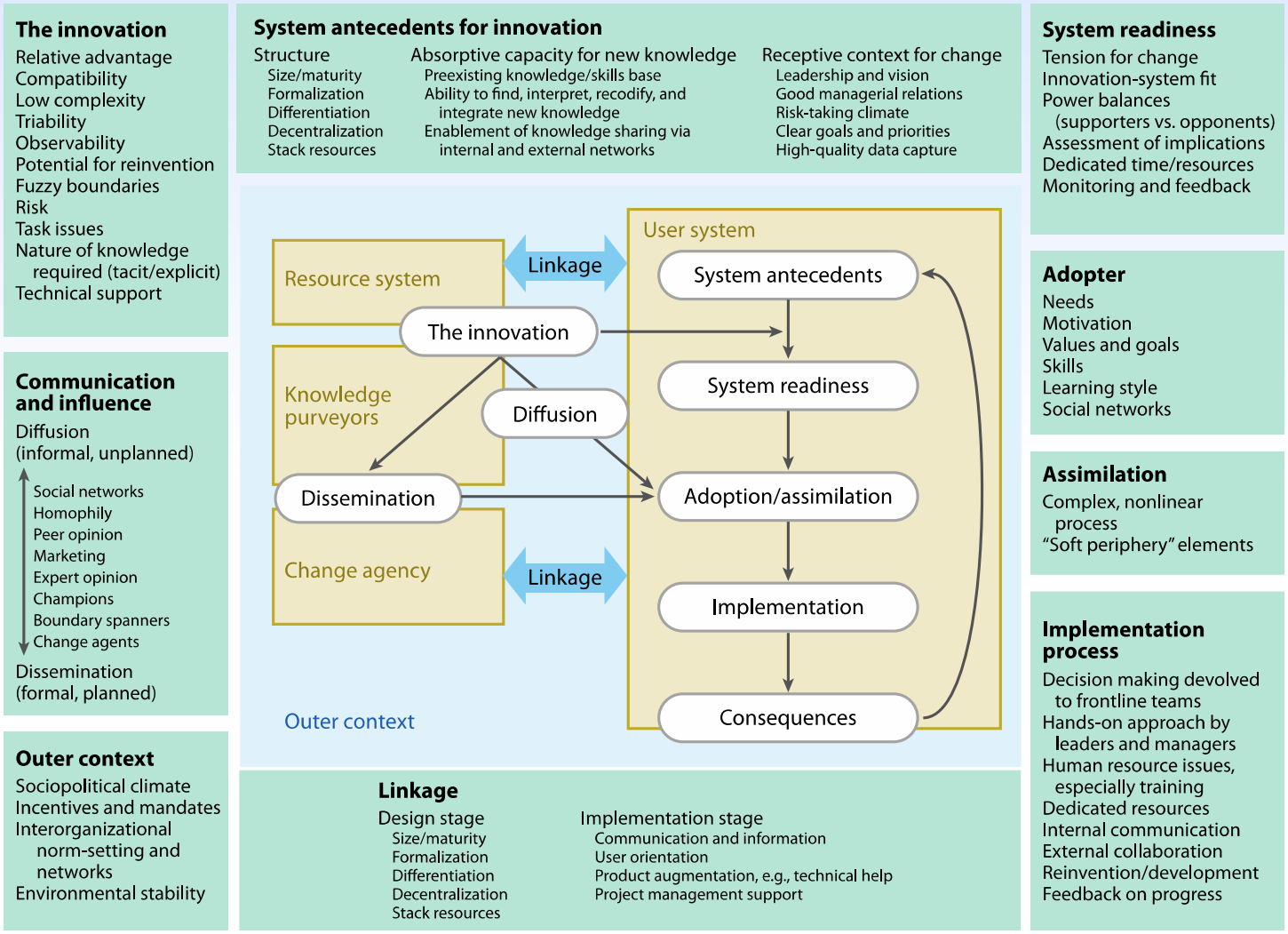
ries responded to the survey. They
spondents reported using theories
hance conceptual clarity, and guide
eria used by the most respondents to
%), empirical support (53%), and

SO WHICH ONE SHOULD I USE?

"Essentially, all models are wrong, but some are useful."

(George E.P. Box 1919 – 2013)

Diffusion of innovations in service organizations



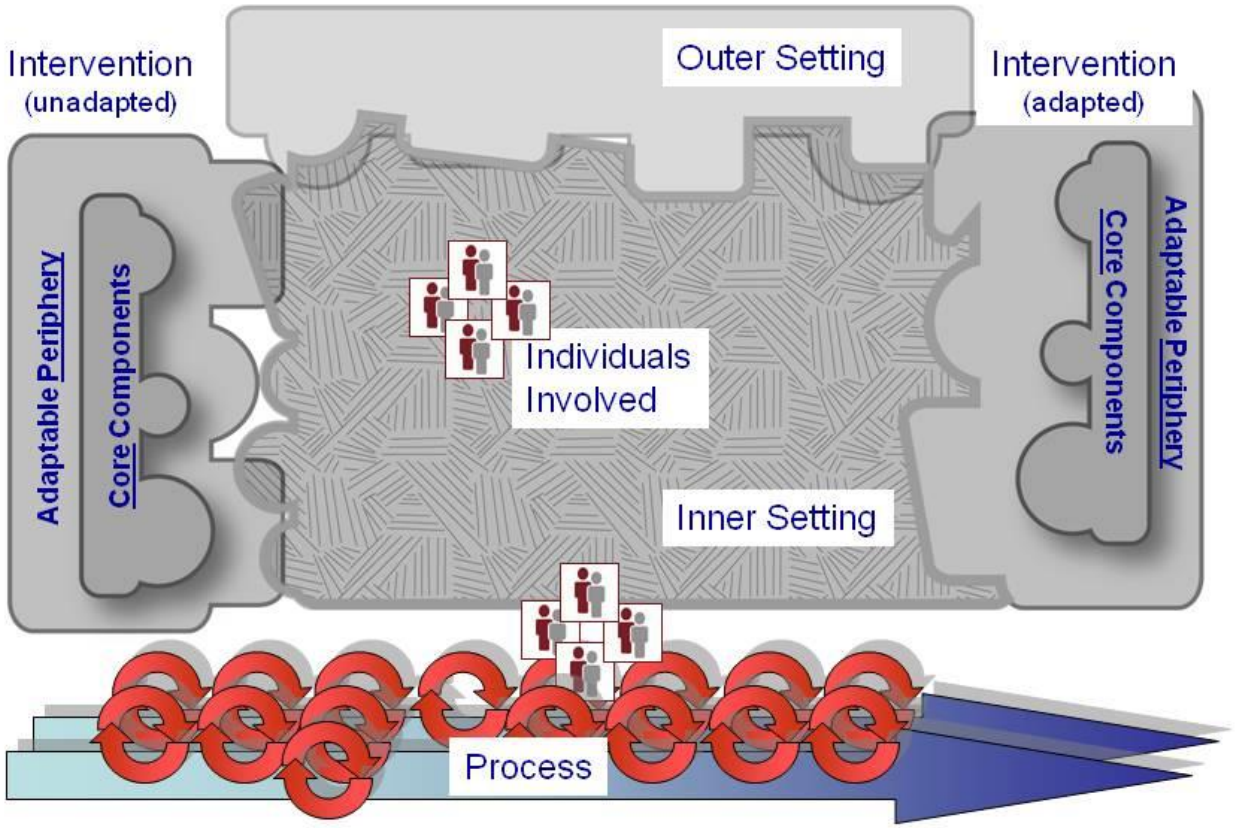
Greenhalgh T, Robert G, Macfarlane F, Bate P, Kyriakidou O. Milbank Q. 2004. 2004. 82:581–629

Lobb R & Colditz GA. Annual Review of Public Health 2013 34:1, 235-251

Consolidated Framework for Implementation Research

www.CFIRGuide.org

Damschroder LJ et al. *Implementation Science* 2009:4:50



Exploration, Preparation, Implementation, and Sustainment (EPIS) Framework

Aarons, G.A et al. (2011). *Administration and Policy in Mental Health and Mental Health Services Research.38*, 4-23.

