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GEISEL SCHOOL OF
MEDICINE

Dartmouth Center for
**IMPLEMENTATION
SCIENCE**

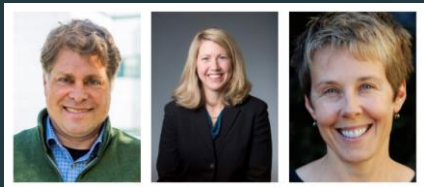
Measuring Implementation Context, Process, and Outcomes



Katharine Rendle, PhD, MPH, MSW

Assistant Professor, Family Medicine and Community Health
University of Pennsylvania Perelman School of Medicine

Hosted by:



Jeremiah Brown, DCIS Director
Kelly Aschbrenner, DCIS Co-Director
Sarah Lord, DCIS Co-Director

Learning Objectives

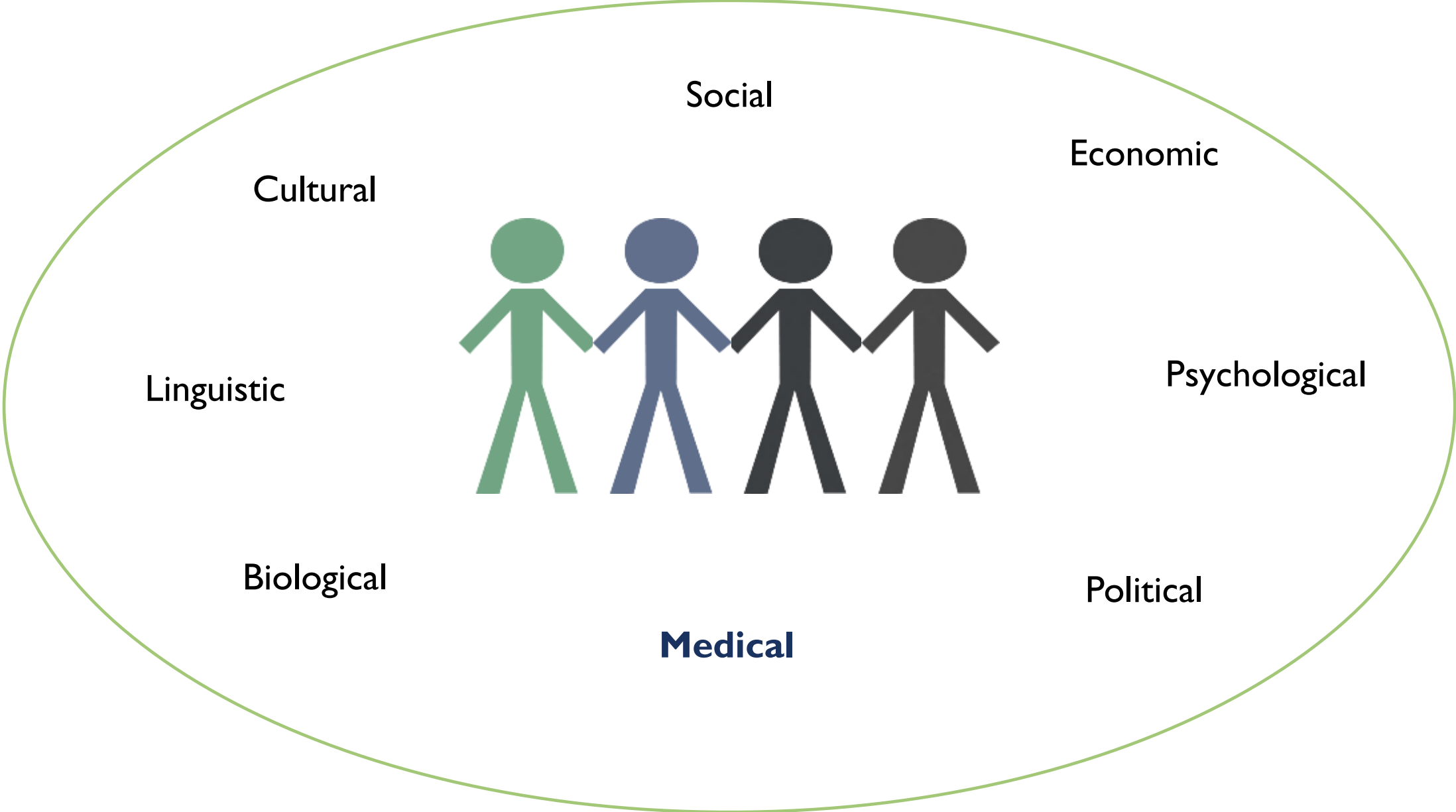
- To understand different strategies for collecting contextual data in implementation studies and trials
- To identify approaches for ensuring equity and representativeness in contextual data collection
- To describe importance of collecting contextual data within implementation studies and trials



