Clarity out of Chaos: Application of Theory within Implementation Research

QUERI

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Laura J. Damschroder, MS, MPH

Implementation Research Group, VA QUERI CyberSeminar Series

VA CENTER FOR CLINICAL MANAGEMENT RESEARCH
Ann Arbor HSR&D Center of Innovation

U.S. Department of Veterans Affairs
Veterans Health Administration
Patient Care Services
Health Promotion and Disease Prevention

Embracing Complexity

1. Intervention complexity
   - Multiple components
2. Contextual Complexity
   - Dynamic multidimensional environments
3. Implementation Complexity
   - Multi-component strategies
4. Pathway complexity
   - Feedback loops, mediators, moderators, etc
5. Population complexity
   - Focus on multiple pt groups

Butler M, Epstein RA, Totten A, Whitlock EP, Ansari MT, Damschroder LJ, Balk E, Bass EB, Berkman ND, Hempel S, Iyer S. AHRQ series on complex intervention systematic reviews—paper 3: adapting frameworks to develop protocols. Journal of clinical epidemiology. 2017 Oct 1;90:19-27.

Power of Theory

- Provides organizing framework for your research
- Provides harmonized language: common terms & definitions
- Builds scientific knowledge base
    - Context, mechanisms of action
    - Generalize through theory
    - Syntheses
- Efficient way to systematically build collective knowledge

Colquhoun, H., Leeman, J., Michie, S., Lokker, C., Bragge, P., Hempel, S., … Grimshaw, J. (2014). Towards a common terminology: a simplified framework of interventions to promote and integrate evidence into health practices, systems, and policies. Implementation Science, 9, 51.
Foy R, Ovretveit J, Shekelle PG, et al. The role of theory in research to develop and evaluate the implementation of patient safety practices. Quality & safety in health care. Feb 11 2011.

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Clarity out of chaos: Use of theory in implementation research

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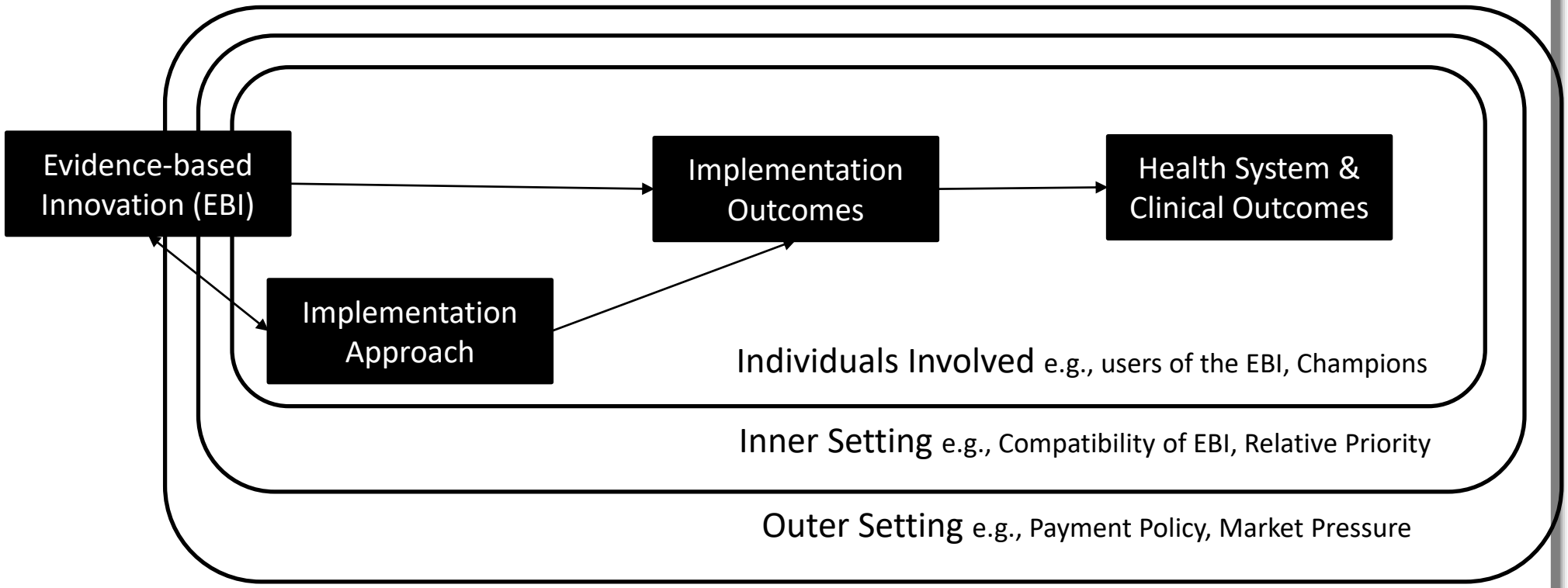
VA Center for Clinical Management Research, Ann Arbor, MI, USA

ARTICLE INFO

Keywords:
Implementation science
Theory
Frameworks
Models

ABSTRACT

Implementation science has been recognized as a potential catalyst for health system reform, in part, because of its contribution of well-grounded conceptual theories, often encapsulated in frameworks. Well-designed frameworks provide a semantic structure, a common language by which to guide systematic approaches to studying implementation and testing interventions. An overview of the types and roles of theory in advancing implementation science is offered in this article. Resources for selecting appropriate frameworks are described along with illustrative examples. The case is made that well-developed theory is what enables knowledge to emerge out of seeming chaos and for translation of that knowledge to be widely and reliably implemented into routine practice so that health and well-being of patients is maximized by delivery of interventions that are rooted in that knowledge.



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All models are wrong...George Box1976

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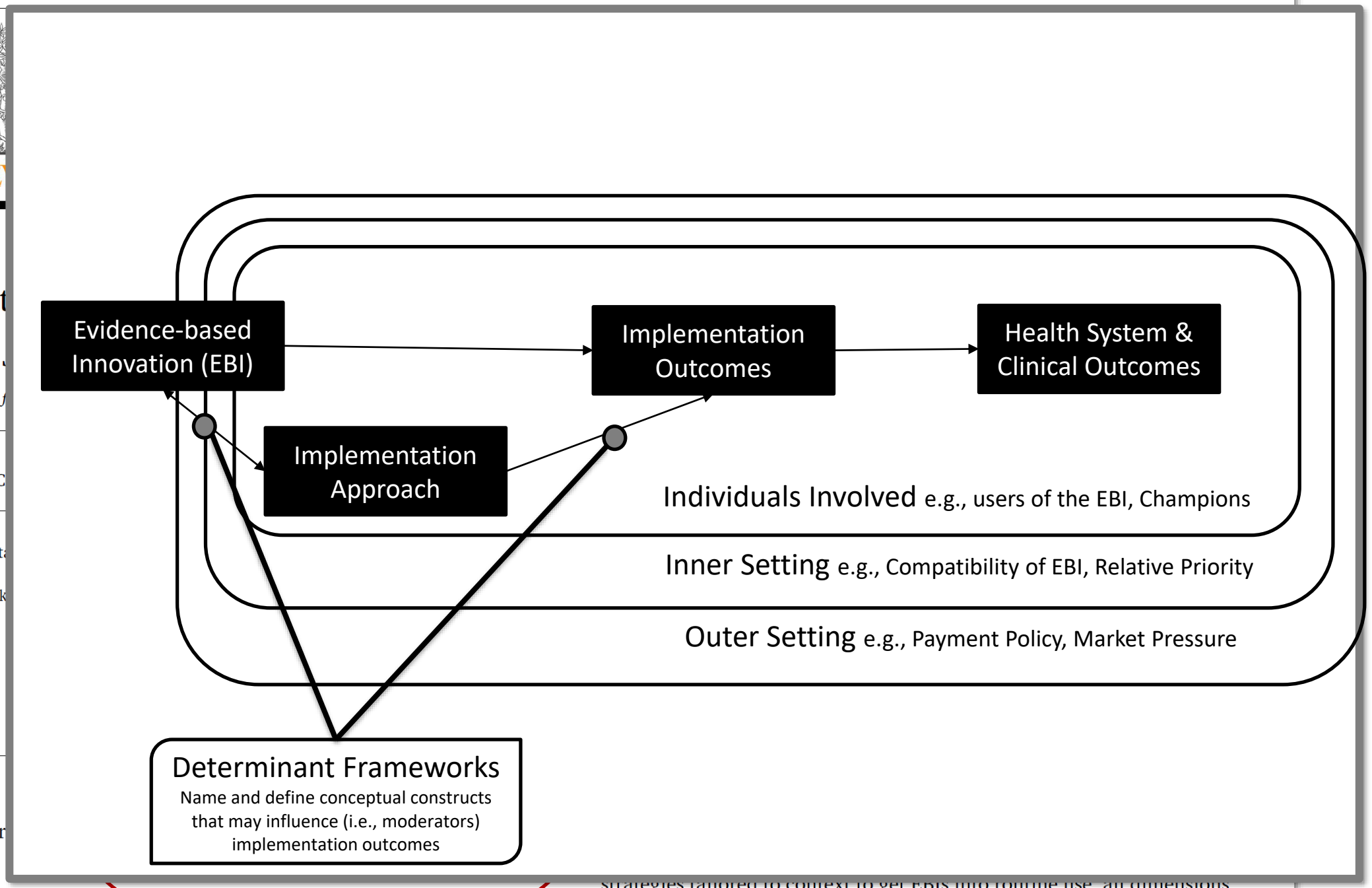

