

Closing the Implementation Gap: Why Evidence Fails to Reach People

Frederick L. Altice, M.D.

Director, Yale Center for Clinical and Community Research

Professor of Medicine and Public Health

Yale University



Evidence does not implement itself. Implementation science asks how evidence reaches routine practice, for whom, and under what conditions.

What this opening session gives you

A working vocabulary for the rest of the bootcamp

1

Name the gap

2

**Separate the thing
from the stuff**

3

**Read a cascade
as a diagnostic tool**

4

**Use context
as data**

5

**Make a strong
IS argument**

Today we will not teach frameworks, strategy taxonomies, adaptation, or study design.

Those are later sessions. This talk sets the problem up so those tools make sense.

Output: one clean implementation gap statement

How this session sets up the summer bootcamp

Start with the gap; then every later method has a job

DAY 1

**Define and state
the
implementation
gap**

DAY 2

**Diagnose
determinants
and choose tools**

DAY 3

**Design, monitor,
and learn in
motion**

DAY 4

**Stress-test
sustainment,
scale, and equity**

The know-do gap

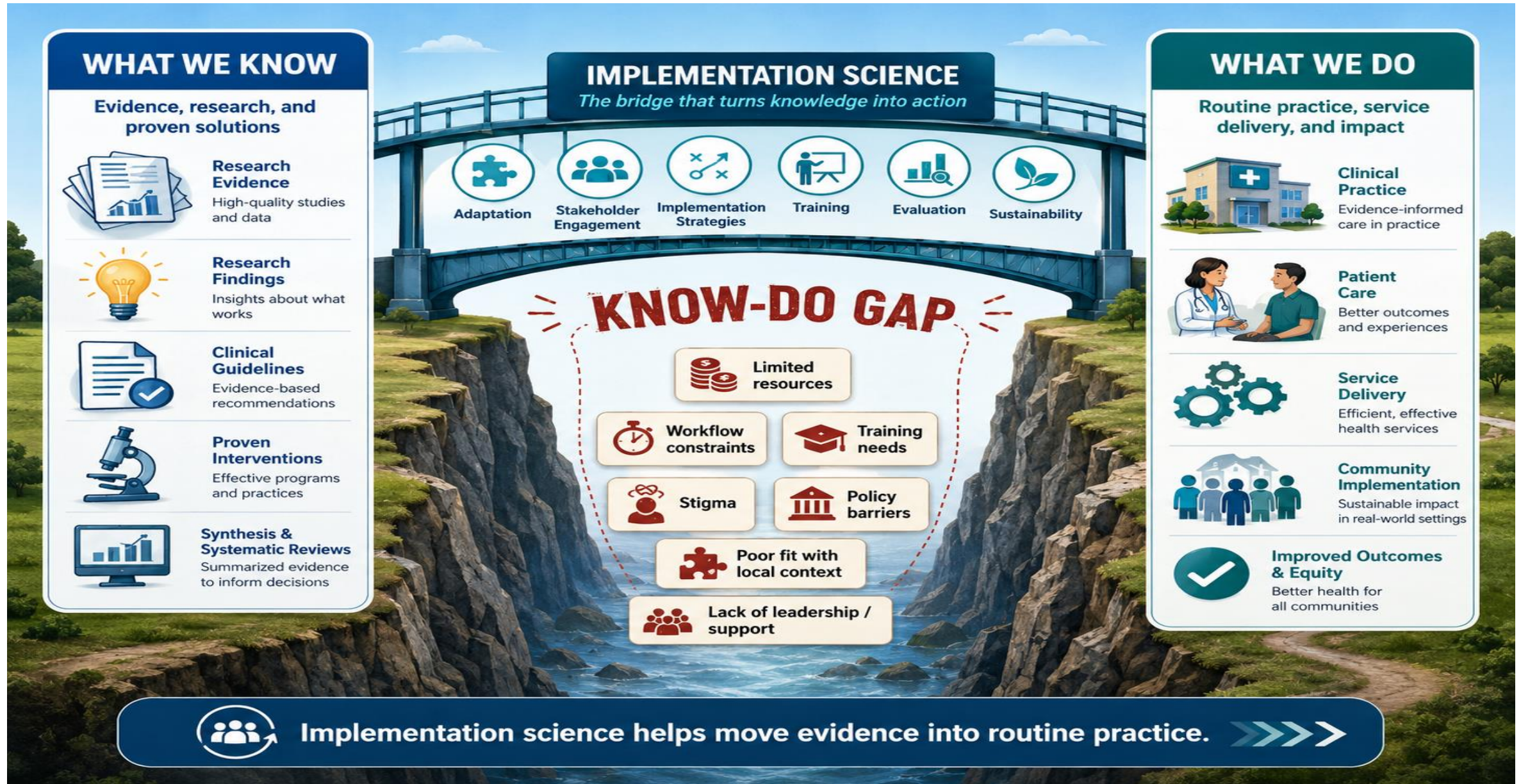
The space between what we know works and what people actually receive



Implementation science makes the gap visible, testable, and improvable.

Bauer & Kirchner: effectiveness alone does not guarantee routine uptake; uptake depends heavily on context.

The Know-Do gap



Evidence-to-practice delay is real

But do not over-teach a single magic number

The memorable claim

17 years / 14%

Useful as a provocation,
not a universal law.