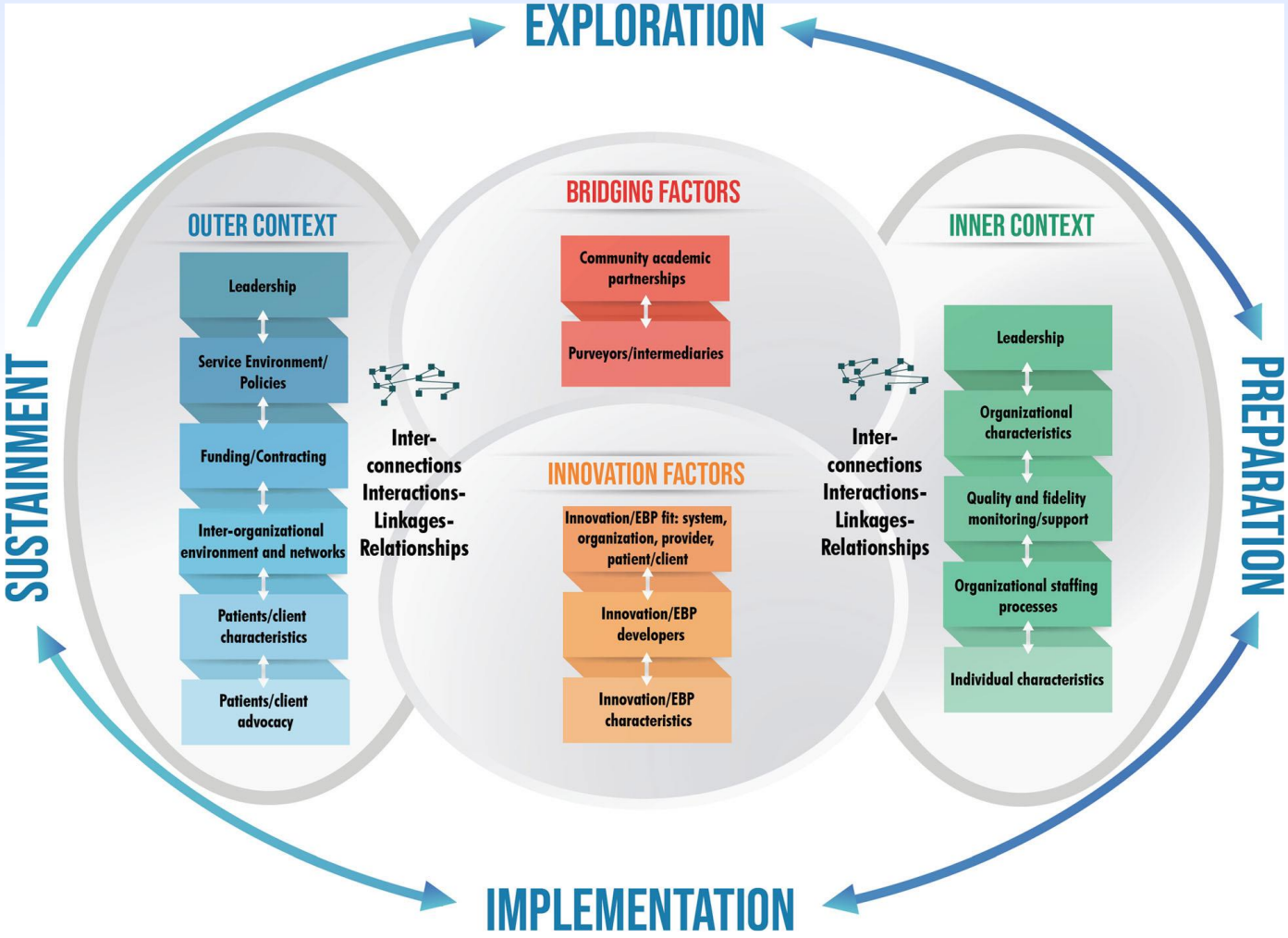


Fig. 1 Exploration, Preparation, Implementation, Sustainment (EPIS) framework including phases, Outer/Inner Context, Bridging Factors, and Innovation factors

Reach, Effectiveness, Adoption, Implementation, and Maintenance Framework

www.re-aim.org

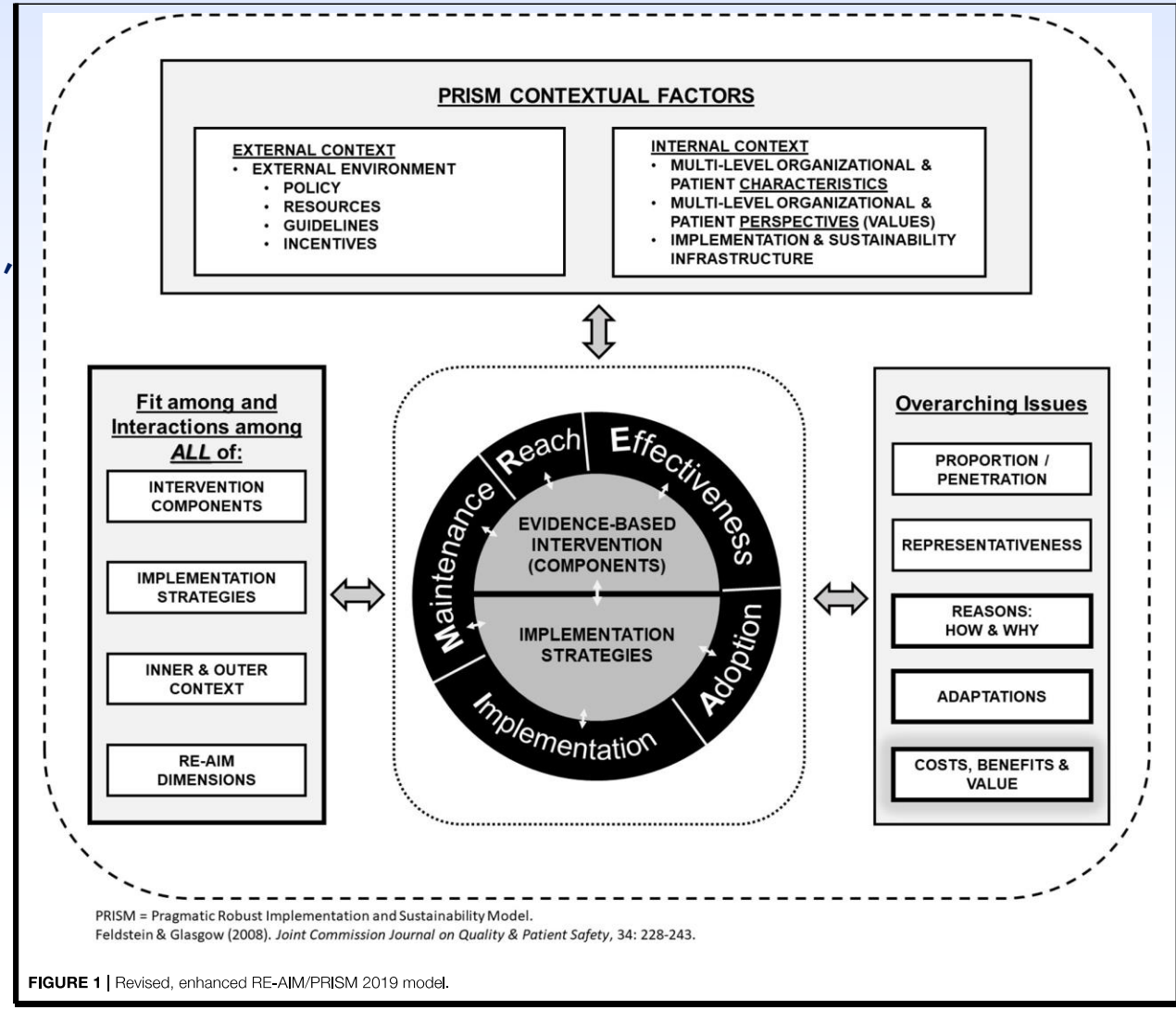
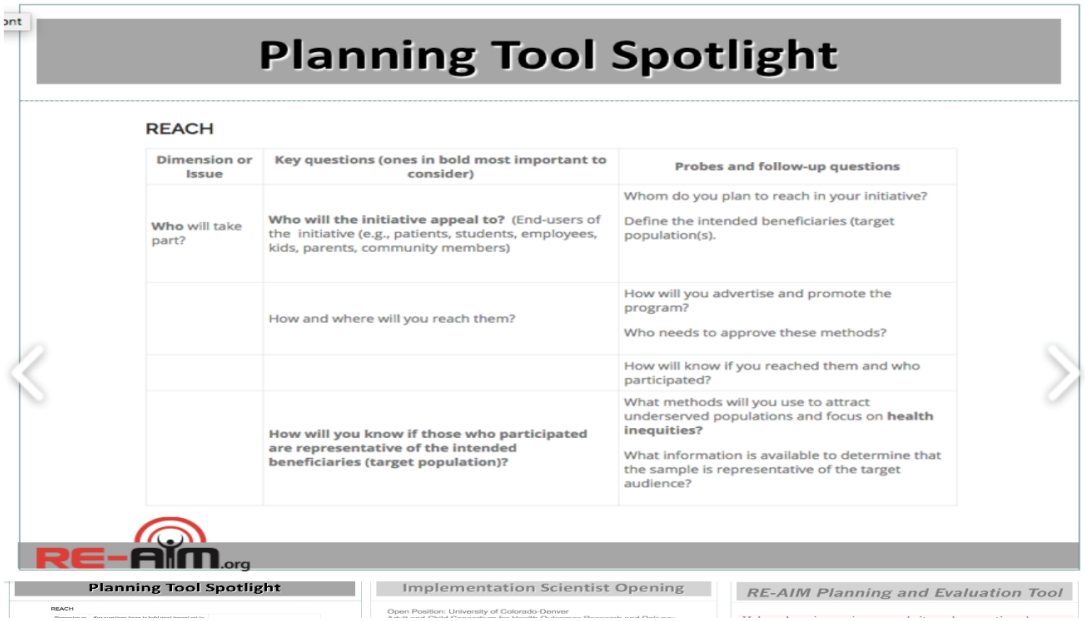


