Dissemination Strategies to Bridge the Gap Between Research and Practice in the Cancer Control System

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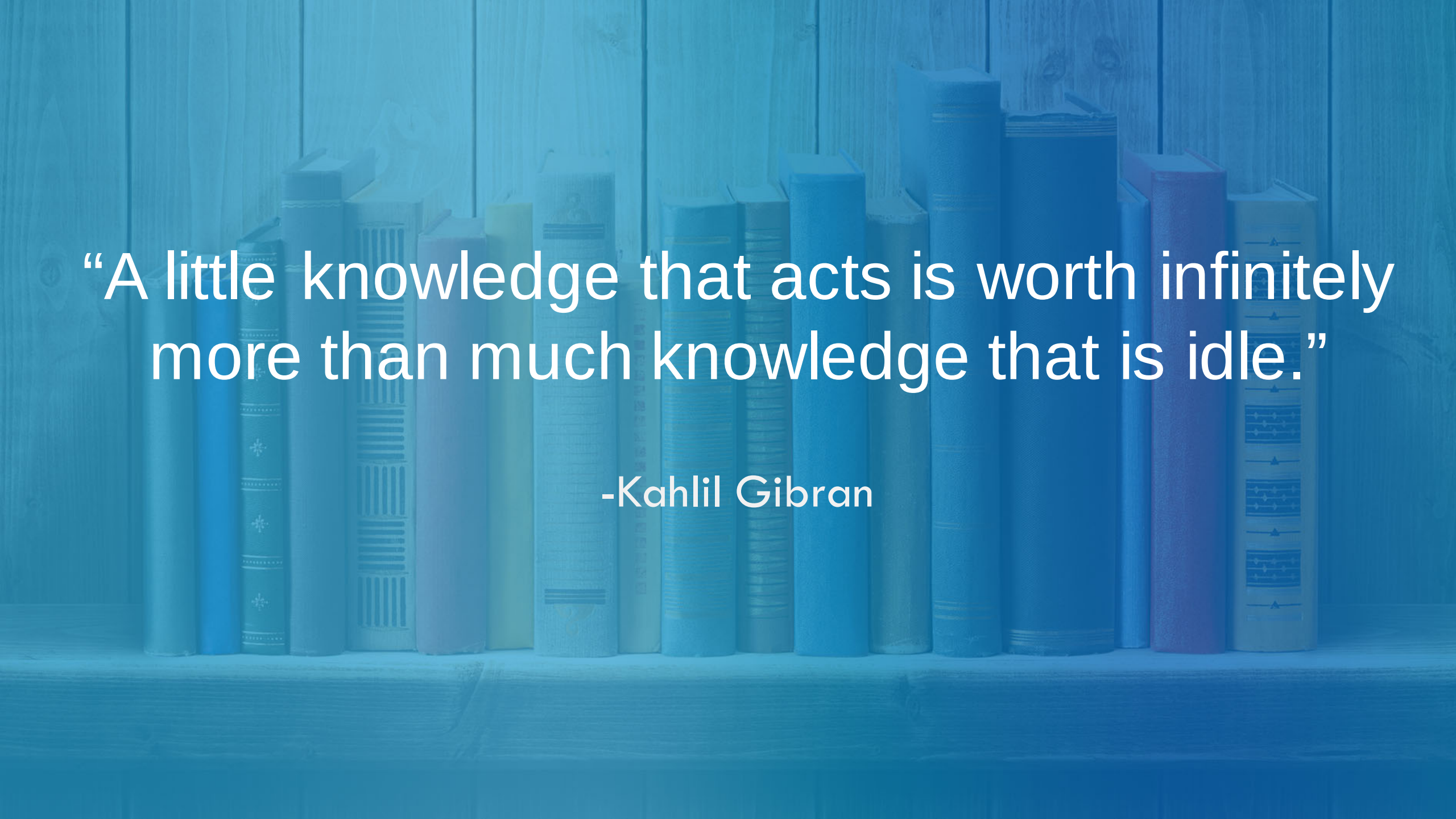
Disclosures

I have nothing to disclose.

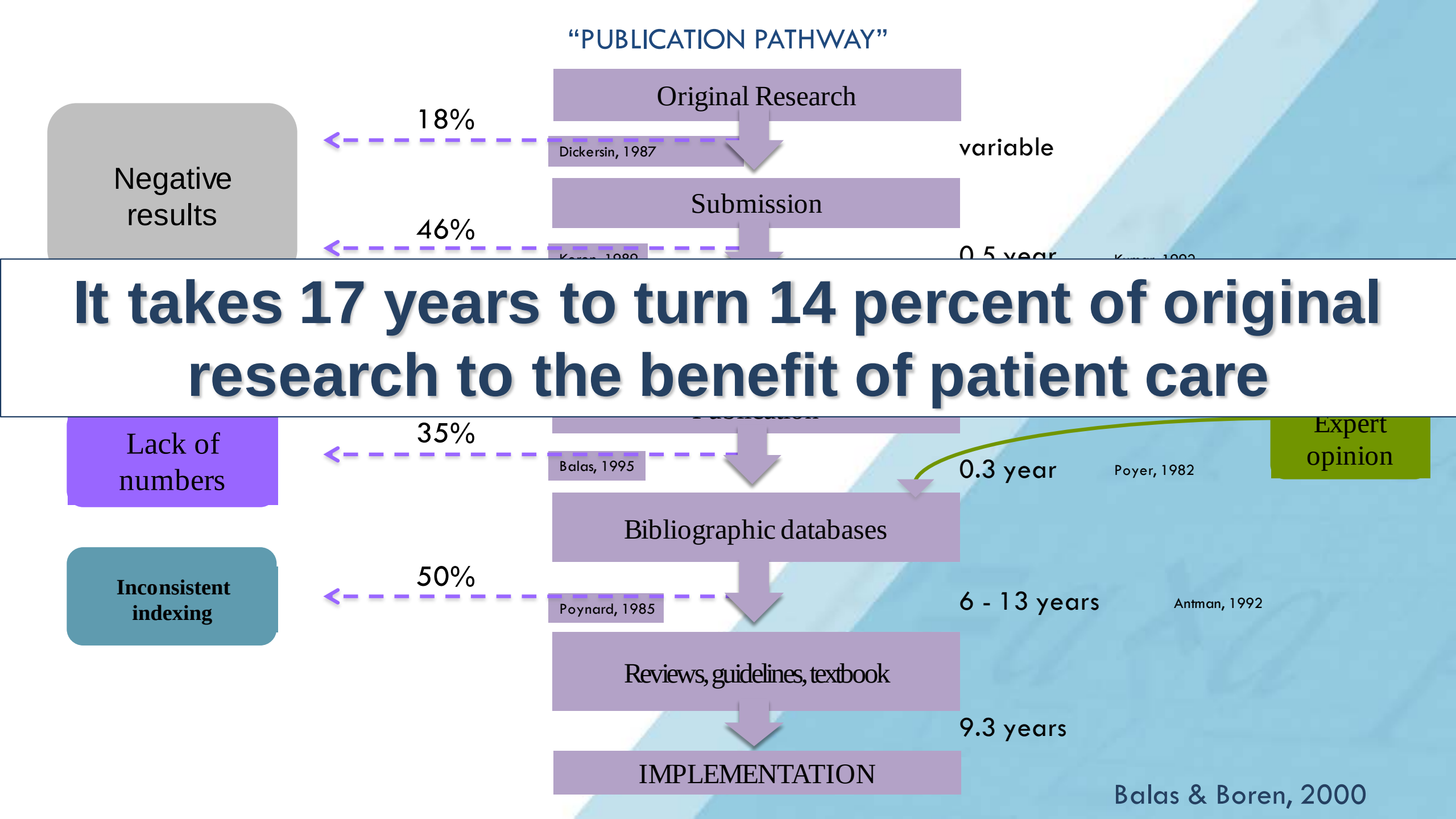
Objective

- Define dissemination and implementation research and practice
- Discuss the challenges and opportunities of dissemination and implementation in a complex adaptive system
- Optimization of evidence-based cancer control interventions
  - Adaptation of evidence-based cancer control Interventions
  - Development and selection of implementation strategies


“A little knowledge that acts is worth infinitely more than much knowledge that is idle.”
-Kahlil Gibran

Definitions: Implementation & Dissemination

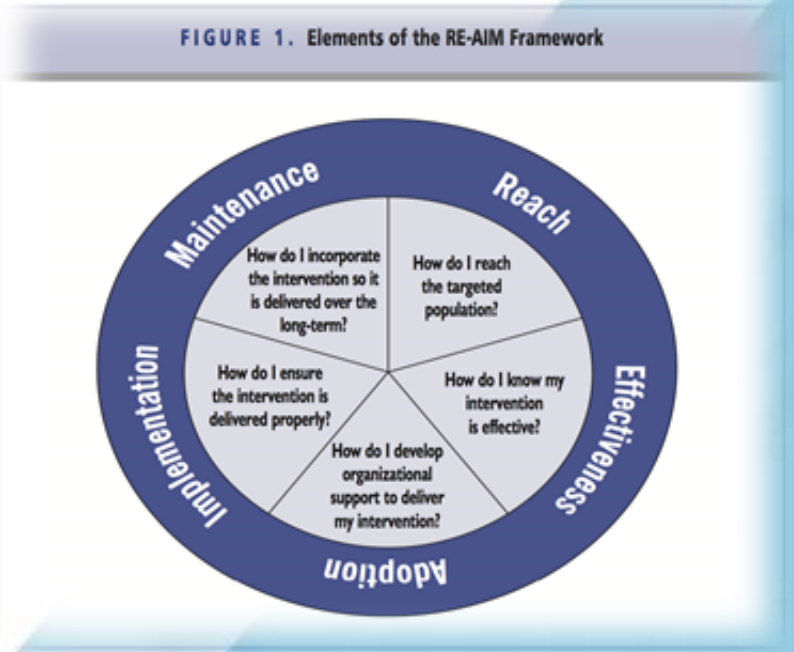
- ***Dissemination*** refers to the distribution of an innovation or intervention to a specific audience.
- ***Implementation*** refers to the integration of a new innovation or intervention within a specific setting or context.