The stronger teaching point

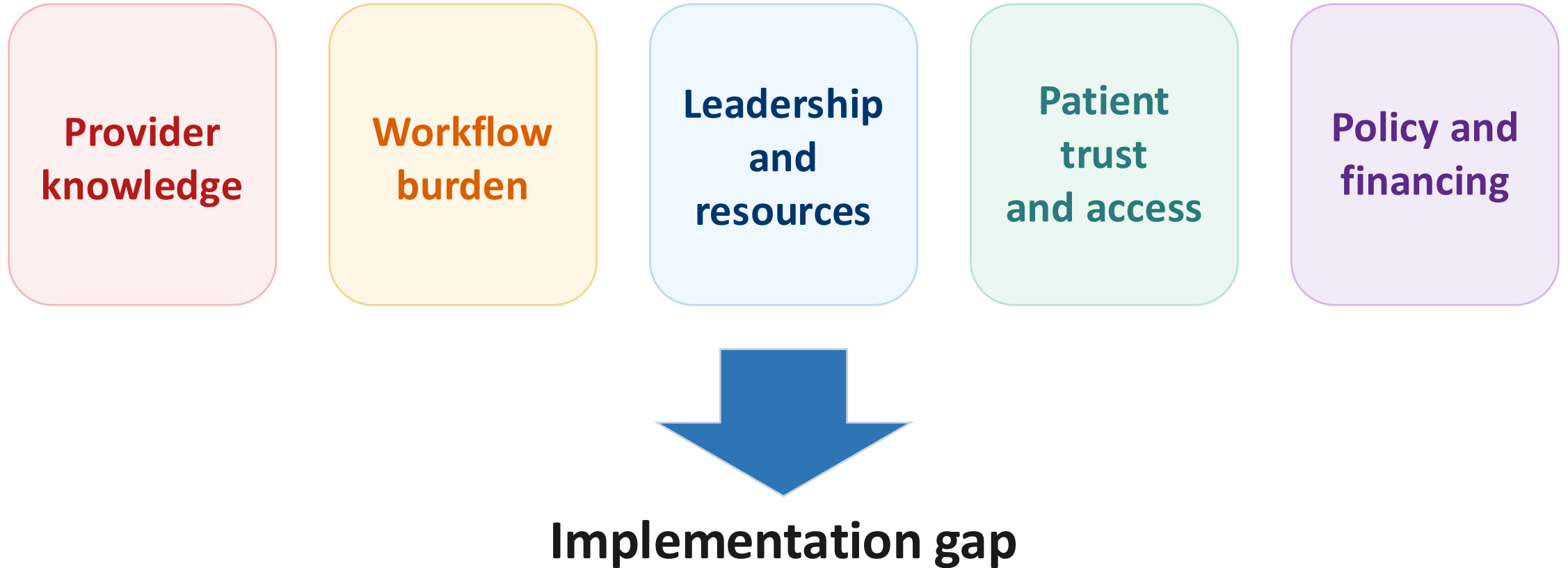
Publication alone rarely changes care.
Guidelines rarely redesign workflow.
Training rarely fixes stigma, financing, trust, or supply.

Implementation science studies what it takes to
move evidence into routine settings.

Better question: Where is the gap, and what are we learning?

Implementation failure is rarely one person's fault

Most failures are systems failures, not individual incompetence



The same evidence-based practice can succeed in one setting and fail in another because the implementation system is different.

A practical definition of implementation science

Keep it simple enough to use

Implementation science is the systematic study of strategies to promote uptake, quality, and sustainment of evidence-based interventions in routine settings.

SYSTEMATIC
not anecdotal

STRATEGIES
the work that moves
evidence

ROUTINE SETTINGS
real clinics, communities,
systems

TRANSFERABLE LEARNING
what others can use

Definition adapted from Eccles & Mittman, Implement Sci 2006; implementation outcomes from Proctor et al., Adm Policy Ment Health 2011.

What implementation science is not

The boundaries blur in practice, but the questions differ (part of the Diffusion-Dissemination-Implementation Continuum)

Service delivery	QI	M&E	Implementation science
Primary aim: deliver services	Primary aim: solve a local performance problem	Primary aim: track program performance	Primary aim: produce transferable learning
Did we provide HIV testing, ART, PrEP, PMTCT?	Can this clinic reduce wait time or missed visits?	How many visits, tests, starts, refills?	What strategy works, why, for whom, and under what conditions?

IS can partner with all of these - but it is not identical to any of them.

QI and IS are often blended, but QI is usually local improvement while IS emphasizes generalizable implementation learning.

Diffusion, dissemination, implementation

A useful distinction for public health programs

Diffusion

Watch it happen!

Passive spread; people may adopt because an idea becomes visible.

Dissemination

Help it happen!

Active communication: guidelines, toolkits, trainings, campaigns.

Implementation

Make it happen!

Active integration into routine care through changed conditions and learning.

Training may be necessary - but it is rarely sufficient.

Implementation Science: Core terminology

Shared language for implementation problems.

The thing (EBP) versus the stuff (Implementation Strategy)

Do not confuse the evidence-based intervention with implementation work

THE THING

What improves health
or behavior (EBP)

ART PrEP PMTCT
OAT HIV testing
Viral load monitoring

These “things” have evidence for working!



THE STUFF

What helps people or places
do the thing (Strategy)

Navigation reminders
workflow redesign
peer outreach A&F

The “strategy” is selected to address the barriers
(determinants)!

Implementation science studies whether the stuff changes delivery of the thing.