FIGURE 1 | Revised, enhanced RE-AIM/PRISM 2019 model.

RE-AIM



Planning Tool Spotlight

REACH

Dimension or Issue	Key questions (ones in bold most important to consider)	Probes and follow-up questions
Who will take part?	**Who will the initiative appeal to?** (End-users of the initiative (e.g., patients, students, employees, kids, parents, community members)	Whom do you plan to reach in your initiative? Define the intended beneficiaries (target population(s).
	How and where will you reach them?	How will you advertise and promote the program? Who needs to approve these methods?
		How will know if you reached them and who participated?
	How will you know if those who participated are representative of the intended beneficiaries (target population)?	What methods will you use to attract underserved populations and focus on **health inequities?** What information is available to determine that the sample is representative of the target audience?

RE-AIM.org

Planning Tool Spotlight | Implementation Scientist Opening | RE-AIM Planning and Evaluation Tool

Search ...

SEARCH

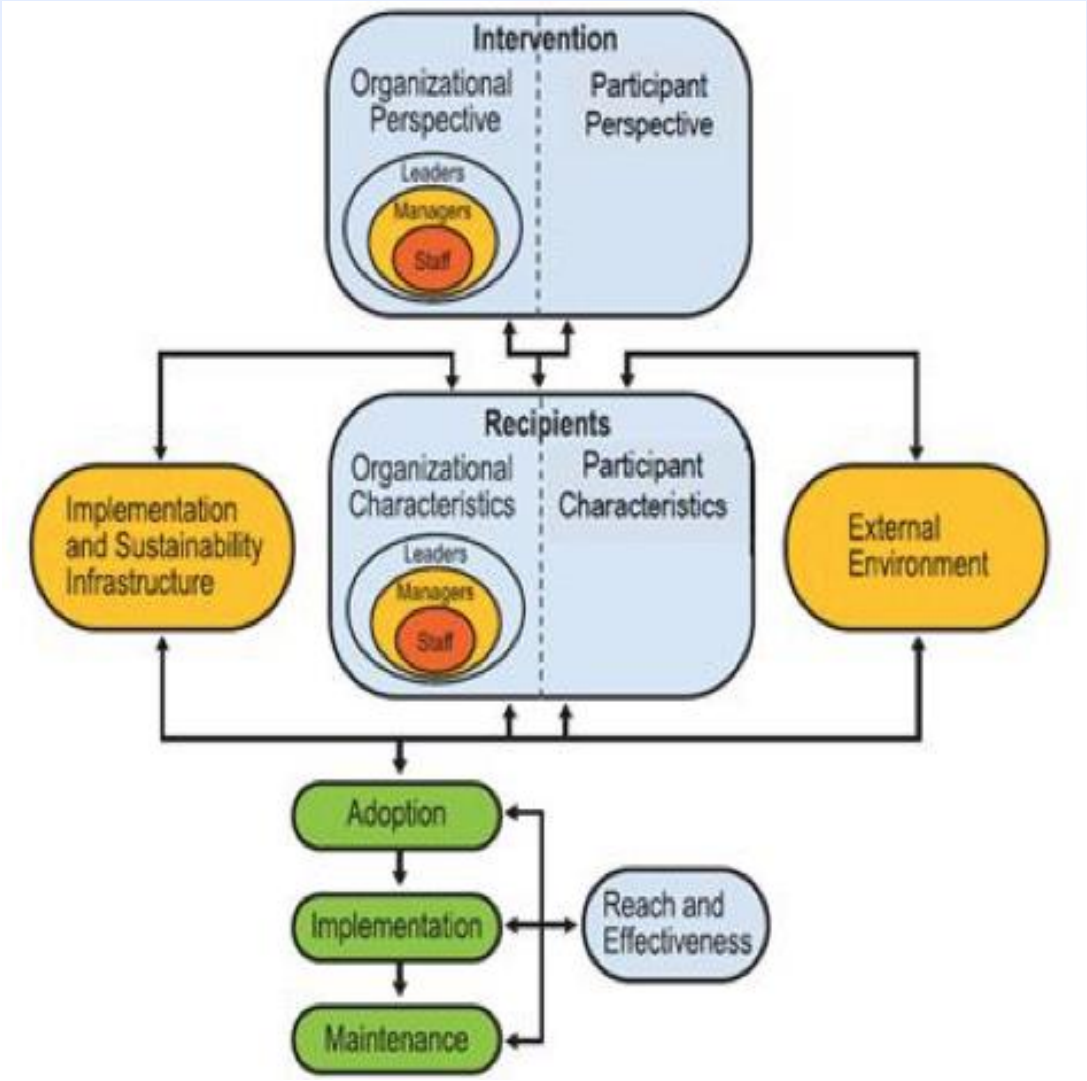
WHAT'S NEW

2018-An Examination of Fluconazole and Prevention of Systemic Fungal Infection in Lymphoma A Retrospective Chart Review