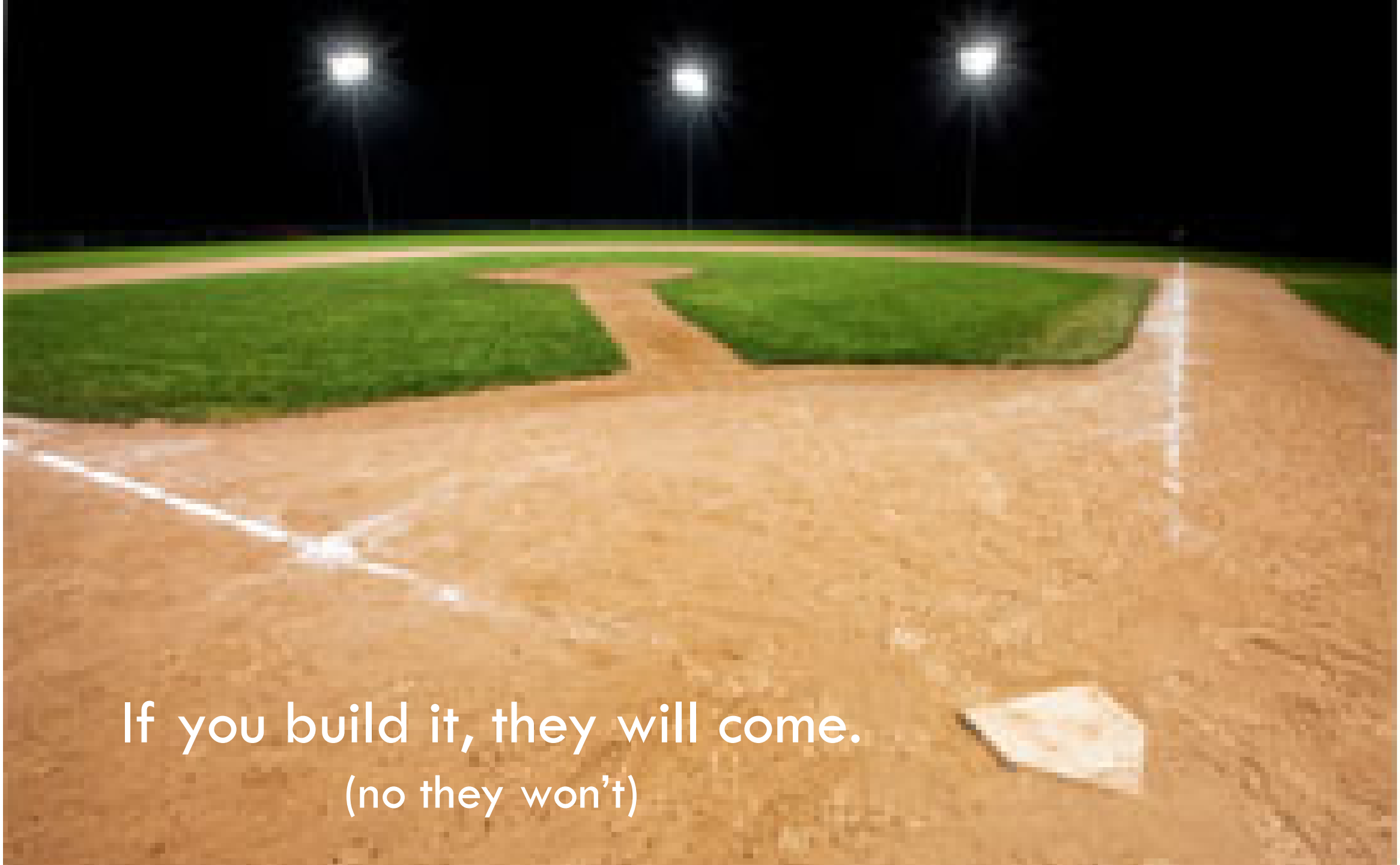

"PUBLICATION PATHWAY"
Original Research
18%
Dickersin, 1987
variable
Negative results
Submission
46%
0.5 year
Kumar, 1992
It takes 17 years to turn 14 percent of original research to the benefit of patient care
Lack of numbers
35%
Balas, 1995
Expert opinion
0.3 year
Poyer, 1982
Bibliographic databases
Inconsistent indexing
50%
Poynard, 1985
6 - 13 years
Antman, 1992
Reviews, guidelines, textbook
9.3 years
IMPLEMENTATION
Balas & Boren, 2000

Cancer Control Intervention Impact

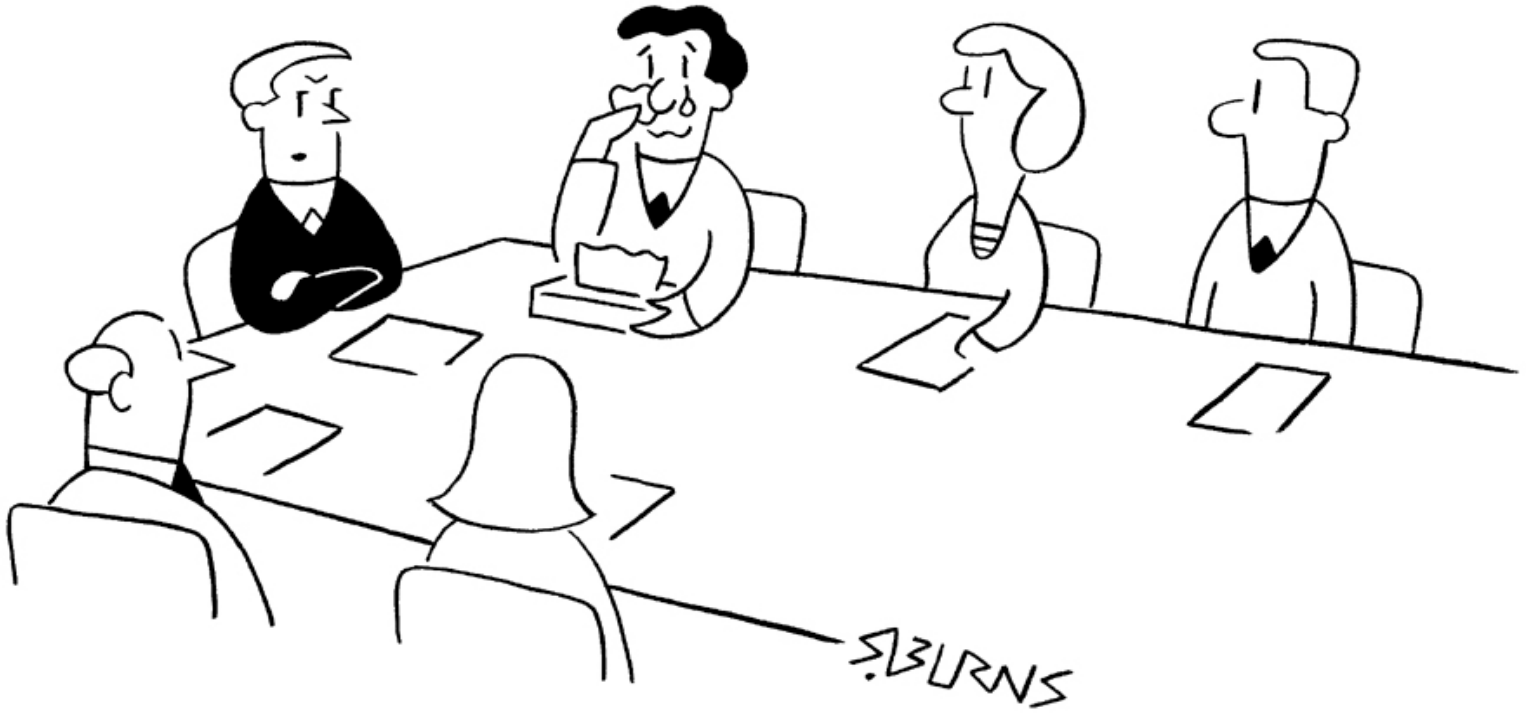
The ultimate impact of a cancer control intervention depends on:

- Effectiveness of the intervention
- Reach in the population




If you build it, they will come.
(no they won't)

Research to Practice



"The latest research shows that we really should do something with all this research."

"Closing the gap between research discovery and program delivery is both a complex challenge and an absolute necessity if we are to ensure that all populations benefit from the Nation's investments in new scientific discoveries."

(National Institutes of Health)

Types of Evidence-Based Interventions (EBIs) that can be implemented and disseminated

- Clinical Practice Guidelines
- Clinical Innovations (e.g. new screening technology)
- Cancer Prevention Educational Programs (Packaged programs)
- Policies
- Strategies (USPSTF Community Guide Recommendation; e.g. mass media, one on one, provider reminders)

Fernández ME, Mullen PD, Leeman J, Walker TJ. Evidence-Based Cancer Practices, Programs, and Interventions. In: *Advancing the Science of Implementation across the Cancer Continuum*. 2018, Oxford Press.

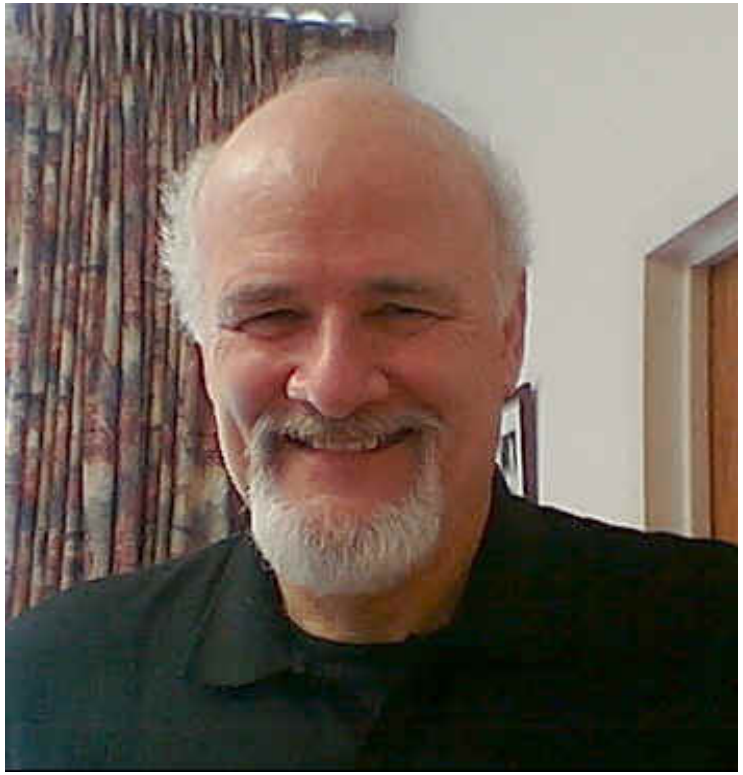
Implementation and Dissemination Challenges

- Organizational and leadership support
- Limited involvement of stakeholders and policy makers
- Limited knowledge among practitioners of existing evidence-based cancer control interventions (EBIs)
- Concerns about fit with previous practices and with client needs
- Researcher focused studies and designs /little attention to external validity

Reference:
Dissemination & Implementation: Overview. (n.d.). Retrieved from https://www.div12.org/implementation/overview/
Society of Clinical Psychology/American Psychological Association

Escoffery, Hannon, Maxwell, Vu, Leeman et al. 2015

Generating Practice-based Evidence



"If we want more evidence-based practice, we need more practice-based evidence"

Lawrence W. Green, PhD

Guiding Cancer Control: A Path to Transformation

RECOMMENDATION A: A U.S. National Cancer Control Plan should principally ensure resource integration and operational coordination across the various components of the cancer control system, and should actively do the following:

A1. Improve the availability of preventive, screening, diagnostic, and therapeutic interventions.

