Implementation Science Research at NIOSH

Rebecca J. Guerin, PhD, CHES
Chief, Social Science and Translation Branch
Division of Science Integration

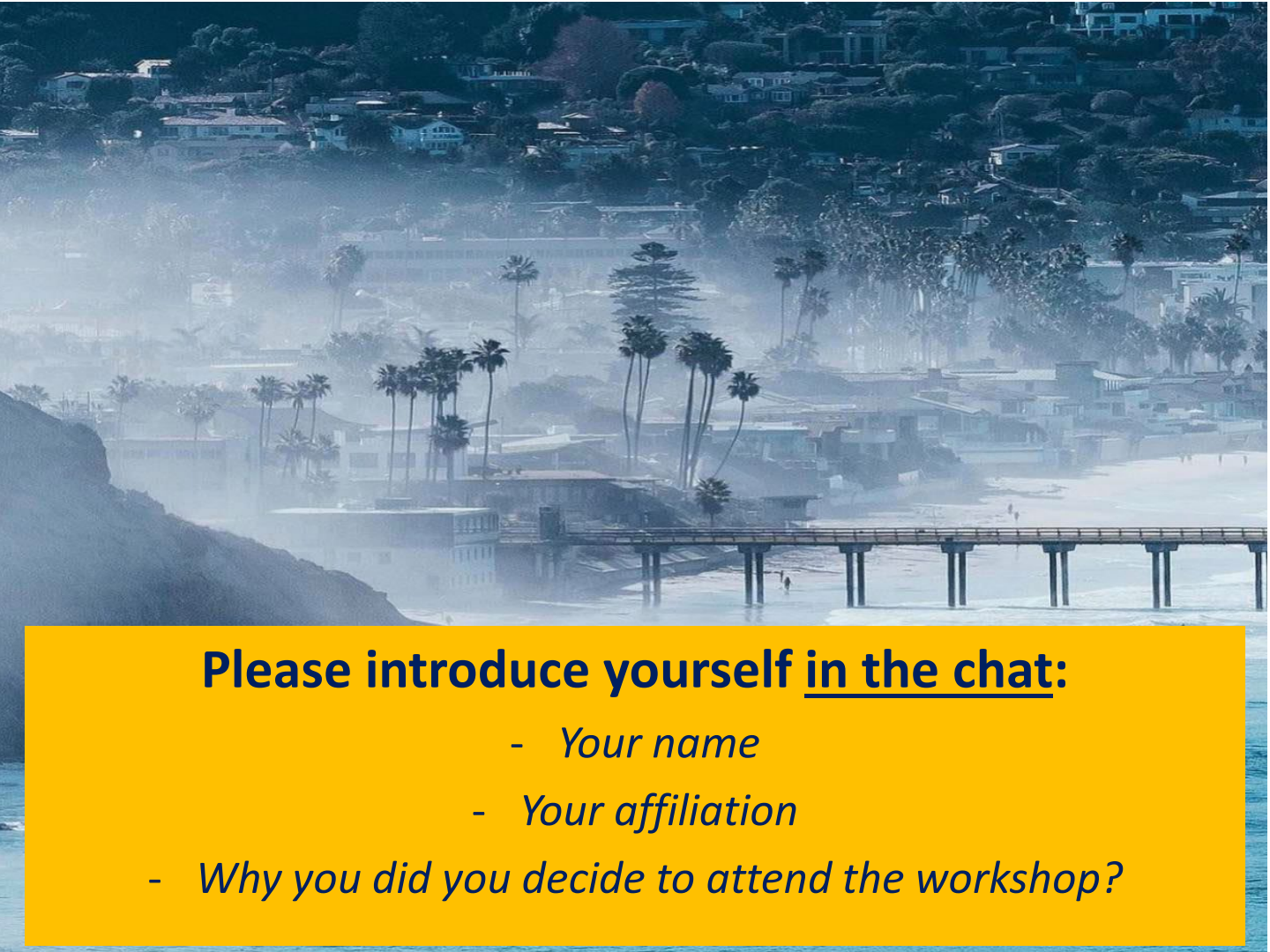
Borsika Rabin, PhD, MPH, PharmD
Implementation Scientist, UC San Diego

Workshop at the NIOSH Centers Meeting
July 28, 2022

The findings and conclusions in this report are those of the author and do not necessarily represent the views of the National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention.

Plans for today

- Welcome and Introductions
- Why does implementation science matter
- How do we define solutions in implementation science
- Implementation science and NIOSH
- Implementation science theories, models, frameworks
- Barriers, facilitators and strategies
- Partner engagement in implementation science
- Measuring success for implementation science
- Additional resources, closing remarks, Q&A



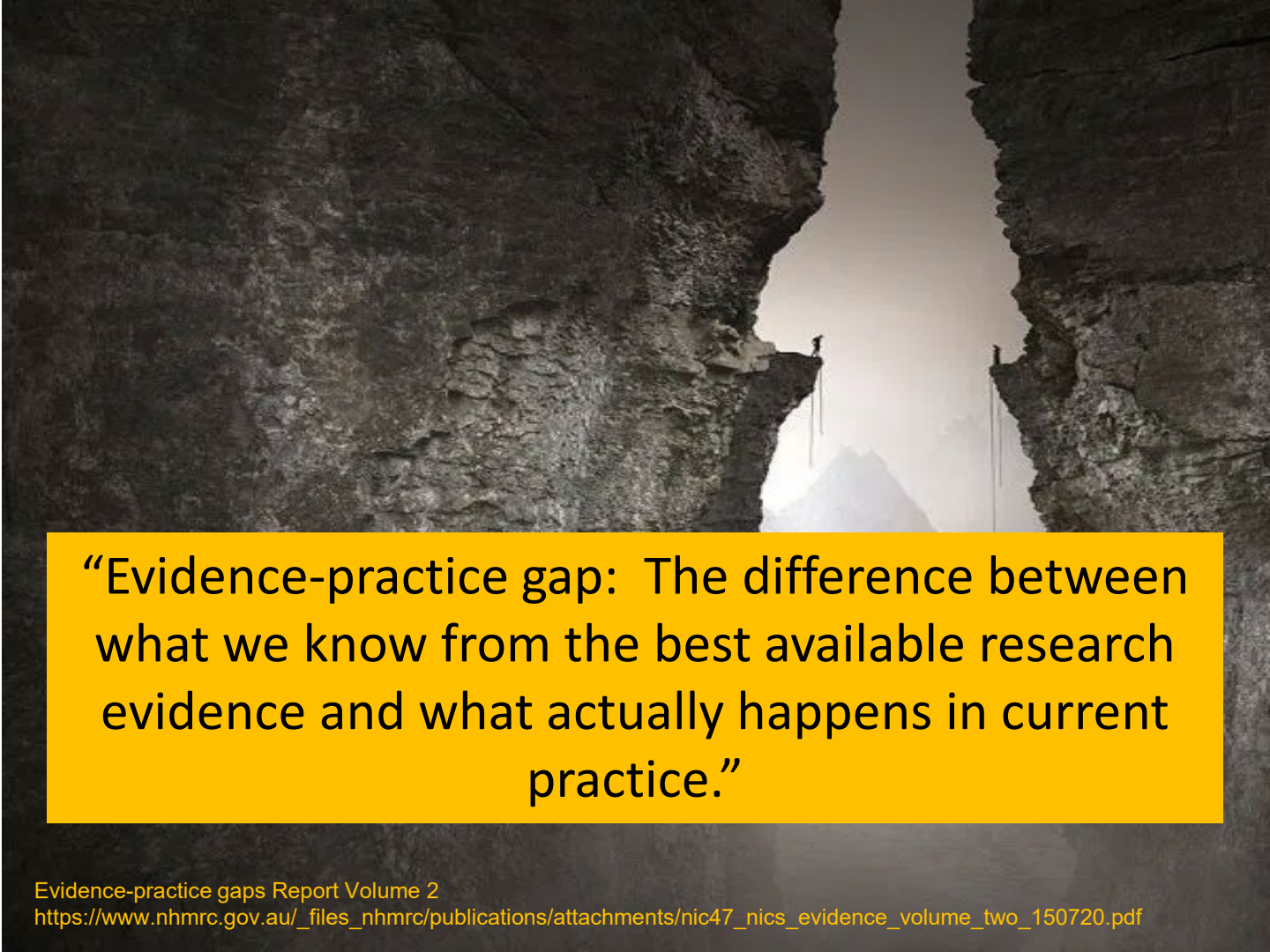
Please introduce yourself <u>in the chat</u>:

- *Your name*
- *Your affiliation*
- *Why you did you decide to attend the workshop?*

What is implementation science? Why does it matter?

"The long-term goal of any health-related endeavor should ultimately be to improve the human condition through decreasing disease risk and prevalence and increasing the quality of life."

Source: Emmons KM, Viswanath K, Colditz GA. *Am J Prev Med 2008*



"Evidence-practice gap: The difference between what we know from the best available research evidence and what actually happens in current practice."

Evidence-practice gaps Report Volume 2
https://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/nic47_nics_evidence_volume_two_150720.pdf

Evidence-practice gap: Colorectal cancer screening

Population	Recommendation	Grade
Adults aged 50 to 75 years	The USPSTF recommends screening for colorectal cancer in all adults aged 50 to 75 years. See the "Practice Considerations" section and Table 1 for details about screening strategies.	A
Adults aged 45 to 49 years	The USPSTF recommends screening for colorectal cancer in adults aged 45 to 49 years. See the "Practice Considerations" section and Table 1 for details about screening strategies.	B
Adults aged 76 to 85 years	The USPSTF recommends that clinicians selectively offer screening for colorectal cancer in adults aged 76 to 85 years. Evidence indicates that the net benefit of screening all persons in this age group is small. In determining whether this service is appropriate in individual cases, patients and clinicians should consider the patient's overall health, prior screening history, and preferences.	C

EVIDENCE ASSESSMENT The USPSTF concludes with high certainty that screening for colorectal cancer in adults aged 50 to 75 years has substantial net benefit. The USPSTF concludes with moderate certainty that screening for colorectal cancer in adults aged 45 to 49 years has moderate net benefit. The USPSTF concludes with moderate certainty that screening for colorectal cancer in adults aged 76 to 85 years who have been previously screened has small net benefit. Adults who have never been screened for colorectal cancer are more likely to benefit.

RECOMMENDATION The USPSTF recommends screening for colorectal cancer in all adults aged 50 to 75 years. (A recommendation) The USPSTF recommends screening for colorectal cancer in adults aged 45 to 49 years. (B recommendation) The USPSTF recommends that clinicians selectively offer screening for colorectal cancer in adults aged 76 to 85 years. Evidence indicates that the net benefit of screening all persons in this age group is small. In determining whether this service is appropriate in individual cases, patients and clinicians should consider the patient's overall health, prior screening history, and preferences. (C recommendation)

JAMA. 2021;325(19):1965-1977.
doi:10.1001/jama.2021.6238

Evidence-practice gap: Colorectal cancer screening

Increase the proportion of adults who get screened for colorectal cancer — C-07

Status: Baseline only

Learn more about our data release schedule

Most Recent Data:
65.2 percent (2018)

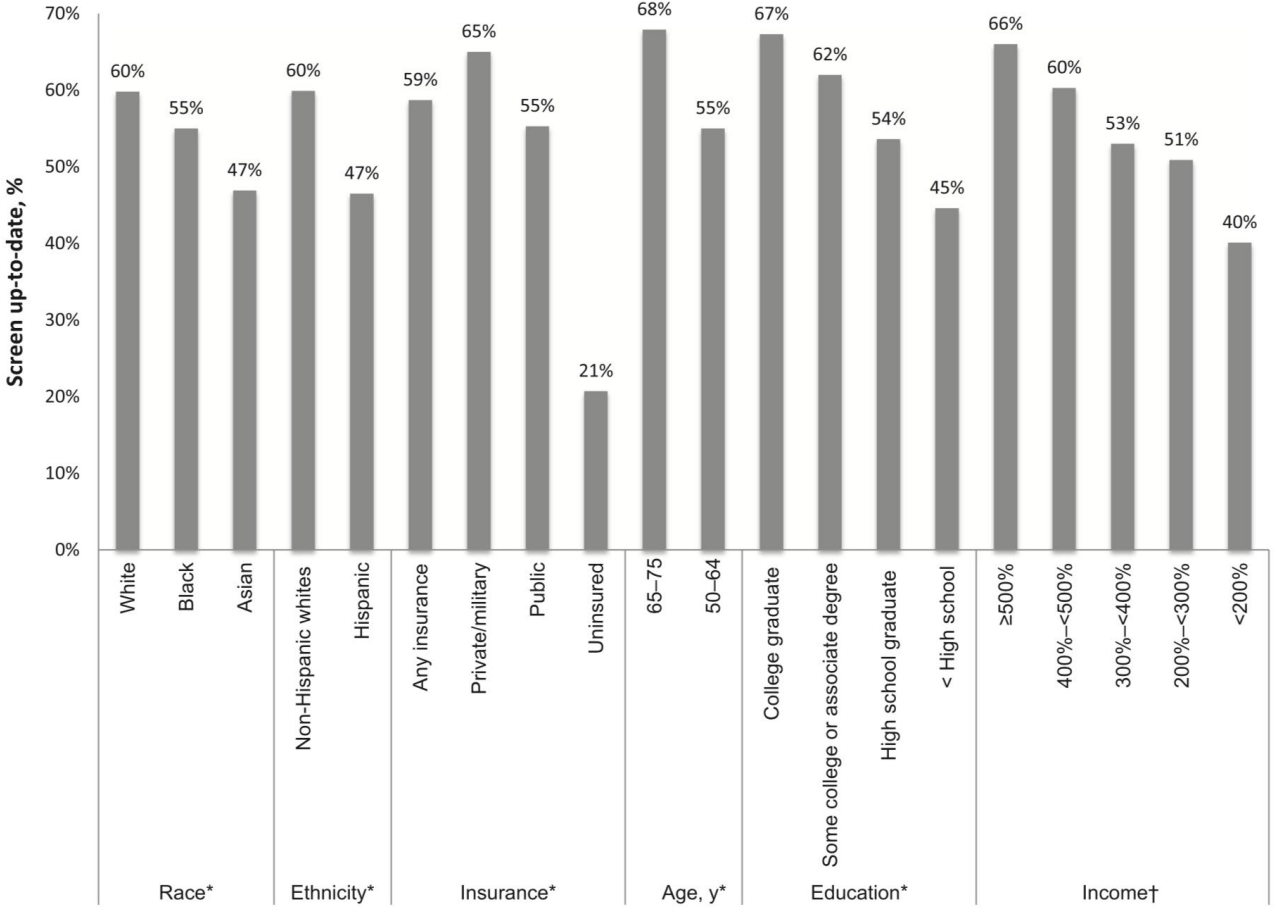
Target:
74.4 percent

Desired Direction:
Increase desired

Baseline:
65.2 percent of adults aged 50 to 75 years received a colorectal cancer screening based on the most recent guidelines in 2018 (age adjusted to the year 2000 standard population)

https://health.gov/healthypeople/objectives-and-data/browse-objectives/cancer/increase-proportion-adults-who-get-screened-colorectal-cancer-c-07/data