2018-AVALIAÇÃO DE UM PROJETO DE EXTENSÃO UNIVERSITÁRIA NA PERCEPÇÃO DE PROFESSORES DA EDUCAÇÃO BÁSICA

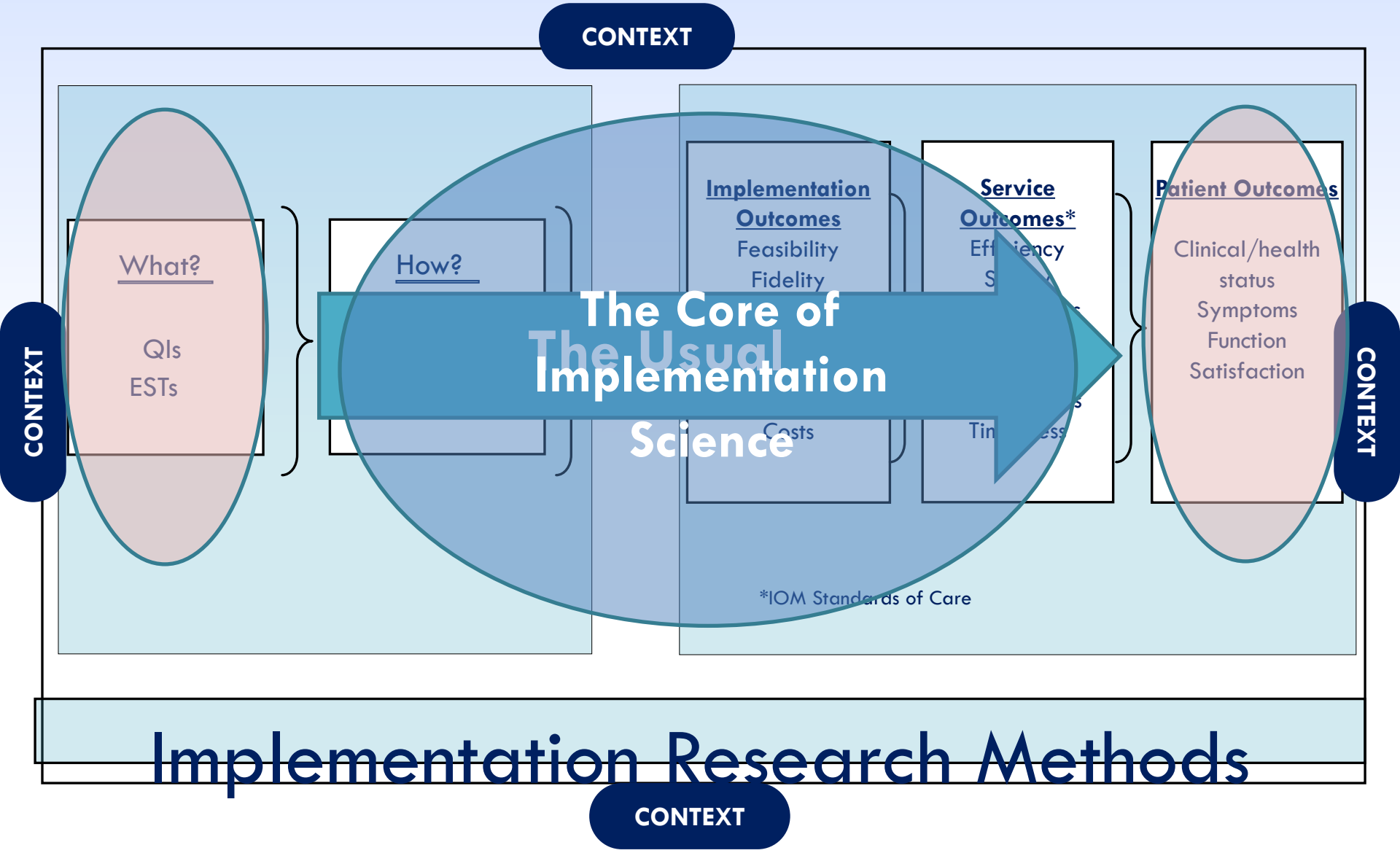
www.re-aim.org

Practical, Robust Implementation and Sustainability Model (PRISM)



Feldstein and Glasgow, *The Joint Commission Journal on Quality and Patient Safety* 2008;34(4):228-243.

Conceptual Model for Implementation Research



Proctor et al 2009 Admin. & Pol. in Mental Health Services

Selecting a D&I Model

- What is/are the research questions I'm seeking to answer?
- What level(s) of change am I seeking to explain?
- What characteristics of context are relevant to the research questions?
- What is the timeframe?
- Are measures available?
- Does the study need to be related to a single model?

Chambers, 2014 (Chapter Two) in Beidas & Kendall (eds), OUP.

Model Categories

Construct Flexibility (CF)

1: Broad — *Loosely outlined and defined constructs; allows researchers greater flexibility*

2

3

4

5: Operational — *Detailed, step-by-step actions for D&I research*

Dissemination and / or Implementation (D/I)

D only — *Focus on active approach of spreading EBIs to target audience via determined channels using planned strategies*

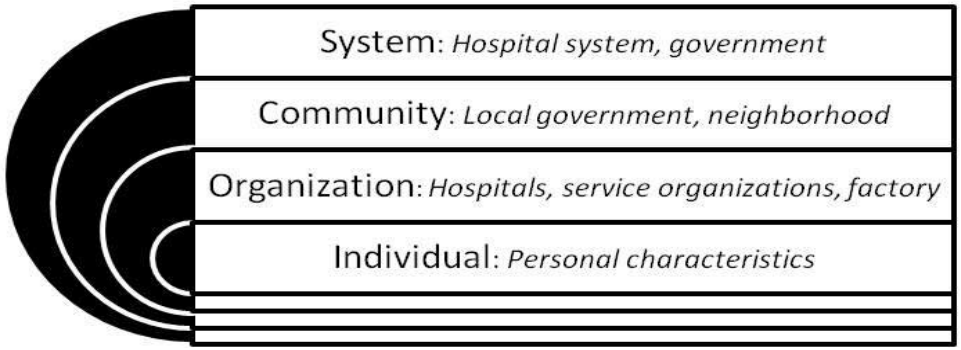
D > I

D = I — *Equal focus on dissemination and implementation*

I > D

I only — *Focus on process of putting to use or integrating evidence-based interventions within a setting*

Socio-ecological Framework (SEF)



http://www.cdc.gov/prc/images/dni-models_large.jpg

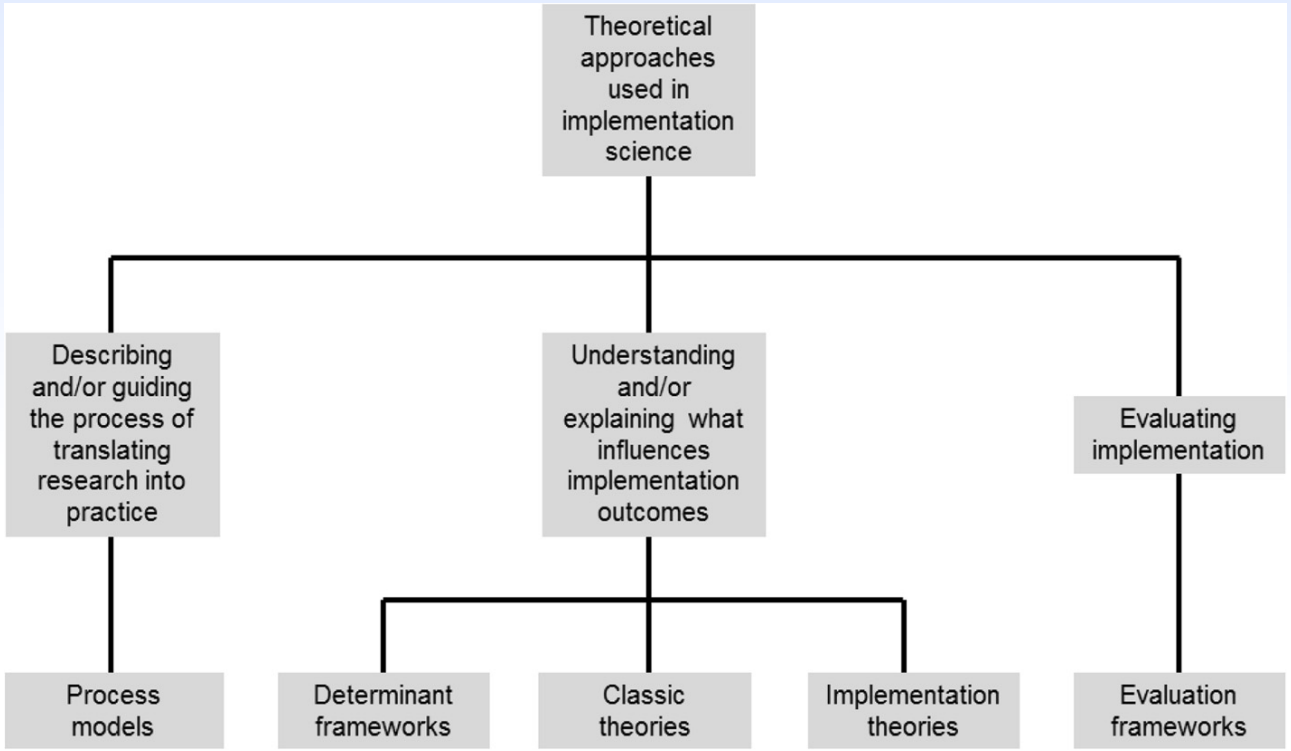


Figure 1 Three aims of the use of theoretical approaches in implementation science and the five categories of theories, models and frameworks.