A5. Apply the tools of complex systems analyses for assessing the "value" of cancer control interventions.

A6. Minimize the waste and harm stemming from disparate clinical practices, interventions lacking evidence of effectiveness, and conflicting clinical practice guidelines.

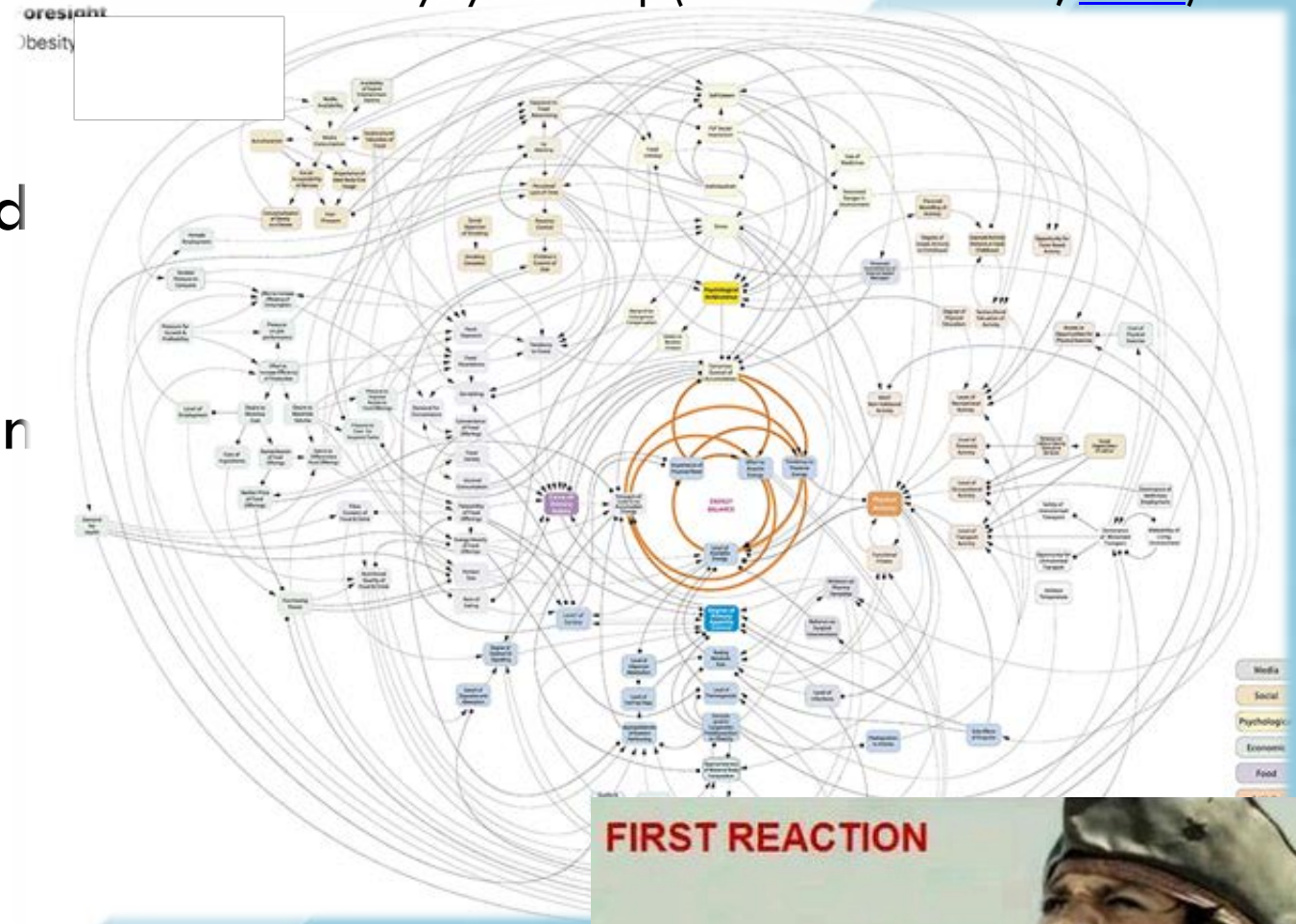
A8. Expand and support reproducibility strategies for developing reliable evidence in cancer control from biomedical, clinical, public health, and social science research.

National Academies of Science, Engineering, and Medicine 2019. *Guiding Cancer Control: A Path to Transformation*. Washington DC

Cancer Control in a Complex Adaptive System

- Diverse components and actors that interact with each other and with the external environment.
- Property of both the intervention and the context.
- Unpredictability of effects.
- Invites new approaches to addressing the issue.

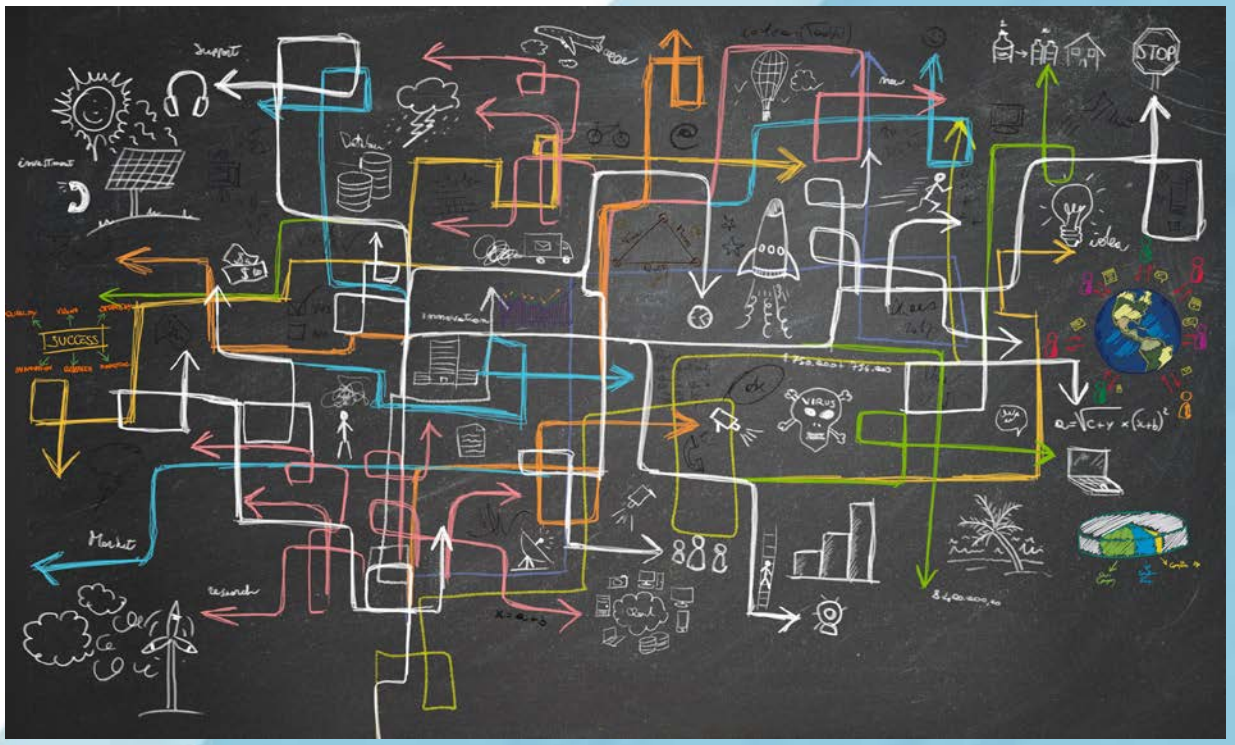
Obesity system map (Vandenbroeck et al., 2007).



National Academies of Science, Engineering, and Medicine 2019. *Guiding Cancer Control: A Path t*

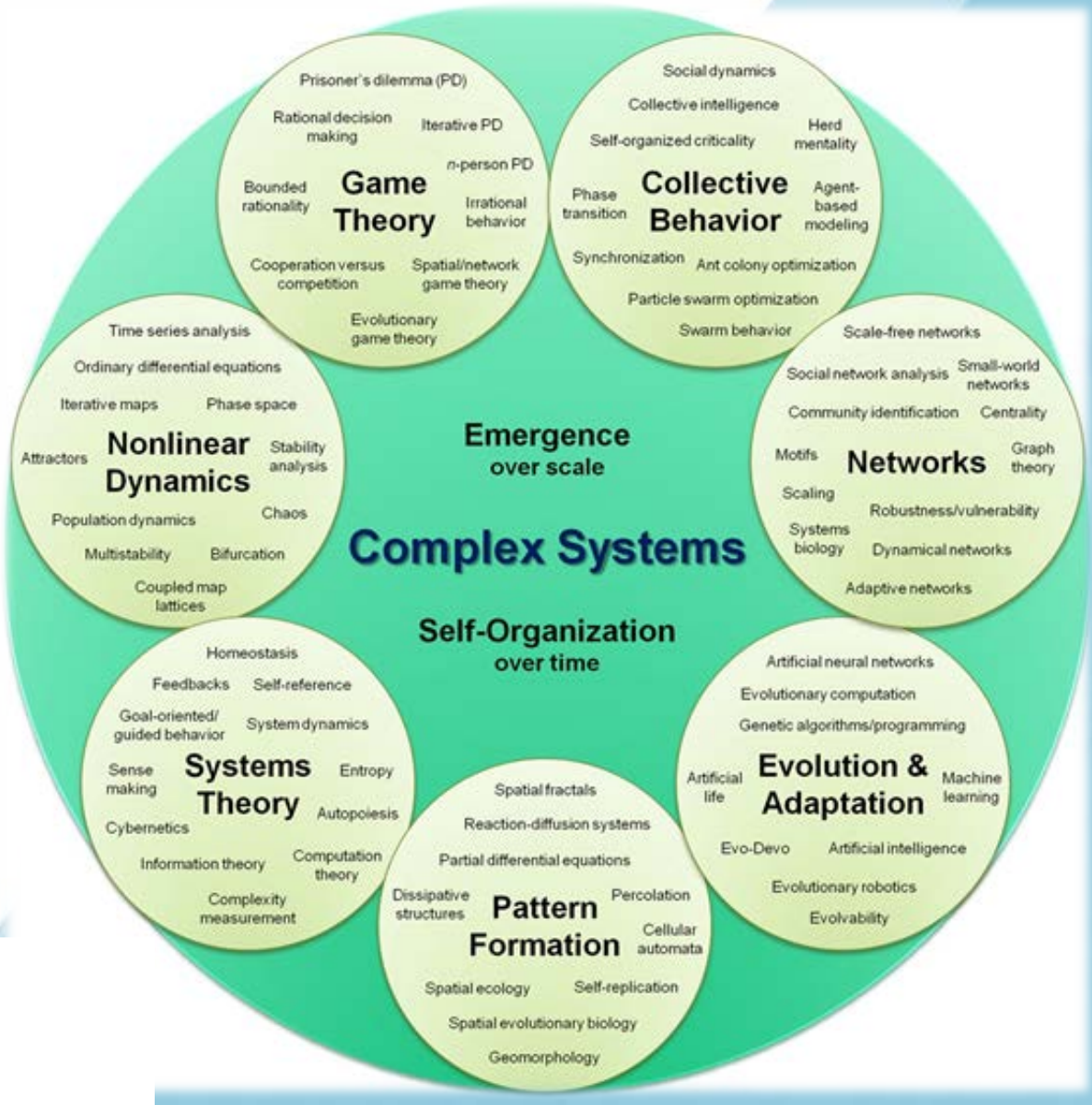
Framing Complexity in Environmental and Human Health. *Oxford Research Encyclopedia of Environmental Science; .*

How do we improve dissemination of evidence-based interventions for cancer control in a complex adaptive system?



