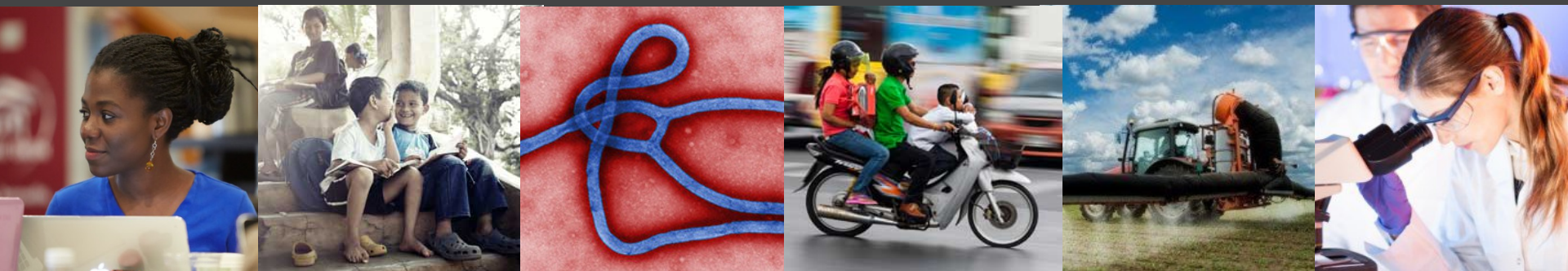


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Powerful ideas for a healthier world



**Dissemination, Implementation and
De-Implementation in Disease Prevention**

Karen M. Emmons, Ph.D.
Professor of Social and Behavioral Science

Columbia University School of Public Health, April 27, 2018

Key Points

- We have more knowledge about disease prevention than we use
- Understanding the drivers and context of variation is critical to improve uptake of scientific evidence
- D & I study designs focus on real-world settings and external validity
- Share examples of implementation science studies designed to increase uptake of evidence-based interventions



What We Know about Prevention... and What We Do



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More than half of cancers can be prevented and mortality reduced by applying existing knowledge

- *Colorectal Cancer*: Screening yields 30-50% reduction in incidence and mortality
- *Cervical cancer*: Screening yields 95% reduction in mortality; vaccines yield 100% reduction
- *Breast cancer*: Screening yields 30% reduction in mortality; Salpingo-oophorectomy and selective estrogen receptor modulators further reduce risk among high-risk women
- *Lung cancer*: USPSTF guideline recommendations yield 20-90% reduction in mortality

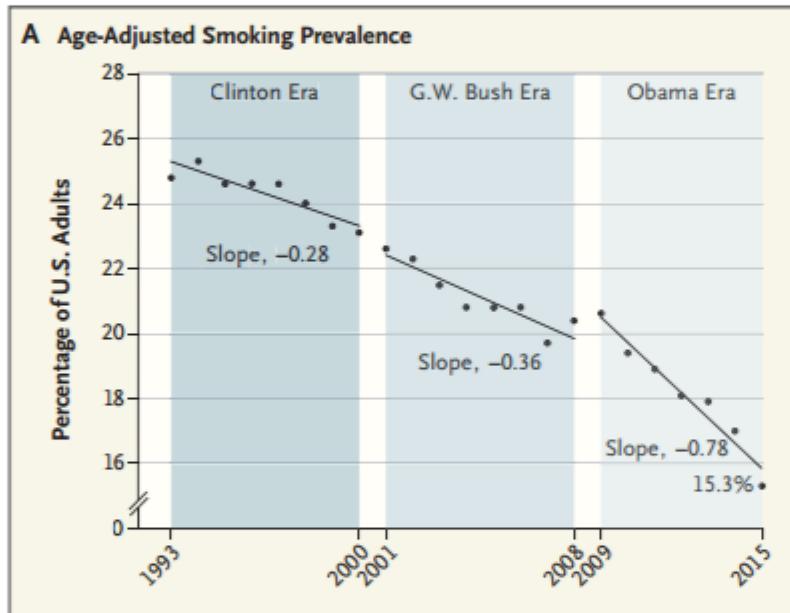
Emmons & Colditz, NEJM, 2017



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Tobacco Use in the US



Trends in Smoking Prevalence among U.S. Adults.

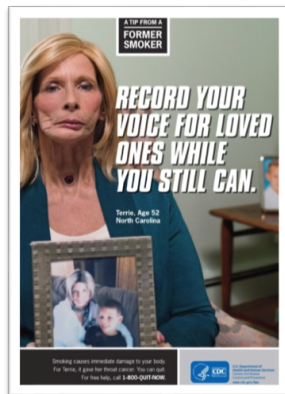
Panel A shows age-adjusted prevalence by year, from 1993 through 2015. Data are from the National Health Interview Survey.¹ Panel B shows the estimated trajectories, which are based on the slopes from relevant past periods, from 2015 forward.

- Obama Era Federal “Interventions”:
 - Tobacco treatment a free essential benefit under ACA
 - Raised federal excise tax to \$1.01/pack
 - FDA authority to regulate tobacco products
 - 1st federally funded anti-tobacco media campaign
- Significant state and local “interventions”

We Need to Implement the Full Range of Evidence – for Everyone

Media Campaigns and Labelling Requirements

- *Impact*: Implementation of GWLs in Canada reduced smoking rates by 12-20%;
- Advertising bans reduce smoking prevalence by 6%
- Counter ads are critically important
 - 1st US federally funded national mass media campaign (2012);
 - In 3 years, 5 M smokers made quit attempt; 300K quit for good
 - highly cost-effective; cost \$393 per year of life saved.



CDC



The Truth Initiative



FDA

Saffer & Chaloupka, 2000.
Huang, Chaloupka, Fong, 2014.



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IN 2000, **23%** OF TEENS SMOKED.

TODAY, ONLY **9%** OF TEENS SMOKE.

THAT'S LESS THAN THE NUMBER
OF VHS TAPES SOLD IN 2013.