Example: same evidence, different implementation

OAT as HIV prevention requires a delivery system

The thing

Opioid agonist therapy reduces overdose risk and injection-related HIV transmission.

The barriers

Stigma, restrictive rules, low provider confidence, weak linkage after release, supply chain, policy resistance.

The stuff

Project ECHO, NIATx, audit-feedback, prison-community linkage, patient navigation, workflow redesign, policy engagement.

Implementation science studies whether the “stuff” changes delivery of the “thing.”

The black box problem

If it works, we need to know how. If it fails, we need to know why.



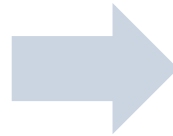
**If it works, we need to know how.
If it fails, we need to know why.**

Implementation outcomes are not the same as health outcomes

Both matter, but they answer different questions

Implementation outcomes

Reach, adoption, acceptability, feasibility, fidelity, cost, penetration, sustainability.



Service / clinical / health outcomes

Quality, efficiency, safety, symptoms, viral suppression, injury rates, mortality, equity.

A strategy can improve implementation before health effects are visible.

Example: improved reach and fidelity may precede declines in overdose, falls, HIV incidence, or reinjury.

Core implementation outcomes

Proctor's framework gives us a useful vocabulary

Acceptability

Is it agreeable?

Appropriateness

Does it fit?

Feasibility

Can it be done?

Adoption

Do people start?

Fidelity

Is it delivered as intended?

Cost

What does it require?

Penetration

How embedded is it?

Sustainability

Does it last?

Determinants: barriers and facilitators

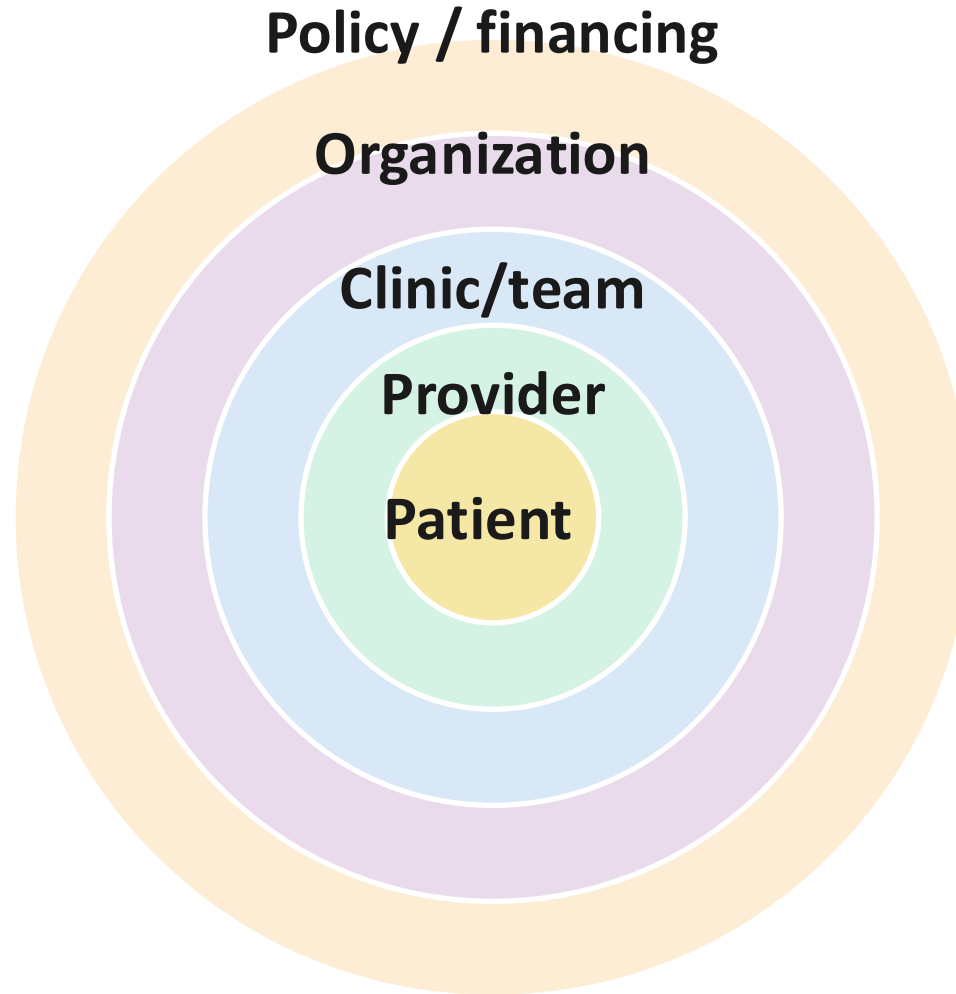
Implementation strategies should be matched to the reasons practice is not changing



A good strategy is chosen because it plausibly addresses a determinant.