Dissemination of Cancer Control in Complex Adaptive Systems

- Apply the tools of complex systems analyses for improving implementation and dissemination of EBI.
- Engage key stakeholders at multiple levels to better understand and intervene.
- Use systematic processes for developing D&I strategies using theory, empirical evidence, and advances in implementation science.



Definitions: Dissemination & Implementation Research

- ***Dissemination research*** is the scientific study of targeted distribution of evidence (knowledge, interventions, practices, policies) to a specific public health or clinical practice audience. The intent is to understand how best to spread and sustain evidence-based interventions.

- ***Implementation research*** is the scientific study of the use of strategies to adopt and integrate evidence-based health interventions into clinical and community settings in order to improve patient/population outcomes.

Adapted from : NIH PAR 16-238: Dissemination and Implementation Research in Health (R01)
Dissemination & Implementation: Overview. (n.d.). Retrieved from https://www.div12.org/implementation/overview/ (Society of Clinical Psychology/American Psychological Association)

Implementation Science

Center for Scientific Review: Dissemination and Implementation Research in Health Study Section

SIRC
SOCIETY FOR IMPLEMENTATION RESEARCH COLLABORATION

5th Biennial Society for Implementation Research Conference: September 12-14, 2019

AcademyHealth

[12th Annual Conference on the Science of Dissemination and Implementation in Health]
December 4-6, 2019

Research to Practice

Wait, what? You are saying we need more research to figure out what to do with all of this research?

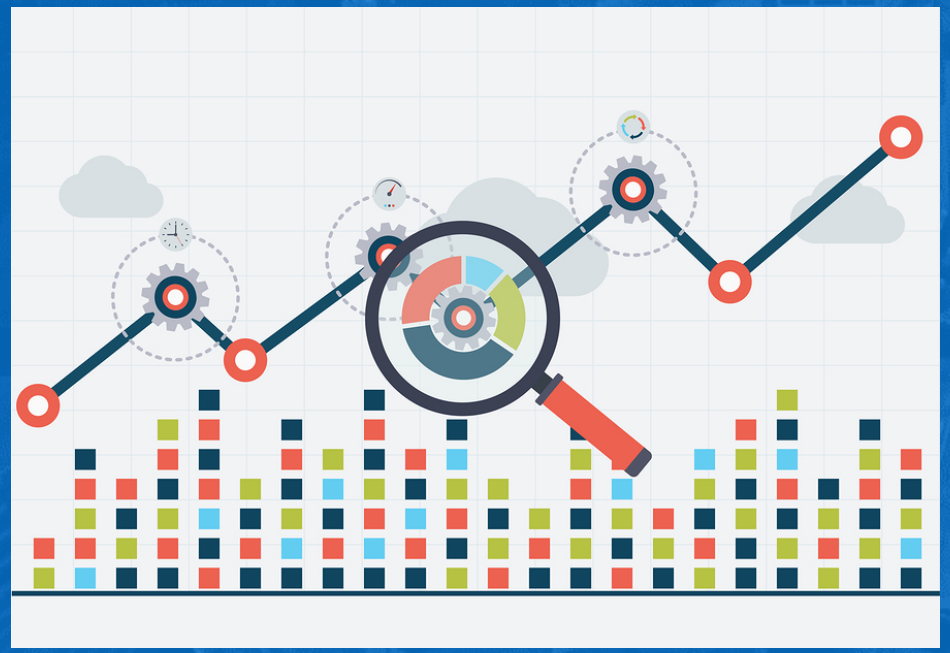
Addressing Complexity to Enhance D&I

To address complexity, dissemination and implementation strategy planners must:

- Better understand the complexity of the context and issues all players are facing
- Systematically design implementation strategies that consider complexity and make reasonable assumptions about the "shock to the system"
- Learn to balance strategic designs with respect for self-organization principles (adaptation)

Reference:
Sarriot, E., & Kouletio, M. (2014). Community Health Systems as Complex Adaptive Systems: Ontology and Praxis Lessons from an Urban Health Experience with Demonstrated Sustainability. Systemic Practice and Action Research, 28(3), 255–272. doi: 10.1007/s11213-014-9329-9

Optimization of Evidence-Based Cancer Control Interventions

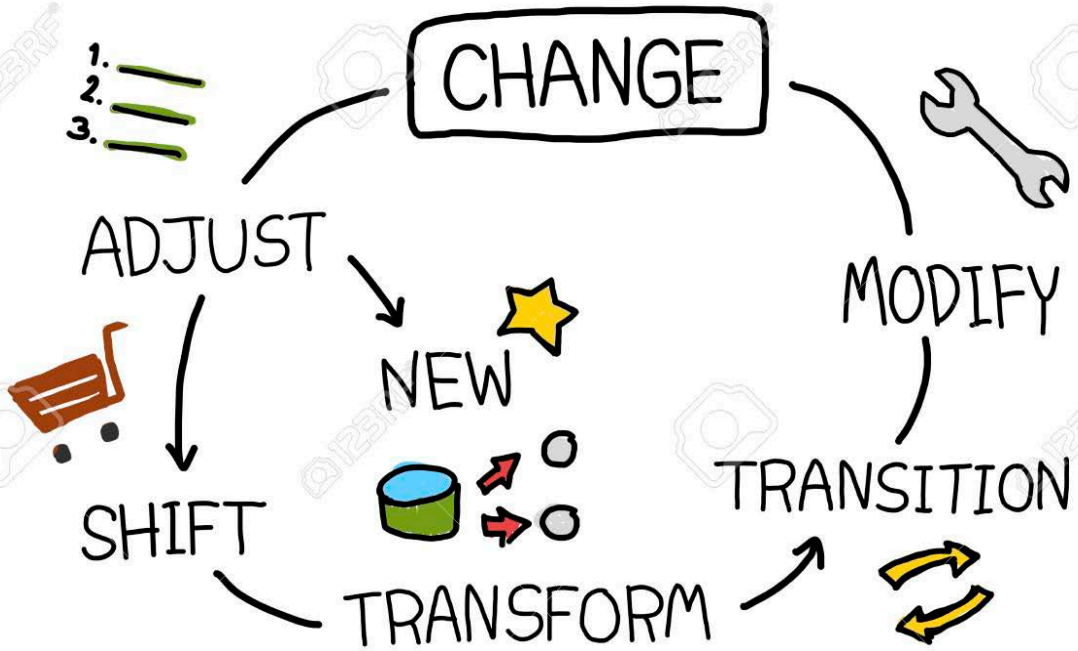


Optimization is: "A deliberate, iterative and data-driven process to improve a health intervention and/or its implementation to meet stakeholder-defined public health impacts within resource constraints".

- Adaptation
- Developing, Selecting, and Tailoring Implementation Strategies

Wolfenden L, …Fernández ME, Yoong S. Optimisation: defining and exploring a concept to enhance the impact of public health initiatives. *Health Research Policy and Systems*. 2019. In press.

Program Adaptation



“Planned or purposeful changes to the design or delivery of an intervention”

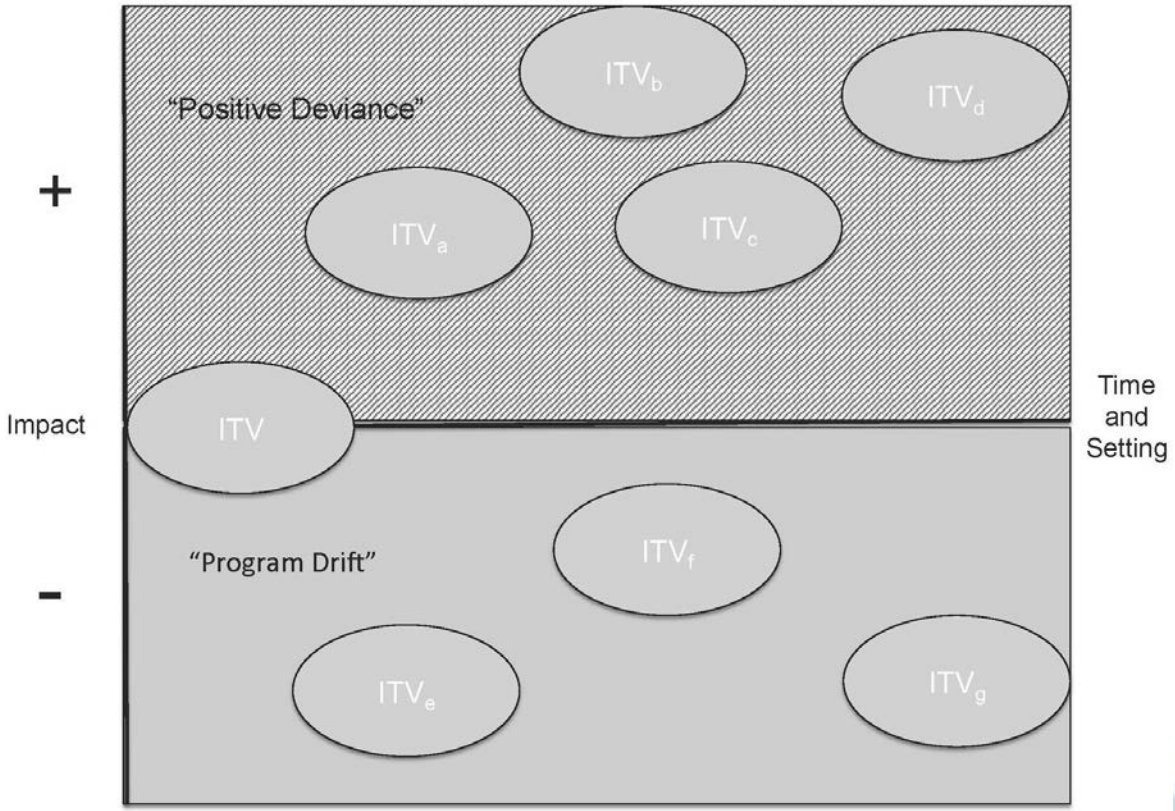
Wiltsey-Stirman et al., 2013; Brownson et al., 2012

Fidelity?