**WE CAN
FINISH
SMOKING.
FOR GOOD.**

3%

**WE CAN BE THE GENERATION
THAT ENDS SMOKING.**

FINISH IT 

**ENLIST AT
THETRUTH.COM**



**DON'T GET PLAYED
WHILE BIG TOBACCO
GETS PAID**



Evans, et al, 2018;
Vallone, et al, 2017

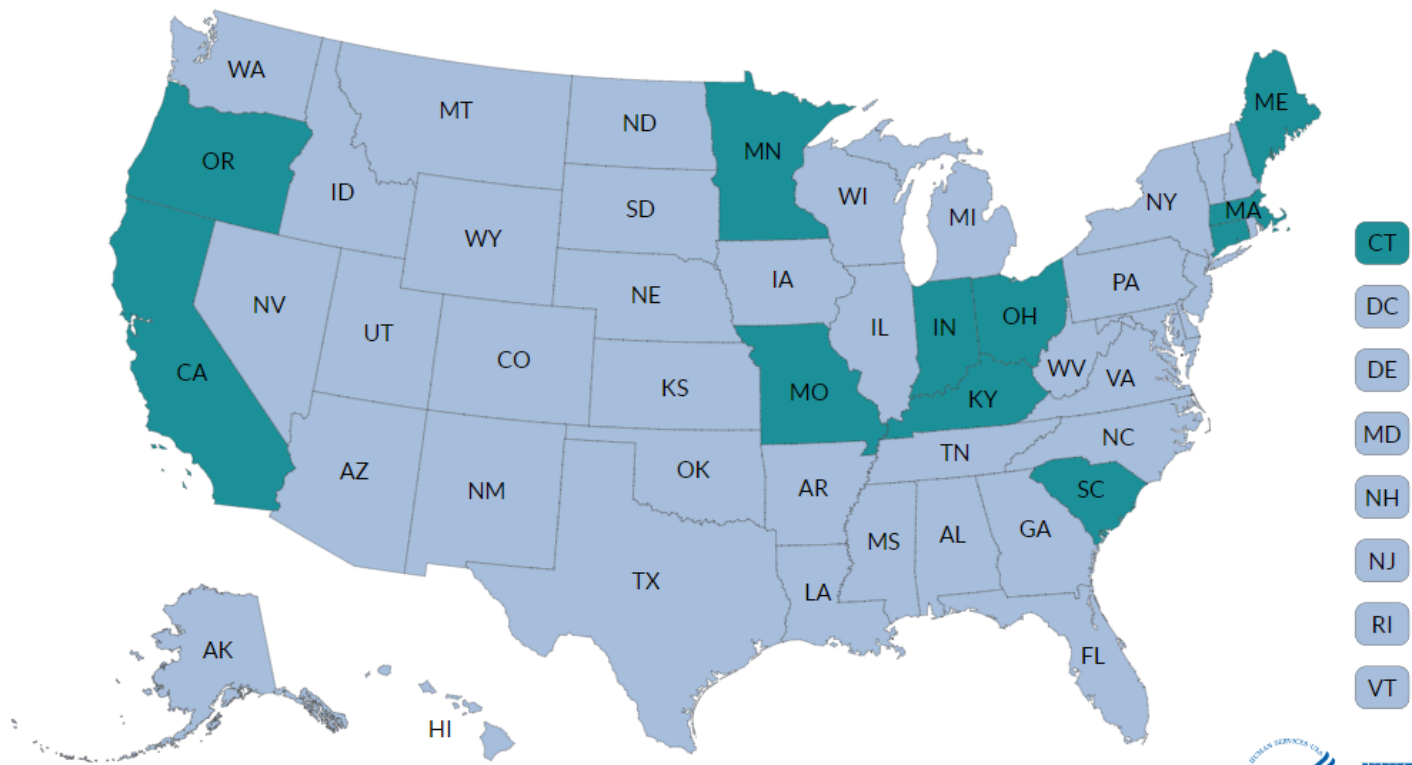


We Need to Implement the Full Range of Evidence – for Everyone

Medicaid Coverage of Cessation Treatments (Lung Association Cessation Coverage) (In effect as of December 31, 2017)

About This Map

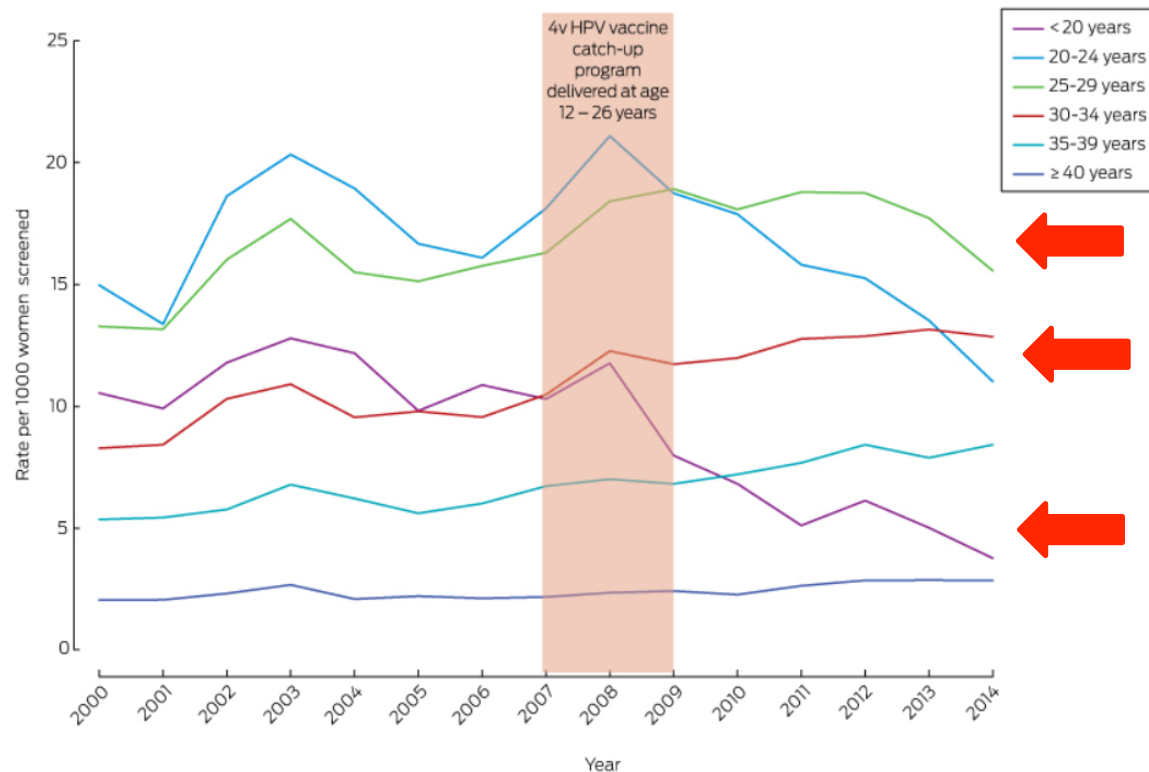
-  Comprehensive Coverage
-  Less Than Comprehensive Coverage



What Happens When We Do What We Know? HPV Vaccination in Australia

- Mandatory school-based administration and free vaccine introduced in 2007
- By 2015 (age 15):
 - Girls: 83% had 2 doses
77% had 3 doses
 - Boys: 74% had 2 doses
66% had 3 doses

Box – Trends in prevalence rates of high-grade histologically confirmed cervical abnormalities* diagnosed in Victorian women, by age group, 2000–2014



Dissemination and Implementation Science— How to Do More of What We Know



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Fairy Tales We Wish Were True....