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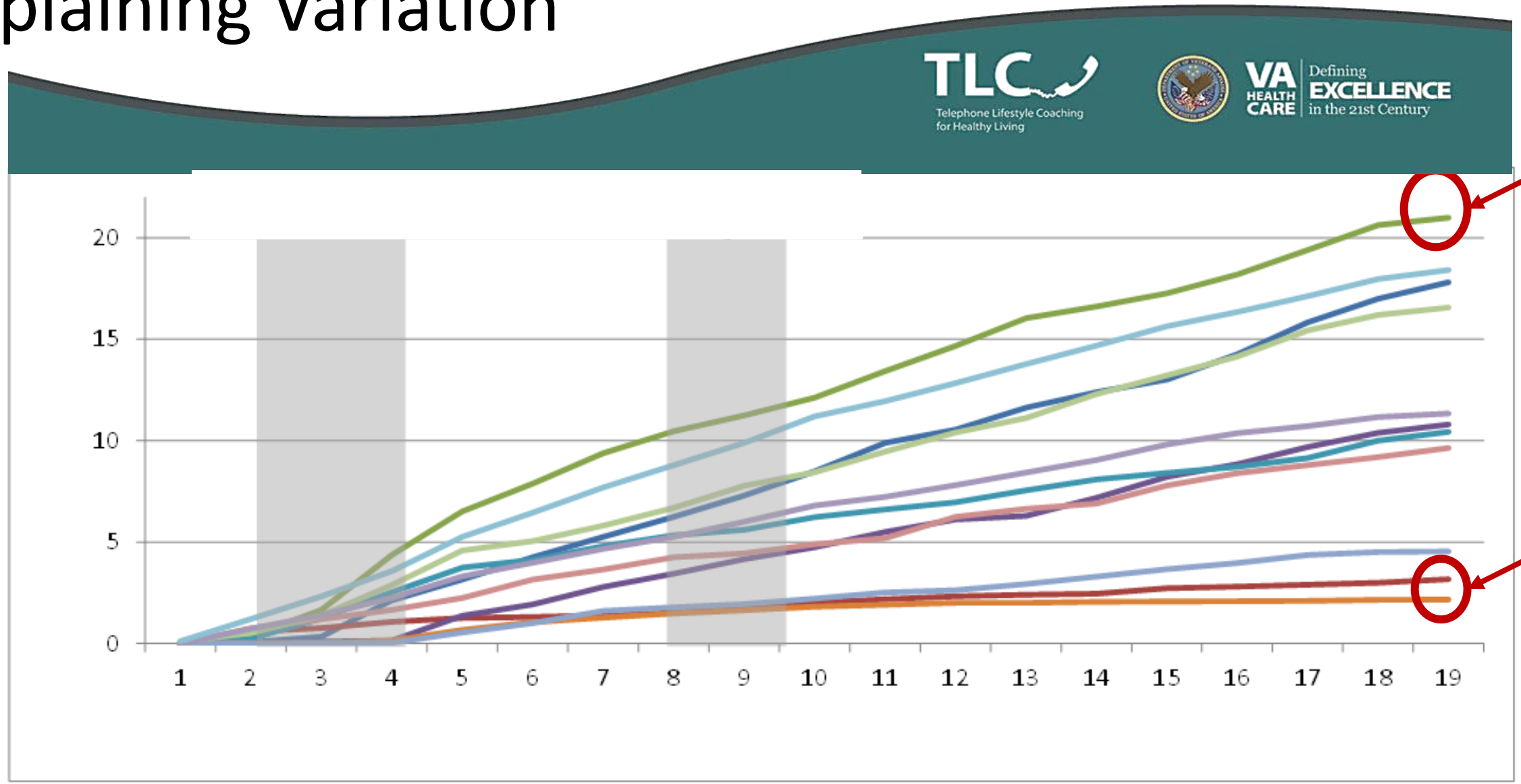
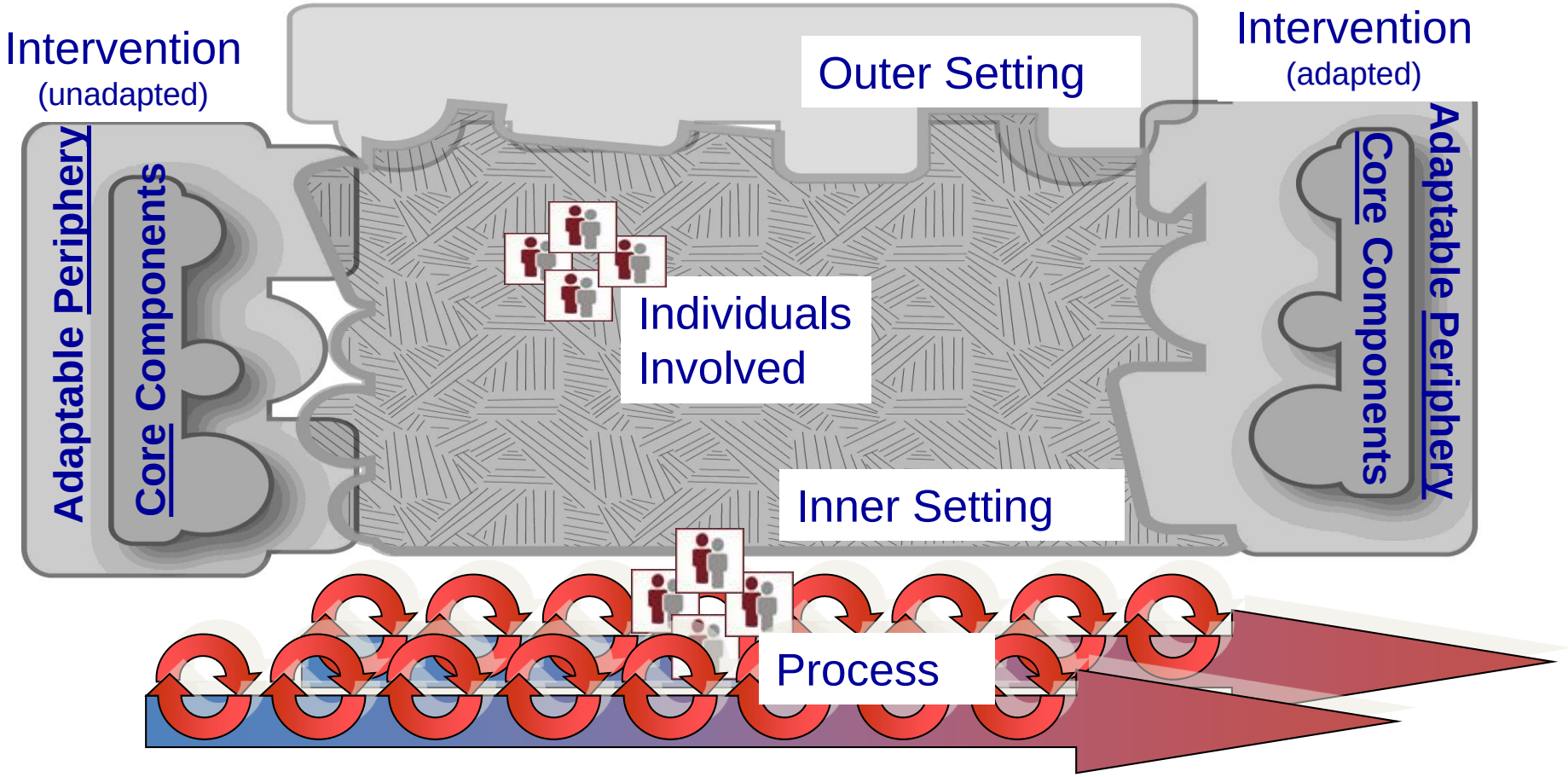
Explaining Variation

