



Introduction to Implementation Science

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Acknowledgements

- Juan Villamar
- JD Smith
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Outline

- Basics of Implementation Science
 - Definitions
 - Why its needed

- Implementation Science Methods
 - Frameworks, Strategies, Outcomes
 - Partnerships

Definitions

- **Implementation Science** is the study of methods to promote the integration of evidence-based interventions (EBI) into healthcare/public health practice and policy¹
 - **Methods:** Frameworks, Strategies, Outcomes, Metrics/Measures, Design
 - **Frameworks** are graphical or narrative representations of the key factors, concepts, or variables that explain the phenomenon of implementation ²
 - **Implementation strategies** are methods or techniques used to enhance the adoption, implementation, and sustainability of an EBI, program or practice³

- **Implementation research** is the scientific study of the use of strategies to adopt and integrate EBIs in real-world settings to improve patient outcomes and population benefit¹

- **Implementation** is the use of strategies to adopt and integrate EBIs ¹

Source: ¹National Institutes of Health. (2010). Dissemination and implementation research in health. Retrieved from <http://grants.nih.gov/grants/guide/pa-files/PAR-10-038.html>; ²Moullin J, et al. A systematic review of implementation frameworks of innovations in healthcare and resulting generic implementation framework. *Health Research Policy and Systems* 2015. 13:16; ³ Proctor E, et al. Implementation strategies: recommendations for specifying and reporting. *Implement Sci.* 2013; 8: 139;.

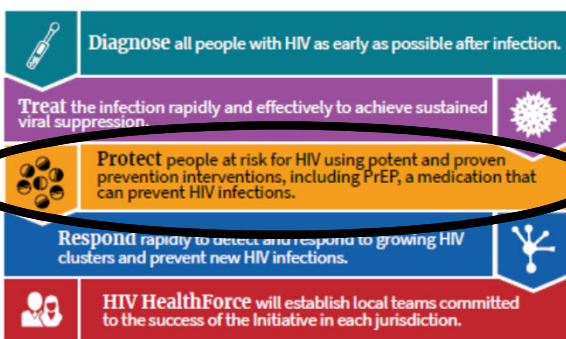
When defining implementation science, some very non-scientific language can be helpful...

- The intervention/practice/innovation is **THE THING**
- *Effectiveness* research looks at whether **THE THING** works
- *Implementation* research looks at how best to help people/places **DO THE THING**
- Implementation strategies are the stuff we do to try to help people/places **DO THE THING**
- Main implementation outcomes are **HOW MUCH** and **HOW WELL** they **DO THE THING**

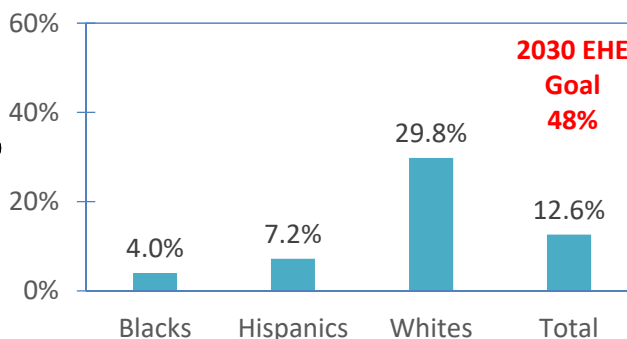
Source: Curran GM. Implementation science made too simple: a teaching tool. *Implement Sci Commun*. 2020;1:27. Published 2020 Feb 25. doi:10.1186/s43058-020-00001-z

Why do we need implementation science?