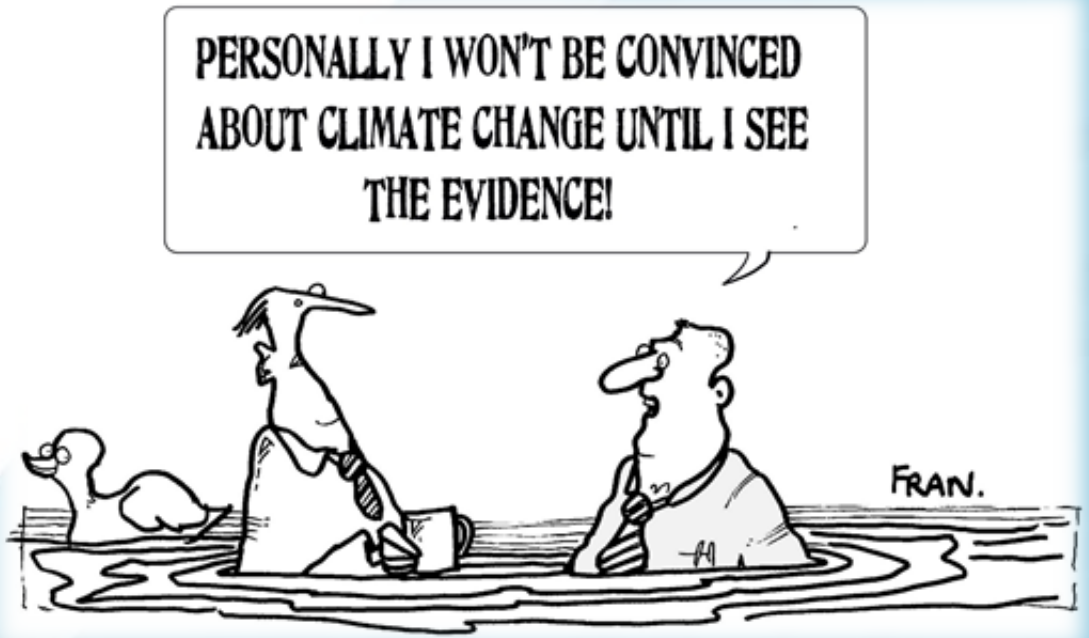
Core Elements: required components that most likely produce the EBI's effectiveness. Core elements include:

1. Content
2. Delivery strategies
3. Methods/ mechanisms of change

Assumptions limiting progress…



Program Drift



Permanence of Evidence Base

Chambers & Norton, 2016

Fidelity vs Adaptation

Historical view of fidelity vs adaptation

A mature view of fidelity and adaptation

Implementation and Dissemination Strategies

Methods or techniques used to enhance the adoption, implementation, sustainment, and scale-up of a program or practice.

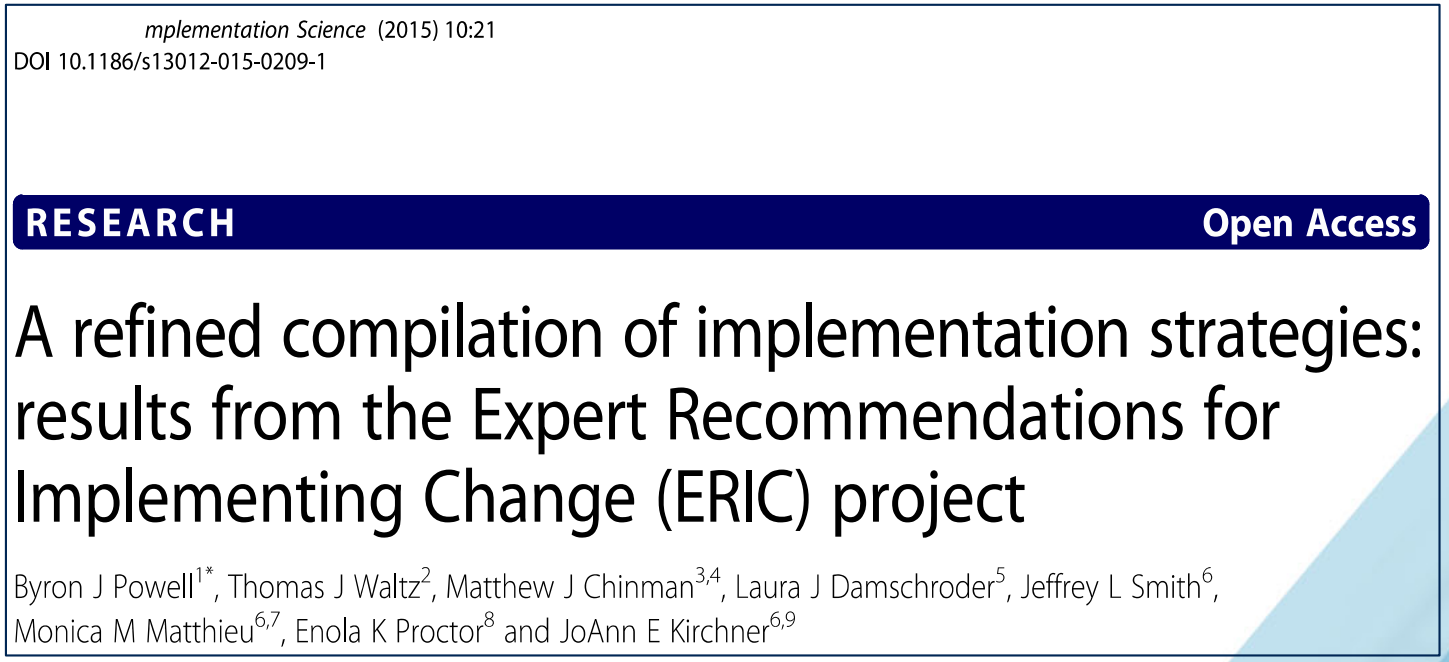
Proctor, Powell, & McMillen (2013); Powell, Garcia, & Fernandez (2018)

Effective Dissemination and Implementation Strategies

Intervention Category	Intervention Examples
Dissemination Targeting **HEALTH PROFESSIONALS**	Train the trainer, academic detailing, treatment algorithms, role modeling, multiple dissemination strategies, postal delivery
Dissemination Targeting **ORGANIZATIONS** *Example: HMOs*	Evidence-based manuals, workshops, targeted approaches to management, passive dissemination of worksite interventions
Dissemination Targeting **INDIVIDUALS**	Media awareness campaigns & peer leader programs

References:
Ellis, P., Robinson, P., Ciliska, D., Armour, T., Brouwers, M., Obrien, M. A., … Raina, P. (2005). A Systematic Review of Studies Evaluating Diffusion and Dissemination of Selected Cancer Control Interventions. *Health Psychology*, *24*(5), 488–500. doi: 10.1037/0278-6133.24.5.488

Updated Compilation Types of Implementation Strategies



mplementation Science (2015) 10:21
DOI 10.1186/s13012-015-0209-1

RESEARCH Open Access

A refined compilation of implementation strategies: results from the Expert Recommendations for Implementing Change (ERIC) project

Byron J Powell[1*], Thomas J Waltz[2], Matthew J Chinman[3,4], Laura J Damschroder[5], Jeffrey L Smith[6], Monica M Matthieu[6,7], Enola K Proctor[8] and JoAnn E Kirchner[6,9]

- Use Evaluative and Iterative Strategies
- Provide Interactive Assistance
- Adapt and Tailor to Context
- Develop Stakeholder Interrelationships
- Train and Educate Stakeholders
- Support Clinicians
- Engage Consumers
- Utilize Financial Strategies
- Change Infrastructure

Powell, et al. 2015; Powell*, BJ, Garcoa, KG, Fernández ME, Implementation Strategies. In: *Advancing the Science of Implementation across the Cancer Continuum*. 2018. Eds. Chambers, DA, Vinson, CA, Norton, WE. 2018, Oxford Press.

Challenges in Selecting Implementation and Dissemination Strategies

- While some compilations exist, they may be less relevant for certain settings (clinical vs public health or community settings)
- Strategies included in compilations are broad and may represent qualitatively different things (delivery channel, assessments, processes)
- Underutilization of conceptual models and theories,
- Variations related to the EBPs and the contexts in which they are implemented

Waltz, et al. 2014; Powell et al. 2017

Strategies: A Research Agenda

frontiers in Public Health

PERSPECTIVE
published: 22 January 2019
doi: 10.3389/fpubh.2019.00003

Check for updates

Enhancing the Impact of Implementation Strategies in Healthcare: A Research Agenda

Byron J. Powell[1,2,3], Maria E. Fernandez[4], Nathaniel J. Williams[5], Gregory A. Aarons[6], Rinad S. Beidas[7,8,9], Cara C. Lewis[10], Sheena M. McHugh[11] and Bryan J. Weiner[12]*

1. Need to Enhance Methods for Designing and Tailoring

Methods to Improve the Selection and Tailoring of Implementation Strategies

Byron J. Powell, PhD
Rinad S. Beidas, PhD
Cara C. Lewis, PhD
Gregory A. Aarons, PhD
J. Curtis McMillen, PhD
Enola K. Proctor, PhD
David S. Mandell, ScD

- Group Model Building
- Conjoint Analysis
- Concept Mapping
- **Intervention Mapping**

Baker et al. (2015); Bosch et al. (2007); Colquhoun et al. (2017); Grol et al. (2013); Powell et al. (2017)