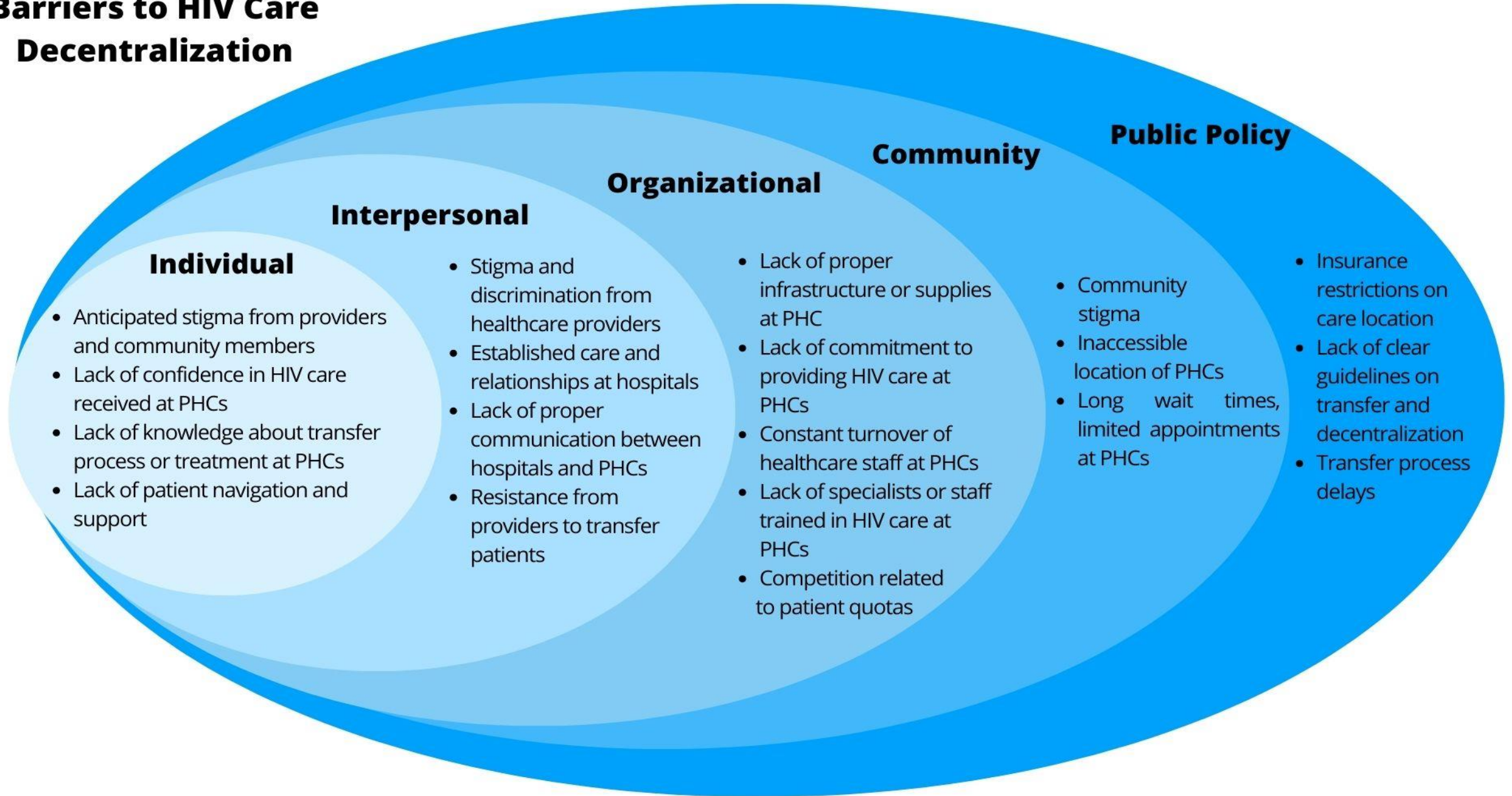
The socio-ecological lens: Level of Influence

Most implementation problems are multi-level



Implementation strategies may vary depending on level.