Charge: Ending the HIV Epidemic



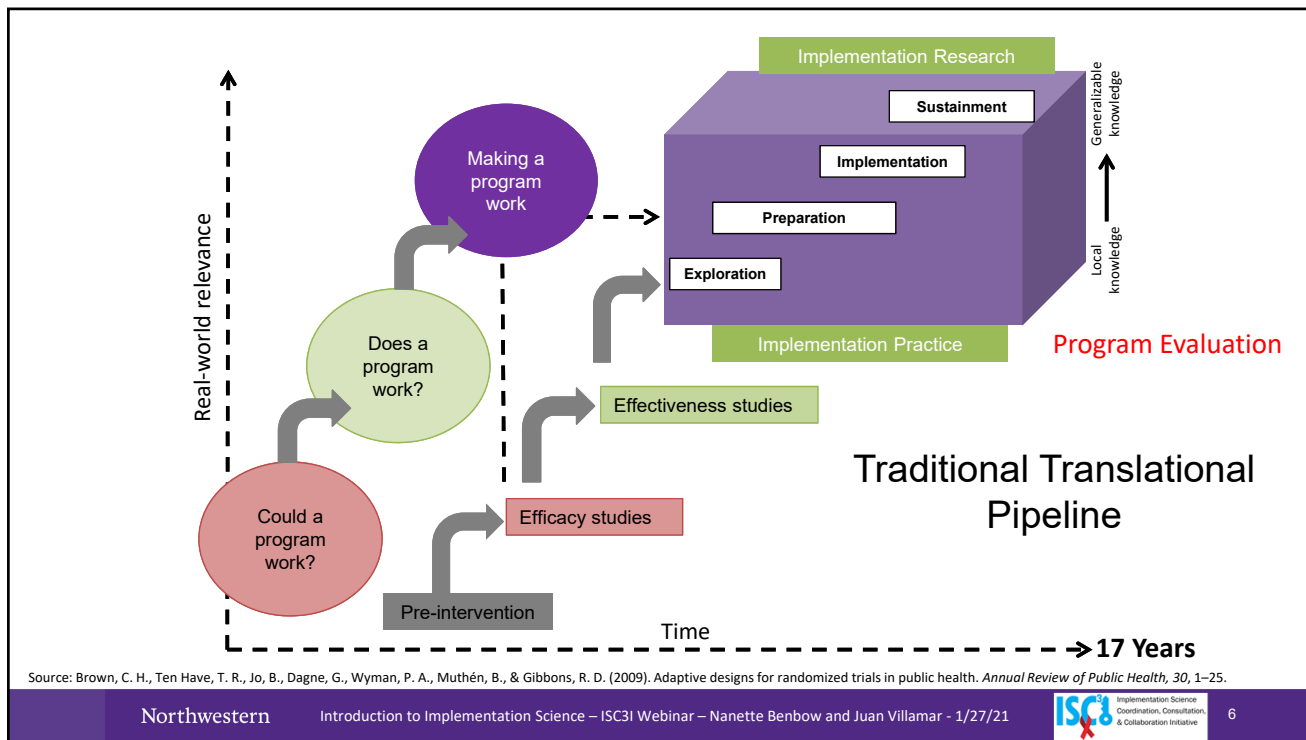
Where We Are Now: Estimated % of PrEP-Eligible Individuals Prescribed PrEP, US, 2017¹



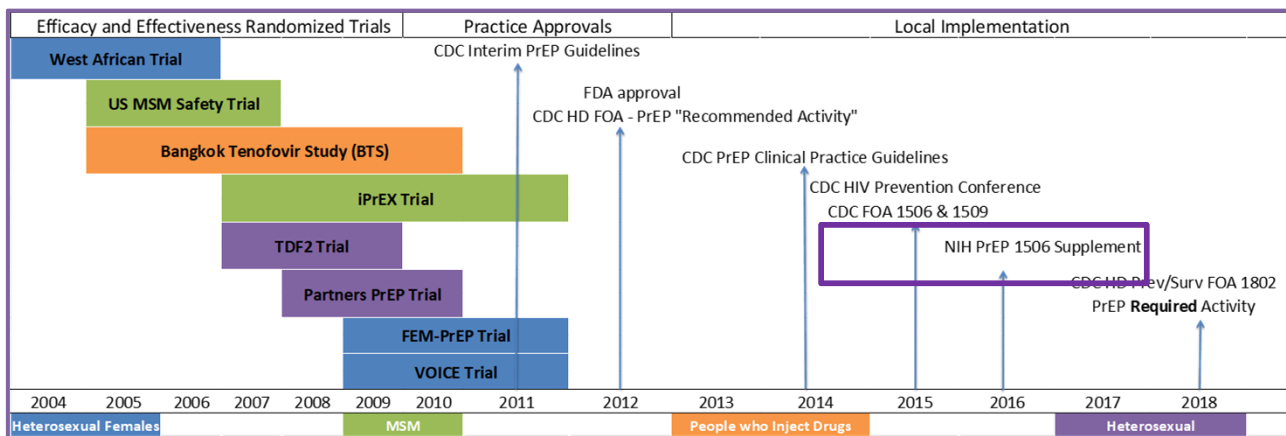
Increase beneficial impact of PrEP²

- Scale-out - adapt and implement EBIs across different settings and/or across different populations
- Scale-up - expand implementation of an EBI designed for one setting to other similar settings