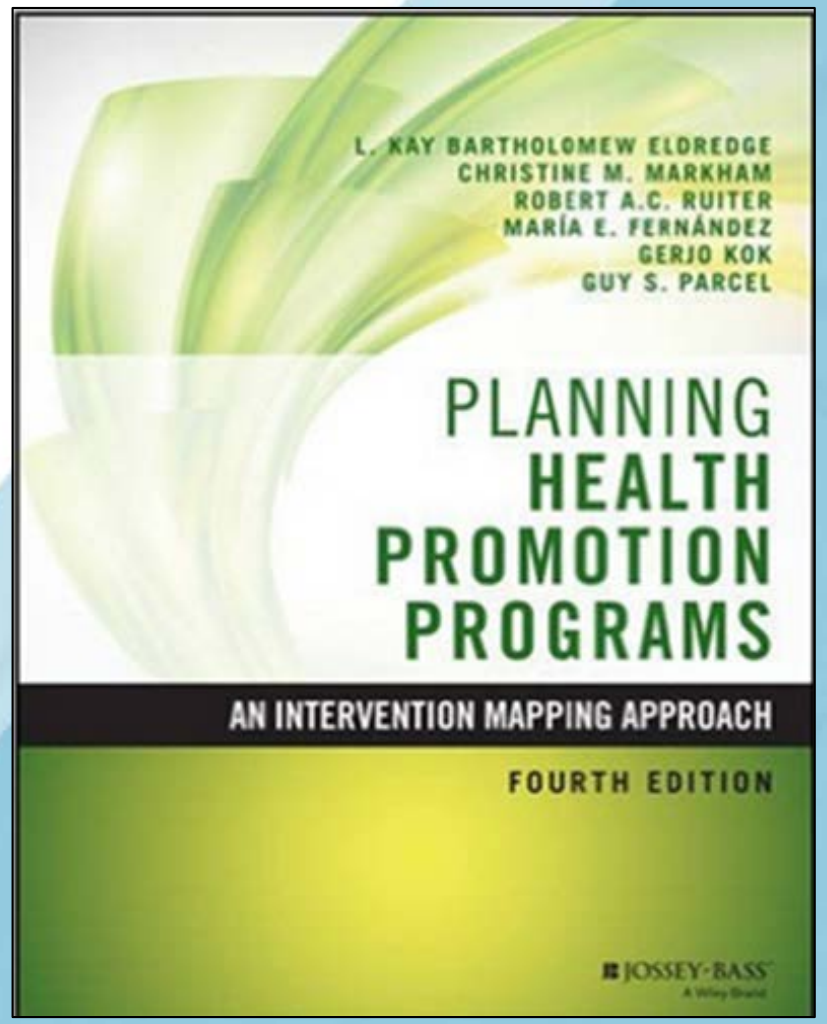
Intervention Mapping:
A Systematic Approach for Program, Development, Implementation and Adaptation

Three ways to use IM for D&I

1. Designing programs in ways that enhance its potential for being adopted, implemented, and sustained

2. Using IM processes to adapt existing evidence-based interventions

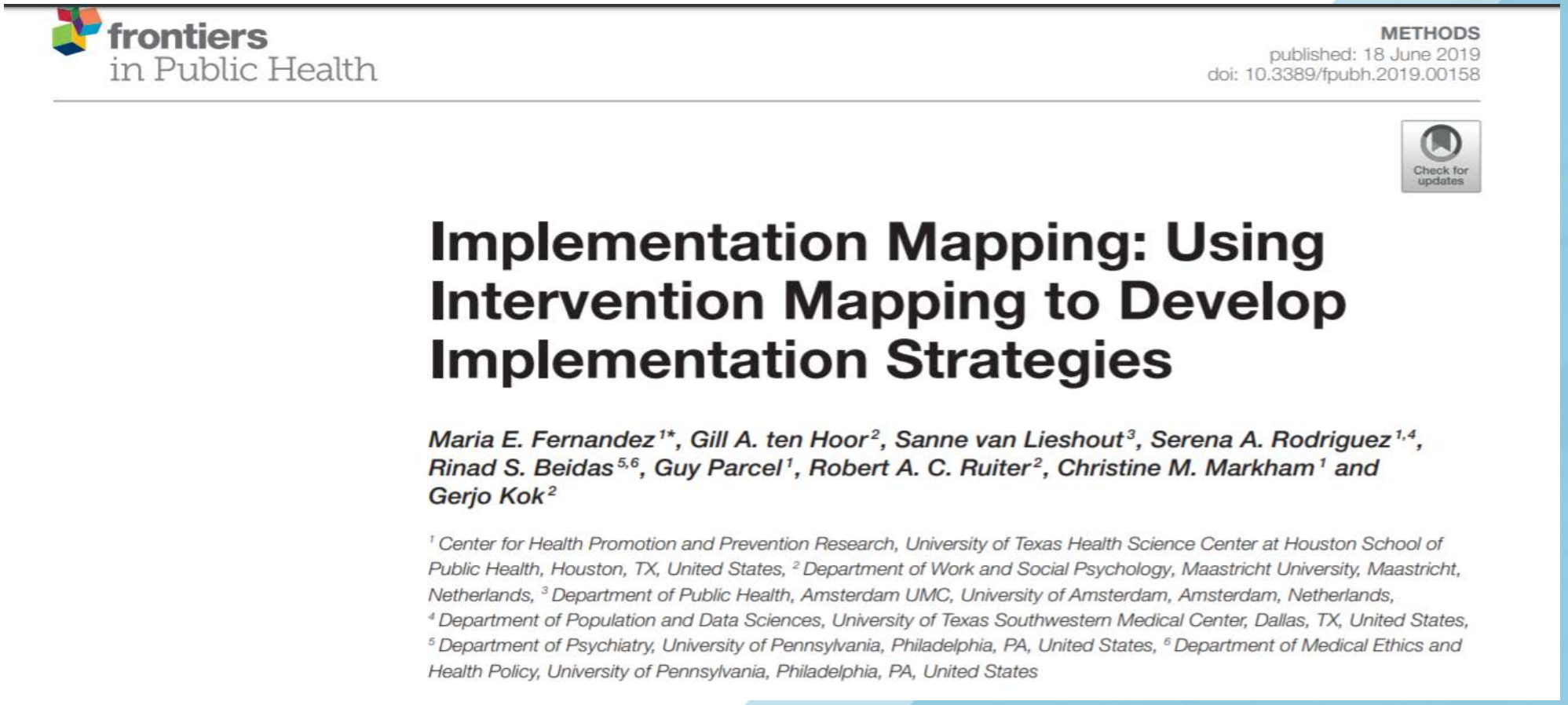
3. **Designing implementation and dissemination strategies to influence adoption, implementation and continuation: *Implementation Mapping***



Bartholomew Eldredge, LK, Markham, CM, Ruiter, RAC, Fernández, M.E., Kok, G, Parcel, GS (Eds.). Jan 201). *Planning health promotion programs: An Intervention Mapping approach* (4th ed.). San Francisco, CA: Jossey-Bass.

What is Implementation Mapping?

The Use of the Intervention Mapping Protocol for planning Implementation Strategies (Implementation Interventions).
Implementation science + Intervention Mapping **= Implementation Mapping**



frontiers in Public Health

METHODS
published: 18 June 2019
doi: 10.3389/fpubh.2019.00158

Check for updates

Implementation Mapping: Using Intervention Mapping to Develop Implementation Strategies

Maria E. Fernandez[1], Gill A. ten Hoor[2], Sanne van Lieshout[3], Serena A. Rodriguez[1,4], Rinad S. Beidas[5,6], Guy Parcel[1], Robert A. C. Ruiter[2], Christine M. Markham[1] and Gerjo Kok[2]*

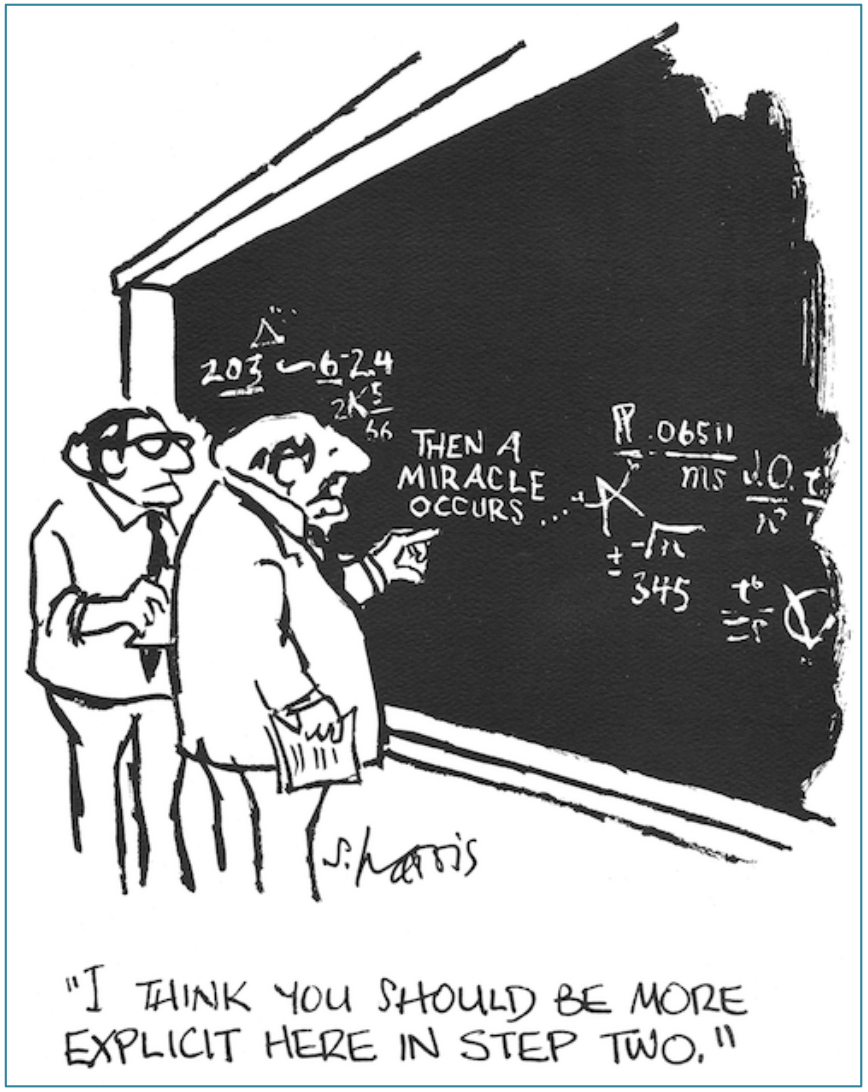
[1] Center for Health Promotion and Prevention Research, University of Texas Health Science Center at Houston School of Public Health, Houston, TX, United States, [2] Department of Work and Social Psychology, Maastricht University, Maastricht, Netherlands, [3] Department of Public Health, Amsterdam UMC, University of Amsterdam, Amsterdam, Netherlands, [4] Department of Population and Data Sciences, University of Texas Southwestern Medical Center, Dallas, TX, United States, [5] Department of Psychiatry, University of Pennsylvania, Philadelphia, PA, United States, [6] Department of Medical Ethics and Health Policy, University of Pennsylvania, Philadelphia, PA, United States