Evidence-practice gap: Colorectal cancer screening

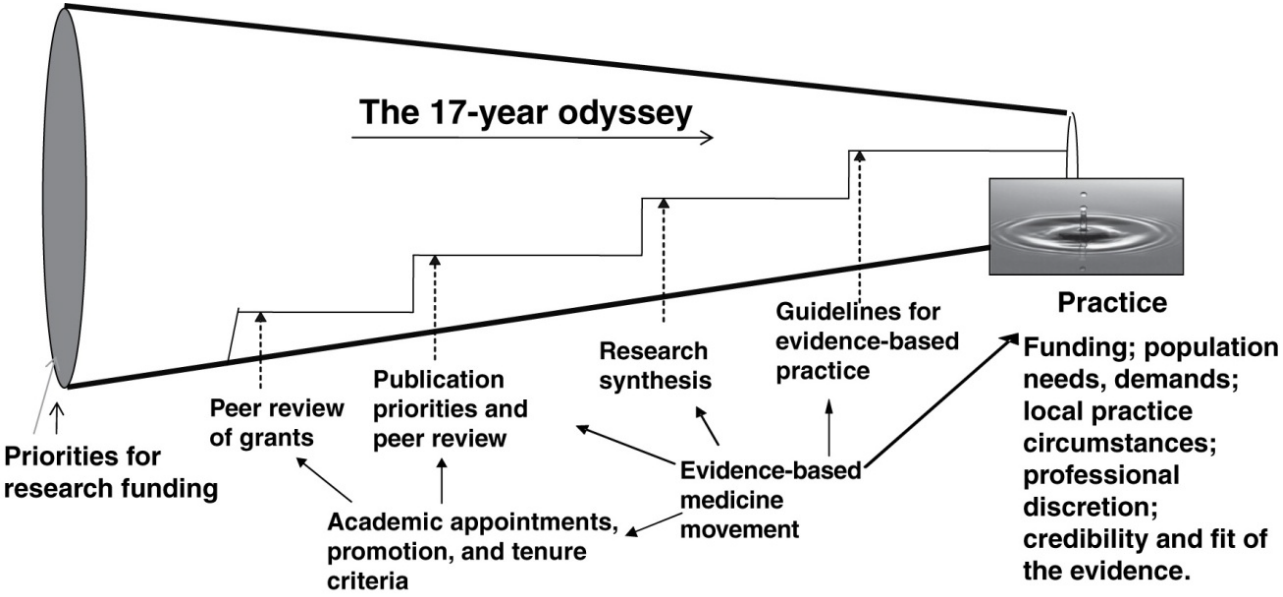


Gupta S, Sussman DA, Doubeni CA, Anderson DS, Day L, Deshpande AR, Elmunzer BJ, Laiyemo AO, Mendez J, Somsouk M, Allison J, Bhuket T, Geng Z, Green BB, Itzkowitz SH, Martinez ME. Challenges and possible solutions to colorectal cancer screening for the underserved. J Natl Cancer Inst. 2014 Apr;106(4):dju032.

What does Implementation Science mean to you?

Respond in the chat

The “leaky” research-to-practice pipeline



Green, Ottoson, Garcia, & Hiatt, 2009
Balas & Boren, 2000

Ultimate Impact of an Insurance-sponsored Weight Management Program in West Virginia

Dissemination step	Concept	% Impacted
8.8% of Weight Management sites participated	Adoption	8.80%
5.9% of members participated	Reach	0.52%
91.4% program components implemented	Implementation	0.47%
43.8% of participants showed weight loss	Effectiveness	0.21%
21.2% maintained benefit (individual)	Maintenance	0.04%

[1]Abildso CG, Zizzi SJ, Reger-Nash B. Evaluating an Insurance-Sponsored Weight Management Program With the RE-AIM Model, West Virginia, 2004-2008. Preventing Chronic Disease Public Health Research, Practice, and Policy. 2010. 7(3).

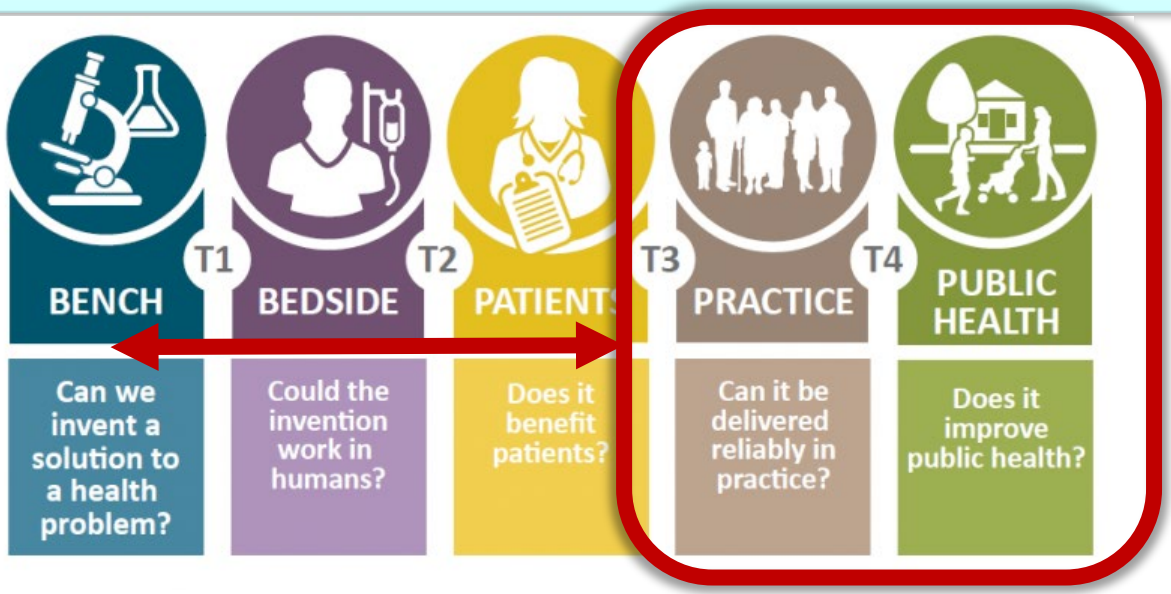
AND NOBODY CAN USE IT…..

DOES IT STILL MAKE AN IMPACT?

Implementation Science:
A Cross-Cutting Translational Science

"Study of methods to promote the adoption and integration of evidence-based practices, interventions, and policies into routine health care and public health settings to improve our impact on population health."

-National Cancer Institute



Efficacy, effectiveness and implementation research questions

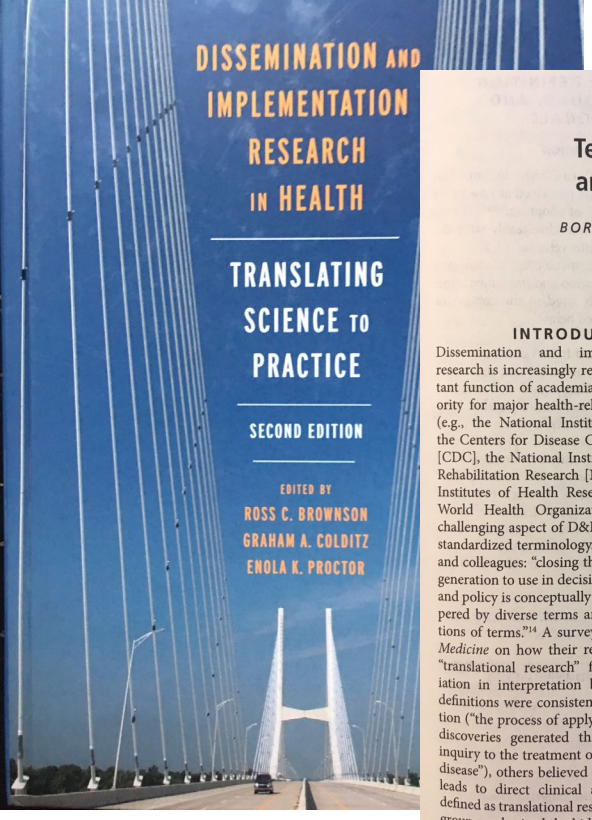
- Does this intervention work under optimal conditions?
- Does this intervention work under real world conditions?
- When, where, how, with whom, under what circumstances, and why does this intervention work?

(Gaglio & Glasgow, 2018; Nilsen & Bernhardsson, 2019; Rabin & Brownson, 2018; Stange, Breslau, Dietrich, & Glasgow, 2012).

Important considerations for IS

- ***Context*** 
- Multilevel complexity
- Adaptability
- Representativeness and reach
- Equity
- Relevance
- Generalizability
- Scalability and sustainability

Glasgow RE, Chambers D. Developing robust, sustainable, implementation systems using rigorous, rapid and relevant science. *Clin Transl Sci.* 2012;5(1):48



2

Terminology for Dissemination and Implementation Research

BORSIKA A. RABIN AND ROSS C. BROWNSON

INTRODUCTION

Dissemination and implementation
research is increasingly recognized as an
tant function of academia and is a grow
ority for major health-related funding
(e.g., the National Institute of Health
the Centers for Disease Control and Pre
[CDC], the National Institute on Disabi
Rehabilitation Research [NIDRR], the C
Institutes of Health Research [CIHR]
World Health Organization [WHO]).
challenging aspect of D&I research is the
standardized terminology.[8–13] As noted by
and colleagues: "closing the gap from kn
generation to use in decision-making for
and policy is conceptually and theoretical
pered by diverse terms and inconsistent
tions of terms."[14] A survey conducted by
Medicine on how their readers define t
"translational research" found substant
iation in interpretation by respondents
definitions were consistent with the NIH
tion ("the process of applying ideas, insig
discoveries generated through basic s
inquiry to the treatment or prevention of
disease"), others believed that only resea
leads to direct clinical application sh
defined as translational research, and only
group emphasized the bidirectional natur
process (i.e., bench to bedside and back
Phenomenon can be partly explained by
atively new appearance of D&I research

RESEARCH ARTICLE Open Access

A cross-sectional study of the number and frequency of terms used to refer to knowledge translation in a body of health literature in 2006: a Tower of Babel?

K Ann McKibbon[1*], Cynthia Lokker[1], Nancy L Wilczynski[1], Donna Ciliska[2,3], Maureen Dobbins[2,3], David A Davis[4], R Brian Haynes[1], Sharon E Straus[5,6]

Background: The study of implementing research findings into practice is rapidly growing and has acquired many competing names (*e.g.*, dissemination, uptake, utilization, translation) and contributing disciplines. The use of multiple terms across disciplines pose barriers to communication and progress for applying research findings. We sought to establish an inventory of terms describing this field and how often authors use them in a collection of health literature published in 2006.

Methods: We refer to this field as knowledge translation (KT). Terms describing aspects of KT and their definitions were collected from literature, the internet, reports, textbooks, and contact with experts. We compiled a database of KT and other articles by reading 12 healthcare journals representing multiple disciplines. All articles published in these journals in 2006 were categorized as being KT or not. The KT articles (all KT) were further categorized, if possible, for whether they described KT projects or implementations (KT application articles), or presented the theoretical basis, models, tools, methods, or techniques of KT (KT theory articles). Accuracy was checked using duplicate reading. Custom designed software determined how often KT terms were used in the titles and abstracts of articles categorized as being KT.

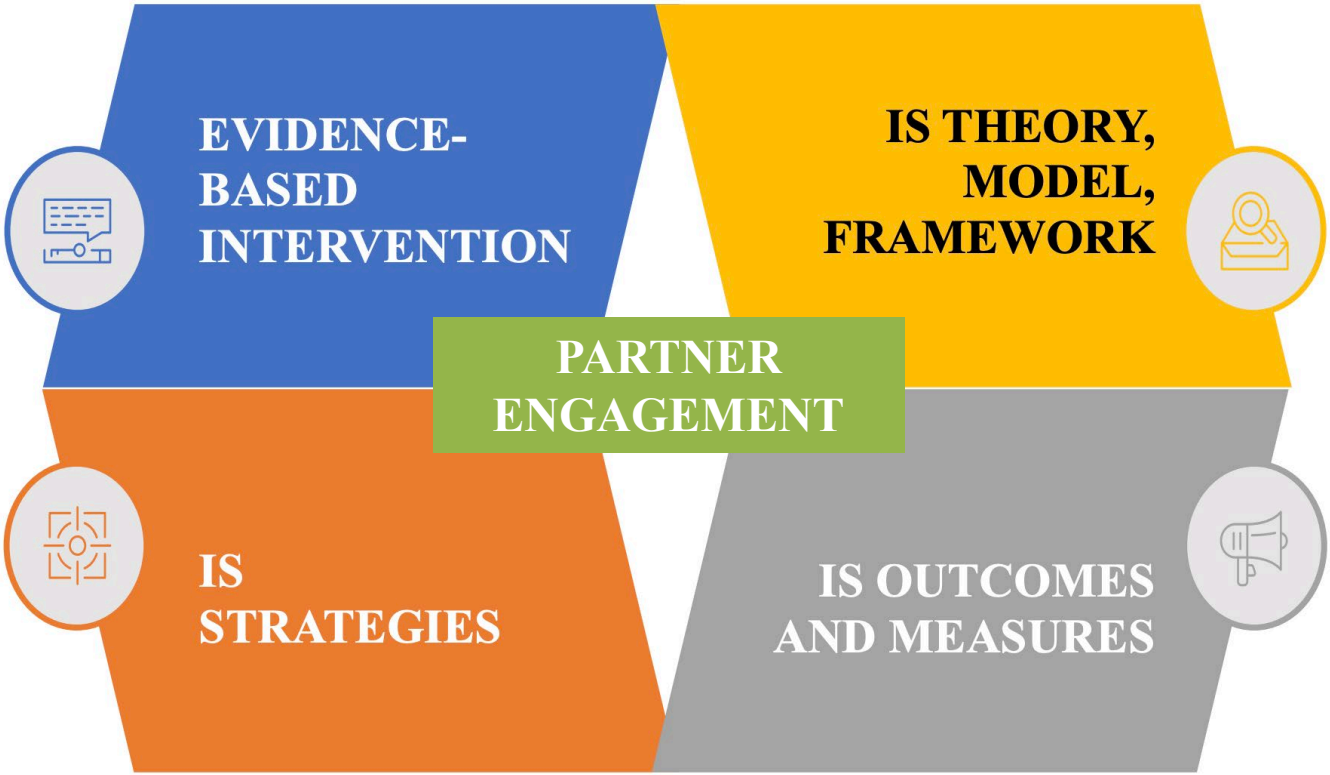
Results: A total of 2,603 articles were assessed, and 581 were identified as KT articles. Of these, 201 described KT applications, and 153 included KT theory. Of the 100 KT terms collected, 46 were used by the authors in the titles or abstracts of articles categorized as being KT. For all 581 KT articles, eight terms or term variations used by authors were highly discriminating for separating KT and non-KT articles ($p < 0.001$): implementation, adoption, quality improvement, dissemination, complex intervention (with multiple endings), implementation (within three words of) research, and complex intervention. More KT terms were associated with KT application articles ($n = 13$) and KT theory articles ($n = 18$).