Source: ¹America's HIV Epidemic Analysis Dashboard. <https://ahead.hiv.gov/about/>. ² Aarons G, Sklar M, Mustanski B, Benbow N. "Scaling-out" evidence-based interventions to new populations or new health care delivery systems. *Implementation Science* (2017) 12:111

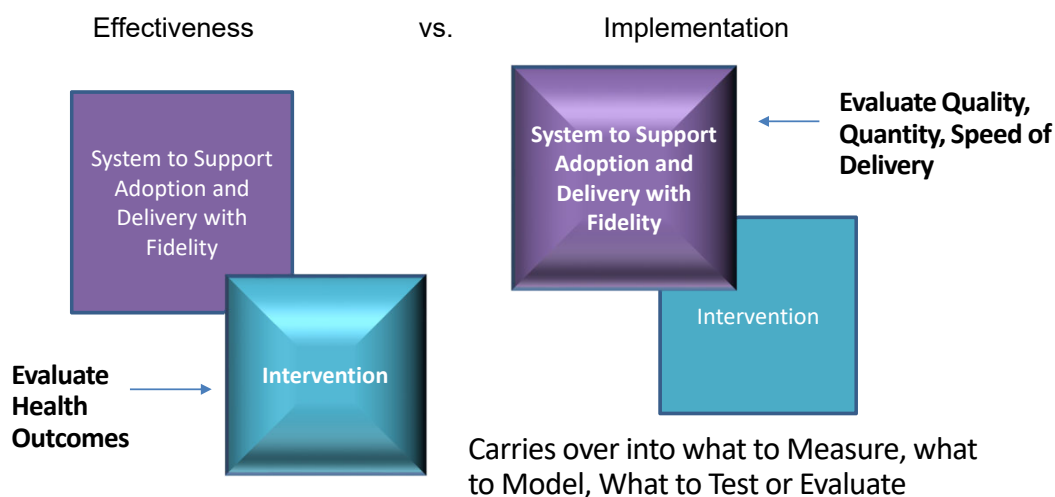


PrEP: Research to Practice Timeline 2004 - 2018



As of November 2016, there were 45 on-going (N=30) and planned (N=15) Open Label Demonstration and Implementation Projects (a total of 6 are in the U.S.). The populations of focus include: MSM (18 projects); Adolescents (13), female sex workers (6); transgender women (5); and heterosexuals (4).
 Source: AVAC, www.avac.org/pxrd.

Implementation Research Has a Different Emphasis Than Other Types of Research



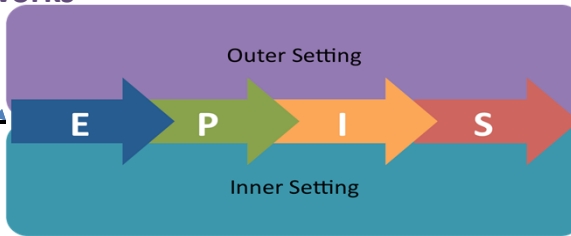
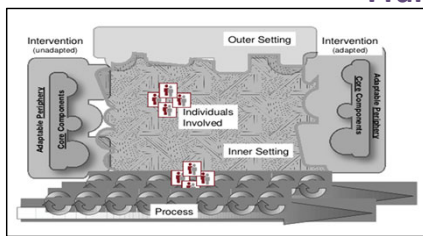
Illustrations of Implementation Research Questions

- What are the primary barriers and facilitators of implementing PrEP in Local Health Departments?
- Under what conditions does implementation of Strategy A work better, faster, more efficiently than Strategy B?
- What are the characteristics of research/service/community partnerships that are sustained over time?
- Does implementation of Strategy A or Strategy B more efficiently take PrEP to scale?