Cross-cutting features of 'optimal' D&I models

- Multi-level
- Contextual
- Intuitive
- Measures are available
- Tested in your context/population/health problem

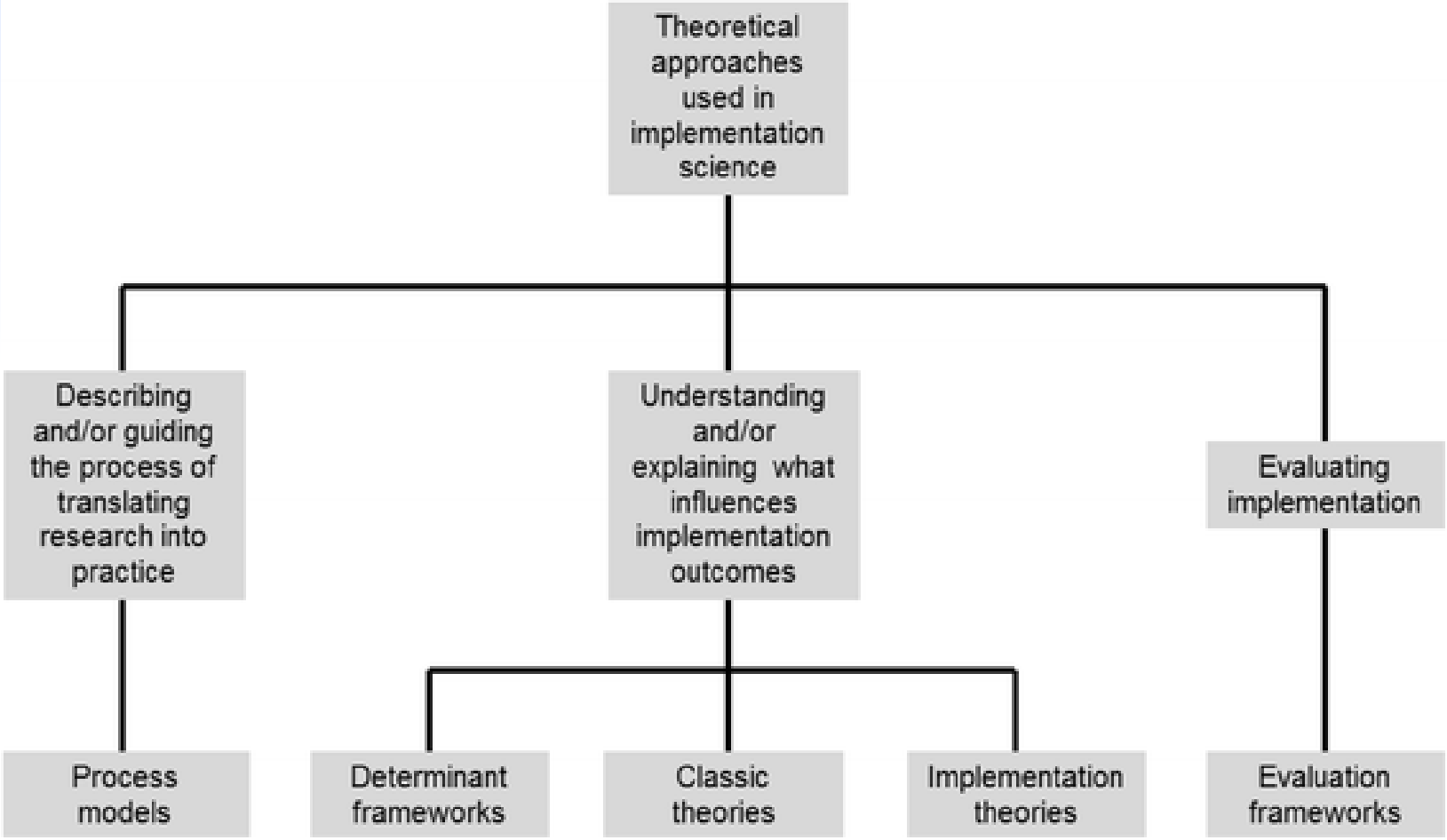
QUESTIONS SO FAR?

WHAT ARE STRATEGIES TO COMBINE D&I MODEL(S)?

Questions to Consider

- Does each model serve a specific purpose?
- Are these models used in a temporal fashion?
- Do constructs from one model expand those in a broader, less specialized model?
- Do they act at various socio-ecological framework levels?

Categories for model's purpose



Nilsen, Per. "Making sense of implementation theories, models and frameworks." Implementation Science 10.1 (2015): 53.
https://implementationscience.biomedcentral.com/articles/10.1186/s13012-015-0242-0

Other Considerations

- Address potential need for adaptations
- Can increase complexity
  - Limit to two models in a single study
- Clearly identify each model's role
  - Avoid multiple models for the same purpose
- Provide rationale for each model and combination

Working Example

- Implementing the Diabetes Prevention Program in a network of primary care clinics

WHAT ARE STRATEGIES TO ADAPT D&I MODEL(S)?

Benefits

- Builds on previous findings
- Demonstrates generalizability
  - Enhances understanding of model and constructs
- May improve appropriateness of the model
- Tests modifications
  - Disregarding pieces shown to be ineffective or inefficient
  - Adding constructs with additional evidence

Consider Factors that may Influence Model Fit

What is the purpose of possible adaptations?

- Evidence-based intervention itself
- Implementation strategy
- Organization and practitioners/providers
- Target population and/or setting
- Construct flexibility and level of specificity
- Focus on dissemination and/or implementation

Some Categories of Adaptations

- Addition/deletion/modification of constructs
  - What constructs were initially, intuitively important?
- Re-organization of relationships between constructs
  - How are the constructs organized and hypothesized to interact?

Looking at the Literature

Citations	Glasgow RE, Vogt TM, Boles SM. Evaluating the public health impact of health promotion interventions: the RE-AIM framework. Am J Publ Health 1999;89(9):1322–7.
Examples	Aittasalo M, Miilunpalo S, StÃ¥hl T, Kukkonen-Harjula K. From innovation to practice: initiation, implementation and evaluation of a physician-based physical activity promotion programme in Finland. Health Promot Int 2007;22(1):19. De Meij JSB, Chinapaw MJM, Kremers SPJ, Jurg ME, Van Mechelen W. Promoting physical activity in children: the stepwise development of the primary school-based JUMP-in intervention applying the RE-AIM evaluation framework. Brit J Sports Med 2010;44(12):879–87. Glasgow RE, Nelson CC, Strycker LA, King DK. Using RE-AIM metrics to evaluate diabetes self-management support interventions. Am J Prev Med 2006;30(1):67–73. Van Acker R, De Bourdeaudhuij I, De Cocker K, Klesges L, Cardon G. The impact of disseminating the whole-community project '10,000 Steps': a RE-AIM analysis. BMC Publ Health 2011;11(1):3.

Model	D and/or I	Construct flexibility	System	Commu	Organiz	Individ	Policy	Field of origin	use the model (Reference #)	times model has been cited[b]	Citations (Reference #)
Diffusion of Innovation	D-only	1		x	x	x		Agriculture	1–8	39,364[b]	9
RAND Model of Persuasive Communication and Diffusion of Medical Innovation	D-only	1		x	x	x		Medical information: technology assessment	10	56	11
Effective Dissemination Strategies	D-only	2		x	x	x		Nursing research	—	24	12
Model for Locally Based Research Transfer Development	D-only	2		x	x			Local health and social service delivery agency	—	50	13
Streams of Policy Process	D-only	2	x	x	x		x	Political science	14–16	8,091[c]	17, 18
A Conceptual Model of Knowledge Utilization	D-only	3	x	x			x	Knowledge utilization in public policy	—	52	19
Conceptual Framework for Research Knowledge	D-only	3			x			Workplace health and	20	32	21

To think about:

- What might be implications of the changes?
- What core components or key elements should NOT be adapted?
- How might changes alter interpretations of study findings?
- How will you document these adaptations and if any others are made?
- How will you monitor the impact of these adaptations and any others are made?

Caveat

- Difficult to provide detailed guidance:
  - How much/little adaptation is appropriate
  - How much on an original model must be maintained
  - How many constructs can I change?
  - What are the core elements of a model?
- Not a single "cookbook" approach; judgment and team input are needed
    - Every situation is different, every study is different

Working Example

Implementing the Diabetes Prevention Program in a network of primary care clinics

- How has the model been designed and presented in the literature?
- How has this model been used in the literature?
- How will you document these adaptations and if any others are made?
- How will you monitor the impact of these adaptations and if any others are made?