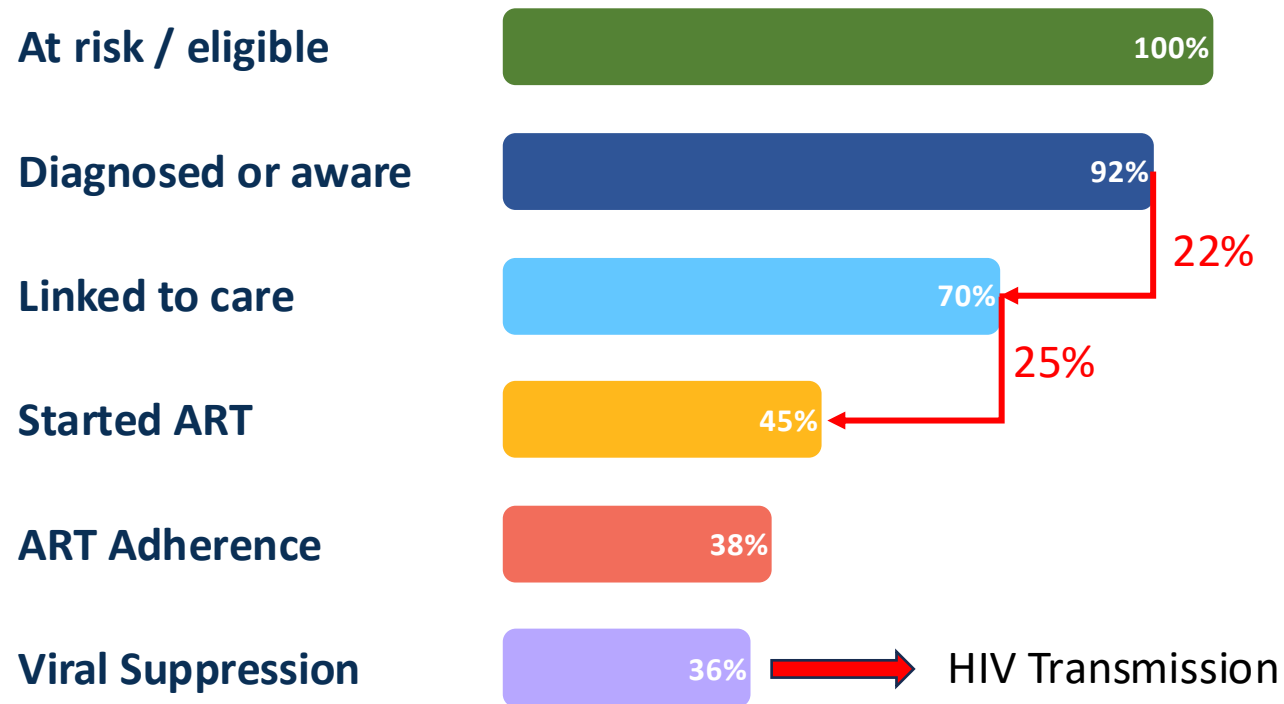
Barriers to HIV Care Decentralization



A cascade makes the gap visible

It tells you where people are lost - not yet why

HIV implementation cascade



Cascade questions

1. Who is in the denominator?
2. Which step leaks (the most)?
3. Does the leak differ by group or setting?
4. What context explains it?
5. What learning would actually expand to reach more people?

How to make a strong implementation science argument

Five moves that turn a problem into an implementation gap

1 Name the evidence

What is known to work?

2 Quantify the loss

Who is not reached? What denominator?

3 Locate the leak

Which cascade step fails?

4 Treat context as data

Why here, for these people, now?

5 Ask for transferable learning

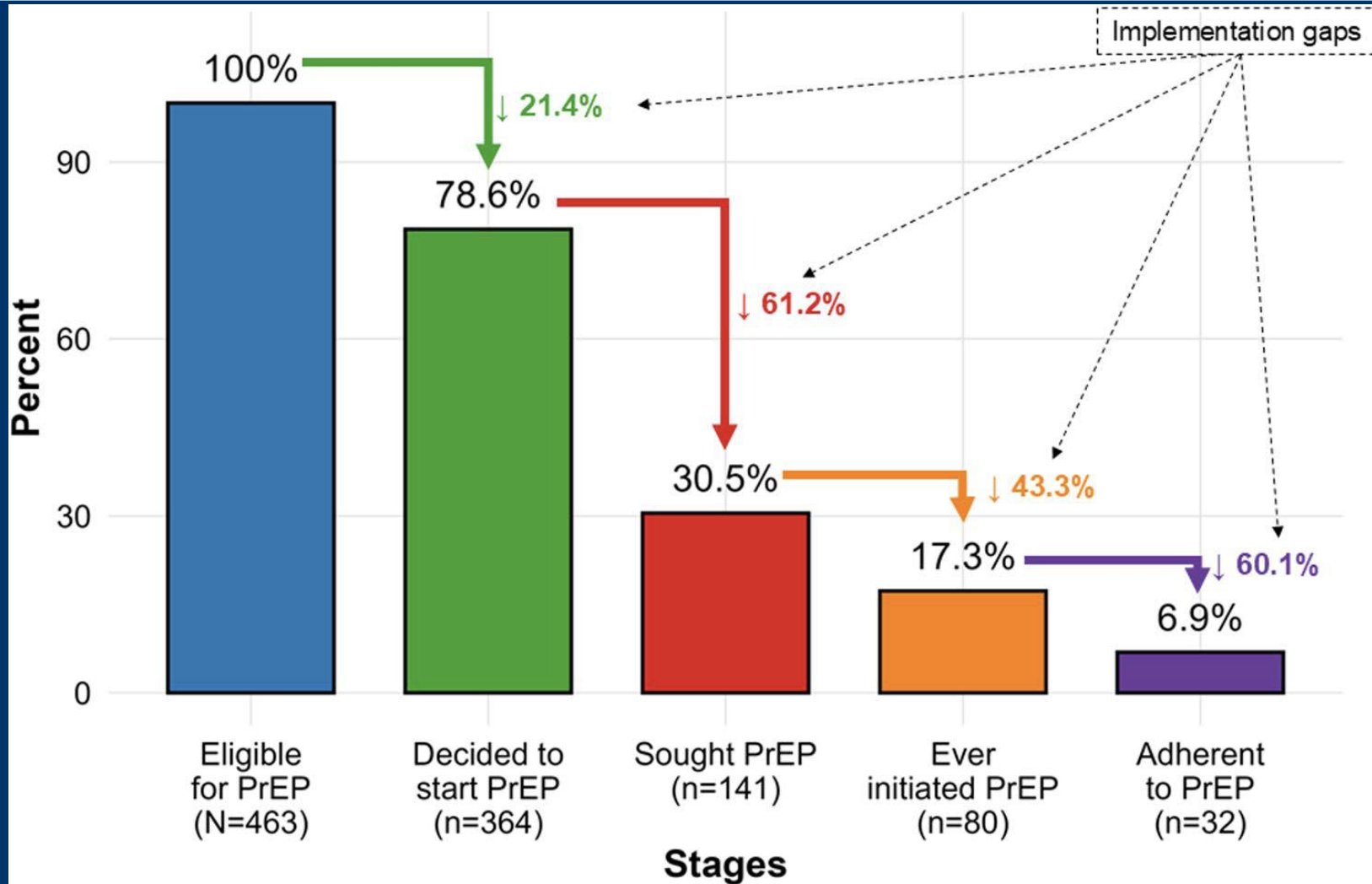
What can other settings learn?