LIFE COURSE APPROACH (MINE) TO DEFINING & MEASURING CONTEXT

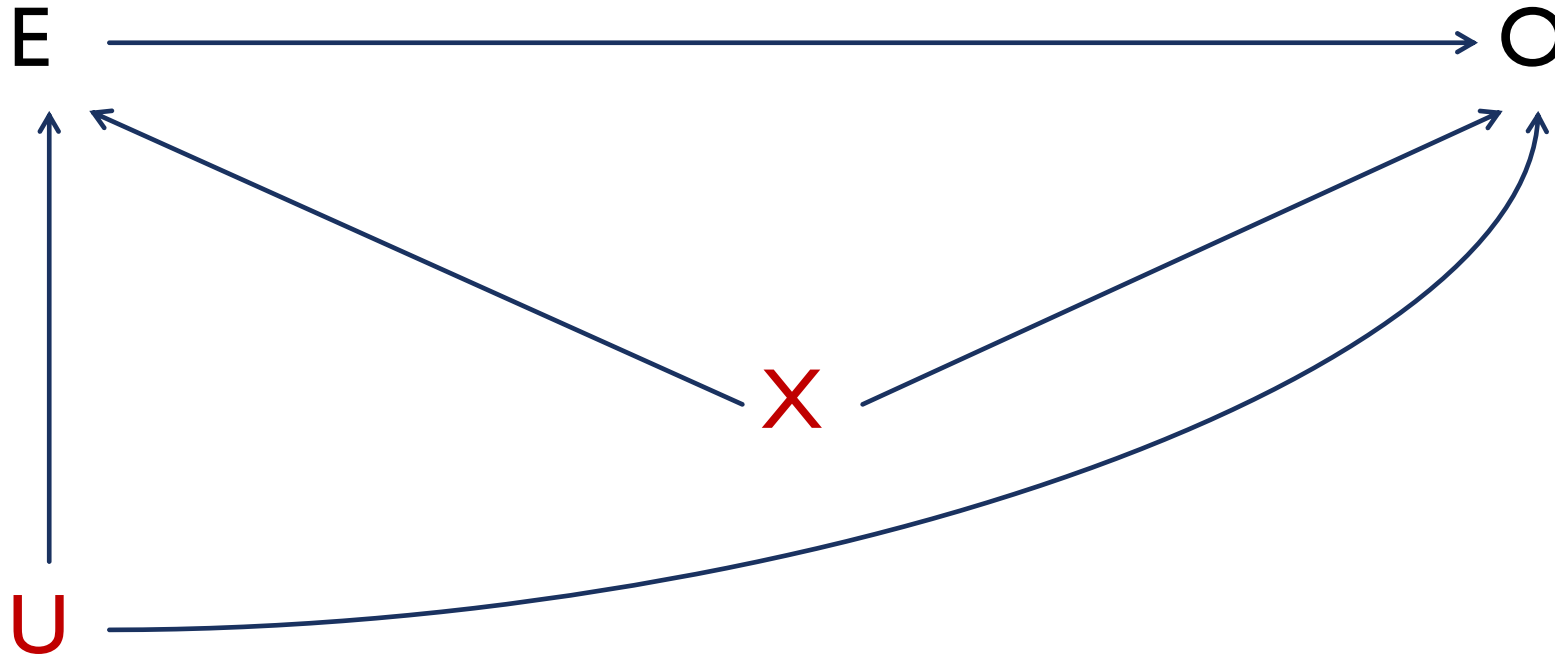


ANTHROPOLOGY: HOLISTIC, *IN SITU* APPROACH TO STUDYING PHENOMENON



EPIDEMIOLOGY: CONTEXT AS A CONFOUNDER, MEDIATOR, MODERATOR

“Context is considered responsible for **study-to-study variations in outcomes**” Nilsen & Bernhardsson 2019.