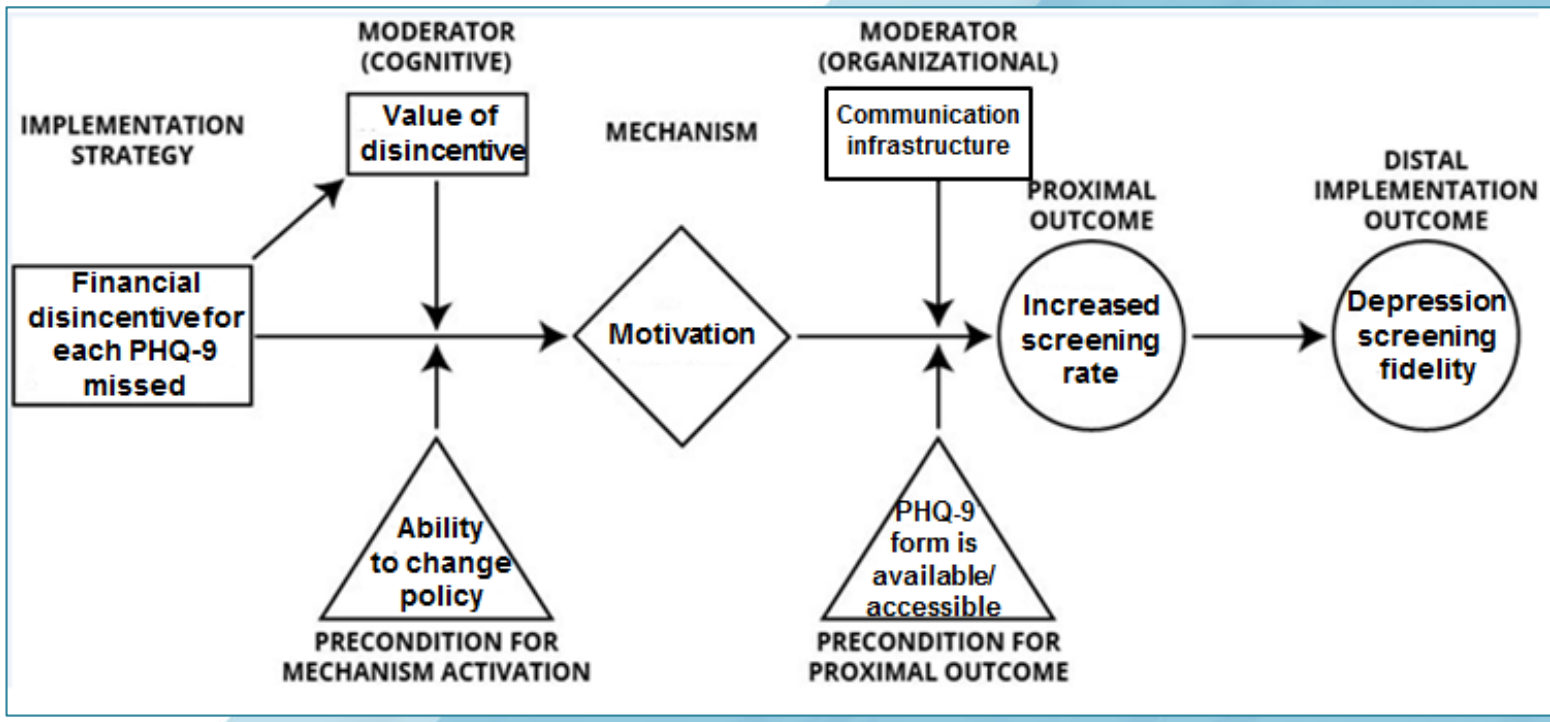
Community and Stakeholder Engagement

Knowledge generation comes from the hands of practitioners/implementers as much as it comes from those usually playing the role of intervention researcher.

Reference:
Hawe, P. (2015). Lessons from Complex Interventions to Improve Health. *Annual Review of Public Health*, *36*(1), 307–323.
doi: 10.1146/annurev-publhealth-031912-114421

2. Specify & Test Mechanisms

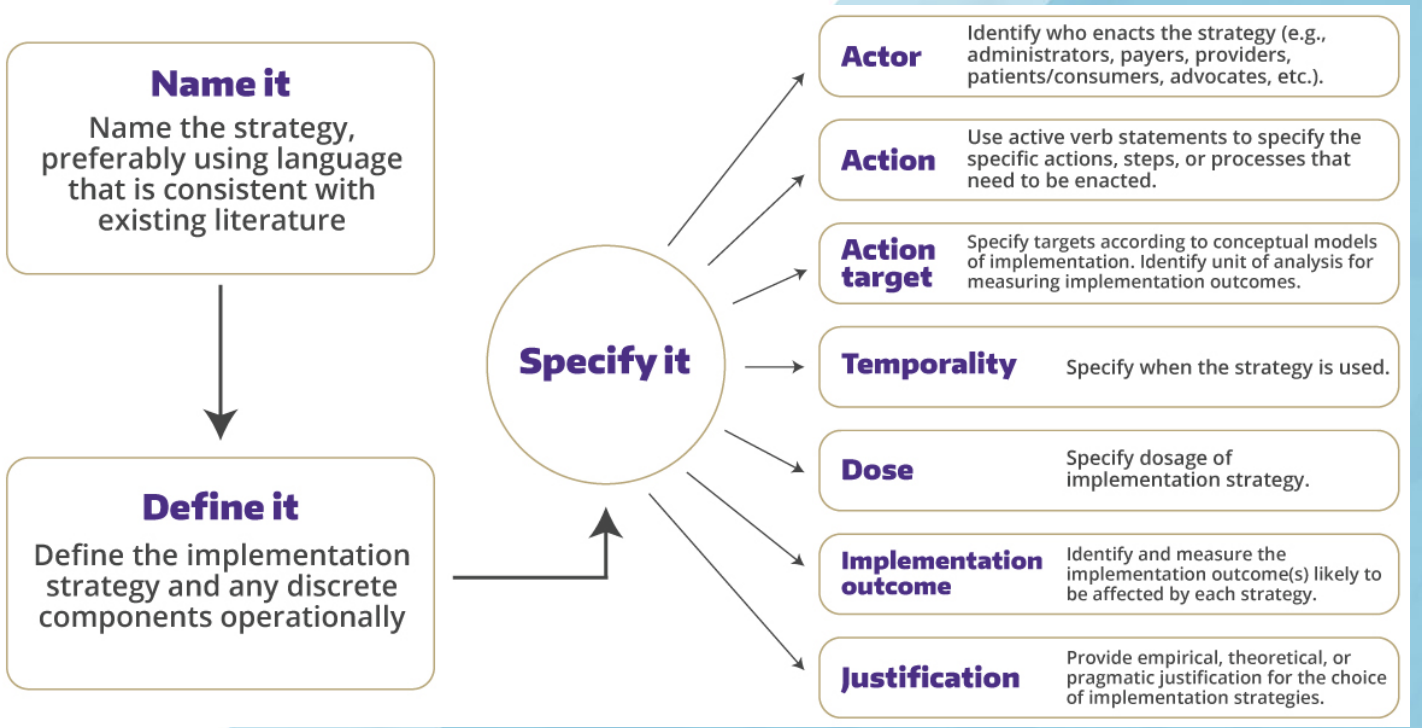




Lewis et al. (2018); National Institutes of Health (2016); Weiner et al. (2012); Williams et al. (2016)

3. Improve Description, Tracking, and Reporting

- Poor description, tracking, and reporting:
  - Limits replication in science and practice
  - Precludes answers to how and why strategies work
- Numerous reporting guidelines exist



Albrecht et al. (2013); Boyd et al. (2018); Bunger et al. (2017); Hoffman et al. (2014); Proctor et al. (2013); Proctor, Powell, & McMillen (2013); https://impsciuw.org/implementation-strategies/

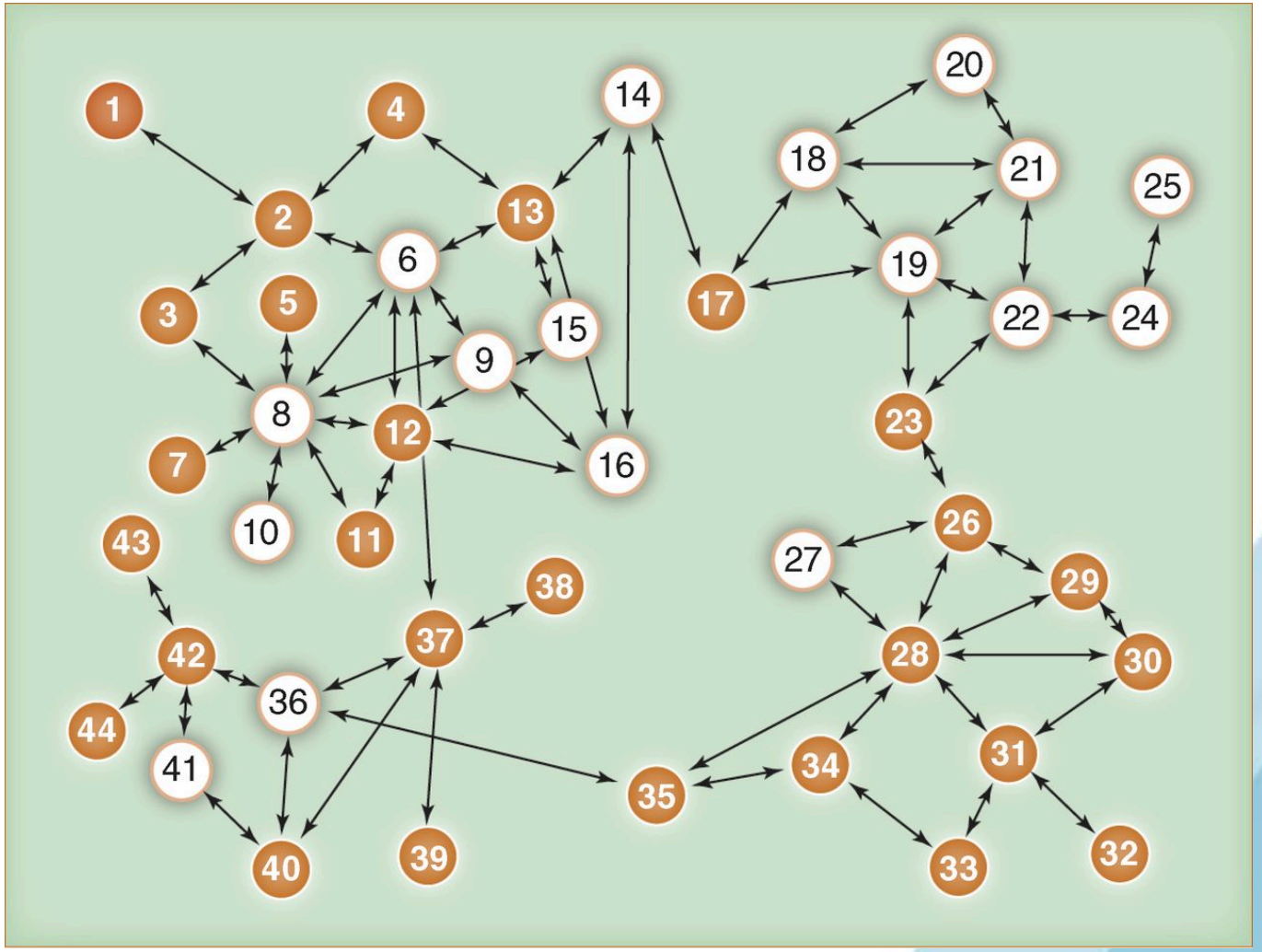
4. Increase Economic Evaluations

- In a review of 235 implementation studies, only 10% provided information about implementation costs
- Severely inhibits decision making regarding strategies
- Practical tools have been developed (e.g., COINS)
- Common framework facilitating comparability is needed