- Best practice recommendations are self-implementing, and will spread spontaneously
- Dissemination (leading to awareness) is necessary *and* sufficient for adoption
- Innovations that are effective in small samples will be effective in large samples
- Conventional research is sufficient to assess benefit and guide implementation decisions
- Publication of findings from conventional implementation studies is sufficient to achieve societal benefit

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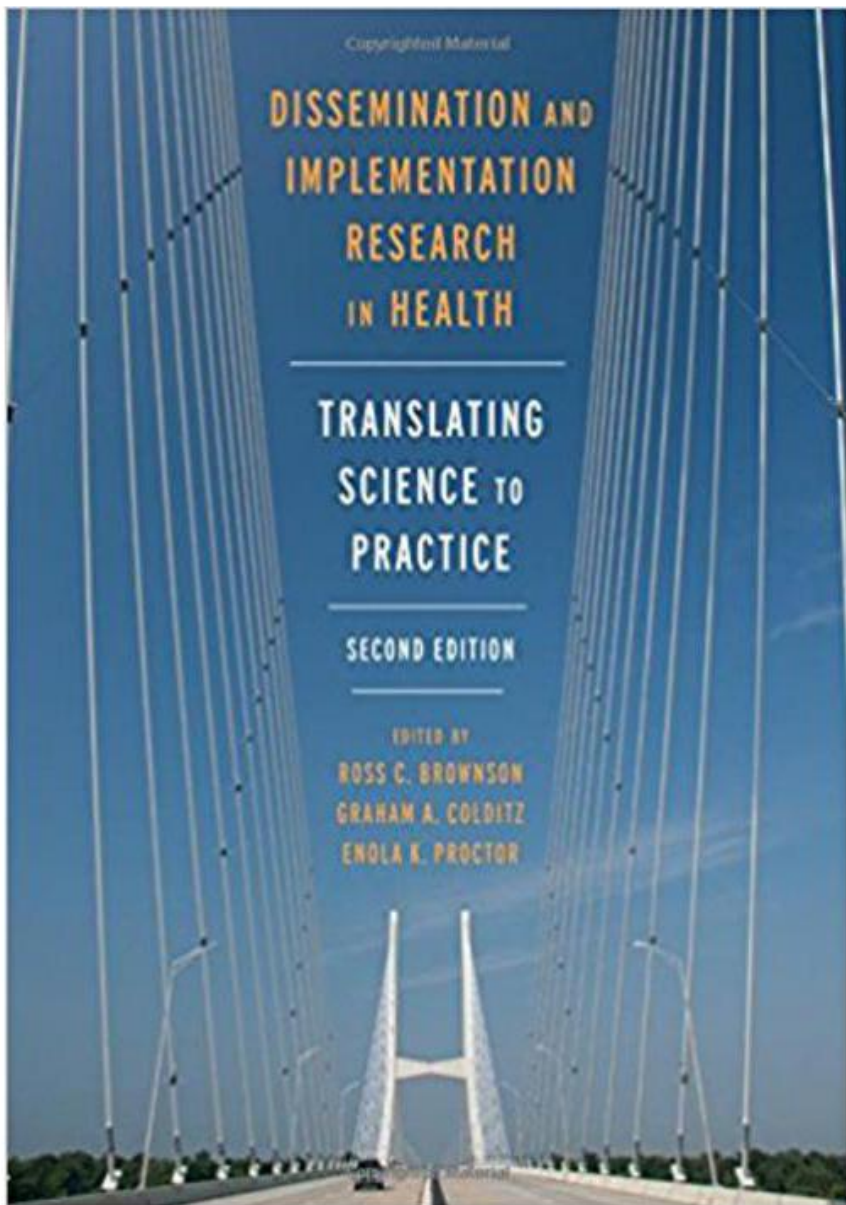
DISSEMINATION AND
IMPLEMENTATION
RESEARCH
IN HEALTH

TRANSLATING
SCIENCE TO
PRACTICE

SECOND EDITION

EDITED BY

ROSS C. BROWNSON
GRAHAM A. COLDITZ
ENOLA K. PROCTOR



Dissemination Science

- Study of factors that lead to widespread use of EBIs
- Focus is on intervention characteristics and methods to enhance EBI uptake



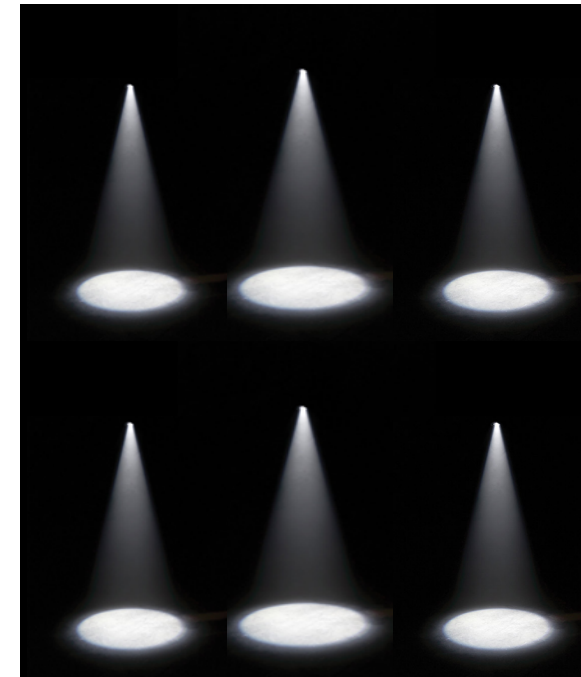
Implementation Science

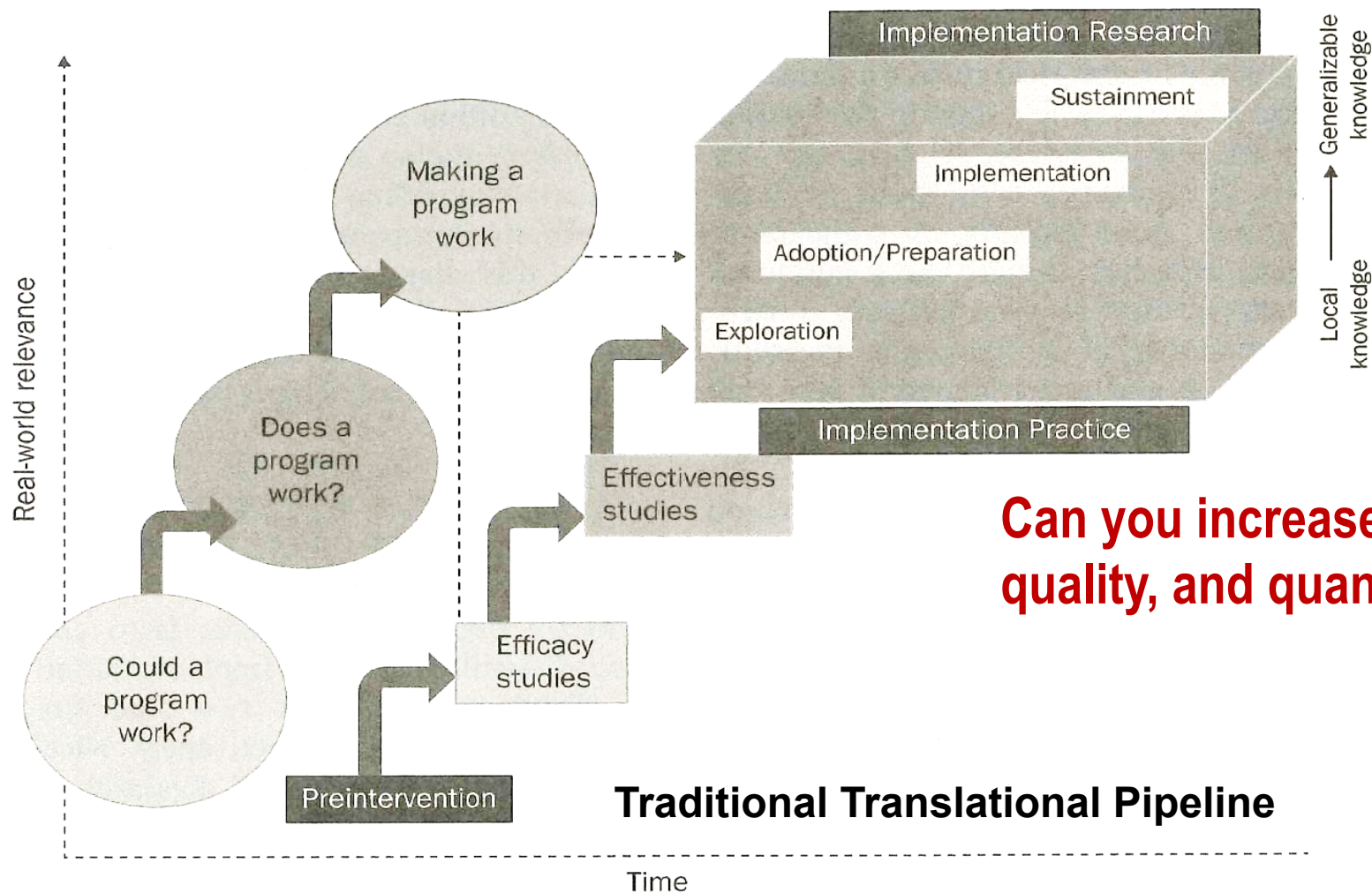
- Understands the processes and factors that lead to successful integration of EBIs in a particular setting
- Assesses whether core intervention components were faithfully incorporated into the real-world setting
- Adaptation of the EBI to the local context