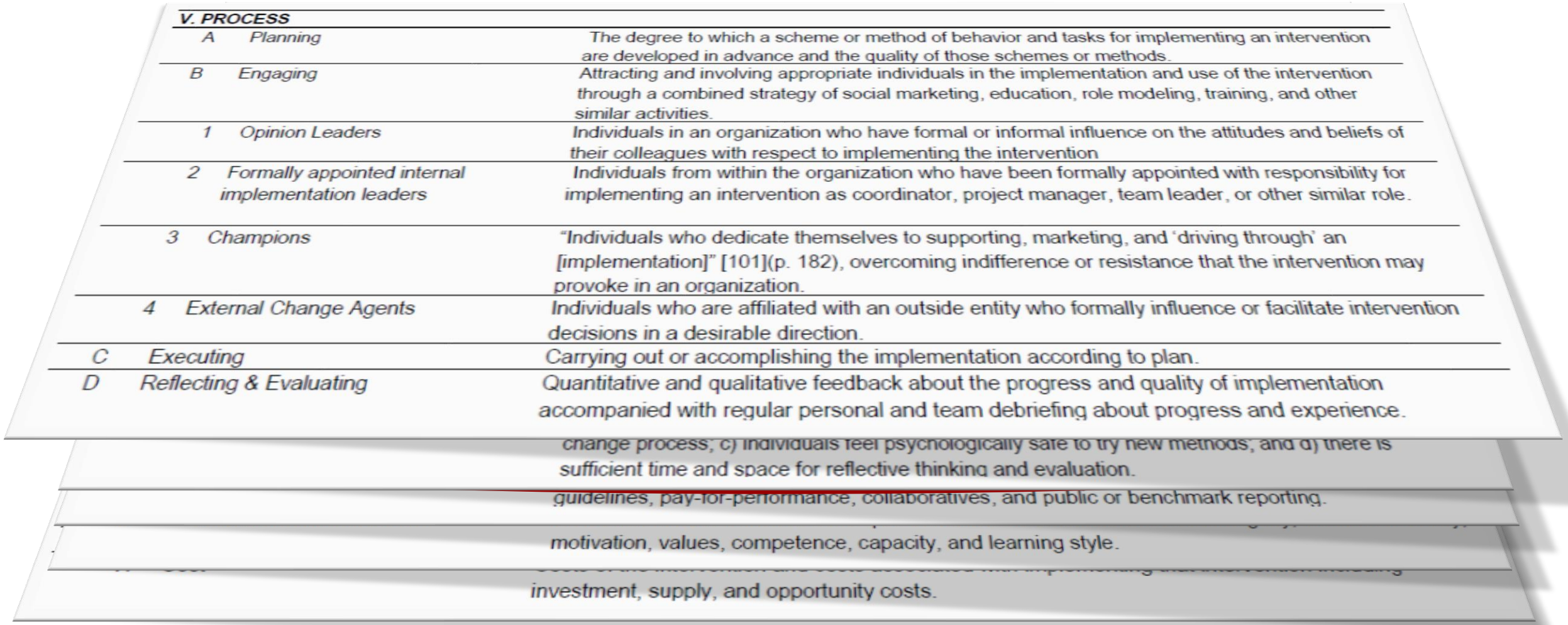


Damschroder, L.J., Reardon, C.M., Sperber, N., Robinson, C.H., Fickel, J.J. and Oddone, E.Z., 2017. Implementation evaluation of the telephone lifestyle coaching (TLC) program: organizational factors associated with successful implementation. *Translational behavioral medicine*, *7*(2), pp.233-241.

CFIR

Consolidated Framework for Implementation Research





V. PROCESS		
A	Planning	The degree to which a scheme or method of behavior and tasks for implementing an intervention are developed in advance and the quality of those schemes or methods.
B	Engaging	Attracting and involving appropriate individuals in the implementation and use of the intervention through a combined strategy of social marketing, education, role modeling, training, and other similar activities.
1	Opinion Leaders	Individuals in an organization who have formal or informal influence on the attitudes and beliefs of their colleagues with respect to implementing the intervention
2	Formally appointed internal implementation leaders	Individuals from within the organization who have been formally appointed with responsibility for implementing an intervention as coordinator, project manager, team leader, or other similar role.
3	Champions	"Individuals who dedicate themselves to supporting, marketing, and 'driving through' an [implementation]" [101](p. 182), overcoming indifference or resistance that the intervention may provoke in an organization.
4	External Change Agents	Individuals who are affiliated with an outside entity who formally influence or facilitate intervention decisions in a desirable direction.
C	Executing	Carrying out or accomplishing the implementation according to plan.
D	Reflecting & Evaluating	Quantitative and qualitative feedback about the progress and quality of implementation accompanied with regular personal and team debriefing about progress and experience.

change process; c) individuals feel psychologically safe to try new methods; and d) there is sufficient time and space for reflective thinking and evaluation.

guidelines, pay-for-performance, collaboratives, and public or benchmark reporting.

motivation, values, competence, capacity, and learning style.

investment, supply, and opportunity costs.

CFIR

Consolidated Framework for Implementation Research

Damschroder, L. J., D. C. Aron, R. E. Keith, S. R. Kirsh, J. A. Alexander, and J. C. Lowery. 2009. "Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science." *Implement Sci 4.*.

www.CFIRGuide.org

Consolidated Framework for Implementation Research

CFIR Constructs

The table below lists all the CFIR constructs by domain along with a short description for each. Clicking on the construct/domain name will take you to our CFIR Wiki which has more detailed information including:

- Detailed description and rationale for inclusion in CFIR
- Qualitative coding guidelines
- Links to quantitative measures when available (check back periodically for updates)
- Opportunity to add to discussions related to any construct

This table is available for downloading in three formats: Word, PDF, Excel

Construct		Short Description
I. INTERVENTION CHARACTERISTICS		
A.	Intervention Source	Perception of key stakeholders about whether the intervention is externally or internally developed.
B.	Evidence Strength & Quality	Stakeholders' perceptions of the quality and validity of evidence supporting the belief that the intervention will have desired outcomes.
C.	Relative Advantage	Stakeholders' perception of the advantage of implementing the intervention versus an alternative solution.
D.	Adaptability	The degree to which an intervention can be adapted, tailored, refined, or reinvented to meet local needs.
E.	Trialability	The ability to test the intervention on a small scale in the organization, and to be able to reverse

Inner Setting

To learn more see the wiki.

To choose questions by construct, click on its name. Or, you can

- [ ] Choose ALL questions in this domain.

Constructs

Structural Characteristics

Networks & Communications

The nature and quality of webs of social networks and the nature and quality of formal and informal communications within an organization. To learn more see the wiki.

1. [ ] Can you describe your working relationships with your colleagues?
2. [ ] To what extent do you get together with colleagues outside of work?
3. [ ] Do you meet (formally or informally) with a team of people?
4. [ ] Can you describe your working relationship with leaders?
5. [ ] Can you describe your working relationship with influential stakeholders?
6. [ ] Are meetings, such as staff meetings, held regularly?
7. [ ] How do you typically find out about new information, such as new initiatives, accomplishments, issues, new staff, staff departures?
8. [ ] When you need to get something done or to solve a problem, who are your "go-to" people?

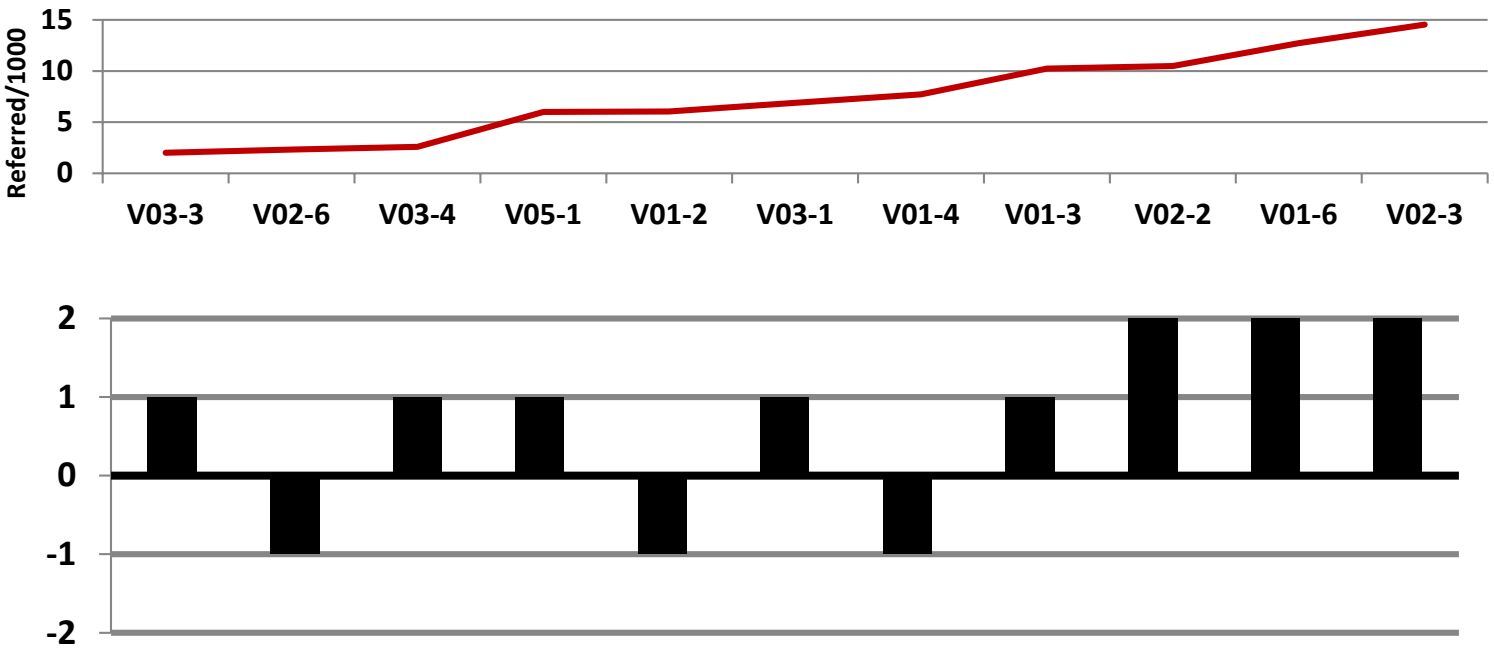
- [ ] Choose ALL questions in this construct.