Conclusions: We collected 100 terms describing KT research. Authors used 46 of them in titles and abstracts of KT articles. Of these, approximately half discriminated between KT and non-KT articles. Thus, the need for consolidation and consistent use of fewer terms related to KT research is evident.

What does implementation science do?

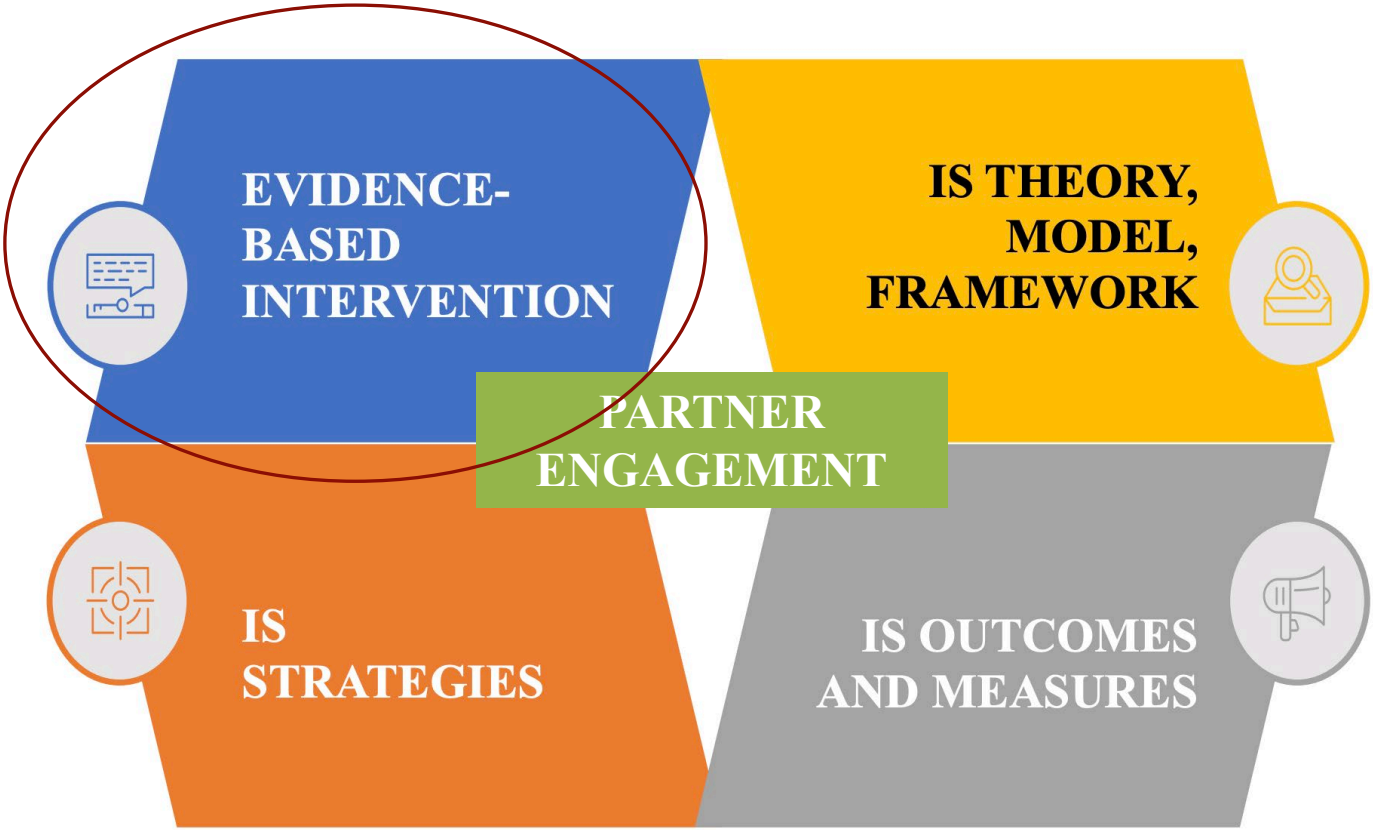
- **Dissemination Research** – The scientific study of targeted distribution of information and intervention materials to a specific public health or clinical practice audience. The intent is to understand how to best spread and sustain knowledge and the associated evidence-based interventions
- **Implementation Research** – The scientific study of the use of strategies to adopt and integrate evidence-based health interventions into clinical and community settings to improve patient outcomes and benefit population health

NIH PAR-18-007

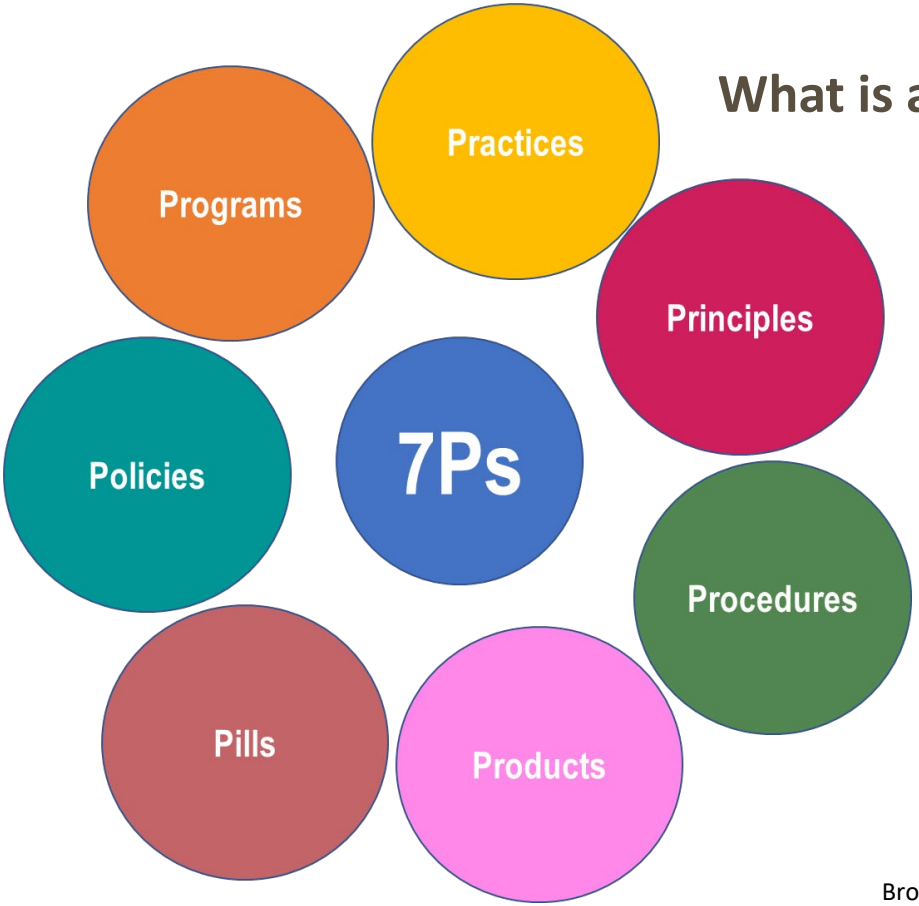


Adapted from: Kuo GM, Trinkley KE, Rabin B. Research and Scholarly Methods: Implementation Science Studies 2022, Journal of American College of Academic Pharmacy

How do we define solutions in Implementation Science?


EVIDENCE-BASED INTERVENTION
IS THEORY, MODEL, FRAMEWORK
PARTNER ENGAGEMENT
IS STRATEGIES
IS OUTCOMES AND MEASURES

What is an intervention?



Brown, Curran, Palinkas, Aarons et al. (2017).

What makes an intervention complex?

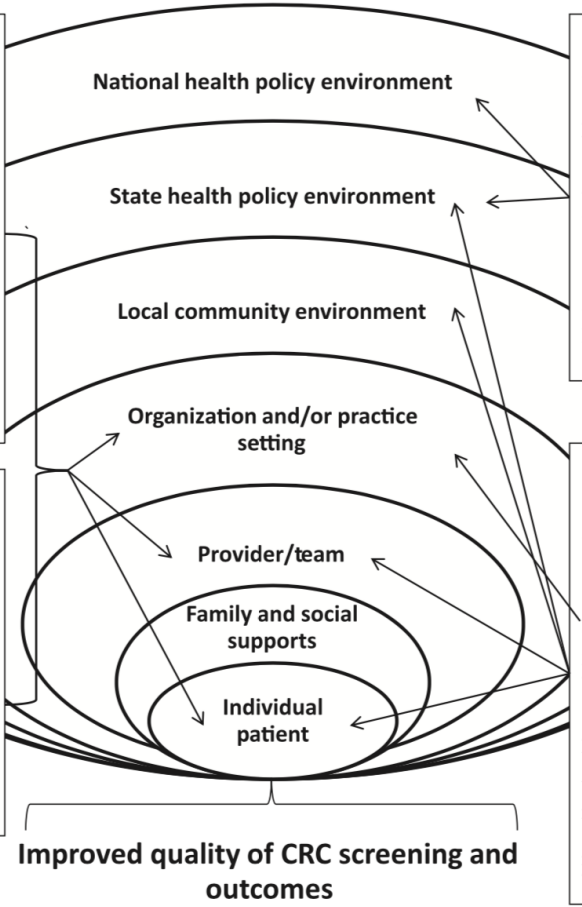
- Number of interacting components within the experimental and control interventions
- Number and difficulty of actions required by those delivering or receiving the intervention
- Number of groups or organizational levels
- Number and variability of outcomes
- Degree of flexibility or tailoring of the intervention permitted

Craig et al. doi:10.1016/j.ijnurstu.2012.09.010; Guise et al doi:10.1016/j.jclinepi.2017.06.011; Hawe et al. doi:10.1136/bmj.328.7455.1561 ; Skivington et al. doi:10.1136/bmj.n2061

Evidence-practice gap: Colorectal cancer screening

Multilevel problem: Identifying unscreened individuals
Multilevel solution:
Develop and implement strategies for identifying unscreened uninsured individuals
Rationale: Identifying unscreened individuals is a problem at the individual, provider/team, and practice level. Implementing strategies at the organization/practice level (such as by a health system or insurance program) could address this problem at all of the levels encompassed by the organization/practice.
Example: Use Medicaid claims data or safety-net EHR data to identify eligible individuals (39,49,51,52).

Multilevel problem: Barriers to receiving screening offers, access, and acceptance
Multilevel solution: Develop and implement organized strategies for screening
Rationale: Organized strategies have potential to address individual patient, provider, and organizational barriers to offering screening and facilitating completion:
Examples: Mail FIT kits with telephone follow-up, use community health worker navigators to promote screening completion, offer FIT at time of flu shot (52-54,59,61,62,64,67).



Multilevel problem: Access to follow-up diagnostic testing, surveillance, and CRC treatment
Multilevel solution: Fund and enhance programs and policies that address the CRC continuum
Rationale: Fundamentally, for underserved populations, access to treatment is best addressed through state and/or national policies that provides CRC treatment if cancer is found.
Example: Develop strategies similar to the Breast and Cervical Cancer Detection Program that provides access to the continuum of CRC screening (63).

Multilevel problem: Identifying the most effective screening approach
Multilevel solution: Promote the message, "The best test is the one that gets done"
Rationale: Identifying the best screening approach is a challenge at nearly every influence on CRC screening, from the individual to the national policy level. National and state health policy endorsing a "best test is the one that gets done" policy will enable organizations and practices, as well as providers, to maximize screening options, and tailor screening based on patient choice as well as local resources.
Example: Promote USPSTF recommendations of screening choice based on current evidence (2, 3).

Gupta S, Sussman DA, Doubeni CA, Anderson DS, Day L, Deshpande AR, Elmunzer BJ, Laiyemo AO, Mendez J, Somsouk M, Allison J, Bhuket T, Geng Z, Green BB, Itzkowitz SH, Martinez ME. Challenges and possible solutions to colorectal cancer screening for the underserved. J Natl Cancer Inst. 2014 Apr;106(4):dju032.

Evidence-based...on what?
External validity, pragmatic criteria (often ignored)

- Participant Representativeness
- Setting Representativeness
- Context and Setting
- Community/Setting Engagement
- Adaptation/ Change
- Sustainability
- Costs/Feasibility of Treatment
- Comparison Conditions

Bryan J Weiner
@bjweiner

I'm often asked: how much evidence does an intervention need to be ready for implementation? Short answer: Enough to get past study section. Long answer: #impsci is evidence-agnostic. Equally applicable to innovations, best practices, and good ideas. Bad ones too, unfortunately.