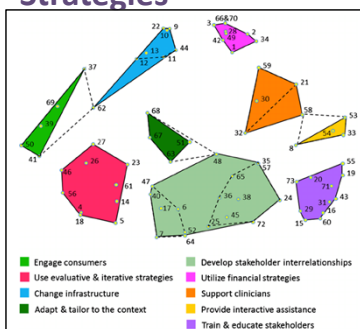
Proctor et al. 2012

Implementation Science Tools

Frameworks



Strategies



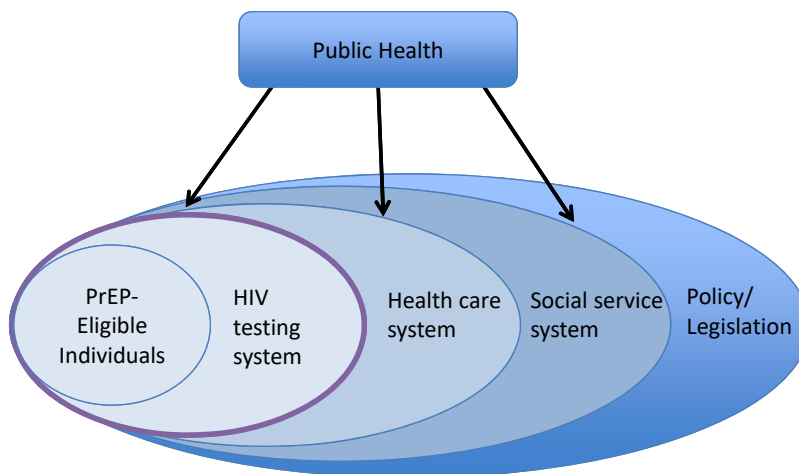
Outcomes



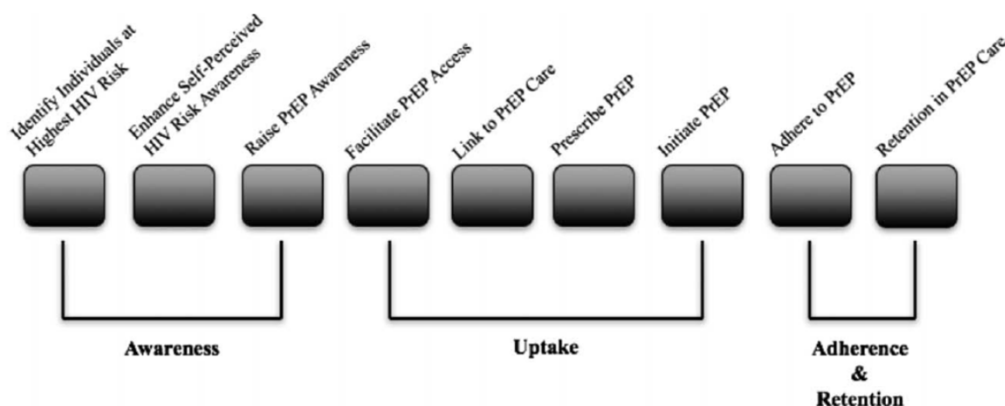
PrEP Implementation Settings & Systems

PrEP implementation can take place at various levels:

- National - Partnerships between national funders, state and local public health departments, associations, advocacy groups, researchers, and policy experts
- Local – City/Statewide through public health departments, community advocates and provider partnerships
- Clinic-based (e.g. **STD clinics**, family planning clinics, HIV primary care, FQHCs)



PrEP Continuum of Care



Source: Nunn, Amy S., Lauren Brinkley-Rubinstein, Catherine E. Oldenburg, Kenneth H. Mayer, Matthew Mimiaga, Rupa Patel, and Philip A. Chan. Defining the HIV pre-exposure prophylaxis care continuum. 2017 AIDS

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PrEP Implementation Readiness in Local Health Departments (LHD)

- 500 LHDs sampled in **2015**; 284 respondents
- 109 LHDs (38%) **currently** engaged in PrEP implementation; 81% operate an STD clinic:
 - Higher among LHDs serving a large population size (68%)
 - 45% expect to expand PrEP
- 175 LHDs (62%) not currently engaged in PrEP implementation; 58% operate STD clinic:
 - Higher among LHD serving a small (82%) or medium (68%) population size
 - 13% expect to initiate PrEP in next 4 year
 - 46% were undecided and 41% unlikely to initiate PrEP

Source: Weiss G, Smith D, Newman S, Weiner J, Kitlas A, Hoover K. PrEP implementation by local health departments in US cities and counties: Findings from a 2015 assessment of local health departments. PLoS ONE 13(7):e0200338.