Culture

Implementation Climate

Readiness for Implementation

Compatibility



- Correlation: 0.55 (p=0.08)

Facility	1	2	3	4	5	6	7	8	9	10	11	Pearson Correlation	
Referral Rate (Number of referrals per 1000 Veterans)	2.01	2.32	2.59	6.00	6.04	6.88	7.72	10.24	10.49	12.73	14.53	r	p
Intervention Characteristics Domain													
Evidence Strength & Quality	+1	+1	+1	0	M	+1	+1	+1	+1	+1	+1	0.1233	0.7344
Relative Advantage	+1	+2	+2	+2	+1	+2	+1	+2	+1	+1	+2	-0.0873	0.7986
Adaptability	0	+1	0	+1	0	0	0	+1	0	0	0	-0.1865	0.5829
Complexity	-1	M	-1	M	M	+2	+1	-1	+1	+1	-1	0.1772	0.6746
Design Quality & Packaging	0	+2	+2	+1	+1	+1	+1	+1	+2	+1	+1	-0.0562	0.8695
Outer Setting Domain													
Patient Needs & Resources	-1	+2	+2	+1	+1	-1	-1	+1	+2	-1	+2	0.0156	0.9637
External Policy & Incentives	M	+1	M	M	M	M	M	0	+1	0	+1	-0.2777	0.651
Inner Setting Domain													
Structural Characteristics	-2	-2	-2	-1	0	-1	-1	-1	-1	-1	+2	**0.7343	0.0101
Networks & Communications	-1	+1	M	M	M	-1	-1	0	0	+2	+2	*0.5762	0.1349
Implementation Climate													
Tension for Change	+1	+1	0	M	+1	+1	-1	0	+1	0	+1	-0.2381	0.5373
Relative Priority	-1	-2	M	M	-1	-1	-1	-1	-2	-2	+1	0.3623	0.3379
Compatibility	+1	-1	+1	+1	-1	+1	-1	+1	+2	+2	+2	*0.552	0.0783
Organizational Incentives & Rewards	M	M	-1	+1	M	+1	M	M	M	M	M	*0.9807	0.1254
Goals & Feedback	-1	+1	+1	+2	-1	+1	-1	+1	-1	-1	+1	-0.1068	0.7547
Readiness for Implementation													
Leadership Engagement	1	-2	1	2	M	0	+1	2	0	1	1	0.3141	0.3767
Available Resources	+1	0	0	+2	-1	+1	0	0	+1	+1	0	-0.1661	0.6694
Access to Knowledge & Information	2	+1	1	2	M	+1	+1	+2	+1	-1	1	-0.4227	0.2236
Process Domain													
Planning	+1	+1	+1	+2	+1	0	0	-1	0	M	M	**-0.6798	0.044
Engaging													
Implementation Leader	-2	+2	-2	+2	+1	+1	+1	+2	+2	+2	+2	**0.6487	0.0308
Patients	-1	+1	+1	+2	-1	+1	-1	+1	+1	0	+1	0.1414	0.6783
Key Stakeholders	-1	+1	-1	+2	+1	+2	+1	+2	+2	+1	+2	**0.6559	0.0284
Reflecting & Evaluating	M	-1	0	+2	0	-1	+1	+1	+1	+1	0	0.3296	0.3863
Key:													

Distinguishing Constructs

	High Referral	Low Referral
Structural Characteristics	Preventive services report to same boss	Unfilled positions PCMH Changes
Networks & Communications	High respect and relationships - teams	Weak/no links in primary care
Compatibility	Values Clinical initiatives Existing programs	Only PCPs refer Could not access notes
Engaging: Implementation Lead(s)	Enthusiastic, capable leaders	Missing leaders
Engaging: Stakeholders	Multi-faceted communications	Poor communications
Planning	“JIT” planning	Roll out to smaller rural clinics first

www.CFIRGuide.org

Consolidated Framework for Implementation Research

Home | Constructs | Evaluation Design | Strategy Design | Articles & Highlights | Tools | Contact Us

Strategy Design

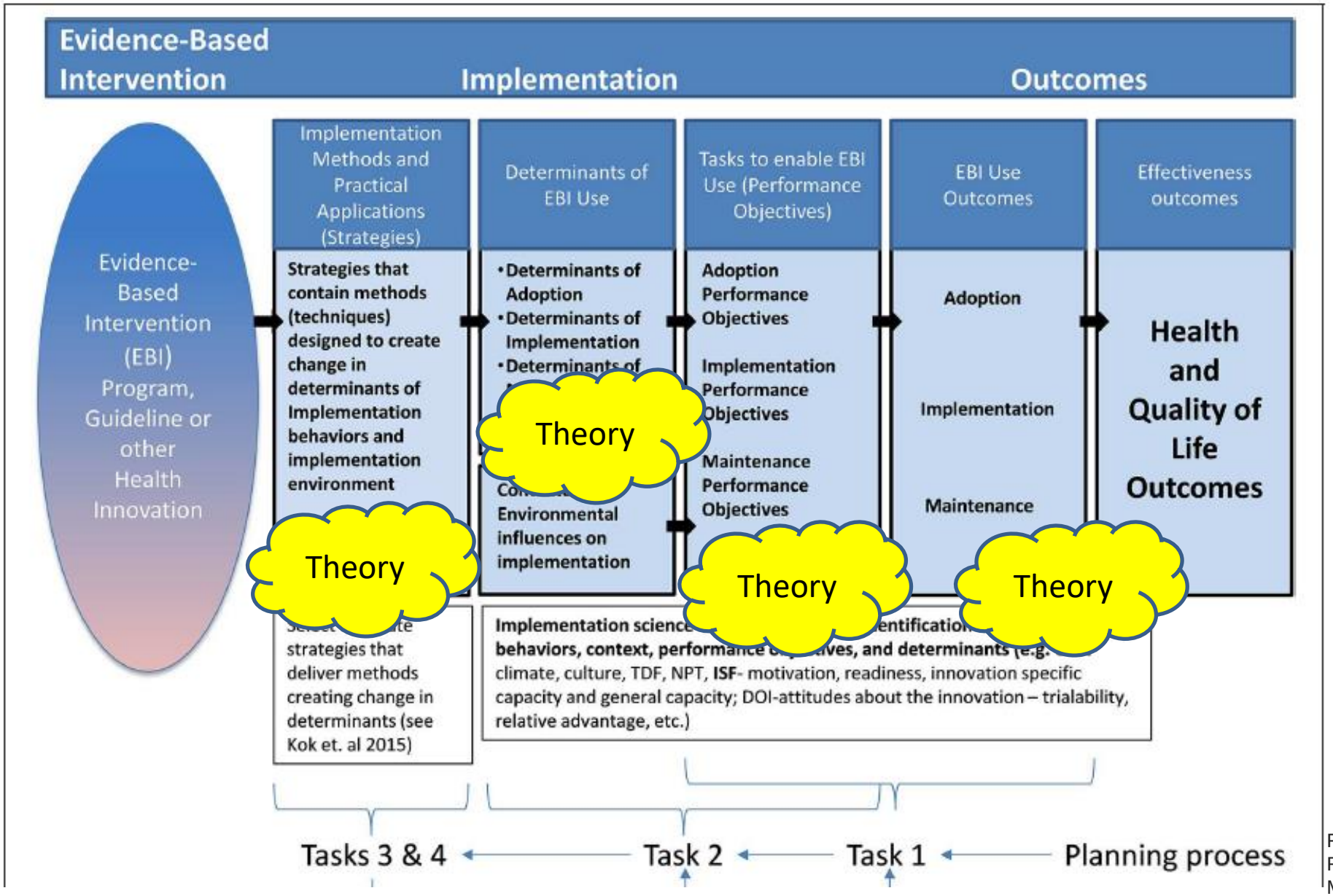
Although the prospective use of the CFIR has been infrequent [1], the CFIR can be used to design an implementation strategy. After completing a context assessment and identifying barriers and facilitators to implementing an innovation, the CFIR can help tailor implementation strategies to mitigate barriers and leverage facilitators. This process can also be used to refine implementation processes through the course of implementation.

+ State of the Science: Tailoring Implementation Strategies to Context

+ CFIR-ERIC Implementation Strategy Matching Tool

Please contact us with ideas for improving and keeping this content updated.

+ References



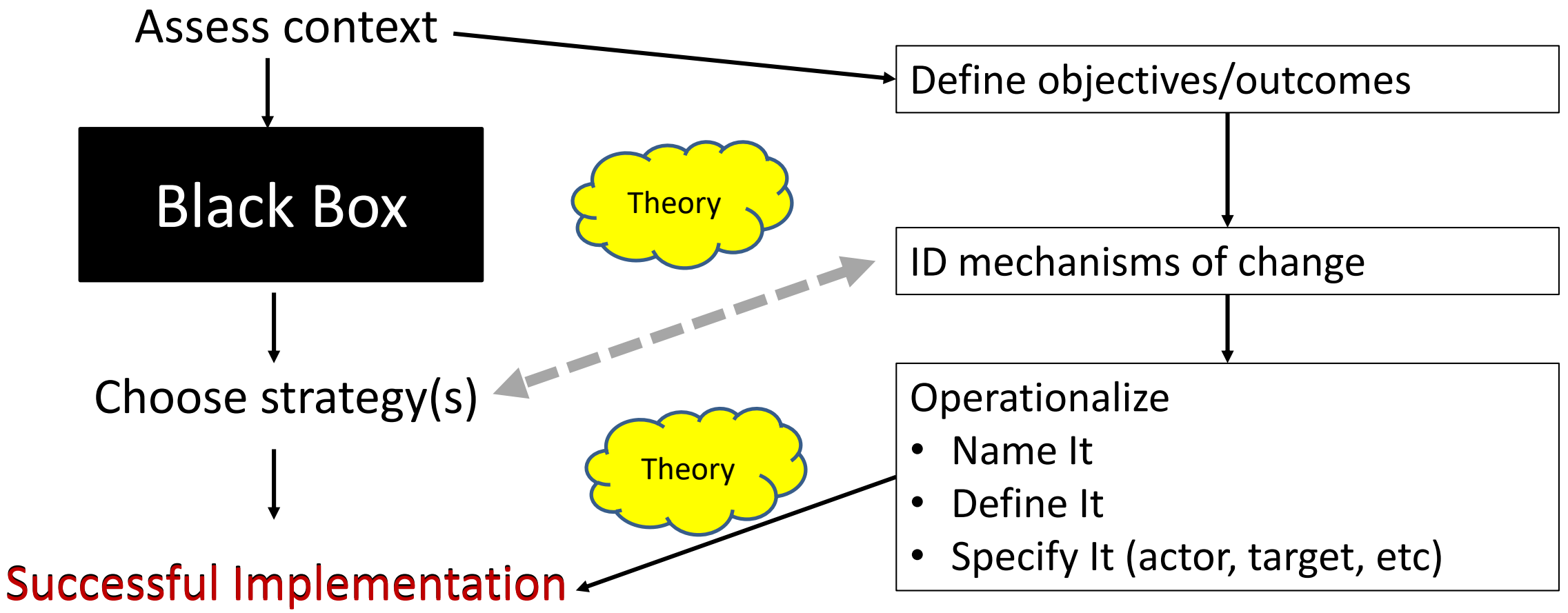
Fernandez ME, Ten Hoor GA, van Lieshout S, Rodriguez SA, Beidas RS, Parcel G, Ruiter RA, Markham CM, Kok G. Implementation mapping: using intervention mapping to develop implementation strategies. Frontiers in public health. 2019;7:158.