Weak: "PrEP uptake is low."

Strong: "The largest loss is between readiness and seeking PrEP services among eligible MSM, suggesting a delivery/context gap rather than lack of biological efficacy."

HIV Prevention Cascade in MSM in Peru

MSM account for 70% of new HIV infection – almost none are on PrEP despite it being free!



Closing two implementation gaps (**PrEP Seeking and Initiation**) was not having sufficient **Actionable PrEP knowledge** (aOR: 4.0), not age, education, PrEP self-efficacy, cost concerns, or recent STI.

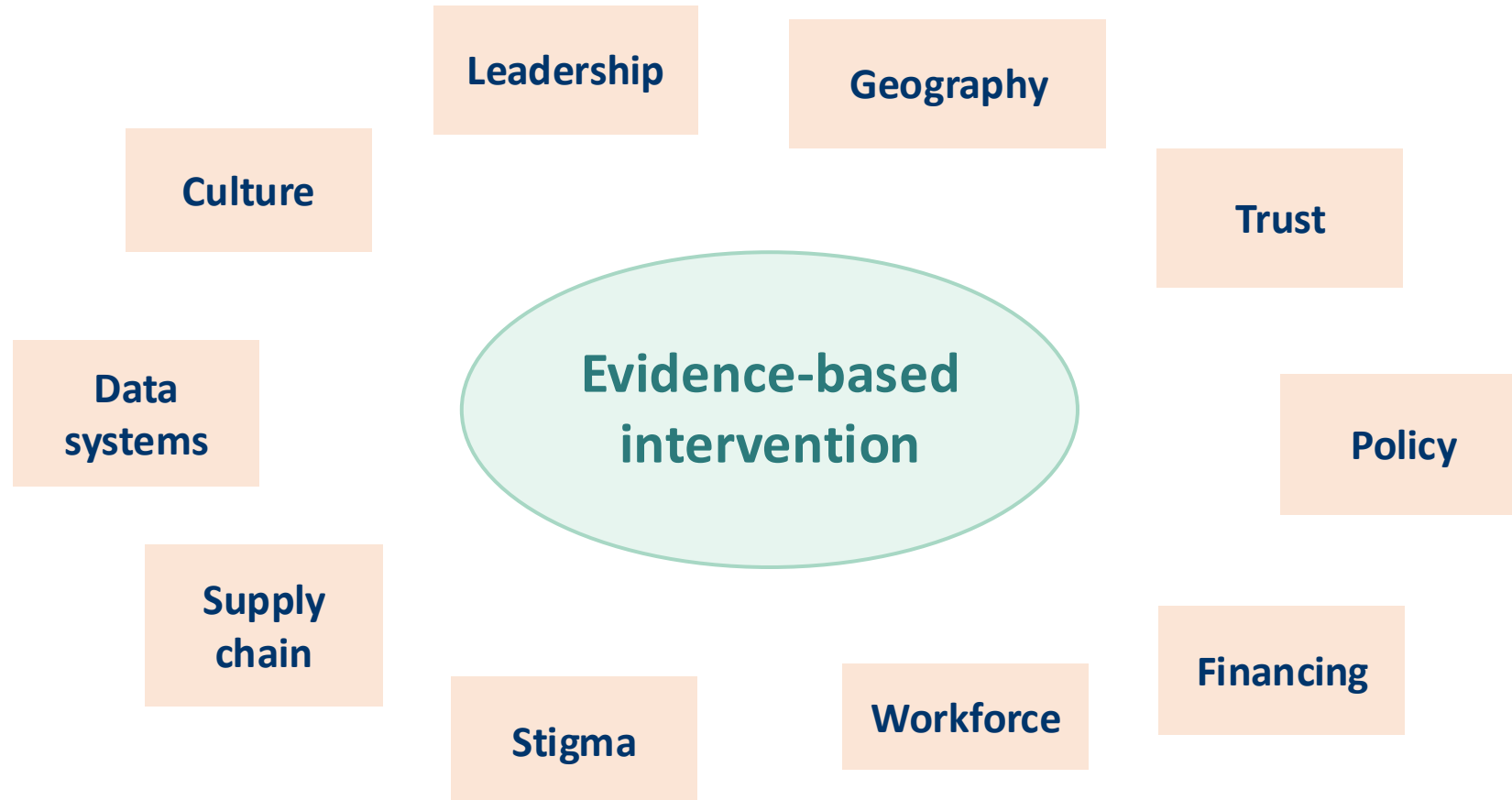
Sticking to PrEP was related to clinical burden, PrEP efficacy and stigma