Scale-Up

- Deliberate efforts to expand adoption from pilot/limited sites
- Moves beyond local implementation





Can you increase speed, quality, and quantity??

FIGURE 13.1 Stages of research and phases of dissemination and implementation.

(Adapted from “Figure 11-1 Stages of research in prevention research cycle” in Chapter 11: Implementation and Dissemination of Prevention Programs (2009) in National Research Council and Institute of Medicine. Preventing Mental, Emotional, and Behavioral Disorders among Young People. Washington DC: The National Academies Press, p. 326 and Brown CH, et al. (2017). An Overview of Research and Evaluation Designs for Dissemination and Implementation. Annual Rev Public Health. 2017; 38:1–22.)

Theoretical Approaches in Implementation Science

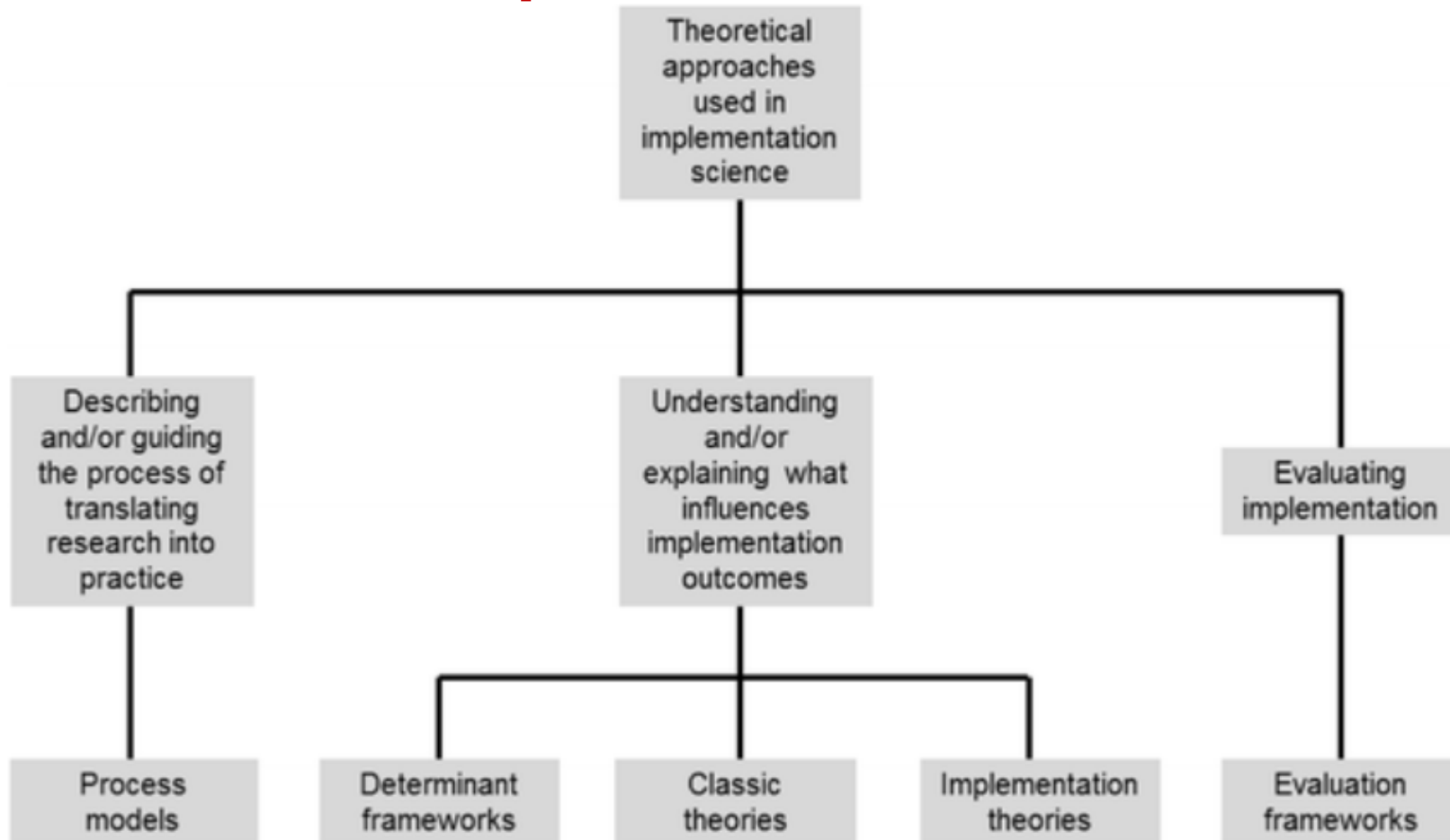
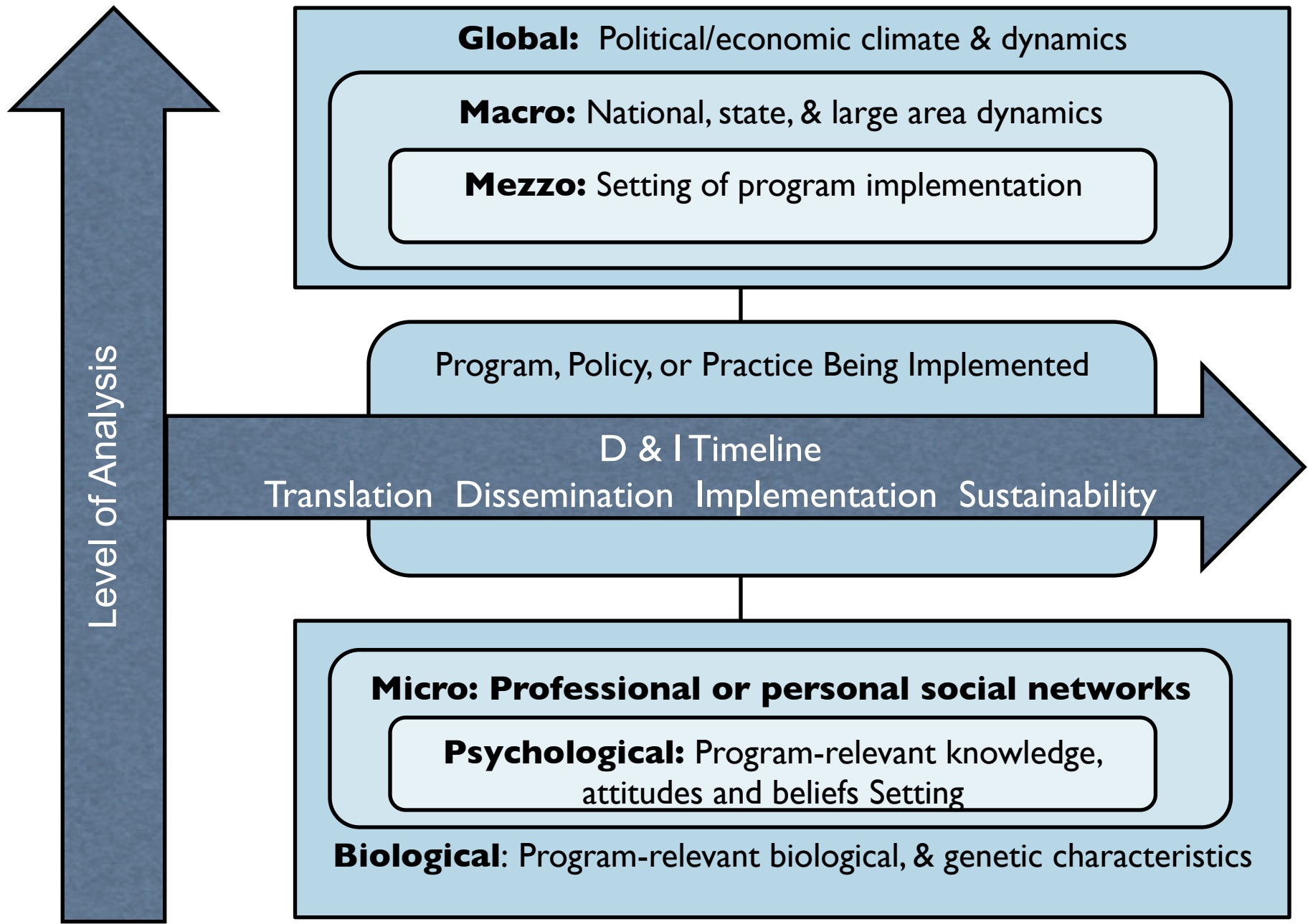