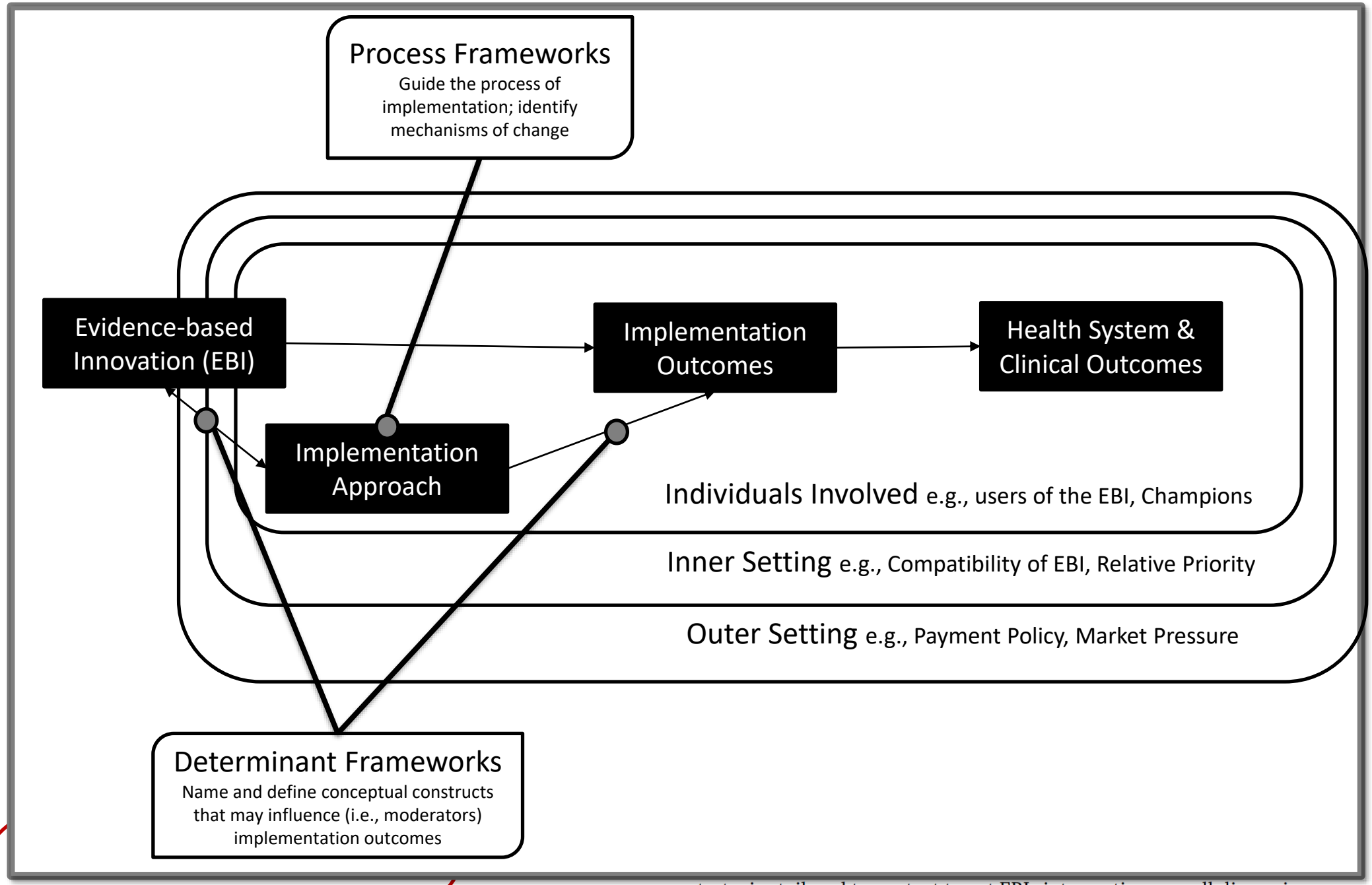
Using Theory to Open the **Black Box**

Tailor strategies to context

Implementation Mapping

https://interventionmapping.com/





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GTO
GETTING TO OUTCOMES™

Chinman M, Ebener P, Malone PS, Cannon J, D'Amico EJ, Acosta J. Testing implementation support for evidence-based programs in community settings: a replication cluster-randomized trial of Getting To Outcomes®. Implement Sci. 2018 Oct 22;13(1):131. doi: 10.1186/s13012-018-0825-7. PMID: 30348227; PMCID: PMC6196461.

Chinman *et al. Implementation Science* (2018) 13:131
https://doi.org/10.1186/s13012-018-0825-7

Implementation Science

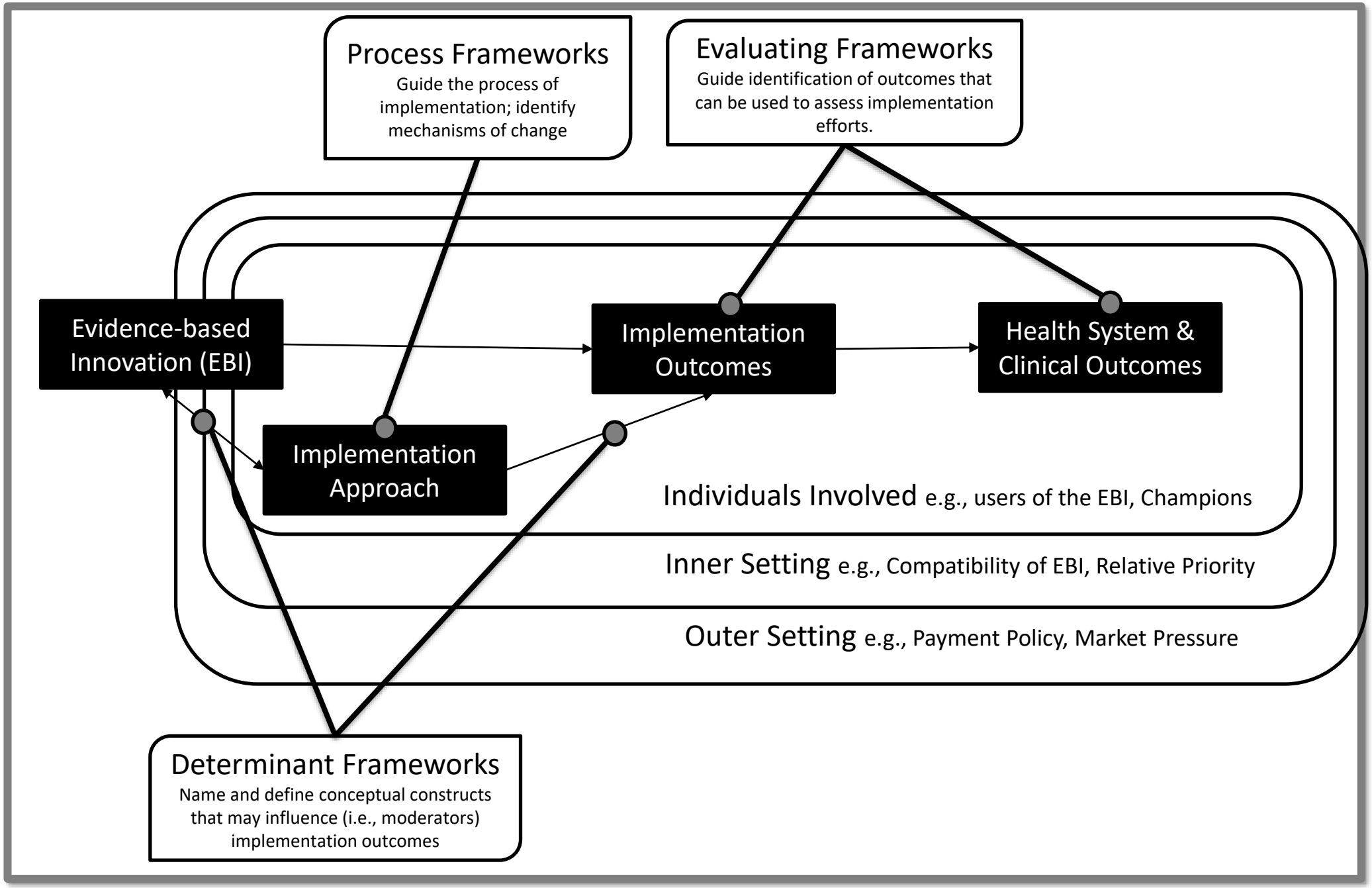
RESEARCH Open Access

Testing implementation support for evidence-based programs in community settings: a replication cluster-randomized trial of Getting To Outcomes®