- Took too long
- I felt judged
- Couldn't manage the system

Gallardo J, AIDS Behav, 2026

Context: everything around the intervention

Context is not background noise — it is often the explanation

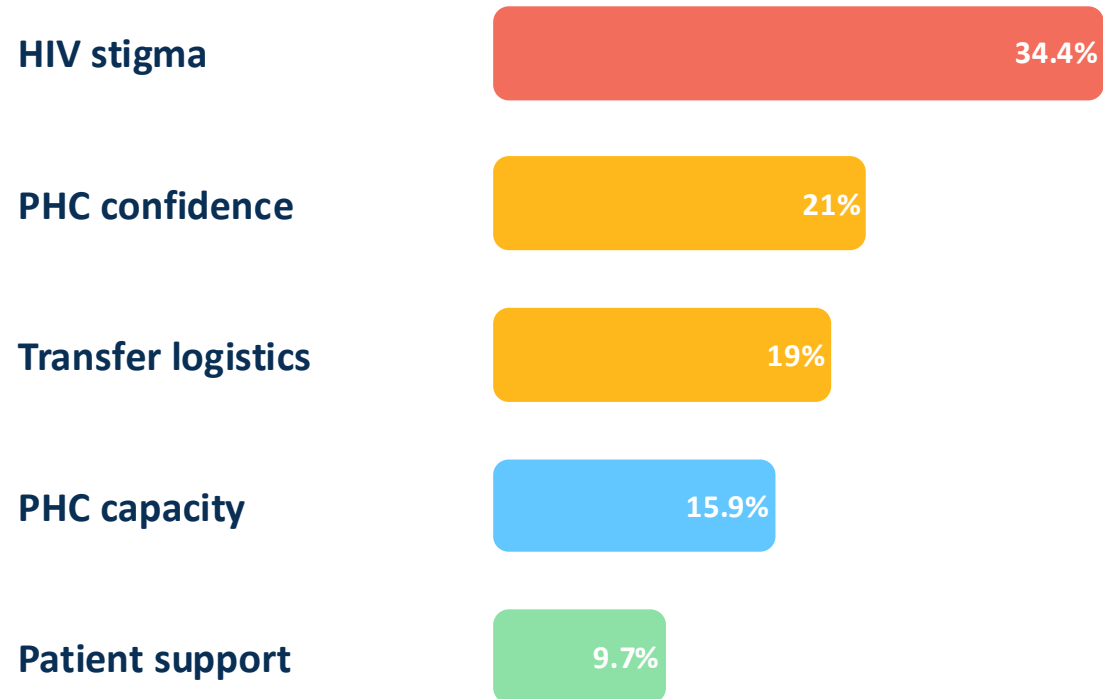


Same intervention ≠ same implementation

Context is not background noise

It often explains where the cascade leaks → largest ART Cascade Gap is in retention in HIV

Prioritized barriers to decentralizing HIV care in Lima



The same EBI (ART) can fail differently

In one setting, diagnosis is the bottleneck.

In another, it is confidence, transfer logistics, or retention.

Context tells you which problem you actually have.

Oliveros D et al. Using nominal group technique to identify barriers to decentralizing HIV care to primary health centers in Lima, Peru. BMC Health Serv Res. 2025.

Context turns a cascade into an implementation problem

PrEP preferences in Peru show what the delivery system must fit

98.2%

owned a smartphone

91.2%

frequent WhatsApp use

80.5%

used social media to
learn about PrEP

18.2%

had initiated PrEP

The implementation argument is not "build an app."

It is: delivery must fit the communication ecology, privacy needs, and information gaps of the population.

PMTCT in Mozambique: high testing, downstream losses

The gap differs by cascade step and context

Selected PMTCT cascade performance indicators

HIV testing in ANC

87%

Maternal ARV prophylaxis

51%

Eligible women/newborns on cART

42%

What the cascade changes

Not: "PMTCT services exist."

Not: "Testing is high."

Instead: "The loss occurs after testing, where treatment delivery must be completed."

Gimbel S et al. The prevention of mother-to-child transmission of HIV cascade analysis tool. BMC Res Notes. 2014;7:743.

PMTCT in South Africa: missed steps caused preventable harm

A cascade gap can be linked to attributable health outcomes

34.9%

missed one or more
PMTCT steps

33.8%

infant infections
attributable to cascade
dropout

3.4% -> 2.2%

estimated transmission if
dropouts eliminated

WHY?

adolescence, SES,
education, late ANC,
home birth. non-
disclosure

**This is a strong implementation argument: the gap is measurable,
preventable, and context-specific.**

Woldesenbet S et al. Missed Opportunities along the PMTCT Services Cascade in South Africa. PLoS ONE. 2015;10:e0132425.

Same evidence, different implementation gap

Context decides where the pathway leaks

Peru HIV care

Evidence
Treatment works

Gap

Gap may be ART start or retention in care

Context: stigma, PHC confidence, transfer logistics

Peru PrEP

Evidence
PrEP works

Gap

Gap between readiness, seeking, and initiation

Context: information, navigation, privacy, digital ecology

PMTCT Africa

Evidence
ARVs prevent MTCT

Gap

Gap after testing: prophylaxis, cART, infant follow-up

Context: ANC timing, disclosure, home birth, equity

From service report to implementation question

The same data can support different kinds of work

Service report (Monitoring)

How many people were tested?
How many started ART?
How many received PrEP?
Did we meet targets?



Implementation question

Who is missed, at which step, why, and under what context?
What repeatable learning would help another setting close the same gap?

Implementation science begins when monitoring data become an explanatory question.

Boundary test: what question are you answering?

A quick way to keep the work clear

Service delivery

Are we doing the work?

M&E

Are activities and indicators on track?

QI

Can this local system improve quickly?

M&M review

What happened in this case or event?