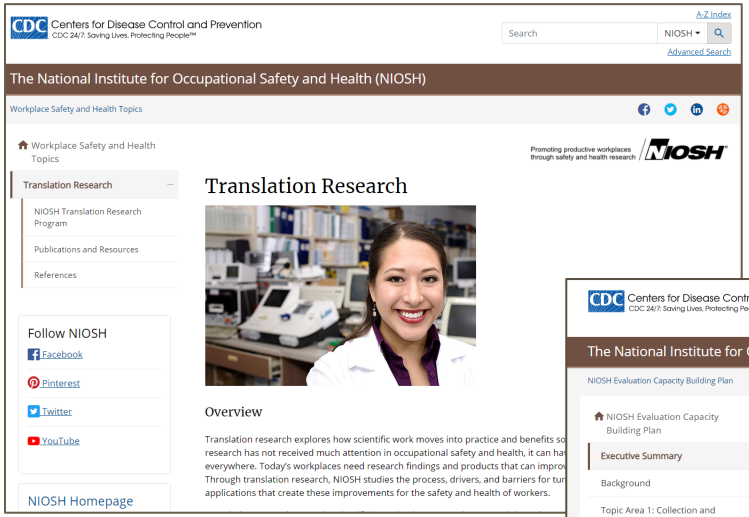
9:14 AM · Jul 13, 2020 · TweetDeck

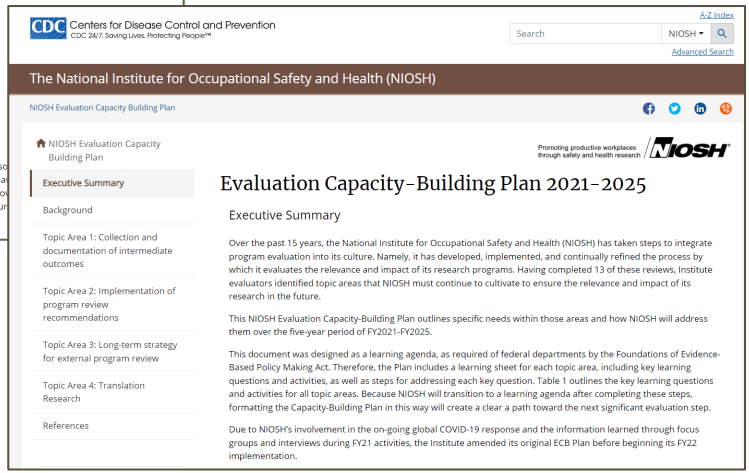
Implementation Science Research at NIOSH

Pipeline issues in Occupational Safety and Health (OSH)

- Effective OSH research programs are not broadly adopted & implemented; Research "sits on the shelf."
  - E.g., only 17% of U.S. fishing safety research has been adopted in workplaces to benefit workers (Lucas et al., 2014)
- Numerous challenges; gaps persist
- These gaps have serious implications for the safety and health of the global workforce

“Translation research” at NIOSH



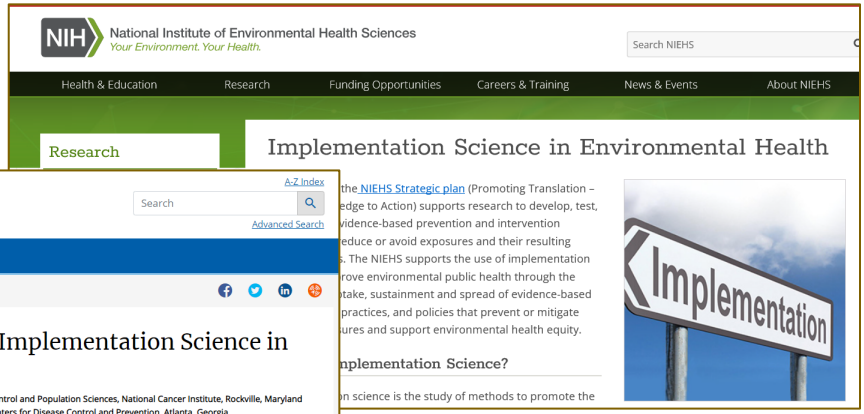


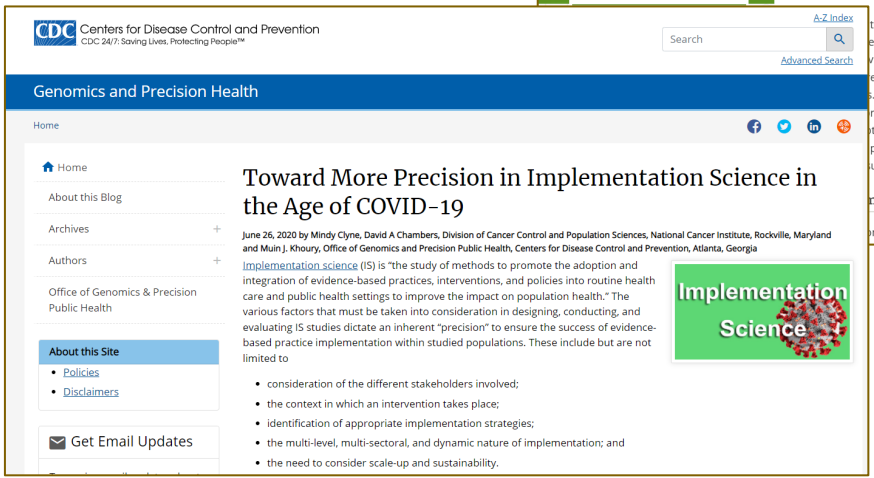
A rose by any other name

QUERI
VA Quality Enhancement Research Initiative
EVIDENCE INTO PRACTICE

SAMHSA
Substance Abuse and Mental Health Services Administration

AHRQ
Agency for Healthcare Research and Quality

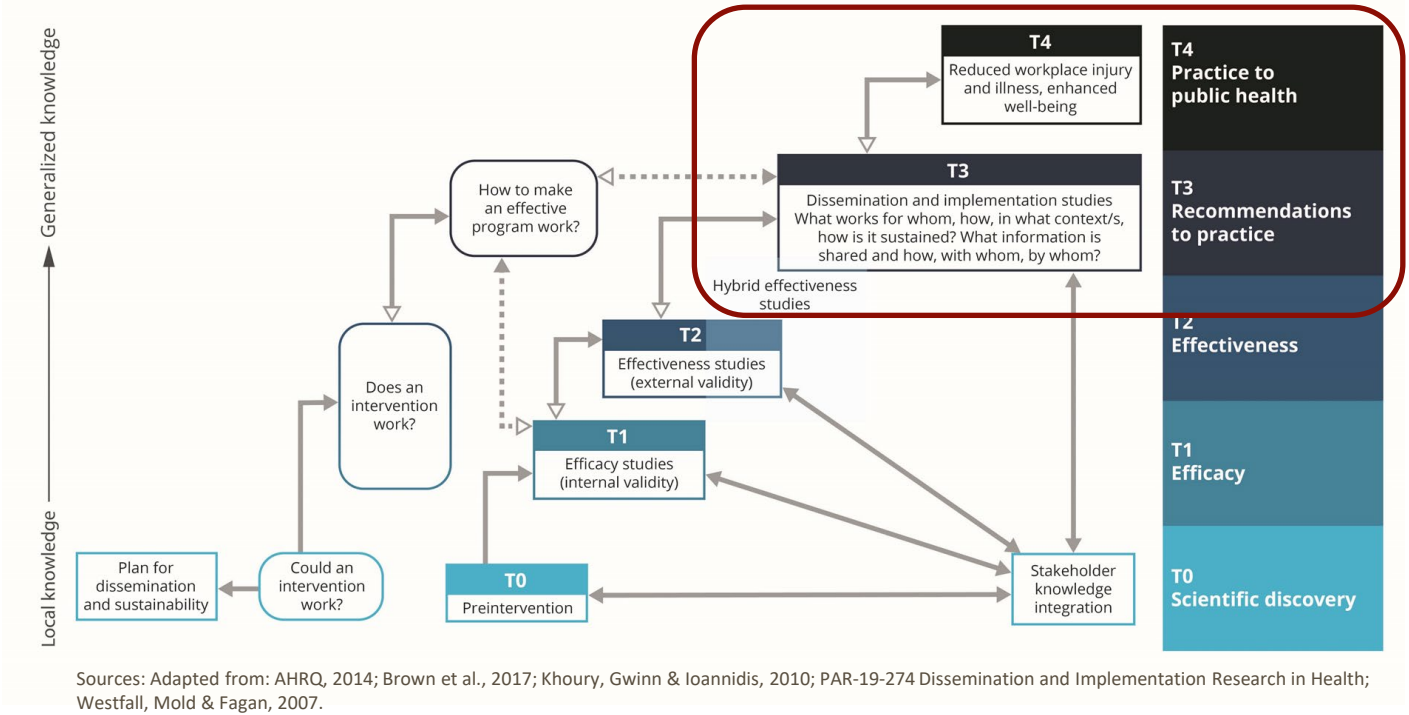




IR is related to evaluation, but not the same

Program evaluation: the systematic collection of information on the activities, characteristics, and results of programs **in a specific setting** to inform **local knowledge and practice** (CDC, Introduction to Program Evaluation for Public Health Programs)

The research continuum in OSH (Guerin et al., 2022)



Sources: Adapted from: AHRQ, 2014; Brown et al., 2017; Khoury, Gwinn & Ioannidis, 2010; PAR-19-274 Dissemination and Implementation Research in Health; Westfall, Mold & Fagan, 2007.

Guerin RJ, Glasgow RE, Tyler A, Rabin BA, Huebschmann AG. Methods to improve the translation of evidence-based interventions: a primer on dissemination and implementation science for occupational safety and health researchers and practitioners. *Saf Sci.* (2022) 152:105763. doi: 10.1016/j.ssci.2022.105763

What OSH solution are you interested in implementing?

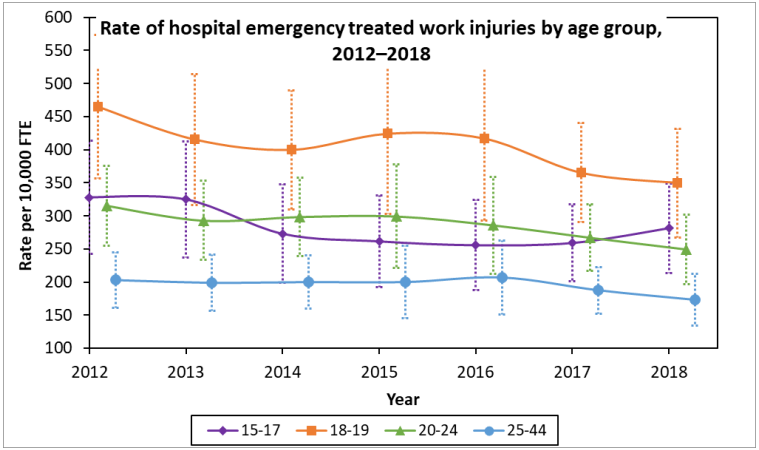
Respond in the chat

Young worker safety and health: An OSH case example (implementation gap and the solution)

Artwork for the NIOSH *Youth@Work-Talking Safety* curriculum by Chi-Yun Lau

The problem: Young worker injuries

- From 2012-2018, ~3.2 million nonfatal, job-related injuries to young workers (15–24 years) treated in hospital emergency departments
- Compared to adult workers, young workers experience rates of job-related injury up to ~2x higher
- Distal impacts on health and well-being; “cumulative burden of morbidity” (Koehoorn, Breslin, & Xu, 2008)



Guerin RJ, Reichard AA, Derk S, Hendricks KJ, Menger-Ogle LM, Okun AH. Nonfatal Occupational Injuries to Younger Workers - United States, 2012-2018. *MMWR Morb Mortal Wkly Rep*. 2020;69(35):1204-1209. Published 2020 Sep 4. doi:10.15585/mmwr.mm6935a3

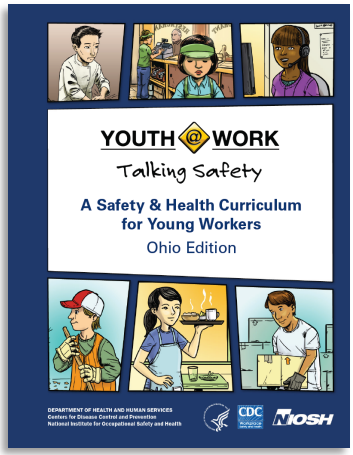
Implementation gap

- A lack of (quality) safety training contributes to work-related injury among teens
- OSH not taught in schools, an effective locus for delivery of “life skills”
- Evidence-based OSH training needs to be tailored for younger learners; adapted for large-scale delivery in K-12 schools; systematically implemented and evaluated
- Why? Evidence of protective effects of OSH training against young worker injury (Boini & Grzebyk 2017)

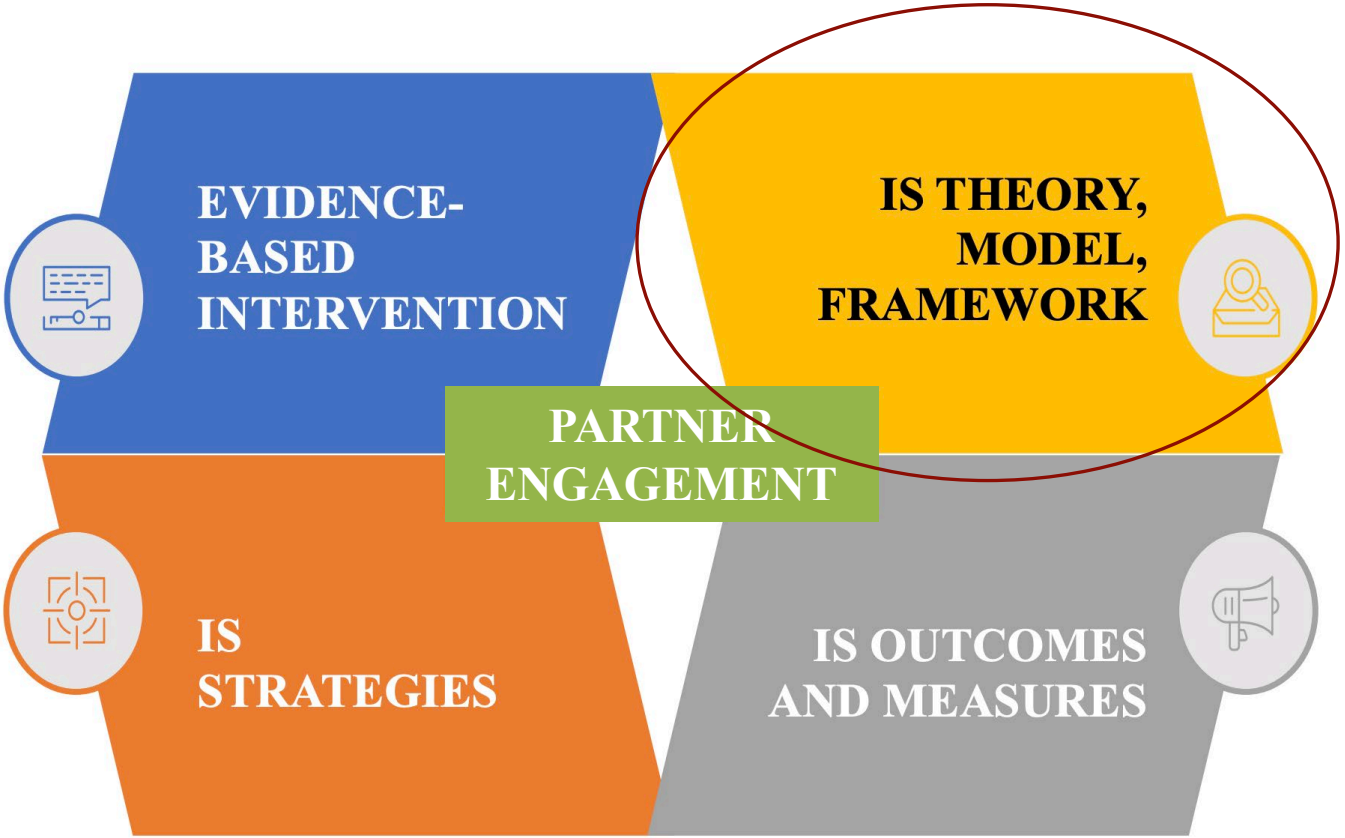
Solution: OSHA 10-hour training + NIOSH *Talking Safety*

- Is the industry standard work safety training; used in career and technical education (CTE)
- Teaches general OSH knowledge (e.g., ladder and chemical safety, regulations)
- Can be delivered only by trained, authorized instructors
- Evidence of effectiveness, but not of implementation

- Based on collaboration with many NIOSH partners
- Is a free, interactive, middle & high school curriculum; 6, 45-minute lessons;
- Teaches *Core OSH Competencies* Customized for each state
- Evidence of effectiveness, and implementation (Guerin et al., 2018; 2019)



How do we define solutions in implementation science?