Matthew Chinman*, Patricia Ebener, Patrick S. Malone, Jill Ca

Abstract

Findings suggest that systematic implementation support provided by GTO can help community organizations achieve better fidelity. Findings replicate the implementation results from a previous GTO study using the same design, but with a different evidence-based program and different fidelity measures


Process Frameworks
Guide the process of implementation; identify mechanisms of change
Evaluating Frameworks
Guide identification of outcomes that can be used to assess implementation efforts.
Evidence-based Innovation (EBI)
Implementation Outcomes
Health System & Clinical Outcomes
Implementation Approach
Individuals Involved e.g., users of the EBI, Champions
Inner Setting e.g., Compatibility of EBI, Relative Priority
Outer Setting e.g., Payment Policy, Market Pressure
Determinant Frameworks
Name and define conceptual constructs that may influence (i.e., moderators) implementation outcomes

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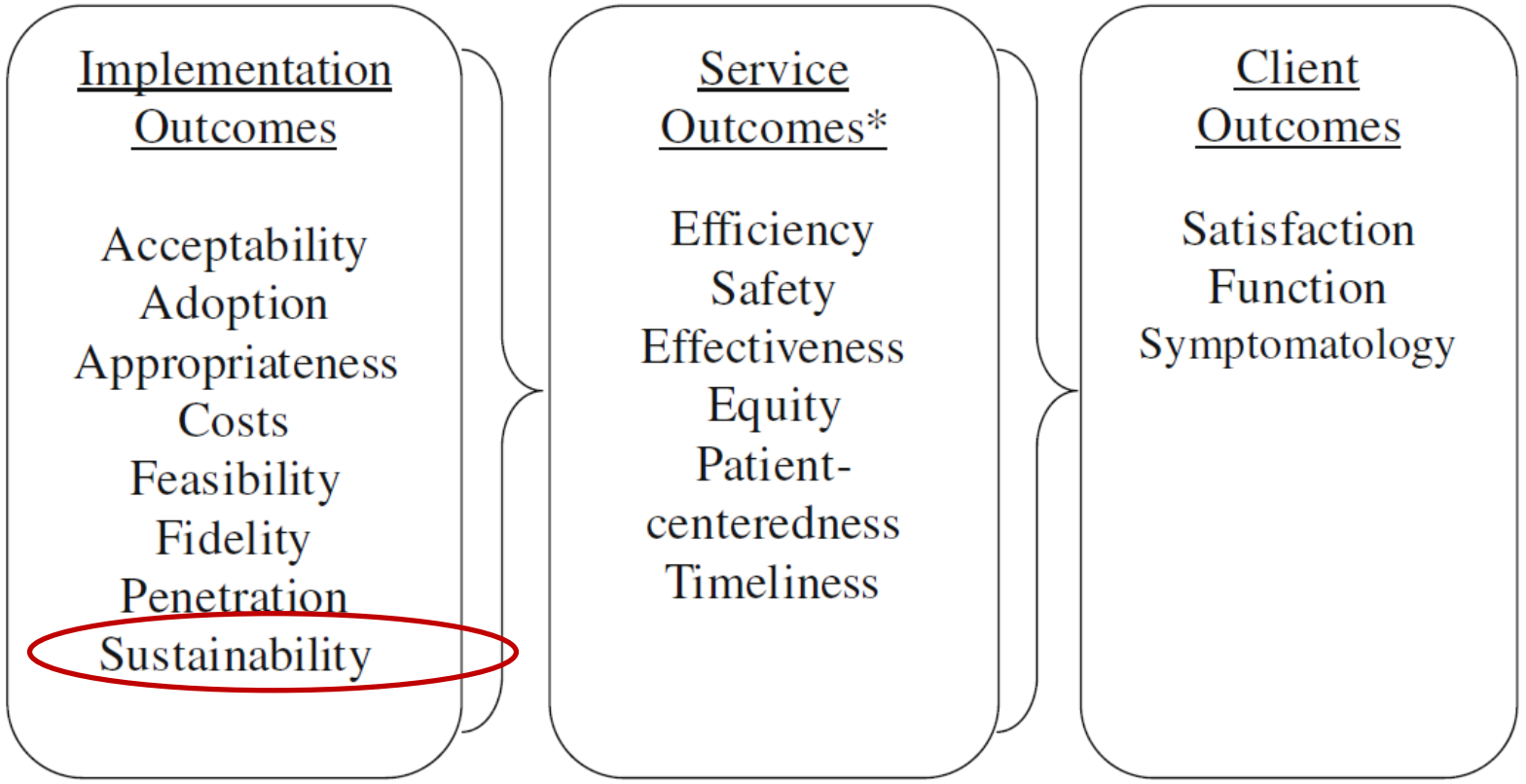
Outcomes



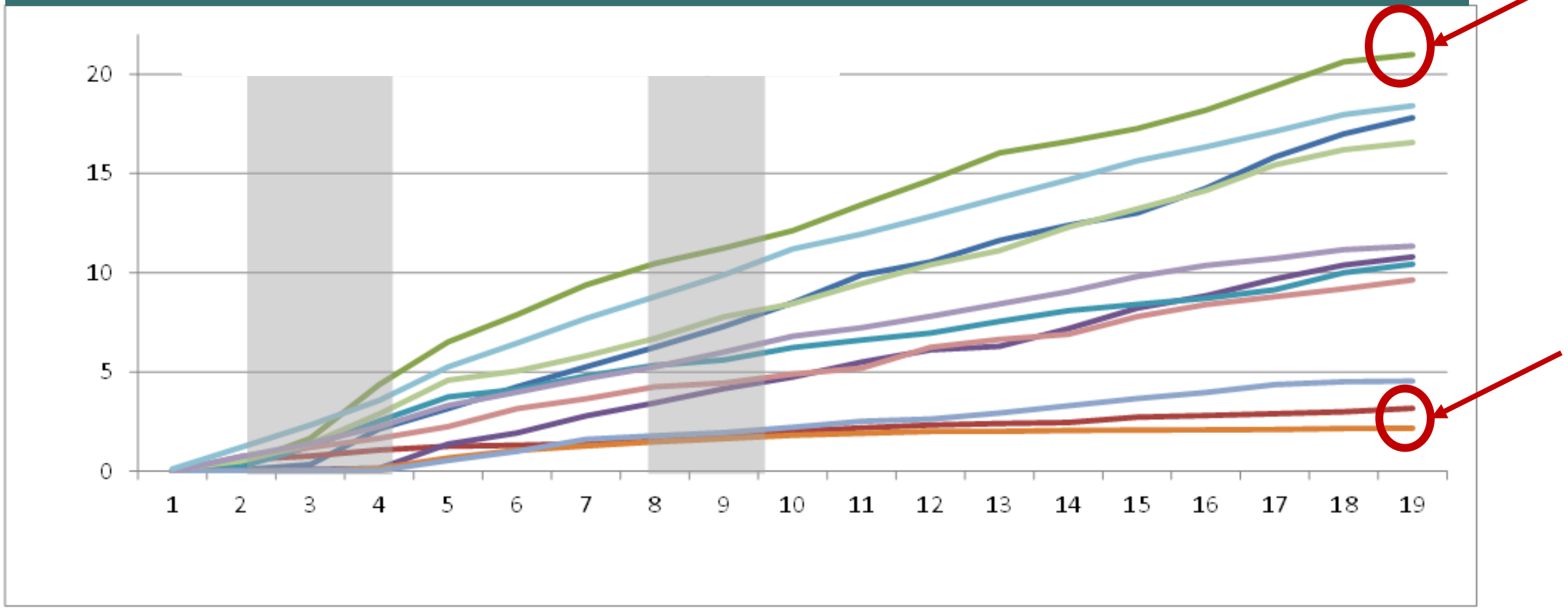
***IOM Standards of Care**

Proctor, E., H. Silmere, R. Raghavan, P. Hovmand, G. Aarons, A. Bunger, R. Griffey, and M. Hensley, *Outcomes for implementation research: conceptual distinctions, measurement challenges, and research agenda. Administration and Policy in Mental Health, 2011.* ***38(2): p. 65-76.***

Penetration: Referral rates

TLC
Telephone Lifestyle Coaching for Healthy Living

VA HEALTH CARE | Defining EXCELLENCE in the 21st Century



RE-AIM.org


REACH
How do I reach those who need this intervention?
EFFECTIVNESS
How do I know my intervention is working?
ADOPTION
How do I develop organizational support to deliver my intervention?
IMPLEMENTATION
How do I ensure the intervention is delivered properly?
MAINTENANCE
How do I incorporate the intervention so it is delivered over the long-term?
RE-AIM

Multiple Frameworks: CFIR + RE-AIM

Damschroder *et al. Implementation Science* (2017) 12:94
DOI 10.1186/s13012-017-0619-3