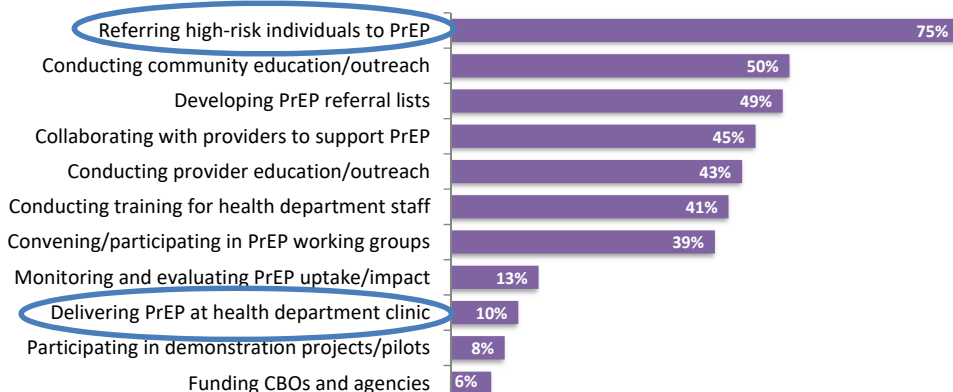
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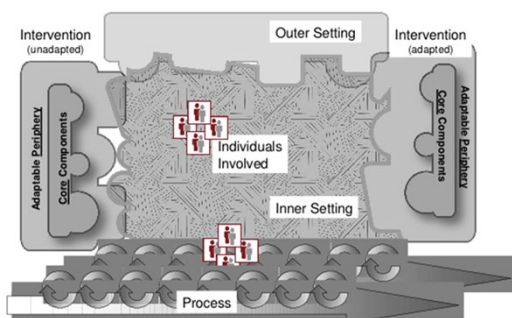
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PrEP Implementation Readiness - Among LHD currently engaged in PrEP implementation



Source: Weis G, Smith D, Newman S, Weiner J, Kitlas A, Hoover K. PrEP implementation by local health departments in US cities and counties: Findings from a 2015 assessment of local health departments. PLoS ONE 13(7):e0200338.

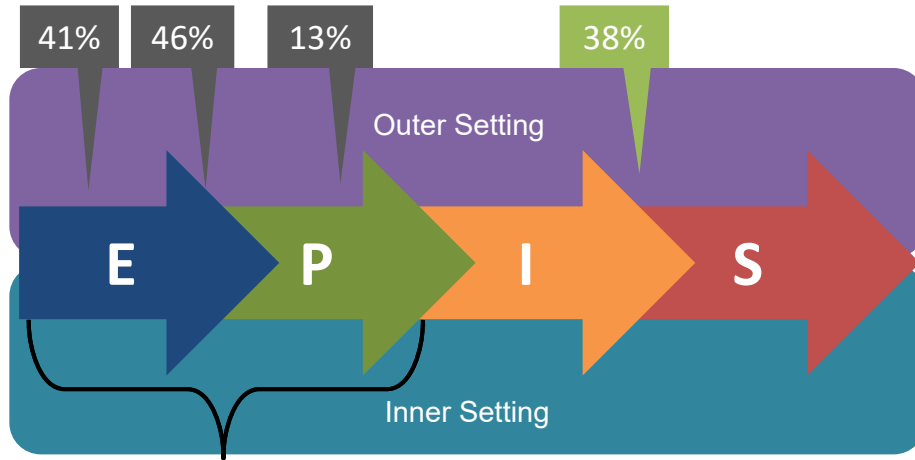
Consolidated Framework for Implementation Research (CFIR)