IMPLEMENTATION SCIENCE: CONTEXT IS EVERYTHING

“[Context] not a backdrop for implementation but interacts, influences, modifies and facilitates or constrains the intervention and the implementation...Context is much more versatile, embracing not only the setting but also roles, interactions and relationships”

Pfadenheuer et al. 2015.

Consolidated Framework for Implementation Research (CFIR) 2.0

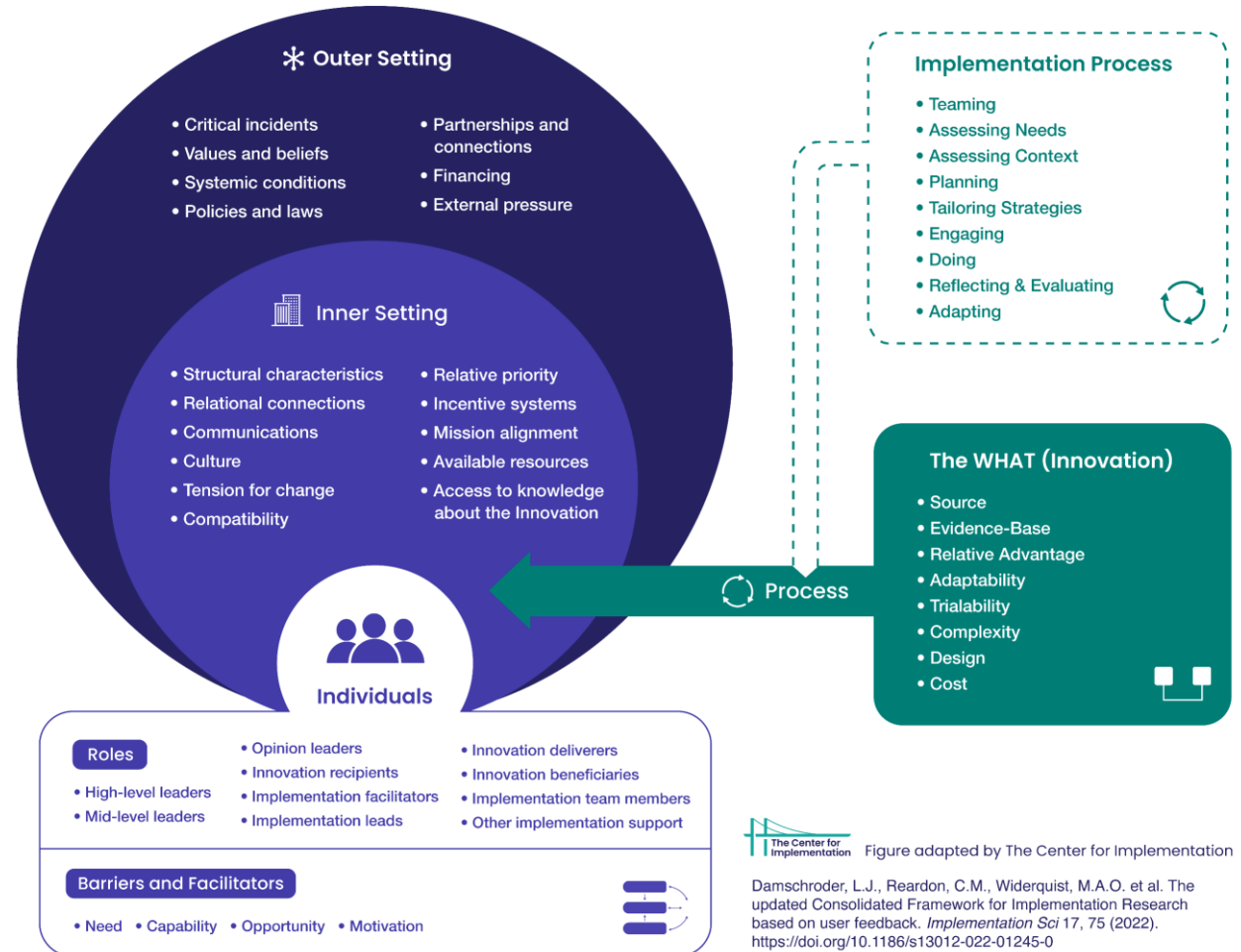
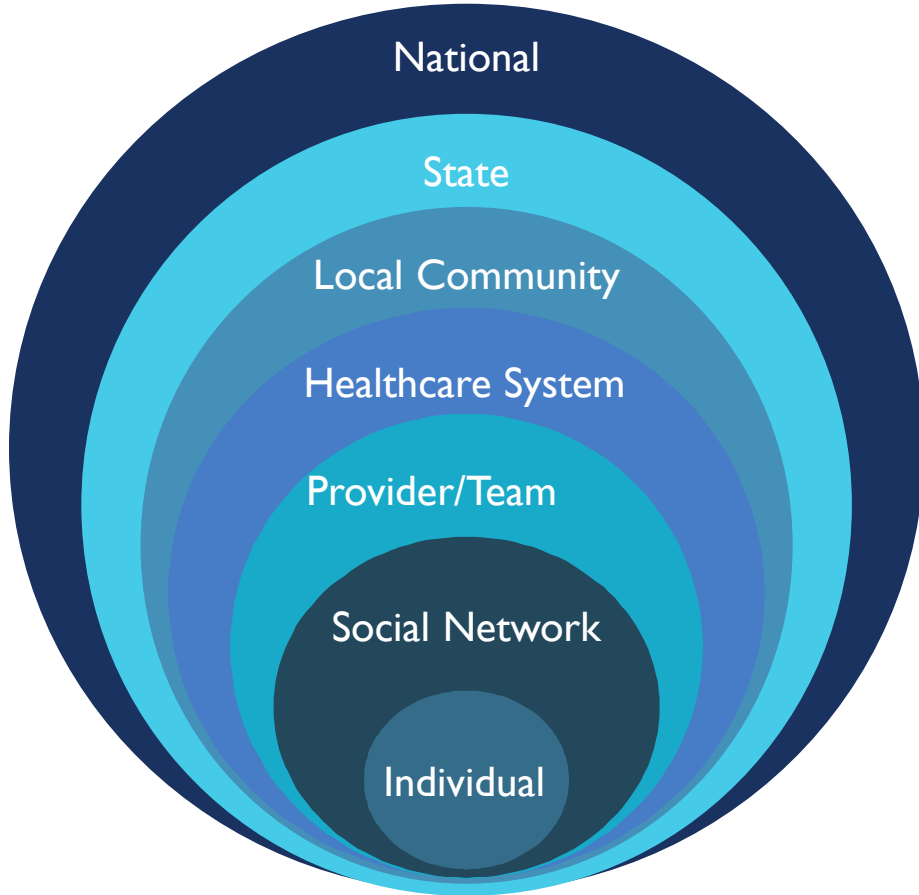