Figure 1

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



Study design rises out of epistemology

- Epistemology – How do we know what we know?
- Fundamental study design characteristics that allow us to connect observations to inference
 - *Reliability* – consistency and accuracy of measurement
 - *Internal validity* - the extent to which a causal conclusion based on a study is warranted
 - *External validity* - to what populations, settings, treatment variables, and measurement variables can an effect be generalized
- Multi-level approaches are key in D & I research



Reliable
Not Valid



Low Validity
Low Reliability

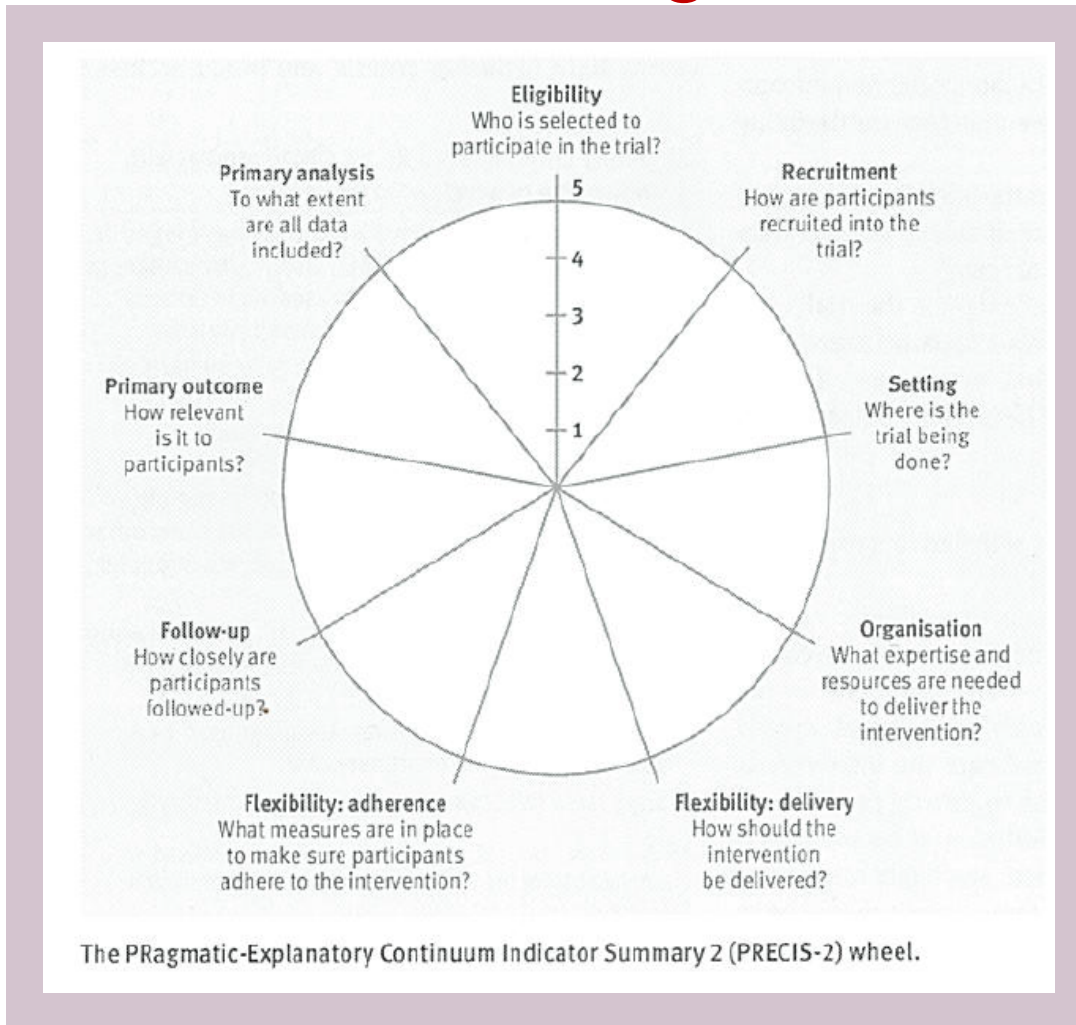


Not Reliable
Not Valid



Both Reliable
and Valid

Pragmatic Trials



➤ Maximize the applicability of the intervention to usual care across a wide range of local and distant settings

➤ Less focused on highly specialized care settings

Loudon, et al, BMJ, 2015



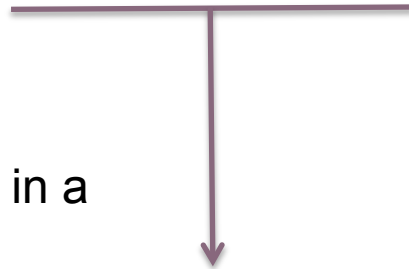
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Selecting D & I Research Designs

What question are you asking?