Implementation Science

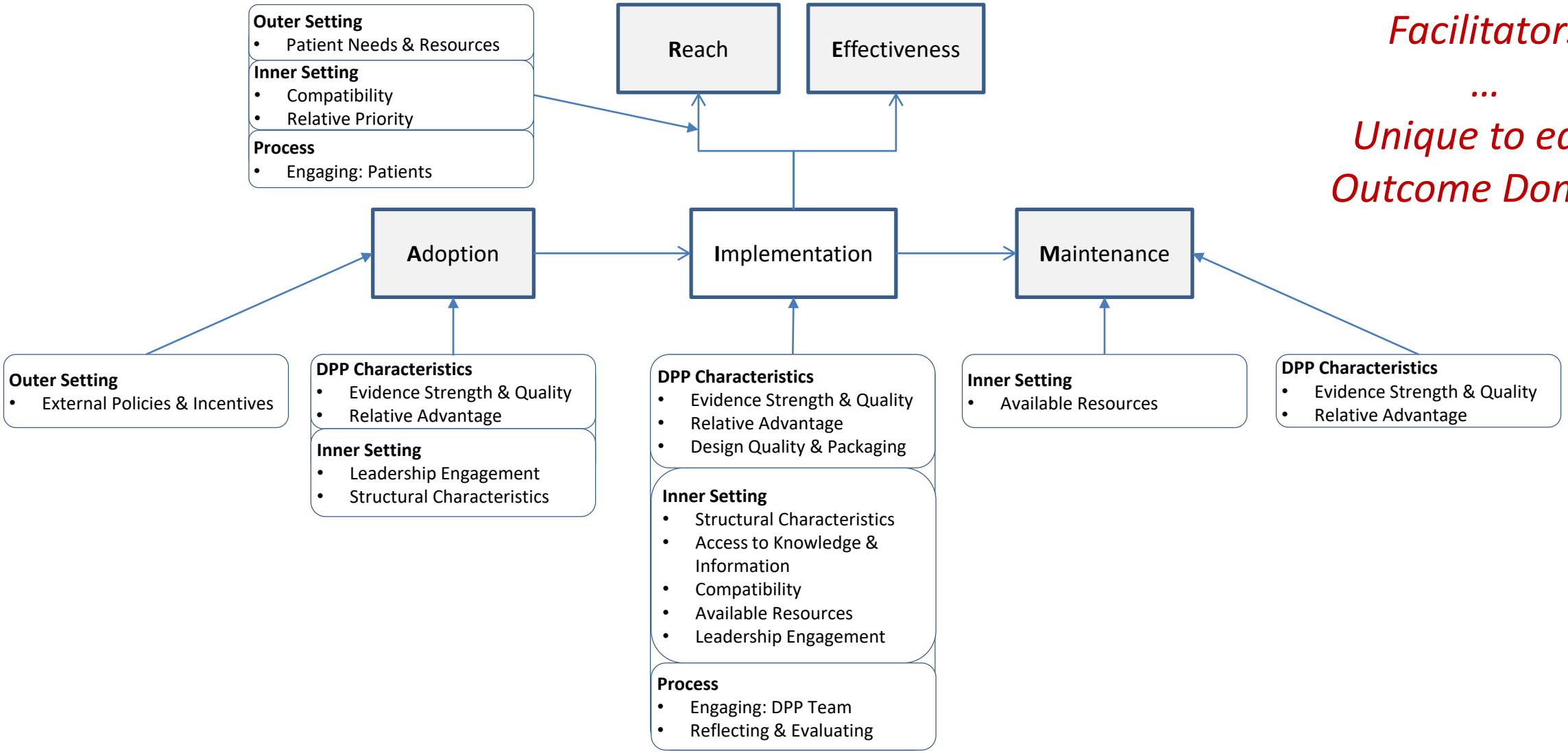
RESEARCH Open Access

Implementation findings from a hybrid III implementation-effectiveness trial of the Diabetes Prevention Program (DPP) in the Veterans Health Administration (VHA)

Laura J. Damschroder[1,2*], Caitlin M. Reardon[1], Mona AuYoung[1,13], Tannaz Moin[3,4,5], Santanu K. Datta[6,7], Jordan B. Sparks[1], Matthew L. Maciejewski[6,7], Nanette I. Steinle[8,9], Jane E. Weinreb[3,4], Maria Hughes[1], Lillian F. Pinault[8,9], Xinran M. Xiang[10,14], Charles Billington[11,12] and Caroline R. Richardson[1,2,10,15]

Abstract

CFIR + RE-AIM



Identify Barriers & Facilitators

…

Unique to each Outcome Domain

Multiple Frameworks: CFIR + GTO

Prevention Science (2019) 20:1200–1210
https://doi.org/10.1007/s11121-019-01037-x

Identify Barriers & Facilitators

…

Using Getting-to-Outcomes Framework versus NO GTO

Influence of an Implementation Support Intervention on Barriers and Facilitators to Delivery of a Substance Use Prevention Program

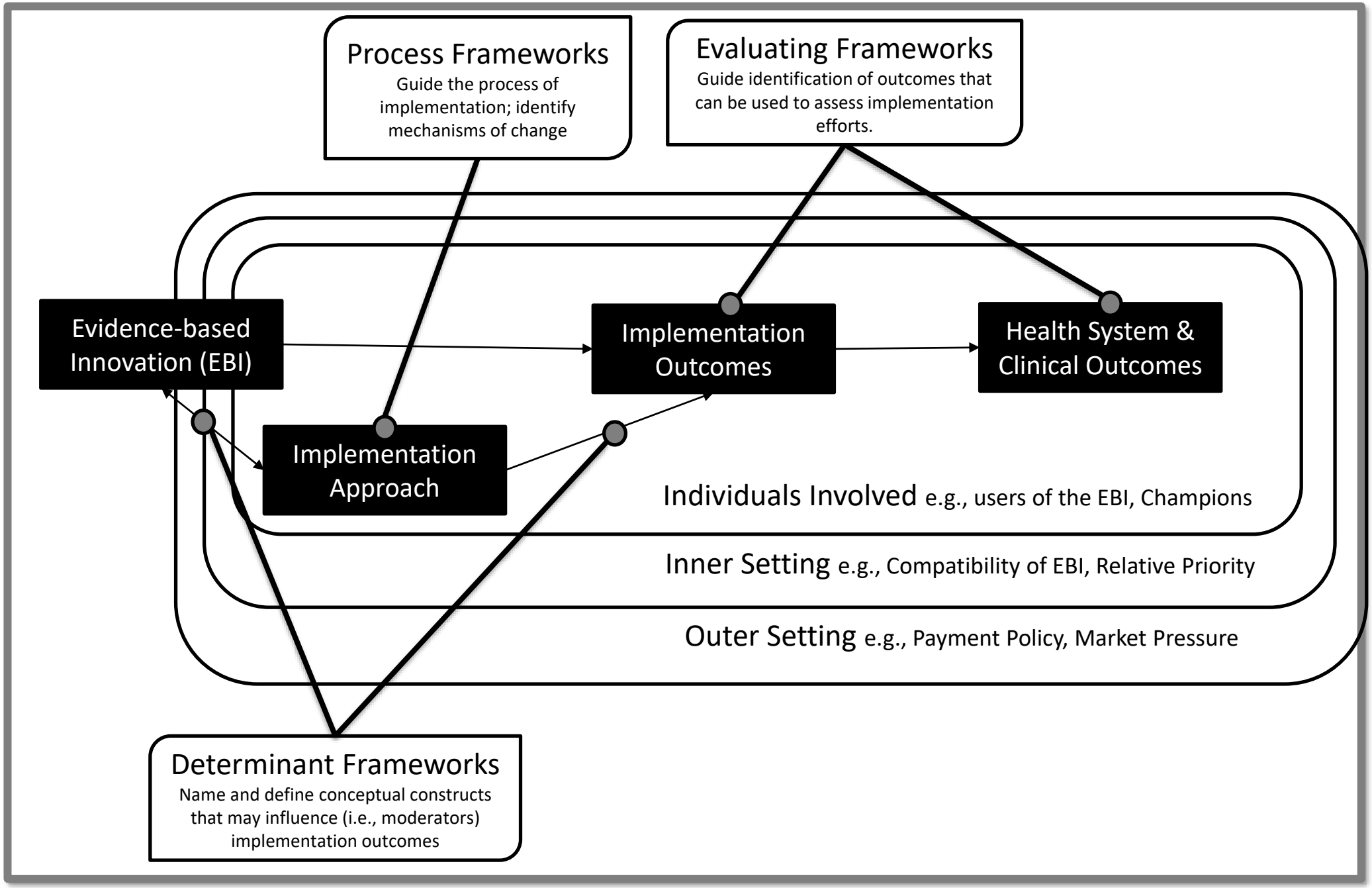
Jill S. Cannon [1] · Marylou Gilbert [1] · Patrida Ebener [1] · Patrick S. Malone [2] · Caitlin M. Reardon [3] · Jole Acosta [1] · Matthew Chinman [1]

Published online: 31 August 2019

Abstract

Implementation support interventions have helped organizations implement progra
comes. For example, a recent randomized controlled trial called Preparing to Run E
implementation support intervention called Getting To Outcomes (GTO) improved i
stance use prevention program (CHOICE) run in community-based settings. However
interventions affect organizational barriers and facilitators of implementation. This p
mentation facilitators and barriers in sites conducting a substance use prevention pr
cluster-randomized controlled trial testing GTO, a two-year implementation support
trial compares 15 Boys & Girls Club sites implementing CHOICE (control group),
drug prevention program, with 14 Boys & Girls Club sites implementing CHOICE su

These findings highlight that implementation support such as GTO is likely to help lower-resourced community-based organizations improve fidelity through a focus on planning and evaluation processes.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Name and define conceptual constructs that may influence (i.e., moderators) implementation outcomes

Levels of Theory

OPEN ACCESS

Demystifying theory and its use in improvement

Frank Davidoff,[1] Mary Dixon-Woods,[2] Laura Leviton,[3] Susan Michie[4]