EVIDENCE-BASED INTERVENTION
IS THEORY, MODEL, FRAMEWORK
PARTNER ENGAGEMENT
IS STRATEGIES
IS OUTCOMES AND MEASURES

Logic Model for IS Research

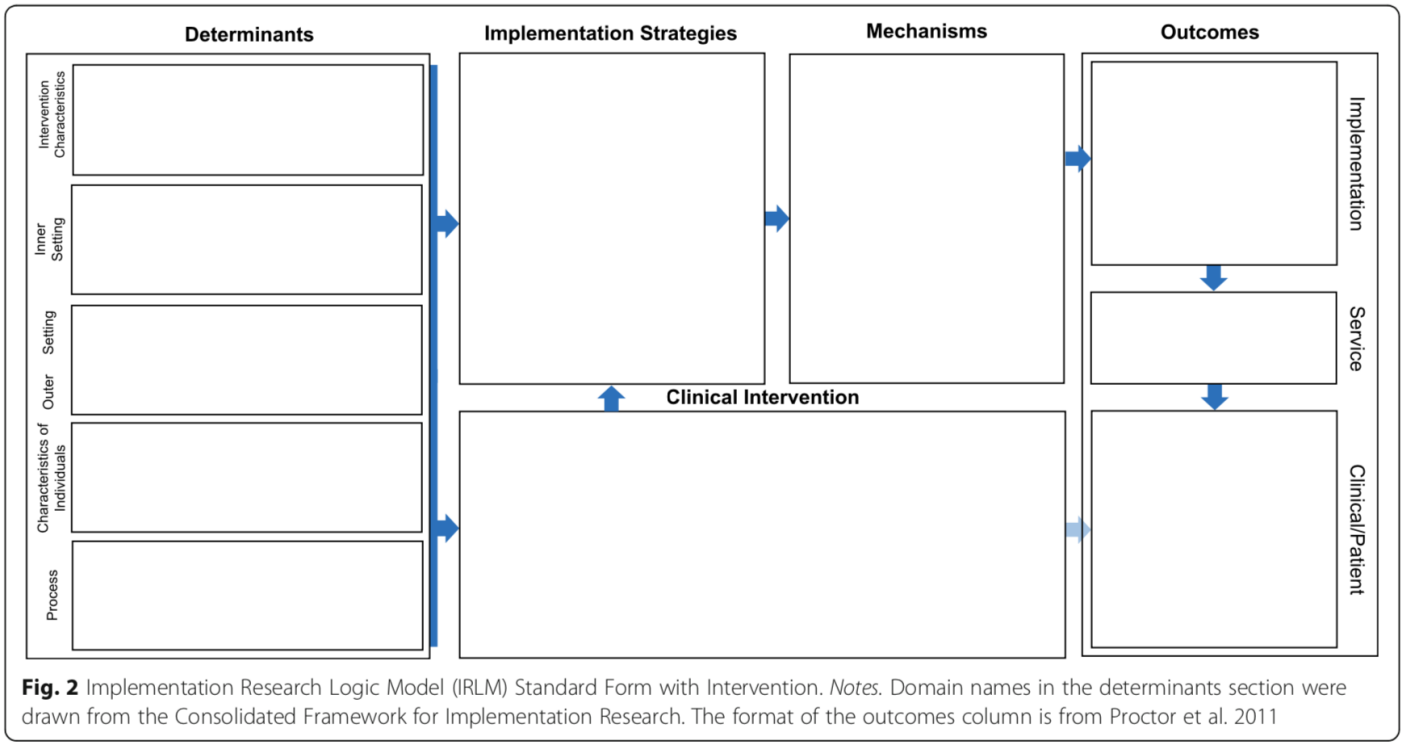
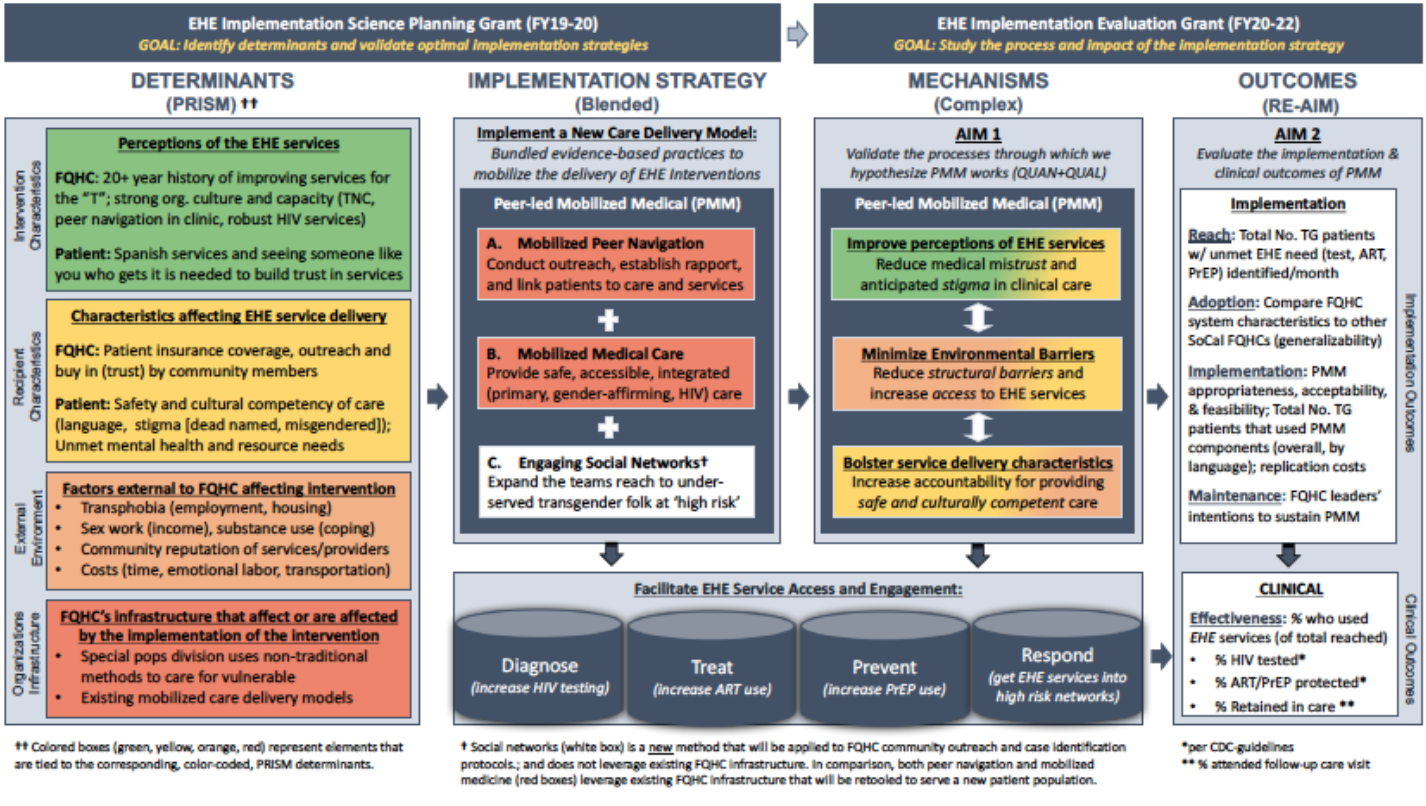


Fig. 2 Implementation Research Logic Model (IRLM) Standard Form with Intervention. *Notes.* Domain names in the determinants section were drawn from the Consolidated Framework for Implementation Research. The format of the outcomes column is from Proctor et al. 2011

TRANS(ending) the HIV Epidemic –
Drs. Laramie Smith and Jill Blumenthal



†† Colored boxes (green, yellow, orange, red) represent elements that are tied to the corresponding, color-coded, PRISM determinants.

† Social networks (white box) is a new method that will be applied to FQHC community outreach and case identification protocols.; and does not leverage existing FQHC infrastructure. In comparison, both peer navigation and mobilized medicine (red boxes) leverage existing FQHC infrastructure that will be retooled to serve a new patient population.

*per CDC-guidelines
** % attended follow-up care visit

IS theories, models, & frameworks (TMFs)

- Terms are used interchangeably
- Describe tools to plan, evaluate, or understand barriers and facilitators (determinants) to IS processes
- Provide tools to plan, organize and understand IS phenomena and why/how IS strategies succeed or fail
- Have many common elements (multiphase, multilevel, stakeholder engagement, health equity, etc.)

D&I theories, models, & frameworks (TMFs)

Theories:

- Are generally specific and predictive
- Have directional relationships between concepts
- Are suitable for hypothesis testing

Models:

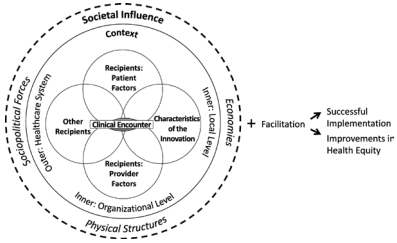
- Are specific, more often prescriptive or strategic
- Provide a systematic way to develop, manage, and evaluate interventions

Frameworks:

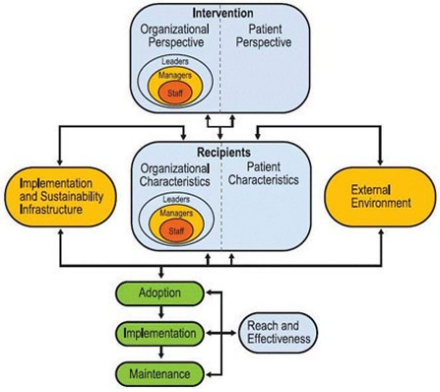
- Organize, explain, or describe phenomena and relationships between concepts
- Delineate processes

Tabak, R. G., Khoong, E. C., Chambers, D. A., & Brownson, R. C. (2012)

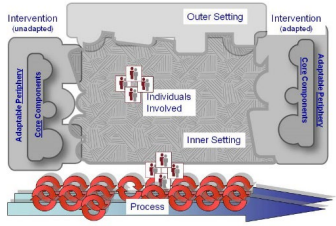
Wealth of existing IS TMFs



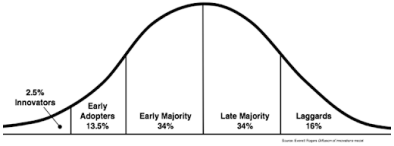
Healthy Equity Implementation Framework



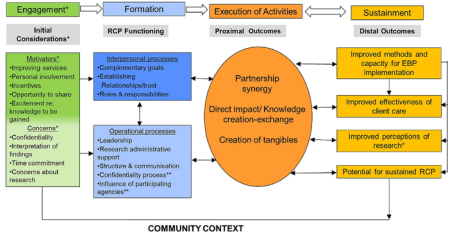
Practical, Robust Implementation and Sustainability Model (PRISM)



Consolidated Framework for Implementation Research (CFIR)



Diffusion of Innovations



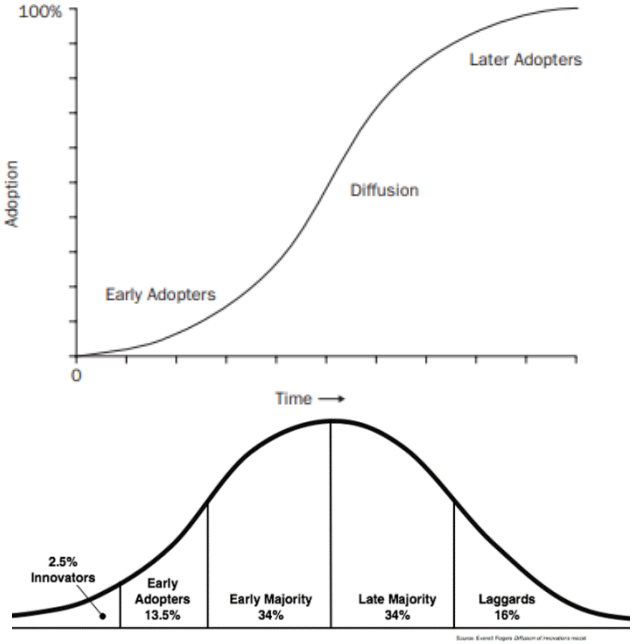
Community-Academic Partnership Model

- 61 models with research focus (Tabak et al., 2012)
-100 + used in an international sample (Birken et al. 2017)
-159 KT/IS theories, models, or frameworks (Strifler et al. 2018)

TMF examples: Diffusion of Innovations

Diffusion: process through which an innovation is communicated through channels over time among members of a social system (Rogers, 2003).