Source: Damschroder, L.J., Aron, D.C., Keith, R.E., Kirsh, S.R., Alexander, J.A. et al Lowery, J.C. (2009). Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. *Implementation Science*, 4: 50
www.cfirguide.org

- Characteristics of the intervention - steps required for individuals to move through PrEP Continuum
- Inner setting - factors that reflect what is happening within settings where PrEP will be implemented (e.g. staffing, policies and procedures, and organizational culture)
- Outer setting – external factors influencing implementation success (e.g. state laws dictating who can be offered PrEP (e.g. adolescents) and how it can be paid (e.g. Medicaid)
- Individuals – considers individuals involved with the intervention or the implementation process (e.g. people in need of PrEP, staff involved in PrEP outreach or delivery)
- Process – represents the combination of activities involved in planning, engaging, and executing PrEP.

EPIS Process Model (Exploration, Preparation, Implementation, Sustainment)



Among the 62% of LHDs NOT implementing PrEP:

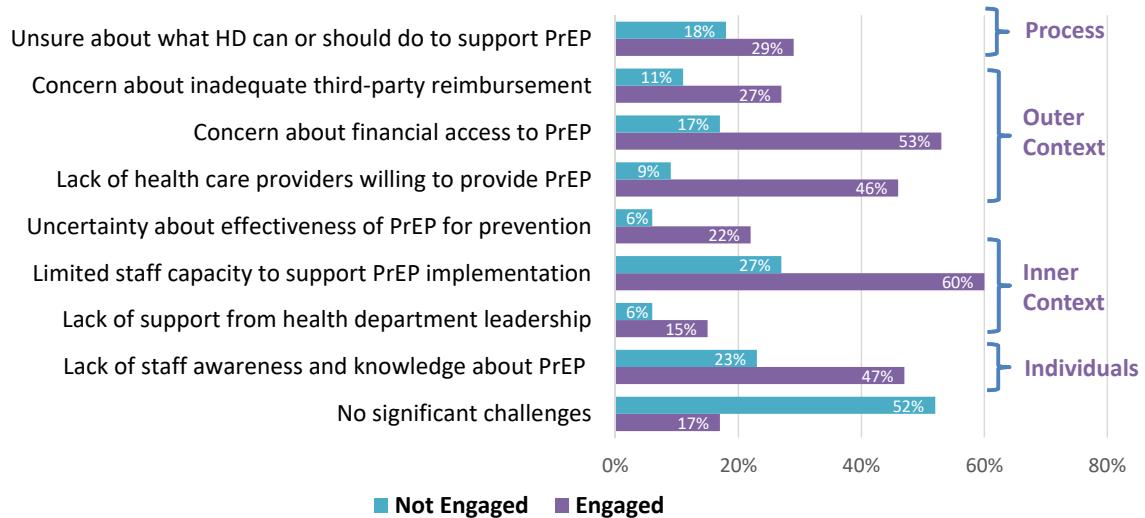
- Motivate the 41% not currently interested
- Help the 46% contemplating
- Support the 13% who may implement in the future

Among the 38% LHDs implementing PrEP

- Data monitoring, metrics and feedback system improve delivery and/or sustainment of PrEP

Source: Aarons, G. A., Hurlburt, M., Horwitz, S.M. (2011). Advancing a Conceptual Model of Evidence-Based Practice Implementation in Public Service Sectors. *Administration and Policy in Mental Health*.38(1):4-23.