Working Example

Citations	Glasgow RE, Vogt TM, Boles SM. Evaluating the public health impact of health promotion interventions: the RE-AIM framework. Am J Publ Health 1999;89(9):1322–7.
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- How will you monitor the impact of these adaptations and if any others are made?

Working Example

Proposed change	Purpose	Possible implications
Adding constructs		
1.		
2.		
Modifying constructs		
1.		
2.		
Removing constructs		
1.		
2.		
Re-organized constructs		
1.		
2.		

HOW DO I USE D&I MODEL(S)?

Where can you use a D&I Model?

Planning study → carrying out project→ reporting findings

Model should be apparent in

- Design
- Aims
- Study activities/protocol
- Selection of measures
- Context and outcomes
- Implementation strategies, mechanisms
- Evaluation
- Analyses
- Interpretation of results
- Dissemination of findings

When writing a grant proposal

- Introduce model early: Aims page
- Protocol based on concepts, terminology, and processes
- Common limitation of a grant application:
  - Model is mentioned in one section
  - Not fully integrated across all of the proposal

When conducting your study

- Continually return to the model
- Ensure alignment of
  - Measures and data collection procedures
  - With model and its constructs
- Identify relevant constructs and begin to determine how each contributes

Working Example: Aims

DPP in a network of primary care clinics

- How does the model help shape the aims, research questions, and/or hypotheses?
  - Does the model address or help us understand a gap in the literature?
- How has the model been used and how does this inform our study?

Working Example: Innovation

DPP in a network of primary care clinics

- In what ways might applying the model add innovation?
  - Application
  - Adaptation
  - Empirical testing
  - New field

Working Example: Approach

DPP in a network of primary care clinics

- How does the model inform the study methods?
  - How is it linked to study measures?
  - How had it informed data collection methods?

Construct	Description	Measure	Level	Method

- Analyses assess the relationships postulated in the model and highlighted on the aims page?

Working Example: Interpretation/Reporting

DPP in a network of primary care clinics

- How might the model inform interpretation of study results?
- In what ways can the model help in communicating the results?
- How does the model guide dissemination of the study findings?

SELECTING MEASURES

Measures for D&I Frameworks

- Need a way to test or evaluate how well your theory or model works
- If you can't measure a construct, it is hard to know if it is necessary, relevant, or contributes anything
- Constructs in D&I research are tricky and often complex and/or imprecise

Challenges to Measurement in D&I Science

- Too many constructs
- Often existing measures do not fit your key constructs well
- Usually time consuming and expensive to do a good job of developing and validating your own measure. It should:
  - Have strong psychometric characteristics
  - Be feasible, pragmatic and relevant

Pragmatism and Psychometrics

- Tough to have both
- Often the approaches to create a model with strong psychometrics (e.g., many items) makes it impractical
- Does not mean you should not try
- Use mixed methods whenever possible; getting multiple stakeholder perspectives on a construct is often helpful

Key Issues in Selecting Pragmatic Measures- One Approach*

1. Required Criteria
   - Important to stakeholders
   - Burden is low to moderate
   - Broadly applicable, has norms to interpret
   - Sensitive to change
2. Additional Criteria
   - Actionable
   - Low probability of harm
   - Addresses public health goal(s)
   - Related to theory or model
   - "Maps" to "gold standard" metric or measure

*Glasgow, RE and Riley, WT. (2013) WT. Pragmatic measures… *Am J Prev Med* 2013;45(2):237–243)

What to Do?

- Select a theory or framework that has well validated pragmatic measures (use this as one criterion for selecting a model)
- More controversial:
  - Combine or add to existing measures
  - Adapt a measure to better fit (kind of like core components issues)
  - Use parts of or subsections of a measure
  - As last resort, make your own measure

Where to GO for D&I Measures

- Seattle Implementation Research Collaboration website https://societyforimplementationresearchcollaboration.org/sirc-instrument-project/
  - Large number of measures organized along CFIR domains
  - Mental health focus
  - Detailed info from systematic lit reviews
  - Data on both psychometric and pragmatic characteristics
  - Do need to be a member

Where to Go for D&I Measures

- NCI Grid Enabled Measures (GEM) website:

https://bit.ly/2OIICPJ

- Organized by D&I constructs
- Direct link from DI Models website constructs
- Information on measure characteristics and usage materials/guides and references
- Crowdsourced sections on user ratings, comments, and data sharing (now underutilized)

Summary Tips on D&I Measures

- Usually not a perfect measure
- Consider multiple and mixed methods
- Decide which measures need to have highest traditional psychometric qualities and which measures need to be very pragmatic
- Do your best; 'show your work and thinking', acknowledge limitations and lessons learned

Take home points

- The integrated use of D&I models increase the likelihood of success for your D&I grant applications and projects
- Development of logic models can help with the selection of the best suited model
- There are a large number of existing D&I models to choose from
- There is no one 'right' model and 'all models are wrong'
- Selection of models should be guided by your research question
- Adaptation of models (with caution) to local context might be necessary
- D&I models need to be fully integrated throughout the research/practice process
- Measures are often not available for D&I constructs

RESOURCES FOR D&I MODEL USE AND WEBSITE TOUR

D&I Models Website:
http://dissemination-implementation.org/

T-CaST: an implementation Theory Comparison and Selection Tool:
https://impsci.tracs.unc.edu/tcast/

The SIRC Instrument Review Project
https://bit.ly/2DgP7UC

Grid-enabled Measures Database - D&I Workspace
https://bit.ly/2OIICPJ

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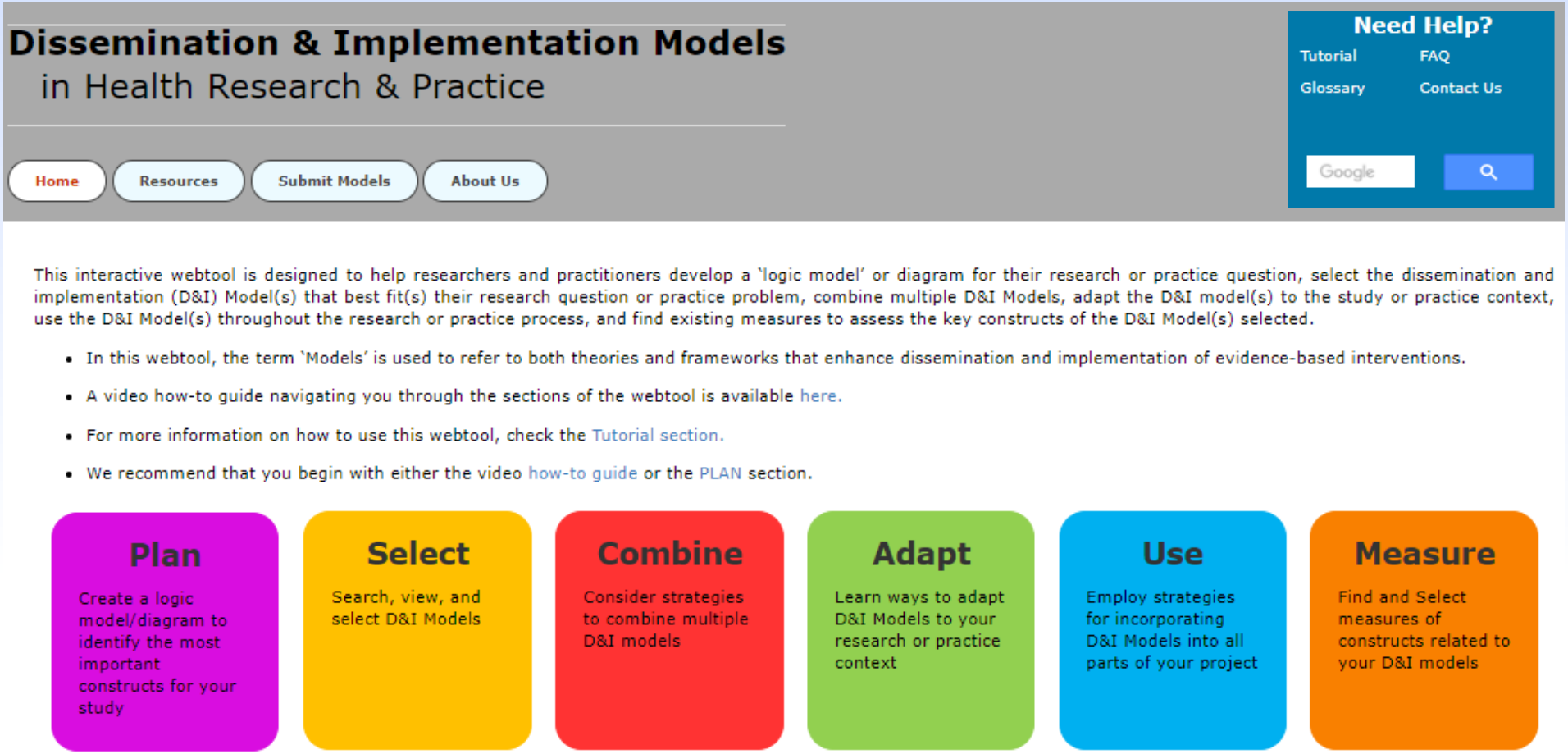