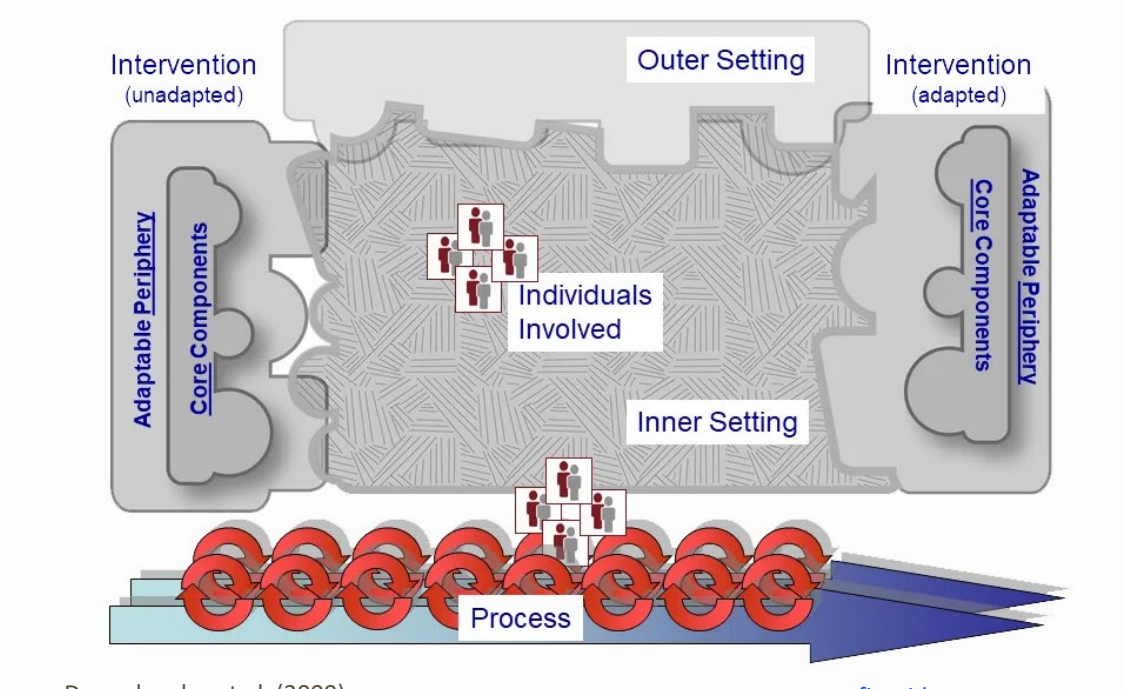
- Innovation
- Adopter
- Social system
- Individual adoption process
- Diffusion system



Rogers, 2003, 5th ed.
Dearing, Kee & Peng, 2018

TMF examples: CFIR

Consolidated Framework for Implementation Research



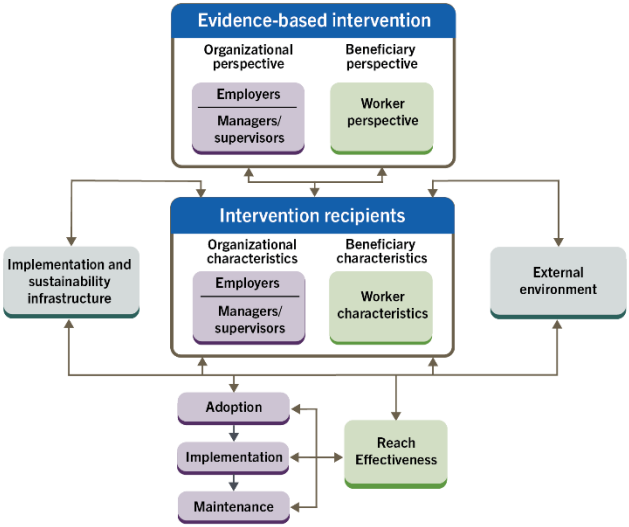
Damschroder et al. (2009)

www.cfirguide.org

TMF examples: RE-AIM & PRISM

- **RE-AIM**: **R**each, **E**ffectiveness, **A**doption, **I**mplementation, and **M**aintenance framework Glasgow, Vogt, & Boles, 1999; Glasgow et al., 2019
- **PRISM**: **P**ractical, **R**obust, **I**mplementation and **S**ustainability **M**odel
  Feldstein & Glasgow, 2008; Glasgow et al., 2019

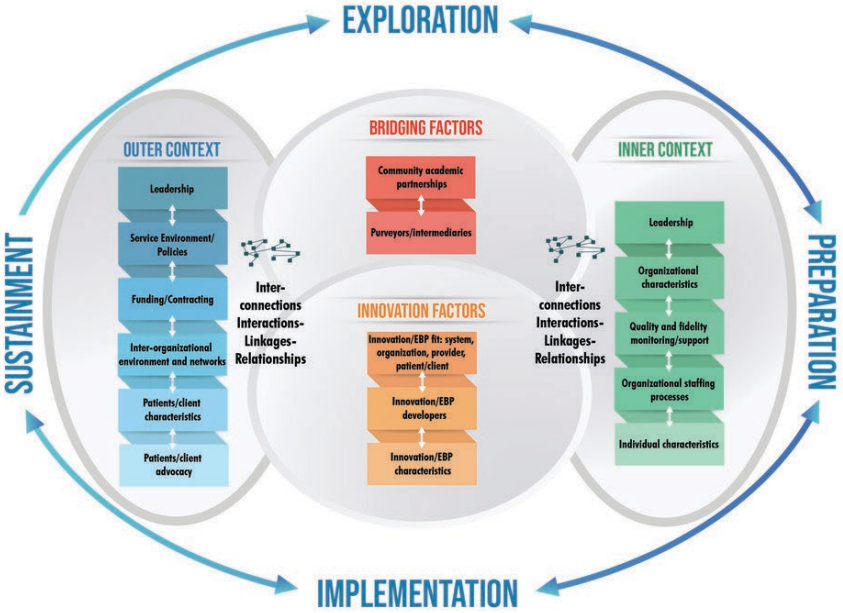
The Practical, Robust, Implementation and Sustainability Model (PRISM) for Occupational Safety and Health



Guerin et al., 2022. Adapted from: Feldstein & Glasgow, 2008

TMF examples: EPIS Framework

Exploration,
Preparation
Implementation
Sustainment



Aarons, Hurlburt, & Horwitz, 2011;
Moullin et al., 2019
https://episframework.com/

Dissemination & Implementation Models
in Health Research & Practice

Home | Access the D&I Models Webtool | Tutorial | Glossary | FAQ | Resources | Submit Models

You are logged out. Login/Register Here

Home

Helping Navigate Dissemination and Implementation Models

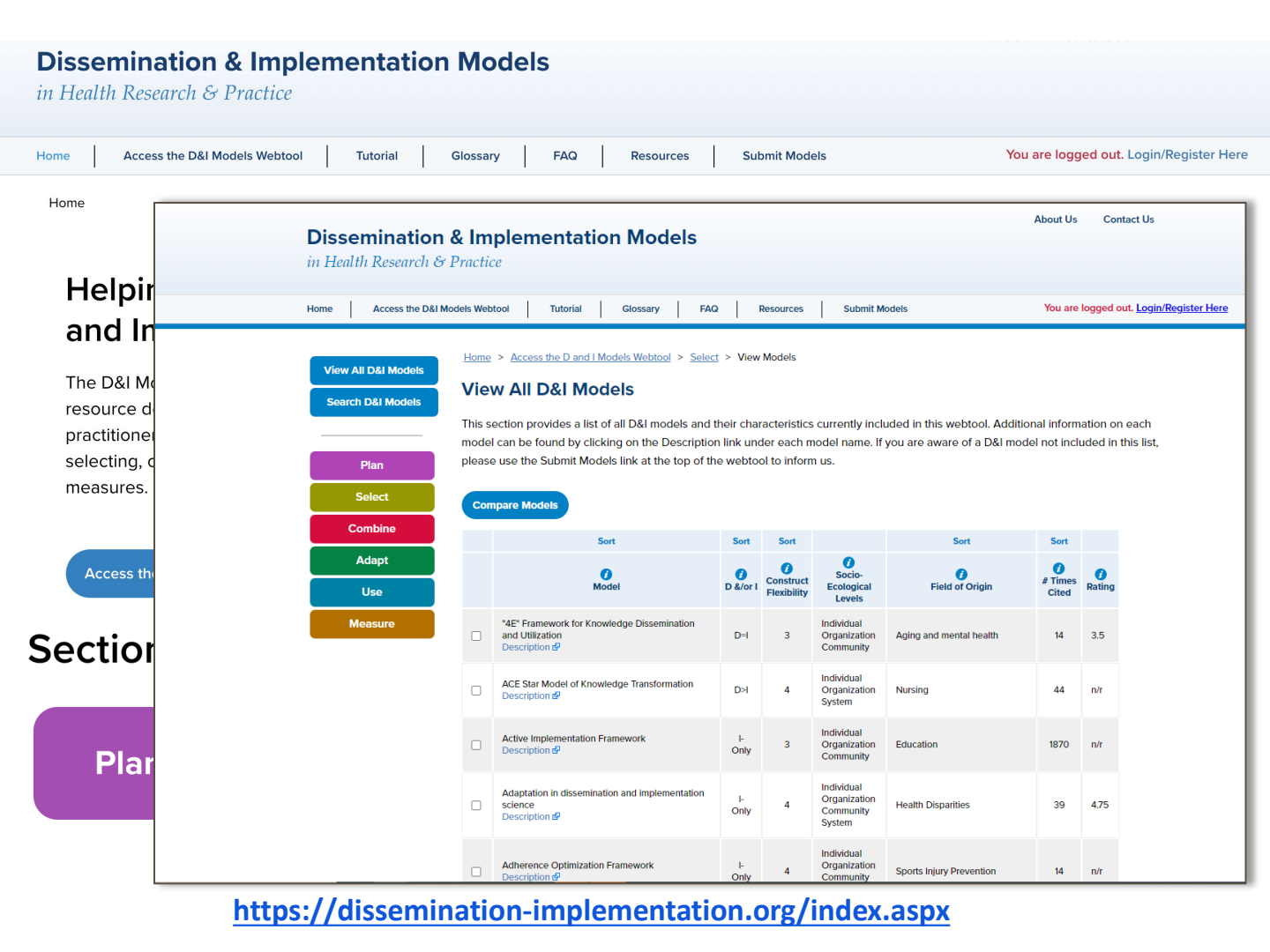
The D&I Models Webtool is an interactive, online resource designed to help researchers and practitioners navigate D&I Models through planning, selecting, combining, adapting, using, and linking to measures.

Access the D&I Models Webtool Here!

Sections of the D&I Models Webtool

Plan | Select | Combine | Adapt | Use | Measure

https://dissemination-implementation.org/index.aspx



https://dissemination-implementation.org/index.aspx

Consider these questions for selecting TMFs

1. What is the purpose of the TMF?
2. What level(s) does the TMF address?
3. What dissemination and implementation concepts are included?
4. How generalizable or specific is the TMF's orientation (e.g., context, intervention)?
5. Are measures available?
6. What is the timeframe?

Moullin *et al. Implementation Science Communications* (2020) 1:42
https://doi.org/10.1186/s43058-020-00023-7

Implementation Science Communications

DEBATE Open Access

Ten recommendations for using implementation frameworks in research and practice

Joanna C. Moullin[1,2*], Kelsey S. Dickson[2,3], Nicole A. Stadnick[2,4,5], Bianca Albers[6,7], Per Nilsen[8], Sarabeth Broder-Fingert[9], Barbara Mukasa[10] and Gregory A. Aarons[2,4,5]

(1) Select Appropriate Implementation Framework(s)
(2) Establish and maintain community stakeholder engagement and partnerships
(3) Define issue and develop research questions and hypotheses
(4) Develop an implementation mechanistic process model or logic model
(5) Select research and evaluation methods
(6) Identify implementation determinants (barriers/facilitators)
(7) Select and tailor, or develop, implementation strategy(s)
(8) Specify implementation outcomes and evaluate implementation
(9) Use a framework(s) at micro level to conduct and tailor implementation
(10) Write the proposal and report

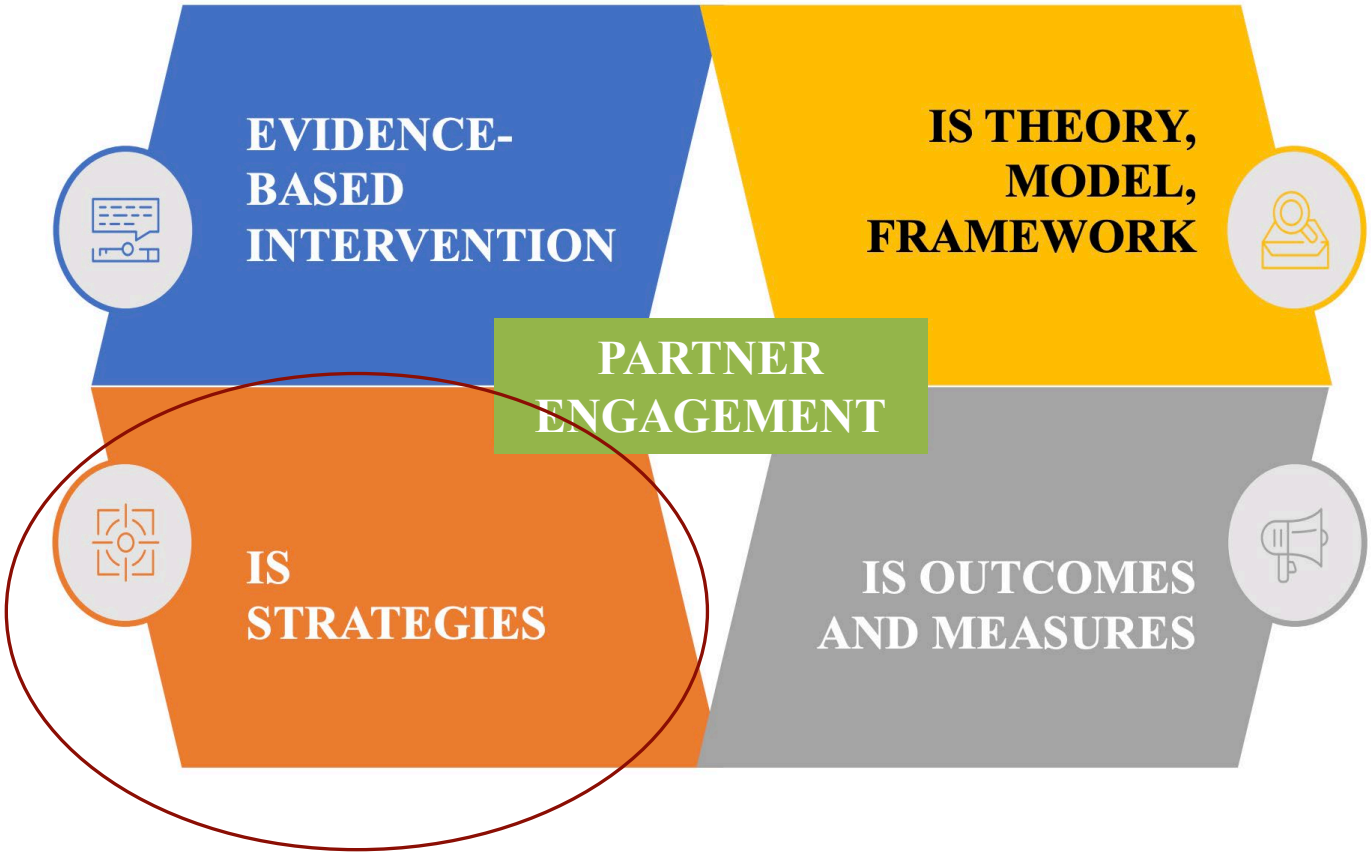
What IS TMF(s) have you used or are using currently?