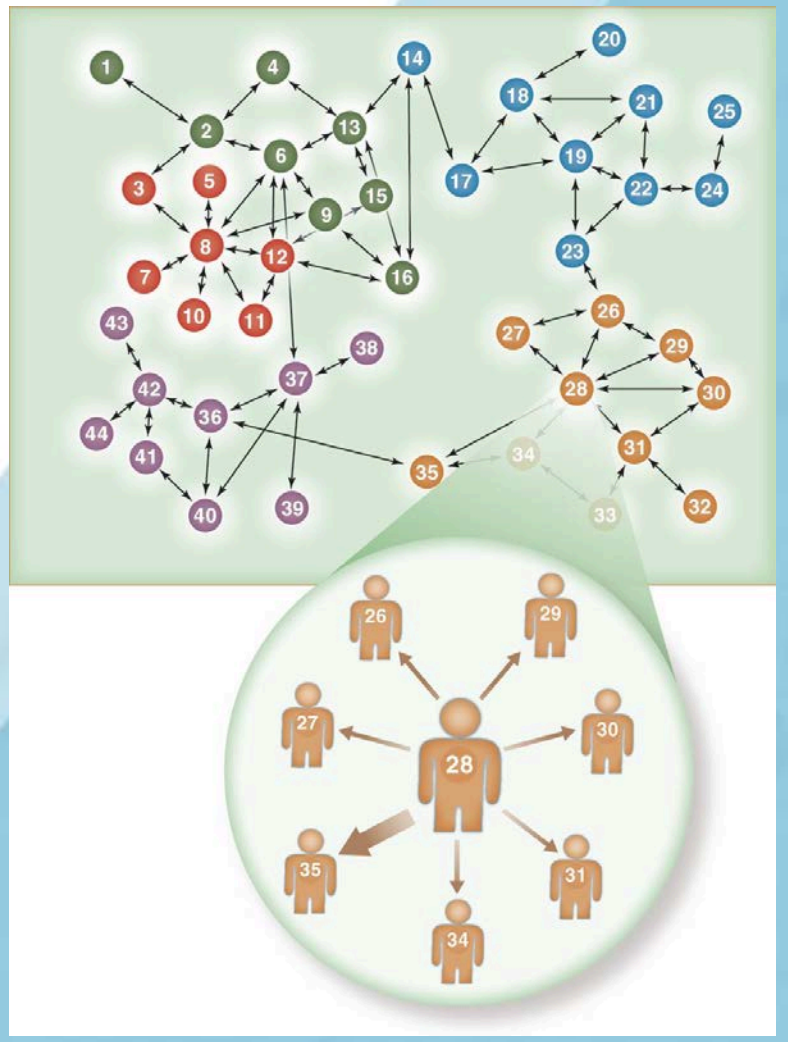
Hoomans & Severens (2014); Raghavan et al. (2018); Saldana et al. (2014); Vale et al. (2007)

New Strategies: Network Interventions

Hypothetical network used to illustrate intervention techniques.



Network segmentation, with each group represented by a distinct color (top).



Thomas W. Valente Science 2012;337:49-53

New Strategies: Adaptive Interventions

Goal: Implement and evaluate practical, scalable, evidence based tobacco cessation strategies among populations most impacted by tobacco use

Partnerships

Utah FQHCs (11 systems; 33 clinics)

Utah Tobacco Quit Line

Utah Department of Health

- Reallocated their tobacco control resources to provide prescription meds

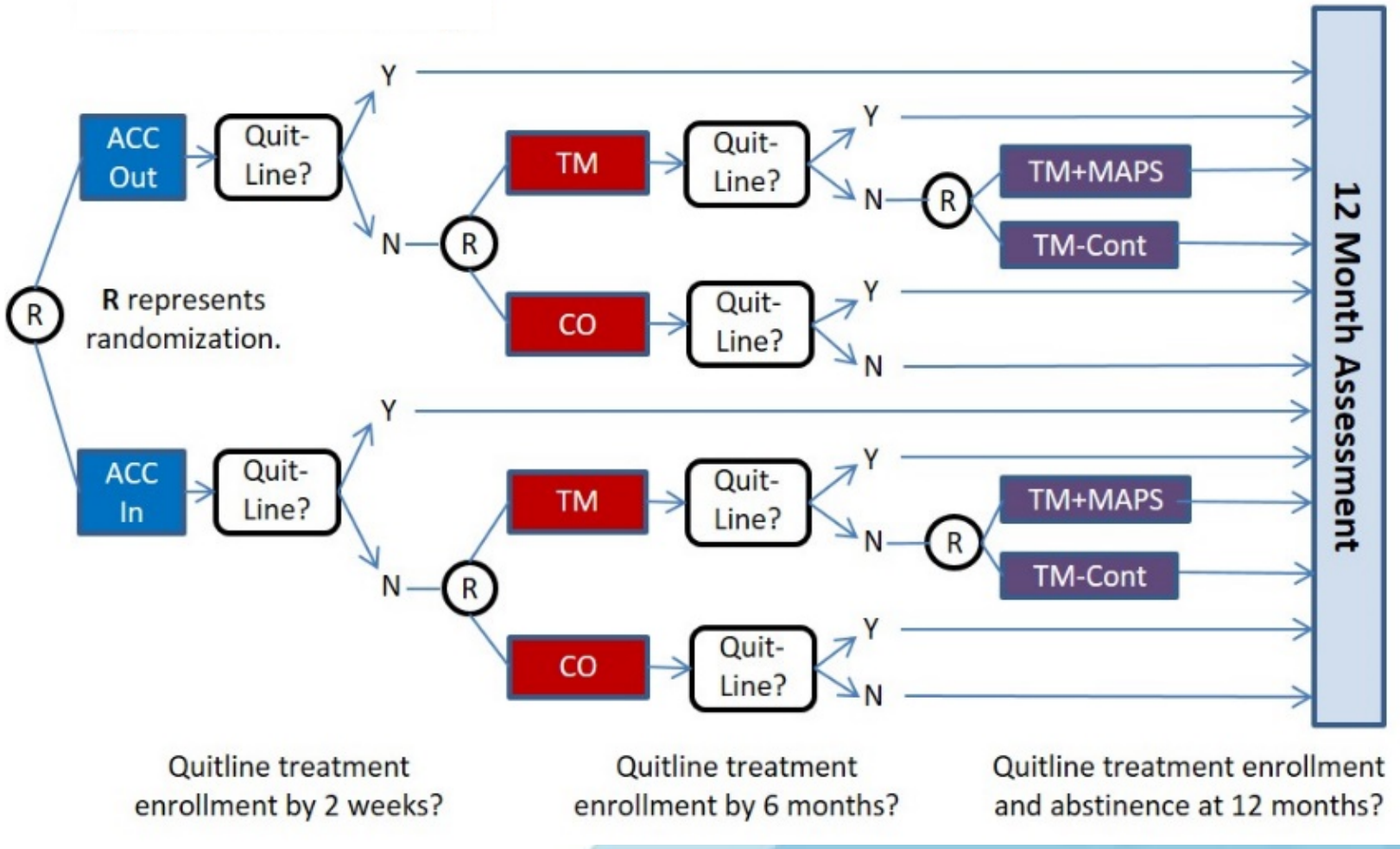
Association for Utah Community Health (AUCH)

- AUCH tobacco control staff member works 80% time on QuitSMART Utah at Center for HOPE

QuitSMART Utah

PCORI Pragmatic Clinical Trial

SMART: Sequential Multiple Assignment Randomized Trial



Clinic-Level Randomization: Phase 1

- AAC Out = Ask, Advise, Connect – Opt Out
- AAC In = Ask, Advise, Connect – Opt In

Patient-Level Randomization: Phase 2

TM = Text Messaging; CO = Connect Only

Patient-Level Randomization: Phase 3

- TM+MAPS = Text Messaging Continued + Navigation
- TM-Cont = Text Messaging Continued

New Strategies: Advancing Precision Medicine with mHealth: Increasing Effectiveness and Reach

Precision Medicine: Takes into account ***individual variability*** *in* ***genes, environment, and lifestyle*** for each person

Just-In-Time Adaptive Interventions (JITAIs)

- Real time, real world, precision tailored interventions
- Integrated into healthcare systems focused on underserved populations

Assessment Approaches

- Streaming physiology via on-body sensors
- Streaming GPS/GIS
- Ecological Momentary Assessment (EMA)

What is De-Implementation?

De-Implementation Research: Study of how to remove, replace, reduce (frequency and/or intensity) or restrict use of ineffective, untested, harmful, overused, inappropriate, and/or low-value health services and practices delivered to patients by health care providers and health systems.

1. **Ineffective**: Empirical evidence demonstrates that intervention does not work.
2. **Contradicted**: More recent, higher-quality empirical evidence indicates that intervention does not work.
3. **Mixed**: Quality and quantity of evidence is equal in support of and against use of intervention.
4. **Untested**: Little to no empirical evidence about intervention.




Norton, Kennedy, & Chambers, 2017; Norton, Chambers, & Kramer, 2019

Following slides on deimplemention curtesy of Wynne Norton, NCI

Improvements in dissemination requires:

- Shift the academic culture and incentives to include a greater focus on linking scientists with research users
- Enhance expectations from funders of research for more consistent and intentional dissemination.
- Identify and emphasize related incentives for dissemination in other organizations with a stake in dissemination (eg, creative approaches among publishers).
- Design studies in a way that emphasizes dissemination early in the research process through involvement of stakeholders.
- Track impact with metrics that focus on use of research outside of academe.

Brownson RC, Eyler AA, Harris JK, Moore JB, Tabak RG. Getting the Word Out: New Approaches for Disseminating Public Health Science. *J Public Health Manag Pract*. 2018;24(2):102–111.

Summary

- There is much to learn about how we can bridge the gap between cancer control research and practice.
- It is critical to consider the dynamic and complex cancer control system as we move from discovery to delivery and use the advances in systems thinking and other tools to do so.
- Implementation science can help bridge the gap by:
  - building an actionable and pragmatic knowledge base to help understand determinants of implementation and dissemination;
  - and developing strategies to accelerate and improve scale up and spread of effective cancer control research innovations.

Acknowledgements

David Chambers, PhD, National Cancer Institute

Wynne Norton, PhD, National Cancer Institute

Brian Mittman, PhD, Kaiser Permanente

Byron Powell, PhD, Washington University