Dissemination and Implementation Models in Health Research and Practice webtool:
http://dissemination-implementation.org/

To provide feedback and help with usability testing of the webtool:
https://bit.ly/35Dt8Dh

QUESTIONS

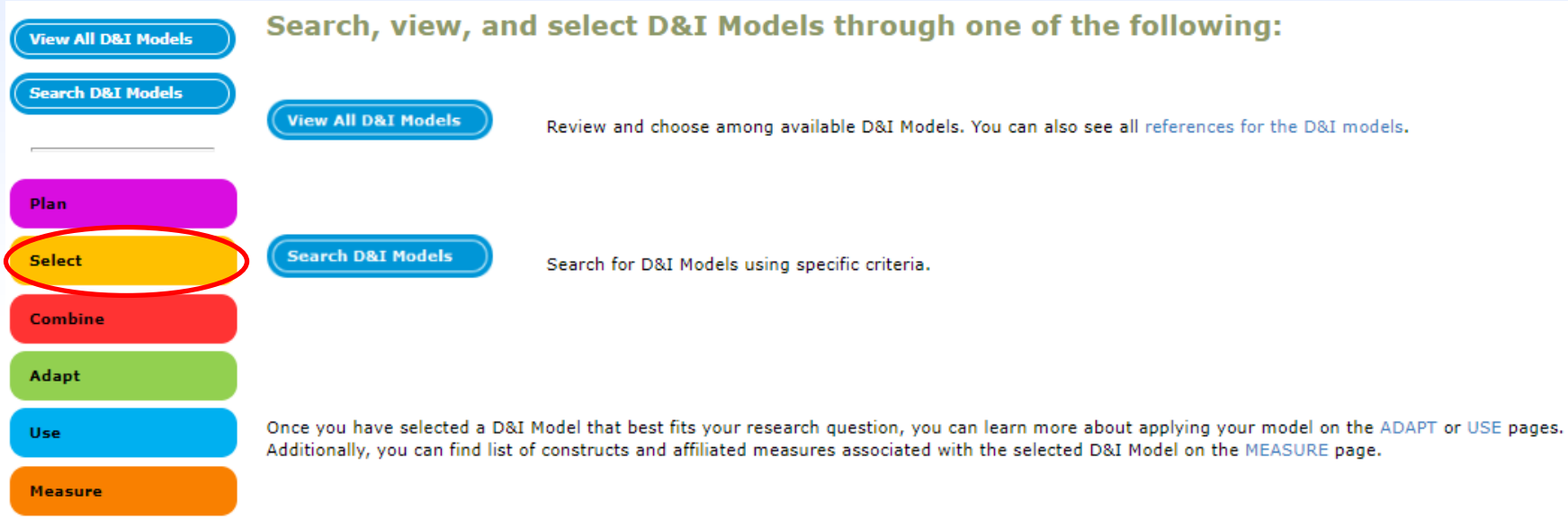
Screenshots

Creating a Logic Model Figure (Roadmap) for Your Project

A logic model or diagram of the issues, activities and constructs involved in your implementation or dissemination project can really help with selecting the best D&I framework for your project. By a construct we mean a concept or element in your theory, intervention, implementation strategy or hypothesized outcome(s). Constructs are used in this website to help you select theories or frameworks, and examples of logic model diagrams and constructs are provided in the links below. We strongly advise you to view the brief Overview demonstration and then to work through the remaining sections. You will end up with a completed, personalized logic model that you can use for your grant or paper, and in the other website sections.

1. Overview and 6 minute video of constructing a logic model (roadmap) for your project: (strongly recommended)

2. Blank logic model diagram for implementation projects
    a. Blank Logic Model.
3. Example completed logic models for:
    a. Public health project (community based Diabetes Prevention Program)
        Example Logic Model - Public Health Project (DPP).pdf
    b. Clinical, primary care Project (lung cancer screening and shared decision making project)
        Example Logic Model - Clinical Primary Care Project.pdf
4. Blank Fillable PDF listing key constructs in your project
    a. Blank Fillable PDF Worksheet
5. Example Worksheet PDF listing constructs


View All D&I Models
Search D&I Models
Plan
Select
Combine
Adapt
Use
Measure
Search, view, and select D&I Models through one of the following:
View All D&I Models
Review and choose among available D&I Models. You can also see all references for the D&I models.
Search D&I Models
Search for D&I Models using specific criteria.
Once you have selected a D&I Model that best fits your research question, you can learn more about applying your model on the ADAPT or USE pages.
Additionally, you can find list of constructs and affiliated measures associated with the selected D&I Model on the MEASURE page.

View All D&I Models

The list of all D&I Models and their characteristics. You can compare up to five models by selecting the check box next to the model name. Additional information on each model can be found by clicking on the Description link under each Model name.

Compare Models

	Sort	Sort	Sort						Sort	Sort	
	Model	D &/or I	Construct Flexibility	Socio-Ecological Levels					Field of Origin	# Times Cited	Rating
				Individual	Organization	Community	System	Policy			
☐	"4E" Framework for Knowledge Dissemination and Utilization Description	D=I	3	I	O	C			Aging and mental health		
☐	A Model for Evidence-Based Practice Description										4.75
☐	ACE Star Model of Knowledge Transformation Description	D>I	4	I	O		S		Nursing		
☐	Active Implementation Framework Description	I-Only	3	I	O	C			Any domain	904	
☐	Adaptation in dissemination and implementation science Description	I-Only	4	I	O	C	S		Health Disparities		
☐	Advancing health disparities research within the health care system Description	I>D	4		O	C	S		Health Disparities		
☐	Advancing Research and Clinical Practice through Close Collaboration (ARCC) Model of Evidence-Based Practice in Nursing and Healthcare Description	D>I	5	I	O				Nursing		
☐	Availability, Responsiveness & Continuity (ARC): An Organizational & Community Intervention Model Description	I-Only	5		O	C			Mental health	89	
☐	Behaviour Change Wheel Description	I>D	3	I	O	C	S	P	Health Psychology		
☐	Blueprint for Dissemination	D-Only	4		O	C			Quality of health	6	

View All D&I Models

Search D&I Models

Plan

Select

Combine

Adapt

Use

Measure

User Name

Password

Login Register

Search D&I Models

You can search for D&I Models by entering a keyword OR by selecting from the categories below.

Enter keyword for model search: Submit Keyword Search

---------- OR ----------

Dissemination & Implementation Models can be searched using individually set criteria.

D And/Or I

- ○ Dissemination Only
- ○ Implementation Only
- ◉ Any

Socio-Ecological Levels

- ☐ Individual
- ☐ Organization
- ☐ Community
- ☐ System
- ☐ Policy
- ☑ All

Constructs

- ☐ Acceptability/feasibility
- ☐ Adaptation and evolution
- ☐ Adopter/implementer/decision maker characteristics
- ☐ Adoption
- ☐ Awareness
- ☐ Dose
- ☐ Development of an intervention
- ☐ Goals
- ☐ Barriers and facilitators
- ☐ Champion/field agent
- ☐ Communication
- ☐ Communication channels
- ☐ Compatibility
- ☐ Complexity
- ☐ Context
- ☐ Context - Inner setting
- ☐ Context - Outer setting
- ☐ Cost
- ☐ Dissemination
- ☐ Engagement
- ☐ Evaluation
- ☐ External validity/generalizability
- ☐ Fidelity
- ☐ Fit
- ☐ Identification
- ☐ Implementation

View All D&I Models

Search D&I Models

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Combine

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Use

Measure

Combine

D&I models should be used to inform all phases of the research process, from early development of D&I research questions through to analyses and dissemination of research findings. There are many occasions when selecting just one model will not address all your needs for guiding the planning, design, implementation, and evaluation activities. Nilsen classified D&I models into five broad categories based on their primary purpose: process models, determinant frameworks, classic theories, implementation frameworks, and evaluation frameworks.[add ref] When one model does not suffice, you might decide to select multiple models and combine them. In this section, we provide you with guidance and basic principles on how best to **combine multiple models.**

+/- Expand All

+/- What is the first step for combining D&I models?