- How an intervention works in a new setting
- How adaptations influence uptake
- How to increase organizational adoption
- How to sustain intervention use



What type of evidence do you need?

- Effective interventions
- Feasibility, Sustainability
- Contextualized effects
- Unintended consequences
- Generalizability/external validity
- Stakeholder acceptance
- Cost-effectiveness
- Implementation priorities
- Strategic planning



Hybrid Implementation Designs

Clinical research -----> Implementation research



Hybrid type I

Test clinical intervention while gathering information on implementation

Hybrid type II

Test clinical intervention while studying implementation strategy

Hybrid type III

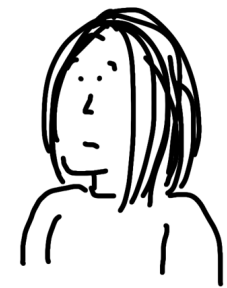
Test implementation strategy while gathering information on clinical intervention



Experimental/Quasi-Experimental Designs

- Randomized controlled trial (RCT)
- Practical/Pragmatic Clinical Trial (PCT)
- Stepped-wedge design
- Interrupted time series (ITS)
- Hybrid/Implementation Effectiveness Designs

Do you know about any RCTs that provide evidence that we should use RCTs?



freshspectrum.com

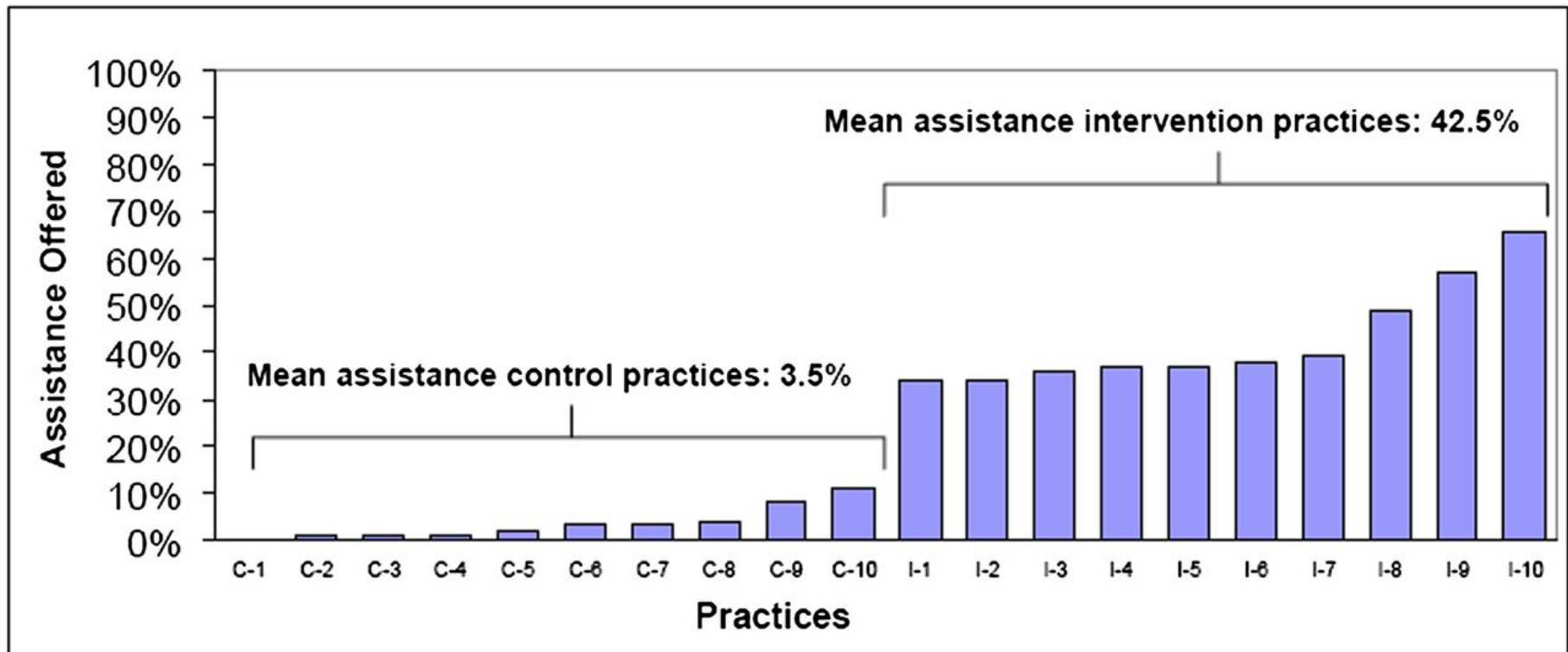
Mercer SL, DeVinney BJ, Fine LJ, Green LW, Dougherty D.. Am J Prev Med. 2007 Aug;33(2):139-154.
Curran, et. al. Effectiveness-Implementation Hybrid Designs. Med Care 2012.



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Implementation RCT: Tobacco Control Assistance for Parental Smokers in Pediatric Practices



Pragmatic Trial: Healthy Eating and Active Living Taught at Home (HEALTHY)

- Weight management intervention embedded in national home visiting program, delivered by parent educators
- Overweight or obese mothers of preschool children located across St. Louis, Missouri,
- Twice as many women in Ix group achieved 5% target at 24 months
- 4.7 Kg difference in weight at 24 months

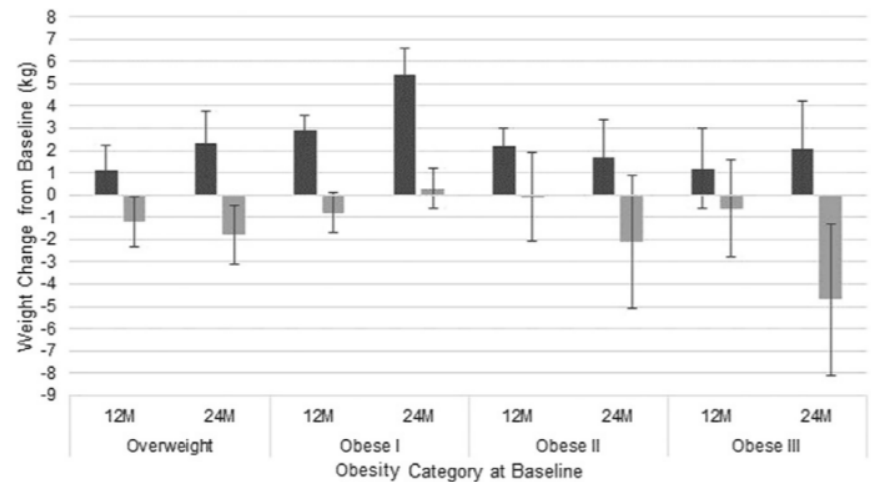


Figure 2. Mean weight change from baseline with SE bars by obesity category for each treatment group.