LHD Challenges to PrEP Implementation

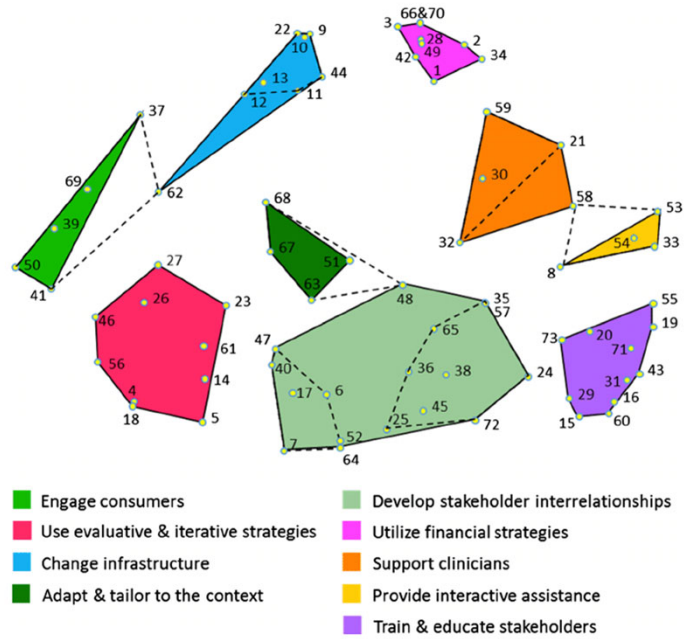


Source: Weiss G, Smith D, Newman S, Weiner J, Kitlas A, Hoover K. PrEP implementation by local health departments in US cities and counties: Findings from a 2015 assessment of local health departments. *PLoS ONE* 13(7):e0200338.

Taxonomy of Implementation Strategies

Methods or techniques used to enhance the adoption, implementation, and sustainability of an EBI, program or practice

- The stuff we do to try to help people/places DO THE THING



Source: Waltz, T. J., Powell, B. J., Matthieu, M. M., Damschroder, L. J., Chinman, M. J., Smith, J. L., . . . Kirchner, J. E. (2015). Use of concept mapping to characterize relationships among implementation strategies and assess their feasibility and importance: results from the Expert Recommendations for Implementing Change (ERIC) study. *Implementation Science, 10*(1), 109.

Implementation Strategies in Recently Funded NIH-Grants

More than 150 discrete implementation strategies

Strategy	N
Adaptation of intervention/tailoring implementation strategy	29
Care Coordination/Care Integration	14
Peer-led delivery/support	10
Incentives	9
Technology-based delivery	6
Community-focused	5
Home-based delivery	4
Combination of EBIs	3
Delivery system change	3
Training/Coaching approach/amount	3

Smith JD, Li DH, Hirschhorn LR, et al. Landscape of HIV Implementation Research Funded by the National Institutes of Health: A Mapping Review of Project Abstracts. *AIDS Behav.* 2020;24(6):1903-1911.

PrEP Implementation Activities Among Those Engaged in PrEP Implementation

Can adding support of a peer navigator improve referral rates?



Referring high-risk individuals to PrEP

75%

Conducting community education/outreach

50%

Developing PrEP referral lists

49%

Collaborating with providers to support PrEP

45%

Conducting provider education/outreach

43%

Conducting training for health department staff

41%

Convening/participating in PrEP working groups

39%

Monitoring and evaluating PrEP uptake/impact

13%

Can integrating PrEP into STD clinic improve uptake and adherence?



Delivering PrEP at health department clinic

10%

Participating in demonstration projects/pilots

8%

Funding CBOs and agencies

6%

Source: Weiss G, Smith D, Newman S, Weiner J, Kitlas A, Hoover K. PrEP implementation by local health departments in US cities and counties: Findings from a 2015 assessment of local health departments. PLoS ONE 13(7):e0200338.

Potential Strategies Along the PrEP Continuum

- Awareness
 - Outreach strategies (SNS) to potential users through PrEP ambassadors
- Uptake
 - mHealth technology for peer navigators to promote initiation/adherence
 - Identification of PrEP clients in ER
 - Provider education to increase provision of PrEP
 - Partner services actively identify PrEP candidates and linkage
 - Active referral to PrEP services
- Adherence & Retention
 - Community of Practice to assist providers w/ prescribing practices (discontinuation)
 - Appointment reminders or interactive reminder messaging
 - Consistent contact with clinic through staff / peers

Taxonomy of Implementation Research Outcomes



Definition: Implementation outcomes are the effects of deliberate and purposive actions (strategies) to embed new treatments, practices, and services into real-world systems of care.

Source: Proctor, E., Silmere, H., Raghavan, R., Hovmand, P., Aarons, G., Bunger, A., . . . Hensley, M. (2011). Outcomes for implementation research: Conceptual distinctions, measurement challenges, and research agenda. *Administration and Policy in Mental Health and Mental Health Services Research*, 38.