What is your most burning question about using IS TMFs?

Respond in the chat

How do we identify key barriers and facilitators to the implementation of your solution in your context?

What strategies can you use to address the barriers and amplify the facilitators?


EVIDENCE-BASED INTERVENTION
IS THEORY, MODEL, FRAMEWORK
PARTNER ENGAGEMENT
IS STRATEGIES
IS OUTCOMES AND MEASURES

Identifying barriers and facilitators

Determinant	Implementation Strategy	Mechanism	Implementation Outcome
Provider knowledge deficit	Education (provision of information)	Awareness-building, knowledge-acquisition	Feasibility, acceptability, appropriateness, adoption
Provider skill deficit	Training (teaching & practice with corrective feedback)	Skill acquisition, refinement, mastery	Fidelity to EBP
Turnover	Train-the-trainer	Continuous on-site expertise available for consultation	Sustainability
Provider engagement	Clinical champion-led implementation team	Implementation climate	Feasibility, acceptability, appropriateness
Unstandardized clinical care options	Guidelines	Clarity of clinical care	Fidelity

Lewis CC, Klasnja P, Powell BJ, et al. From Classification to Causality: Advancing Understanding of Mechanisms of Change in Implementation Science. *Front Public Health*. 2018;6:136. doi:10.3389/fpubh.2018.00136

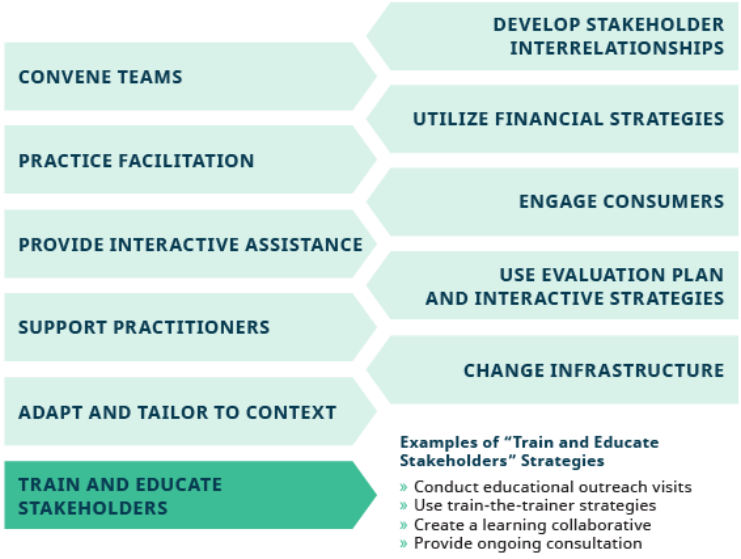
Implementation strategies

Author and Citation	Term	Definition
Powell et al.[15]	Implementation Strategy	A systematic intervention process to adopt and integrate evidence-based health innovations into usual care.
Curran et al.[16]	Implementation Intervention	A method or technique to enhance adoption of a "clinical" intervention. Examples include an electronic clinical reminder, audit/feedback, and interactive education.
	Implementation Strategy	A "bundle" of implementation interventions. Many implementation research trials test such bundles of implementation interventions.
Mazza et al.[17]	Implementation Strategy	A purposeful procedure to achieve clinical practice compliance with a guideline recommendation.
Proctor et al.[19]	Implementation Strategy	Methods or techniques used to enhance the adoption, implementation, and sustainability of clinical program or practice.

- The intervention/practice/innovation = **THE THING**
- *Implementation strategies* = the stuff we do to try to **help people/places DO THE THING**

Powell, B.J., Garcia, K.G., Fernandez, M.E. Implementation Strategies in *Optimizing the Cancer Control Continuum*, Eds. David Chambers, Cynthia Vinson, and Wynne Norton (2018)

Implementation strategies



Identified Factor	Implementation Strategy
YOUR DETERMINANT	YOUR STRATEGY
Lack of knowledge	Interactive education sessions
Beliefs or attitudes	Peer influence or opinion leaders
Community-based services	Process redesign

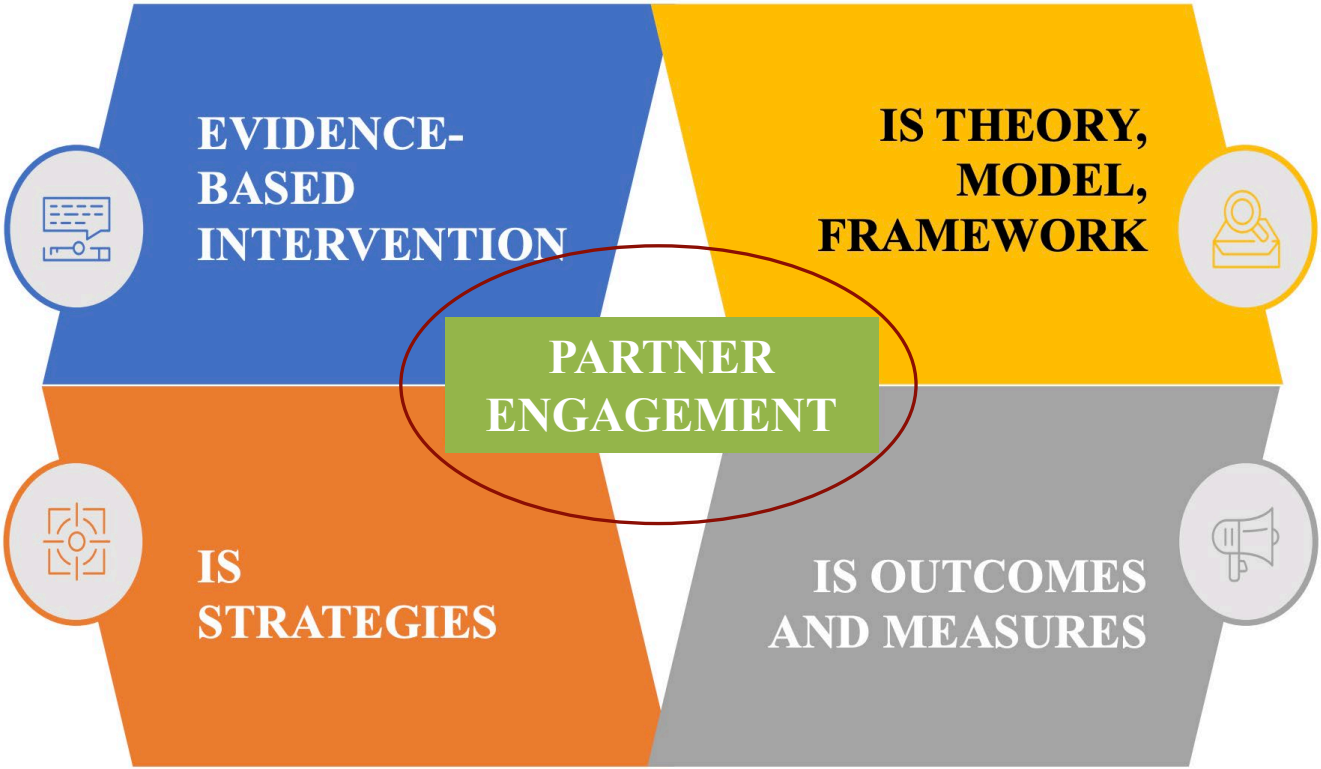
*Expert Recommendations for Implementing Change; NCI, 2018; Powell et al., 2012, 2015; Proctor et al., 2013

What are key barriers and facilitators in the implementation setting you are working in?

Respond in the chat

Who are key implementation partners addressing the OSH issue?

Who are the key beneficiaries of the implementation of this solution to address the OSH issue?


EVIDENCE-BASED INTERVENTION
IS THEORY, MODEL, FRAMEWORK
PARTNER ENGAGEMENT
IS STRATEGIES
IS OUTCOMES AND MEASURES

IAP2 Spectrum of Public Participation

IAP2's Spectrum of Public Participation was designed to assist with the selection of the level of participation that defines the public's role in any public participation process. The Spectrum is used internationally, and it is found in public participation plans around the world.

INCREASING IMPACT ON THE DECISION

	INFORM	CONSULT	INVOLVE	COLLABORATE	EMPOWER
PUBLIC PARTICIPATION GOAL	To provide the public with balanced and objective information to assist them in understanding the problem, alternatives, opportunities and/or solutions.	To obtain public feedback on analysis, alternatives and/or decisions.	To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered.	To partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution.	To place final decision making in the hands of the public.
PROMISE TO THE PUBLIC	We will keep you informed.	We will keep you informed, listen to and acknowledge concerns and aspirations, and provide feedback on how public input influenced the decision.	We will work with you to ensure that your concerns and aspirations are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision.	We will look to you for advice and innovation in formulating solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible.	We will implement what you decide.

STAKEHOLDER ENGAGEMENT NAVIGATOR

DICEmethods.org | Dissemination, Implementation, Communication, and Engagement

A guide for health researchers

Data Science to Patient Value (D2V)
UNIVERSITY OF COLORADO ANSCHUTZ MEDICAL CAMPUS

EDUCATION HUB | FIND ENGAGEMENT STRATEGIES

Stakeholder Engagement Selection Tool

Welcome! The purpose of this tool is to help your team select the most appropriate engagement method or tool for your particular project.

Before using the tool, consider the following:

- **Purpose:** What do you hope to achieve through stakeholder engagement?
- **Budget:** What budget do you expect to have for your engagement activities?
- **Number of interactions:** Over what period of time do you expect to engage your stakeholders?
- **Time per interaction:** How much time do you expect from your stakeholders in any given interaction?
- **Staffing/expertise:** What types of staffing and expertise are available to you?

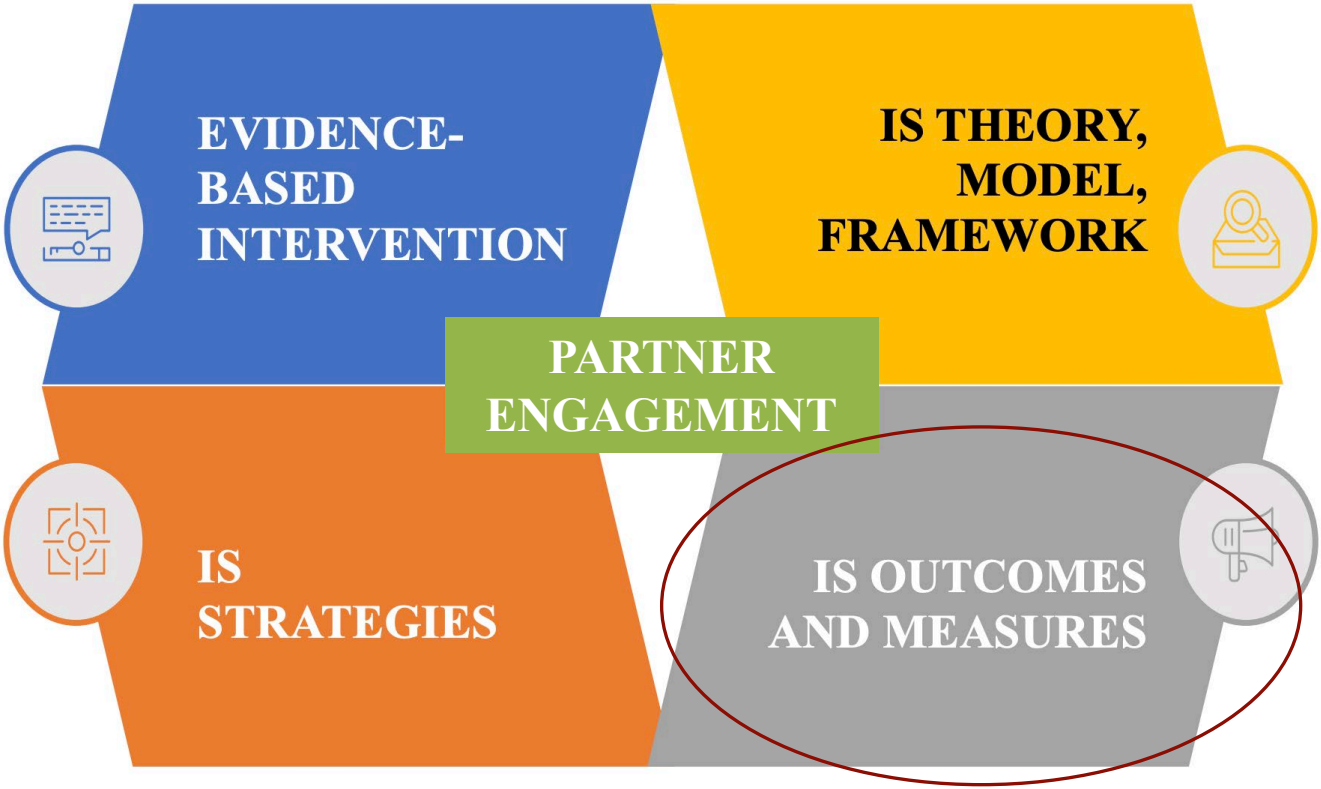
START!