The first step for combining models is to identify multiple models that may meet various aspects of your planned work. In the Select section of this website you can run multiple searches and choose models for these various purposes, using the key constructs you have identified in the Plan section

Another tool that can guide you with identifying and comparing of multiple models for D&I is T-CaST: an implementation theory comparison and selection tool.

More details about this tool can be found:
Birken, S.A., Rohweder, C.L., Powell, B.J. et al. T-CaST: an implementation theory comparison and selection tool. Implementation Sci 13, 143 (2018) doi:10.1186/s13012-018-0836-4

+/- What are some reasons to combine multiple D&I models?

+/- What are some important considerations when combining multiple D&I Models?

+/- What are some examples of combination of multiple D&I models?

Adapt

D&I researchers often utilize theory-based approaches that evolve over time based on empirical testing. As you "shop" for an appropriate model, you should review the core concepts, proposed relationships, and outcomes to be sure you are fully informed beyond what is depicted on the graphic. It is helpful to gather associated literature to define concepts and identify any issues or recommended adaptations based on prior studies. There is likely no comprehensive model that will perfectly fit every study, so it may be necessary to either adapt a model and/or to combine multiple models for your study. The focus of this section is on considerations that should be addressed to adapt an existing model to improve the fit (there are other resources for adapting evidence-based interventions and implementation strategies); please refer to the combine section for more information on using models together.

+/- Expand All

+/- What is adaptation of D&I models about?

Adapting an existing model for a study has many important considerations, which are explored in greater depth in this section. Along the way, documenting adaptations and the reasons for those adaptations is important. However, it is difficult to provide detailed guidance on how much/little adaptation is appropriate or how much on an original model must be maintained (e.g. How many constructs can I change? What are the core elements of a model?). Like the other sections of this website, there is not a single "cookbook" approach to model adaptation, every situation is different and every study is different. It helps to have someone on your team with experience in implementing and using models.

+/- What are the benefits of adapting or an existing D&I model?

+/- What should be considered before adapting an existing D&I model?

+/- What type of modifications can be made to D&I models?

You can view an example here.

Adapt Case example

You can use the fillable PDF on this page that will walk you through this process.

Adapt Worksheet.

Use

Models are used to guide research and help researchers to interpret findings and contribute to the science. Once you have selected, combined and/or adapted a D&I model, you need to use the model in several parts of your study (from planning a study to carrying out a project). The earliest use of a model is often when a grant proposal is being written. It is crucial to introduce your model early in your grant application, generally in the Aims page. "Using the model" means that your protocol is based on the concepts, terminology, and processes described. A common limitation of a grant application is that a model is mentioned in one section, but is not fully integrated across all parts of the proposal. Later, when conducting your study, it is helpful to continually return to your model to ensure that measures and data collection procedures align with the model and its key constructs. There are several general issues to be considered when using a D&I model.

+/- Expand All

+/- When should a model be selected and/or adapted?

As early as possible, preferably in the planning and designing of a study.

+/- Across what stages of a research study should D&I models be used?

+/- How can D&I models support the selection of measures and evaluation of a study?

You can view an example here.

Use Case example

You can use the fillable PDF on this page that will walk you through this process.

Use Worksheet.

Measure constructs

The following page provides a list of constructs affiliated with D&I models and links to measures for these constructs. Additional information on each construct is provided when clicking the Description button.

Construct	Definition	Number of Models	Measure
Acceptability/feasibility Description	Acceptability: Perception among implementation stakeholders that a treatment, service, practice or innovation is agreeable, palatable, or satisfactory....[D]different from the larger construct of service satisfaction...it is more specific, referencing a particular treatment or set of treatments, while satisfaction typically references the general service experience." Stakeholders need specific knowledge about aspects or components of the treatment/innovation are needed in order for acceptability to be assessed. Acceptability should be considered in conjunction with other constructs throughout the implementation process (e.g. acceptability must be considered for adoption during the early stages). Feasibility: The extent to which a new treatment, or an innovation, can be successfully used or carried out within a given agency or setting. Related to appropriateness but may include other concerns specific to an agency or organization like resources or staff training needs. Feasibility should be considered during the early stages of implementation during adoption.	7	GEM D&I link: Acceptability GEM D&I link: Feasibility
Adaptation and evolution Description	For the success of D&I, interventions often need to be adapted to fit the local context (i.e., needs and realities). Adaptation is defined as the degree to which an evidence-based intervention is changed or modified by a user during adoption and implementation to suit the needs of the setting or to improve the fit to local conditions. The need for adaptation and understanding of context has been called Type 3 evidence (i.e., the information needed to adapt and implement an evidence-based intervention in a particular setting or population). Ideally, adaptation will lead to at least equal intervention effects as is shown in the original efficacy or effectiveness trial. To reconcile the tension between fidelity and adaptation, the core components (or essential features) of an intervention (i.e., those responsible for its efficacy/effectiveness) must be identified and preserved during the adaptation process.	20	GEM D&I link: Adaptation and Evolution
Adopter/implementer/decision maker characteristics Description	The characteristics, attitudes, and behaviors of individuals within an adopting organization include position in the organization, education, individual concerns and motivations and may determine the uptake and use of an innovation. Rogers classifies the individual adopters according to their degree of innovativeness into five categories: (1) innovators, (2) early adopters, (3-4) early and late majority, and (5) laggards.	29	GEM D&I link: Adoption GEM D&I link: Adopter Attitudes
Adoption Description	The intention, initial decision, or action to try or employ an innovation or evidence-based practice. Adoption also may be referred to as "uptake." Adoption occurs in the early to mid implementation stage and is	25	GEM D&I link: Adoption

Dissemination & Implementation Models in Health Research & Practice

Resources
- Seminal Publications
- Relevant Websites

View All D&I Models

Search D&I Models

Plan
Select
Combine
Adapt
Use
Measure

Seminal Publications

Peer reviewed manuscripts:

Tabak RG, Khoong EC, Chambers DA, Brownson RC. **Bridging research and practice: models for dissemination and implementation research.** Am J Prev Med. 2012;43(3):337-50.

> Theories and frameworks (hereafter called models) enhance dissemination and implementation (D&I) research by making the spread of evidence-based interventions more likely. This work organizes and synthesizes these models by (1) developing an inventory of models used in D&I research; (2) synthesizing this information; and (3) providing guidance on how to select a model to inform study design and execution.

Mitchell SA, Fisher CA, Hastings CE, Silverman LB, Wallen GR. **A thematic analysis of theoretical models for translational science in nursing: Mapping the field.** Nurs Outlook. 2010;58(6): 287-300.

> The quantity and diversity of conceptual models in translational science may complicate rather than advance the use of theory. This paper offers a comparative thematic analysis of the models available to inform knowledge development, transfer, and utilization. This analysis distinguishes the contributions made by leaders and researchers at each phase in the process of discovery, development, and service delivery. It also informs the selection of models to guide activities in knowledge translation.

Wilson PM, Petticrew M, Calnan MW, Nazareth I. **Disseminating research findings: what should researchers do? A systematic scoping review of conceptual frameworks.** Implementation Science 2010, 5:91

> Addressing deficiencies in the dissemination and transfer of research-based knowledge into routine clinical practice is high on the policy agenda both in the UK and internationally. However, there is lack of clarity between funding agencies as to what represents dissemination. Moreover, the expectations and guidance provided to researchers vary from one agency to another. This paper is based on a systematic scoping review of any conceptual/organizing frameworks that could be used by researchers to guide their dissemination activity.

Nilsen P. **Making sense of implementation theories, models and frameworks.** Implementation Science 2015;10:53.

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Model Website	
Model Description	
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