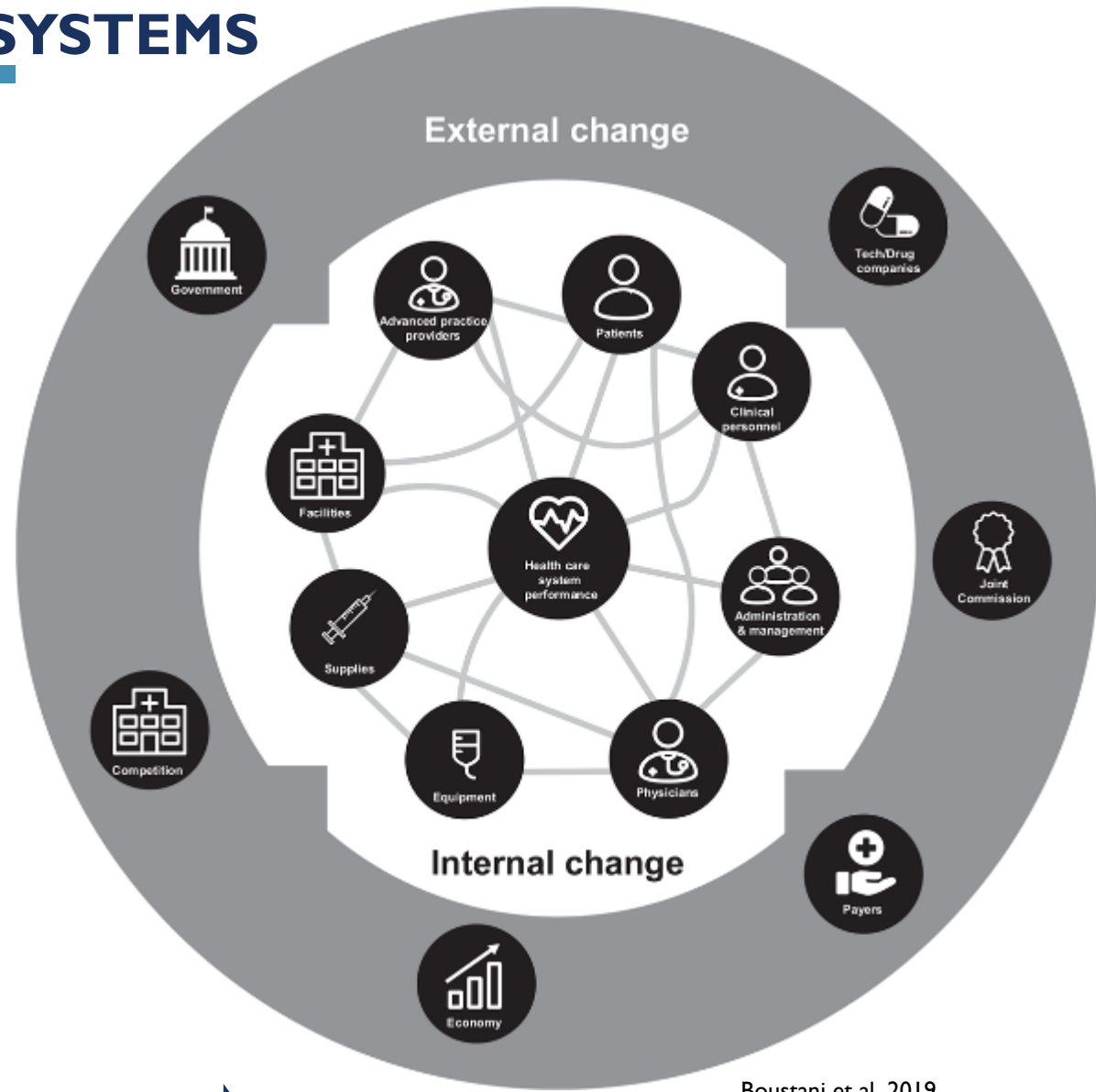
Figure adapted by The Center for Implementation