https://dicemethods.com/tool

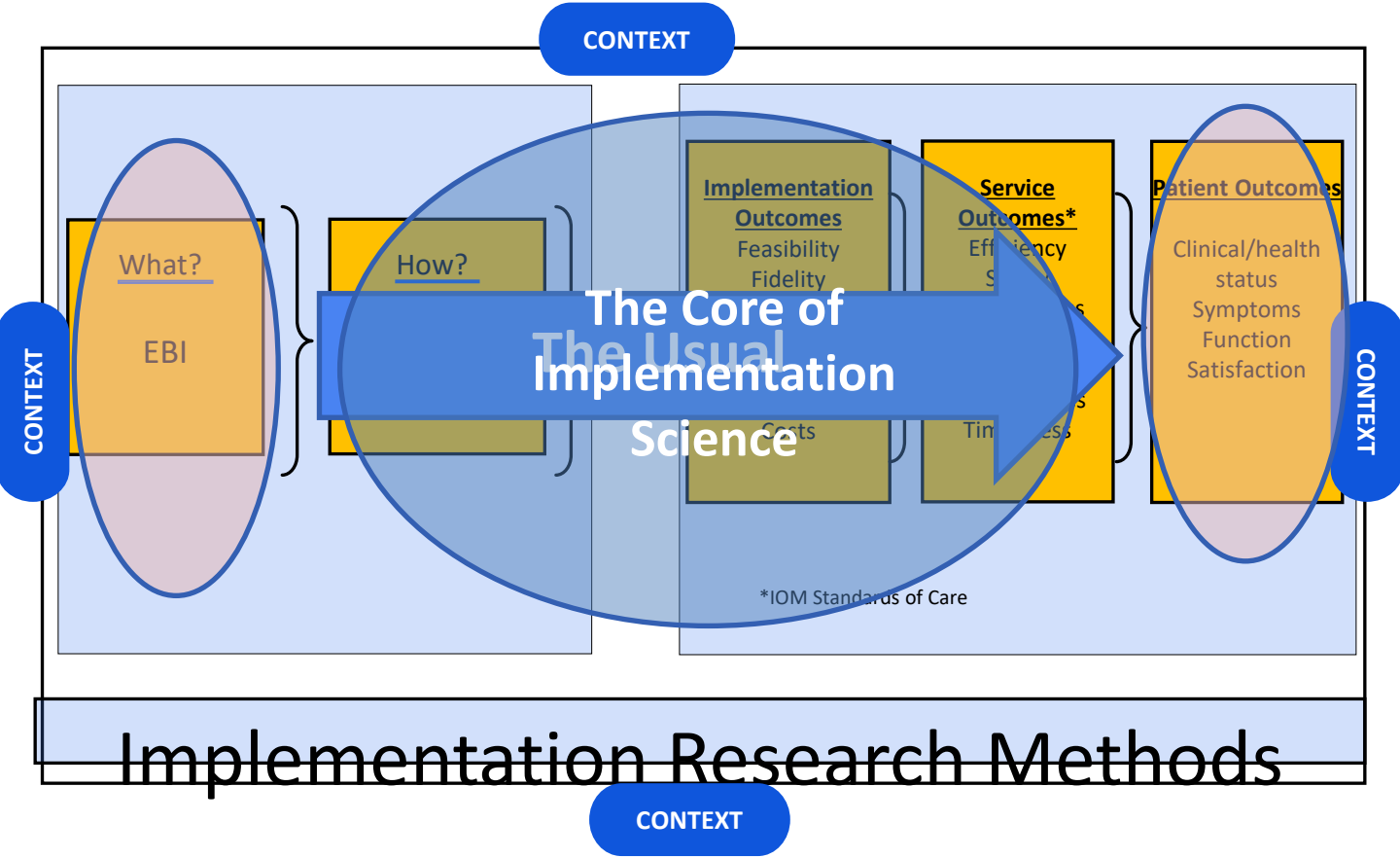
Who are some key implementation partners you were not initially thinking about?

Respond in the chat

What counts as success for each of the partners?
What counts as success for each of the beneficiaries?
How can you measure if success has been achieved?


EVIDENCE-BASED INTERVENTION
IS THEORY, MODEL, FRAMEWORK
PARTNER ENGAGEMENT
IS STRATEGIES
IS OUTCOMES AND MEASURES

Implementation outcomes



Proctor EK, Landsverk J, Aarons G, Chambers D, Glisson C, Mittman B. *Adm Policy Ment Health.* 2009;36(1):24-34. doi:10.1007/s10488-008-0197-4

Proposed criteria for rating dissemination and implementation measures for scientific soundness and practicality

GOLD STANDARD MEASURE RATING CRITERIA - For Primary Research Focus	PRACTICAL MEASURE RATING CRITERIA - For Real-World Application[1]
Reliable: Especially test-retest (less emphasis on internal consistency)	**Feasible***: Brief (generally 2 to 5 items or less); easy to administer/score/interpret
Valid: Construct validity, criterion validity, performed well in multiple studies	**Important to Practitioners and Stakeholders*:** Relevant to health issues that are prevalent, costly, challenging; helpful for decision makers or practice
Broadly Applicable: Available in English and Spanish, validated in different cultures and contexts; norms available; no large literacy issues	**Actionable***: Based on information, realistic actions can be taken, e.g., immediate discussion, referral to evidence-based on-line or community resources
Sensitive to Change* (if applicable): Longitudinal use, for performance tracking over time	**User Friendly:** Patient interpretability; face valid; meaningful to clinicians, public health officials, and policy makers
Public Health Relevance: Related to Healthy People 2020 goals, key IOM objectives or national priorities	**Low Cost*:** Publicly available or very low cost to use, administer, score, and interpret
	Enhances Patient Engagement: Having this information is likely to further patient engagement
	Do No Harm: Can likely be collected without interfering with relationships, putting respondents at risk, or creating unintended negative consequences

(Rabin et al. *Implement Sci* 2012 7:119)

Examples of key implementation & OSH effectiveness outcomes (Guerin et al., 2022)

Examples of key implementation outcomes and OSH effectiveness outcomes

Implementation outcomes*	Organizational effectiveness outcomes	Individual (worker/employer) effectiveness outcomes
Acceptability: Perception among key partners/beneficiaries that the OSH program or practice is agreeable or satisfactory.	Safety culture/ climate	Well-being
Adoption: Intention among key partners/beneficiaries to employ an OSH intervention (i.e., "uptake").	Supervisory support	Physical health
Appropriateness: Perceived fit of the OSH innovation or intervention for a given context/ population/health and safety problem.	Absenteeism	Mental health
Costs: Costs of an OSH implementation effort.	Presenteeism	Changes in attitude, intention and behavior
Feasibility: Extent to which the OSH intervention can be used successfully within a given setting.	Turnover	Occupational injuries, illnesses and fatalities
Fidelity: Degree to which an OSH intervention is implemented as intended by the program developers.	Occupational health equity	Occupational health equity
Penetration: Extent of integration of an OSH intervention within a worksite, workplace, or system.	Occupational injuries, illnesses and fatalities	Fatigue
Sustainability: Extent to which a newly implemented program/ intervention is maintained or institutionalized within an organization/workplace.		Stress
		Depression
		Burnout
		Social connectedness
		Job performance
		Job satisfaction
		Job commitment
		Intent to leave
		Work-life balance
		Positive self-concept

https://doi.org/10.1016/j.ssci.2022.105763

IS measures (examples)

- Acceptability of Intervention Measure
- Intervention Appropriateness Measure
- Feasibility of Intervention Measure
  - Measures by Weiner and colleagues (2017), 12 items, four for each construct

• *Implementation leadership*

  - A 12-item measure of implementation leadership (with four subscales, 3-items each) by Aarons and colleagues (2014).

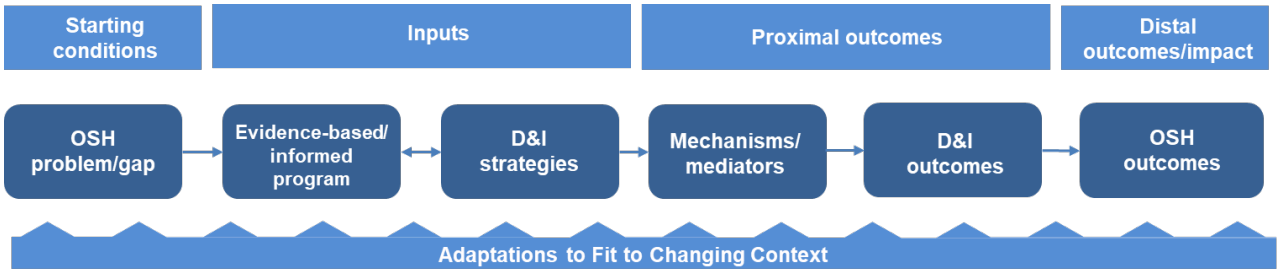
The Society for Implementation Research Collaboration Instrument Review Project: https://societyforimplementationresearchcollaboration.org/sirc-instrument-project

Key principles of defining, measuring, and sharing success

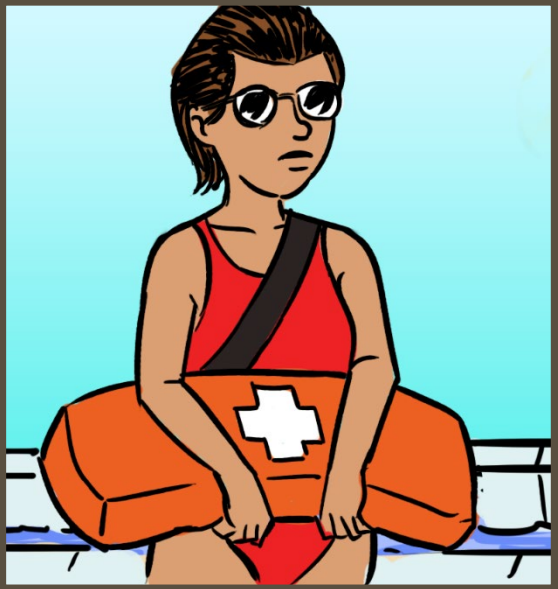
- Defining success at multiple levels from the perspective of multiple partners, and across multiple phases
- Remember, evidence on what? (reach, equitable and sustained impact)
- Measuring and interpreting success using multiple methods and multiple perspectives
- Sharing findings on success using multiple methods, products, channels reaching multiple partners

Putting it all together

Logic model of an IS study for OSH



Guerin RJ, Harden SM, Rabin BA, et al. Dissemination and Implementation Science Approaches for Occupational Safety and Health Research: Implications for Advancing Total Worker Health. *Int J Environ Res Public Health*. 2021;18(21):11050. Published 2021 Oct 21. doi:10.3390/ijerph182111050



Young worker safety and health: An OSH case example (Partner engagement, outcomes, measuring success)

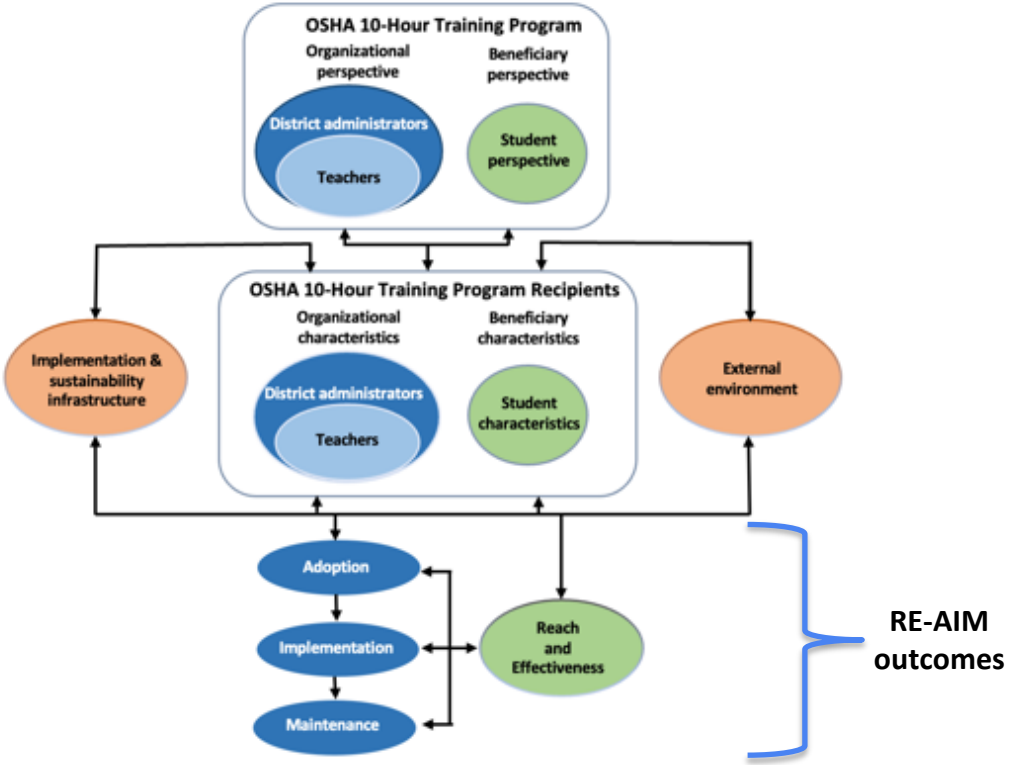
Artwork for the NIOSH *Youth@Work-Talking Safety* curriculum by Chi-Yun Lau

Partner engagement

- Key partners: M-DCPS administrators, Board of Education, union leaders (American Federation of Teachers), OSHA
- Service providers: ~50 Miami Dade County Public Schools (M-DCPS) high school CTE teachers
- Intervention recipients: ~6,000 career tech students in health sciences pathway, grades 9-12

M-DCPS Superintendent, Alberto Carvahlo (center), NIOSH PI Rebecca Guerin, 4th from right, and the Board of Education, 2016

Multilevel outcomes



Adapted from the Practical, Robust, Implementation and Sustainability Model (PRISM) (Feldstein & Glasgow, 2008).

An implementation science lens helps our research:

- Consider more systemically what is important for implementation in the local context
- Identify strategies that support participating schools to implement with fidelity (and sustain) the program
- Identify measures that consider who's being reached and are we reaching those most in need?
- Prepare the program for future scale up/out
- Assess the impact of our program (and any unintended consequences)

Artwork for the NIOSH *Youth@Work-Talking Safety* curriculum by Chi-Yun Lau

Questions?

rguerin@cdc.gov

barabin@health.ucsd.edu

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.