Examples of Implementation Outcomes

- Acceptability – Individual client or individual provider level.
 - Perception among STD clinic providers that PrEP is effective, can be delivered in the clinic with acceptable level of complexity
- Adoption – Individual provider or organization/setting.
 - Intention to prescribe PrEP, uptake and utilization of PrEP in STD clinic;
- Appropriateness – Individual client, individual provider or organization/setting.
 - Perception that PrEP is suitable to their needs or mission; compatible with their other clinic services
- Feasibility – Individual provider or organization/setting
 - Perception that PrEP can be successfully carried out within the STD clinic
- Fidelity – Individual provider
 - Degree to which PrEP was implemented in the STD clinic as outlined in original protocol/procedures
- Penetration/Reach – Organization/setting
 - Degree of the integration of PrEP into STD clinic service, e.g. number of STD clinic providers who prescribe PrEP

Source: Proctor, E., Silmere, H., Raghavan, R., Hovmand, P., Aarons, G., Bunger, A., . . . Hensley, M. (2011). Outcomes for implementation research: Conceptual distinctions, measurement challenges, and research agenda. *Administration and Policy in Mental Health and Mental Health Services Research*, 38.

Implementation Research Designs to Evaluate Impact of Strategies

- Within-site designs - Generally simpler designs, create local knowledge
 - **Post Design** - Only measure implementation outputs after a new EBP is adopted
 - **Pre-Post Design** - Compare implementation outputs before/ after new strategy is used to deliver an EBP
- Between-site designs - Comparison of implementation strategies at the same time in different sites, increases generalized knowledge
 - **Novel implementation strategy vs routine practice**, different sites - can be non-randomized or randomized (reduces bias)
 - **Head-to-Head Randomized Implementation Trial** - two novel implementation strategies for the same intervention
- Within- and between-site designs - Roll-out designs, assign units randomly to when and what implementation strategy is used, produces generalized knowledge
- Hybrid Effectiveness-Implementation Trials, produces generalized knowledge

Partnerships are central in the NIH-funded (EHE) Supplements

- Funding: planning projects to form **partnerships** to address local high priorities gaps in one or more EHE pillars.
- For whom: **partnerships** between CFAR/ARC investigators and local jurisdictions - CBOs, local, county, and state health departments carrying out EHE-related activities.
 - **Partnerships** “will have identified and designed targeted implementation science research project”.

EPIS Framework
Aarons, Hurlburt, & Horwitz 2011

CFIR Framework
Damschroder et al 2009

Partnerships in Theories, Models & Frameworks

Glasgow, Vogt, & Boles 1999
Smith & Hasan 2019

- Reduction in patient's depression symptom severity (PHQ-9 in EHR)
- Stages of Implementation Completion (SIC): Duration (speed) and Proportion (quantity) scores
- Surveys of key staff members after initial training and at 4, 12, and 24 months after start of CCM implementation
- Implementation cost data (administrative/EHR/survey)
- The proportion of eligible patients in the practice who are referred to CCM (administrative/EHR data)
- The number and proportion of clinicians with eligible patients who refer to CCM (administrative/EHR data)
- Surveys at 12 and 24 months after start of CCM implementation
- Implementation cost analysis (administrative/EHR/survey)

Implementation Strategies

- Engage consumers
- Use evaluative & iterative strategies
- Change infrastructure
- Adapt & tailor to the context
- Develop stakeholder interrelationships
- Utilize financial strategies
- Support clinicians
- Provide interactive assistance
- Train & educate stakeholders

Powell et al. 2015
Waltz et al. 2015

Community-Engaged Research

- Bidirectional exchange of expertise between academics (scientific experts) & communities (local, cultural, practice, lived experience experts) to increase value of research for improving health & equity
- Broad spectrum: minimal to equal partnership in all aspects

Principles of Engagement



Summary

- What's is implementation science?
 - A science that focuses on understanding and informing effective implementation of the many interventions we have at our disposal
- Expand use of implementation science to shorten the time between intervention development, testing and applying it in real-world settings
 - Harnessing academic/public health partnerships
 - Developing implementation research questions needed to inform and guide local implementation
- Disseminate findings on effective implementation strategies and how to apply them through the use of dissemination science:

Source: <https://grants.nih.gov/grants/guide/pa-files/PA-16-237.html>

Questions

- For more information:

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