**Implementation
science**

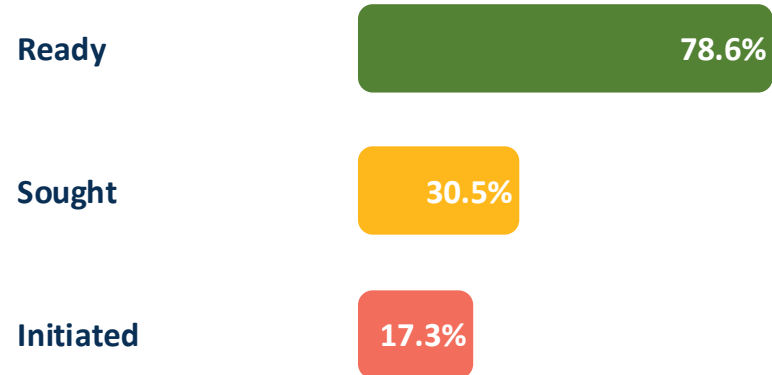
**What closes the gap, why, for whom, and under what
context?**

The boundaries blur. The question should not.

Exercise: write the gap in one paragraph

Use the cascade; do not jump to solutions yet

PrEP cascade example



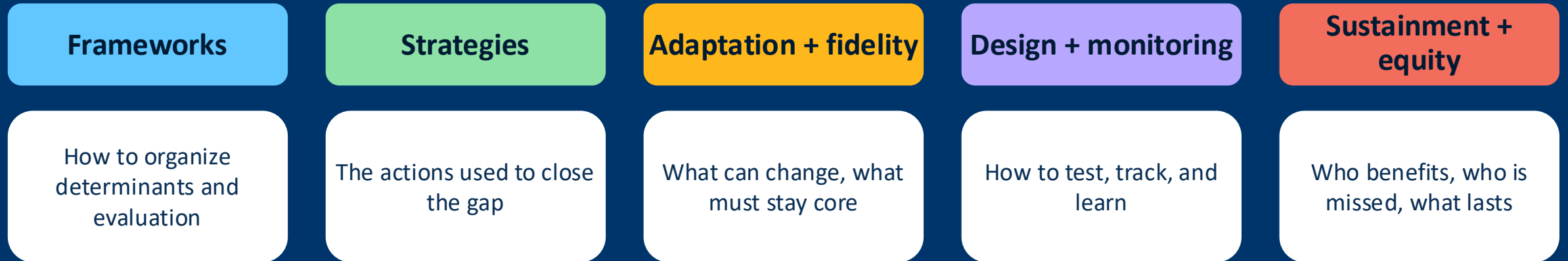
Template

Among **MSM in Lima Peru**, **daily PrEP** is effective/recommended, but only 17% sought PrEP (the EBP). The largest loss occurs between being ready to start it and trying to get it. In this context, insufficient information may explain why. Therefore, the IS problem is ensuring that people know it is safe, simple and where to get it, not that they don't want it.

Data example from Gallardo-Cartagena JA et al., AIDS Behav. 2026.

What comes next - and what we did not cover today

Today names the problem; later sessions choose the tools



You cannot select the right tool until you can state the implementation gap.

Take-home vocabulary

What I want participants to be able to say now

Evidence does not implement itself.

IS studies how to move evidence into routine practice.

Keep the thing and the stuff distinct (the determinants help you).

Cascades show where people are lost, but assess the determinants.

Context explains why the gap differs by setting.

Questions?

Selected references: core vocabulary

Foundational sources

Eccles MP, Mittman BS. Welcome to Implementation Science. *Implement Sci.* 2006;1:1.

Proctor EK et al. Outcomes for implementation research. *Adm Policy Ment Health.* 2011;38:65-76.

Curran GM et al. Effectiveness-implementation hybrid designs. *Med Care.* 2012;50:217-226.

Bauer MS, Kirchner J. Implementation science: what is it and why should I care? *Psychiatry Res.* 2020;283:112376.

Greenhalgh T et al. Diffusion of Innovations in Health Service Organisations. *BMJ Books*; 2005.

Glasgow RE et al. RE-AIM planning and evaluation framework. *Front Public Health.* 2019;7:64.

Bierbaum M et al. Integration of QI and IS methods/frameworks in healthcare. *BMC Health Serv Res.* 2025;25:509.

UNDP. Monitoring and Evaluation: routine tracking for accountability and decision-making; CDC Program Evaluation Framework, 2024.

Selected references: HIV examples

Concrete cascade examples used in the lecture

Chow JY et al. Peru's HIV care continuum among MSM and transgender women. *Int J STD AIDS*. 2016;27:1039-1048.

Primbas AD et al. Linkage to care after HIV diagnosis among MSM and transgender women in Lima, Peru. *AIDS Care*. 2022;34:1472-1479.

Oliveros Gómez D et al. HIV stigma, engagement in HIV care, and ART adherence in Lima, Peru. *AIDS Behav*. 2024;28:2755-2768.

Oliveros D et al. Barriers to decentralizing HIV care to primary health centers in Lima, Peru. *BMC Health Serv Res*. 2025;25:466.

Gallardo-Cartagena JA et al. HIV prevention cascade among Peruvian MSM. *AIDS Behav*. 2026. doi:10.1007/s10461-026-05147-w.

Gallardo-Cartagena JA et al. mHealth features for PrEP engagement among MSM in Peru. *JMIR Public Health Surveill*. 2026;12:e84982.

Ramírez P et al. Daily oral PrEP at HIV/AIDS service organizations in Lima, Peru. *JIAPAC*. 2026. doi:10.1177/23259582251411793.

Gimbel S et al. PMTCT cascade analysis tool. *BMC Res Notes*. 2014;7:743.

Woldesenbet S et al. Missed opportunities along the PMTCT services cascade in South Africa. *PLoS ONE*. 2015;10:e0132425.