[1]Geisel School of Medicine at Dartmouth, Hanover, New Hampshire, USA
[2]University of Leicester, Leicester, UK
[3]Robert Wood Johnson Foundation, Princeton, New Jersey, USA
[4]University College London, London, UK

ABSTRACT

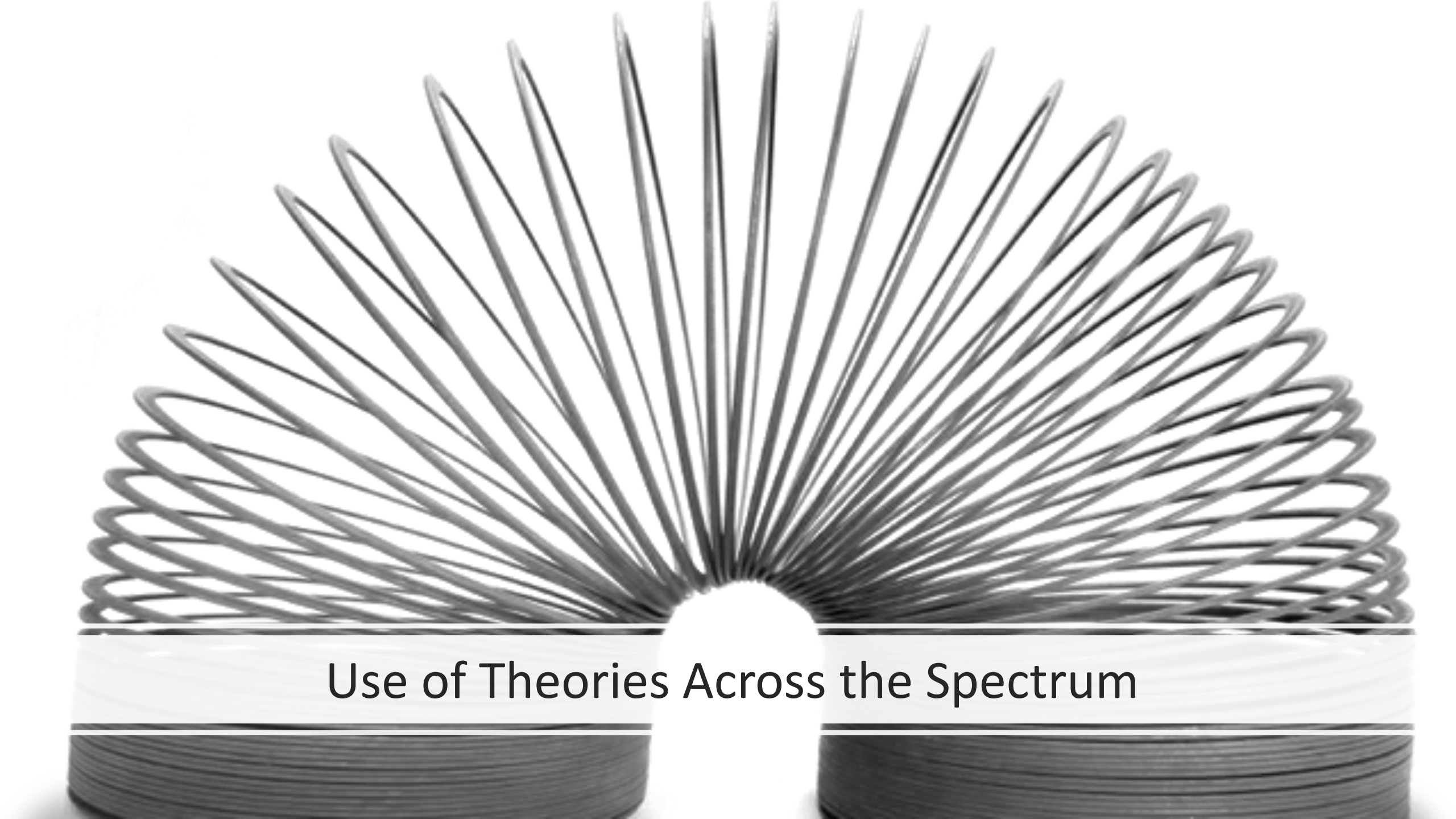
The role and value of theory in improvement work in healthcare has been seriously underrecognised. We join others in proposing that more informed use of theory can strengthen improvement programmes and facilitate the evaluation of their effectiveness. Many professionals, including improvement

advantage of informal and formal theory in planning and executing improvement efforts.[3] It is of course possible to achieve high levels of quality and safety on the basis of intuition derived from experience alone, with little evident help from formal theory. The few successful examples that exist do not, however, help to

Quality Improvement

Work Area or Project: *Example: Incorporating Whole Health concepts throughout Primary Care*

Change X	Will lead to	Improvement Y	Because of	Reason Z
Example: *Implementing a paper-free check-in and check-out process in Primary care.*		*Example:* *Greater efficiency and more time for LPNs to spend with patients asking about their current medical concerns and incorporating Whole Health questions.* *Bonus: a paper-free process is better for the environment, saves money, and is more hygienic.*		*Example:* *Getting rid of the paper check-in and check-out forms means LPNs won't have to walk between the MSA's desk and the vitals station before and after each patient, freeing up time.*



Use of Theories Across the Spectrum

Function of Conceptual Frameworks

1. To build a foundation
2. To conceptualize the study
3. To develop and assess research design and instrumentation
4. To provide a reference point for interpretation of findings
5. To demonstrate how a study advances knowledge

Rocco TS, Plakhotnik MS. Literature reviews, conceptual frameworks, and theoretical frameworks: Terms, functions, and distinctions. Human Resource Development Review. 2009 Mar;8(1):120-30.

Online Theory Comparison and Selection Tool (T-CaST):

https://impsci.tracs.unc.edu/tcast/

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Choosing a Framework

Usability

- ☐ TMF includes relevant constructs (e.g., self-efficacy; climate)
- ☐ Key stakeholders (e.g., researchers; clinicians; funders) are able to understand, apply, and operationalize TMF.
- ☐ TMF has a clear and useful figure depicting included constructs and relationships among them.
- ☐ TMF provides a step-by-step approach for applying it.
- ☐ TMF provides methods for promoting implementation in practice.
- ☐ TMF provides an explanation of how included constructs influence implementation and/or each other.

Testability

- ☐ TMF proposes testable hypotheses.
- ☐ TMF includes meaningful, face-valid explanations of proposed relationships.
- ☐ TMF contributes to an evidence base and/or TMF development because it has been used in empirical studies.

Applicability

- ☐ TMF focuses on a relevant implementation outcome (e.g., fidelity; acceptability).
- ☐ A particular method (e.g., interviews; surveys; focus groups; chart review) can be used with TMF.
- ☐ TMF addresses a relevant analytic level (e.g., individual; organizational; community).
- ☐ TMF has been used in a relevant population (e.g., children; adults with serious mental illness) and/or conditions (e.g., attention deficit hyperactivity disorder; cancer).
- ☐ TMF is generalizable to other disciplines (e.g., education; health services; social work), settings (e.g., schools; hospitals; community-based organizations), and/or populations (e.g., children; adults with serious mental illness).

Acceptability

- ☐ TMF is familiar to key stakeholders (e.g., researchers; scholars; clinicians; funders).
- ☐ TMF comes from a particular discipline (e.g., education; health services; social work).

Embracing Complexity

1. Intervention complexity
   - Multiple components
2. Contextual Complexity
   - Dynamic multidimensional environments
3. Implementation Complexity
   - Multi-component strategies
4. Pathway complexity
   - Feedback loops, mediators, moderators, etc
5. Population complexity
   - Focus on multiple pt groups

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What does a framework clarify?

- Your research questions
- Terms & definitions for key constructs
- Assumptions about relationships between constructs to be tested
  - Logical (what defines a relationship)
  - Temporal (chronological)
- Defines the breadth and scope of your study
  - E.g., intermediate vs long-term outcomes
- Identifies your measures
  - What can and can't be measured

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Clarity out of chaos: Use of theory in implementation research

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ABSTRACT

Implementation science has been recognized as a potential catalyst for health system reform, in part, because of its contribution of well-grounded conceptual theories, often encapsulated in frameworks. Well-designed frameworks provide a semantic structure, a common language by which to guide systematic approaches to studying implementation and testing interventions. An overview of the types and roles of theory in advancing implementation science is offered in this article. Resources for selecting appropriate frameworks are described along with illustrative examples. The case is made that well-developed theory is what enables knowledge to emerge out of seeming chaos and for translation of that knowledge to be widely and reliably implemented into routine practice so that health and well-being of patients is maximized by delivery of interventions that are rooted in that knowledge.

[There is] nothing so practical as good theory (*Lewin, 1951a*)

All models are wrong...George Box1976 (*Box, 1976*)

EBI, the need to assess and understand diverse contexts, adapt EBIs to clinical context and processes, and select and execute implementation strategies tailored to context to get EBIs into routine use, all dimensions of which change over time. Implementation scientists seek to under-

Theory because…

- The adage that "all models are wrong" is not the end of the story,
- …Box goes on to acknowledge that

"…some are useful; the practical question is how wrong do they have to be to not be useful?"

- My take, based on Lewin:
- "…there is nothing so practical as a good theory because good theory is what enables knowledge to emerge out of seeming chaos and to be translated into effective use for the benefit of humankind."

Damschroder LJ. Clarity out of chaos: use of theory in implementation research. Psychiatry research. 2020 Jan 1;283.

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