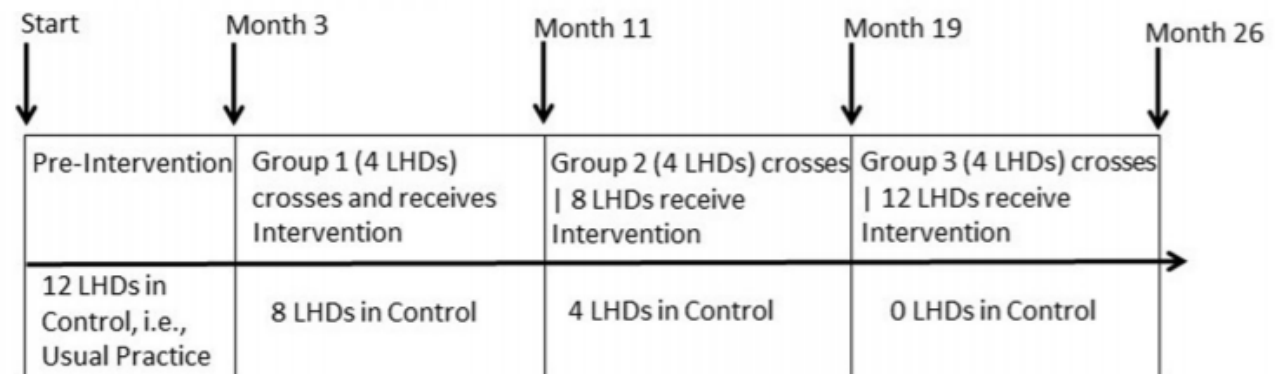
Note: Black bars = usual care; gray bars = intervention. www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html.

Stepped Wedge: Enhancing EB- Diabetes and Chronic Disease Control in Health Departments

	Months 1-2	Months 3-10	Months 11-18	Months 19-26
Group 1 (4 LHDs)				
Group 2 (4 LHDs)				
Group 3 (4 LHDs)				

Parks, Tabak, et al., 2017

Shaded cells represent intervention periods.
Clear cells represent control periods.



Baseline measures for all clusters are taken during the pre-intervention period.
Groups crossover from control to receive intervention activities with measurements at 8-month intervals.
The intervention period varies from 8 months (group 3) to 24 months (group 1).

ig. 3 a Phase 2 stepped wedge study design. b Stepped wedge implementation during study

Maternal Health Financing Policy Implementation- Ghana

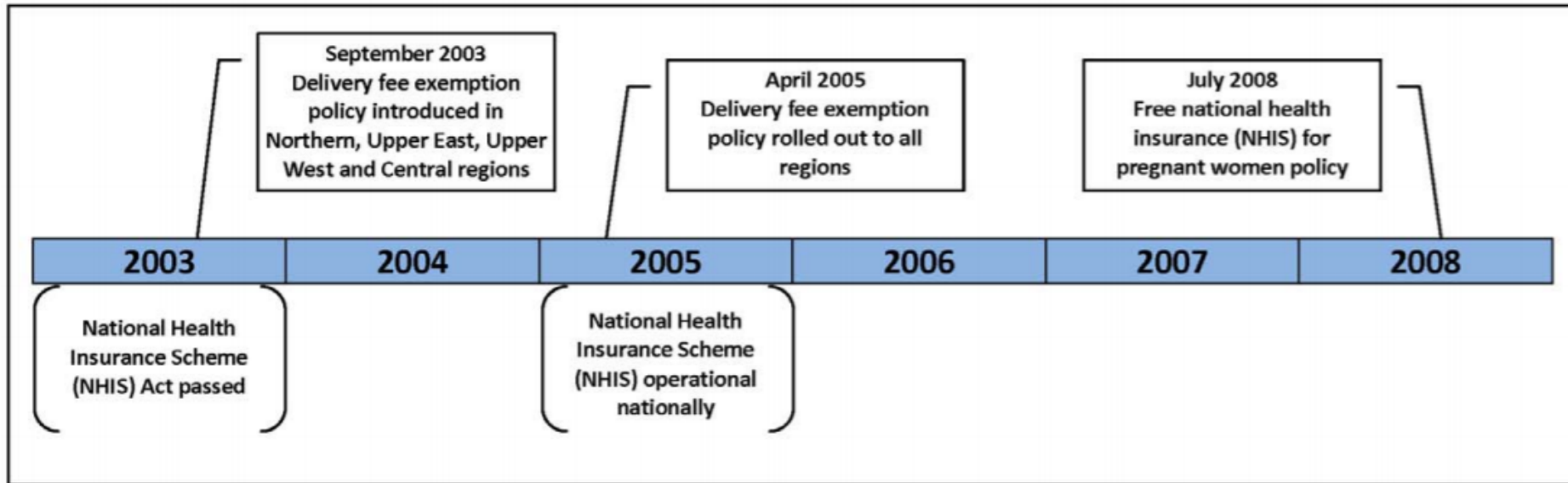
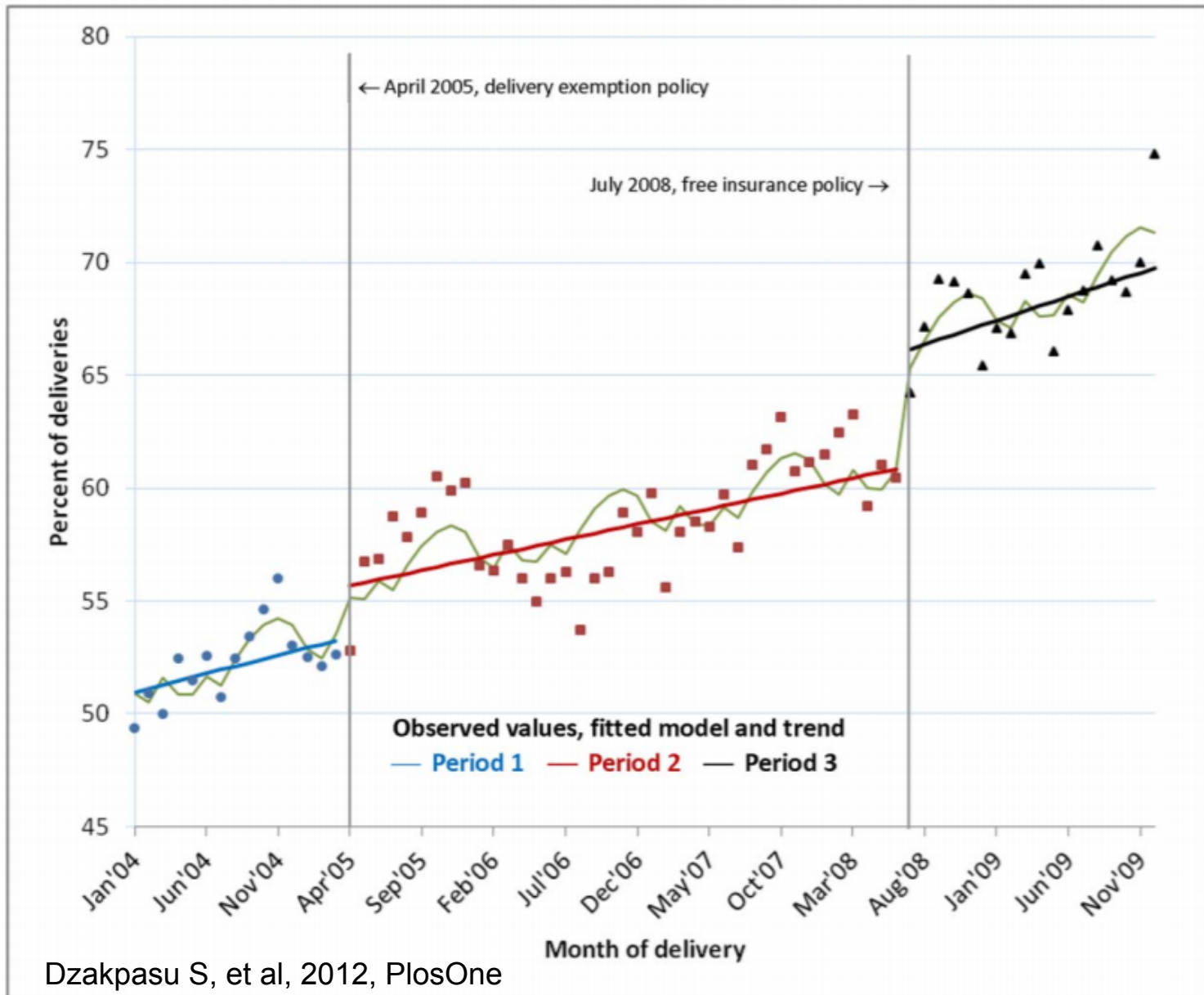


Figure 1. Timing of Ghana's recent maternal health financing policies. Ghana introduced a delivery fee exemption policy in September 2003, which was rolled out to all regions in April 2005. This policy was followed by free national health insurance for pregnant women in July 2008. doi:10.1371/journal.pone.0049430.g001

Facility-Based Deliveries- Ghana



What is De-Implementation?

- Ending harmful practices
- Reducing use of ineffective practices, or those that offer no benefit over less invasive practices
- Reduce use of one practice while increasing uptake of another



The U.S. Preventive Services Task Force's draft recommendations on screening for prostate cancer



For men 55–69, the decision to receive PSA-based screening should be between the clinician and the patient and include a complete understanding of all potential harms as well as benefits, and incorporate the patient's values and preferences. (C grade)



For men 70 and older, the U.S. Preventive Services Task Force recommends against PSA-based screening because the potential benefits do not outweigh the harms. (D grade)



ABSTRACT

Objectives. The purpose of this study was to determine temporal trends in breast-conserving surgery in California from 1988 through 1995.

Methods. Logistic regression was used to analyze data on 104 466 cases of early-stage breast cancer reported to the California Cancer Registry.

Results. A monotonically increasing trend in breast-conserving surgery was detected after adjustment for age, race/ethnicity, stage at diagnosis, and neighborhood education level. Breast-conserving surgery increased at similar rates among all racial/ethnic groups. Older age, Asian or Hispanic race/ethnicity, late-stage diagnosis, and residence in an undereducated neighborhood were factors associated with lower use of breast-conserving surgery.

Conclusions. Although disparities are evident, use of breast-conserving surgery increased steadily in all groups examined in this study. (*Am J Public Health*. 2000;90:281–284)

On the basis of results of retrospective studies and randomized clinical trials conducted during the 1980s, the 1990 National Institutes of Health Consensus Conference¹ recommended breast-conserving surgery as an appropriate therapy for most women with stage I and stage II breast cancer. This recommendation was reaffirmed in 1995 after the exclusion of questionable data from one of the key clinical trials on surgical treatment of breast cancer.²

Temporal trends in the use of breast-conserving surgery have been described for different geographic areas of the United States.^{3,4} In recent years, steady increases in the use of such surgery have been reported. For example, one study showed that in the Detroit metropolitan area, the percentage of women with localized breast cancer who were undergoing breast-conserving surgery increased from 4% in the 1973 to 1977 period to 39% in the 1988 to 1992 period.⁵ That study, however, included only White and Black women. A recent population-based study conducted in Con-

Methods

Study Population

This study included 104 466 women with early-stage breast cancer (first primary tumors only, histologically confirmed stage 0, I, or II) diagnosed in California from 1988 through 1995. The women had undergone either a mastectomy or breast-conserving surgery during their first course of treatment. Data were derived from the California Cancer Registry, which is considered to have complete statewide coverage; details on its operation and reporting regions have been published elsewhere.^{6,11}

Definition of Variables

Surveillance, Epidemiology, and End Results program extent of disease codes were converted to the American Joint Committee on Cancer staging system.¹² Age at diagnosis was grouped to represent premenopausal women (0–49 years), postmenopausal women before eligibility for Medicare (50–



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The Importance of Including Stakeholders— De-Implementation of Essential Health Benefits

CNN politics

Their gripe? The photo featured no women, even though lawmakers were discussing Republicans' health reform proposal -- and members of the House Freedom Caucus want to strip a requirement that health insurance plans cover essential benefits including coverage for maternity services.

"Appreciated joining @POTUS for meeting with the Freedom Caucus again today. This is it.
#PassTheBill"



Senator Patty Murray 
@PattyMurray

 Follow

A rare look inside the GOP's women's health caucus.
twitter.com/VP/status/8449...

3:58 PM - 23 Mar 2017

  7,844  13,768



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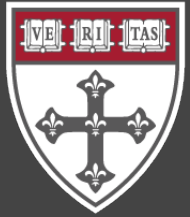
**‘Knowledge without practice is useless.
Practice without knowledge is dangerous.’**

Confucius



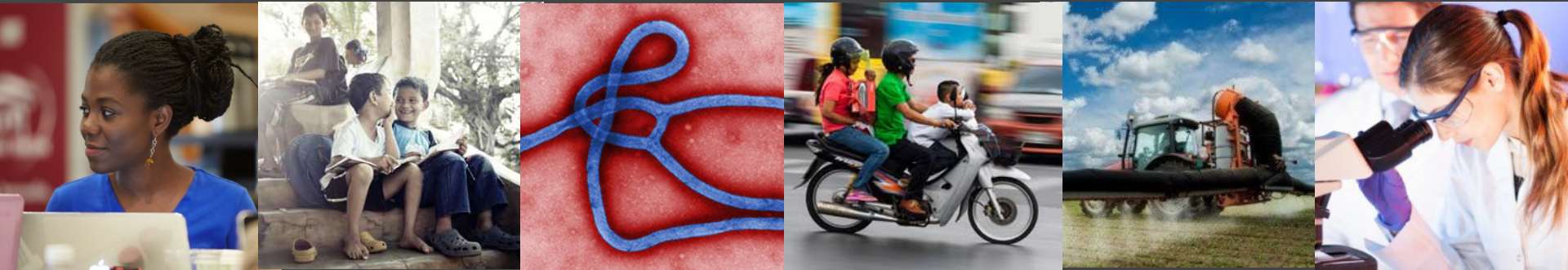
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Thank You!