Damschroder, L.J., Reardon, C.M., Widerquist, M.A.O. et al. The updated Consolidated Framework for Implementation Research based on user feedback. *Implementation Sci* 17, 75 (2022). <https://doi.org/10.1186/s13012-022-01245-0>

HEALTHCARE SYSTEMS AS COMPLEX SYSTEMS



Adapted from Taplin & Rodgers 2010



Boustani et al. 2019

Multilevel Components

**Assess Context & Mechanisms:
Observational Analysis + Mixed Methods**



Complex Systems

**Test Pragmatic Approaches to Implement
Evidence-Based Cancer Care**

When and why do we measure context in IS?

Before Project

What are the determinants shaping uptake (or not) of specific evidence-based practice (EBP)?

What strategies might best align with identified determinants?

What strategies may be acceptable/feasible (or not) in a specific setting?

What is the best outcome(s) to be measure?

During Project

How are your strategies being adapted (or not) during your project?

How might contextual factors outside your project (e.g., competing interventions) change during the course of your project?

Are there any “voltage drops” related to equity occurring during your project and how can you address them?

After Project

How and why did your strategies work or fail?

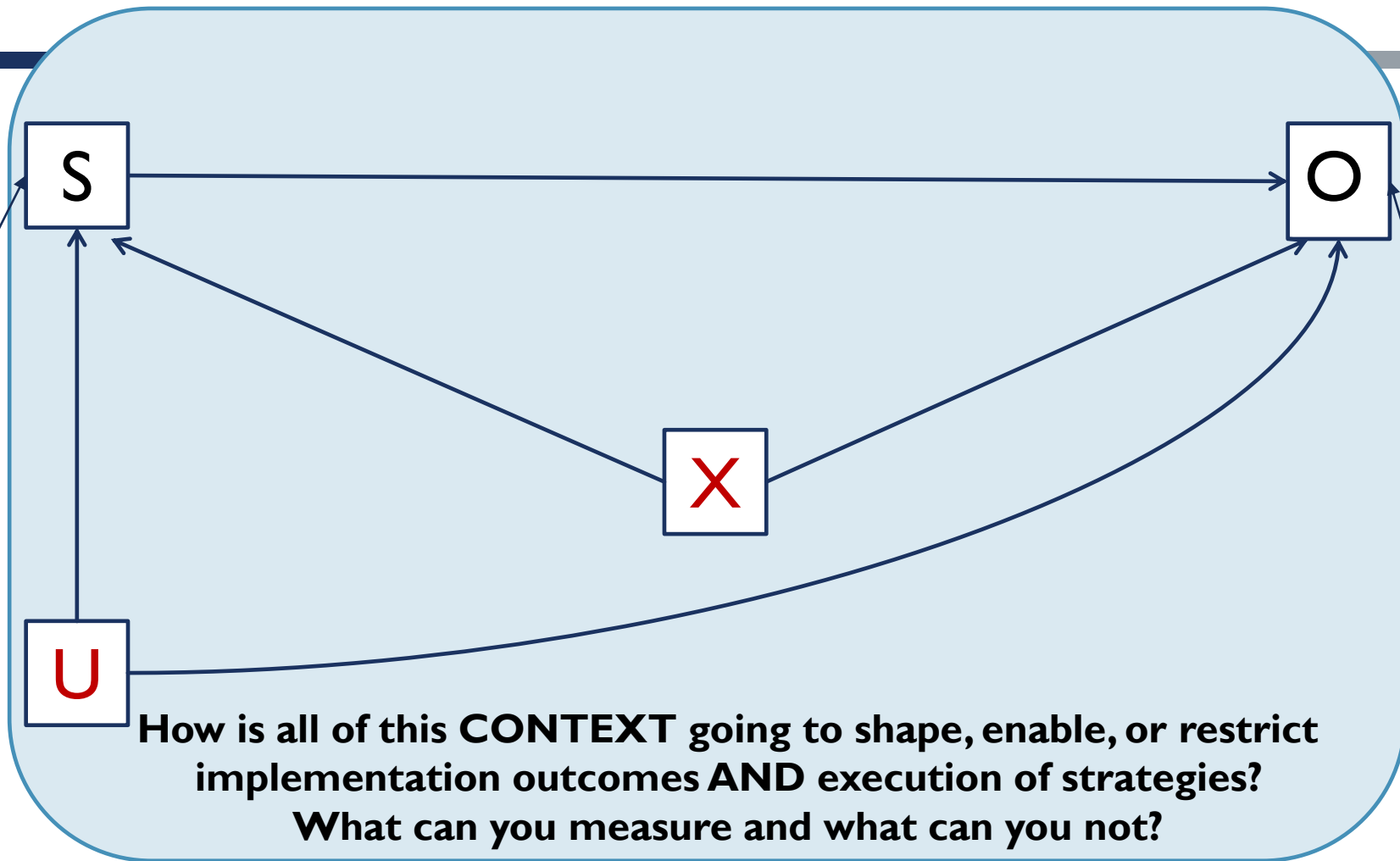
From whom did your strategies work best and least?

What mechanisms drove implementation success or failure overall?

Beyond Project: Transferability/Generalizability/Scalability

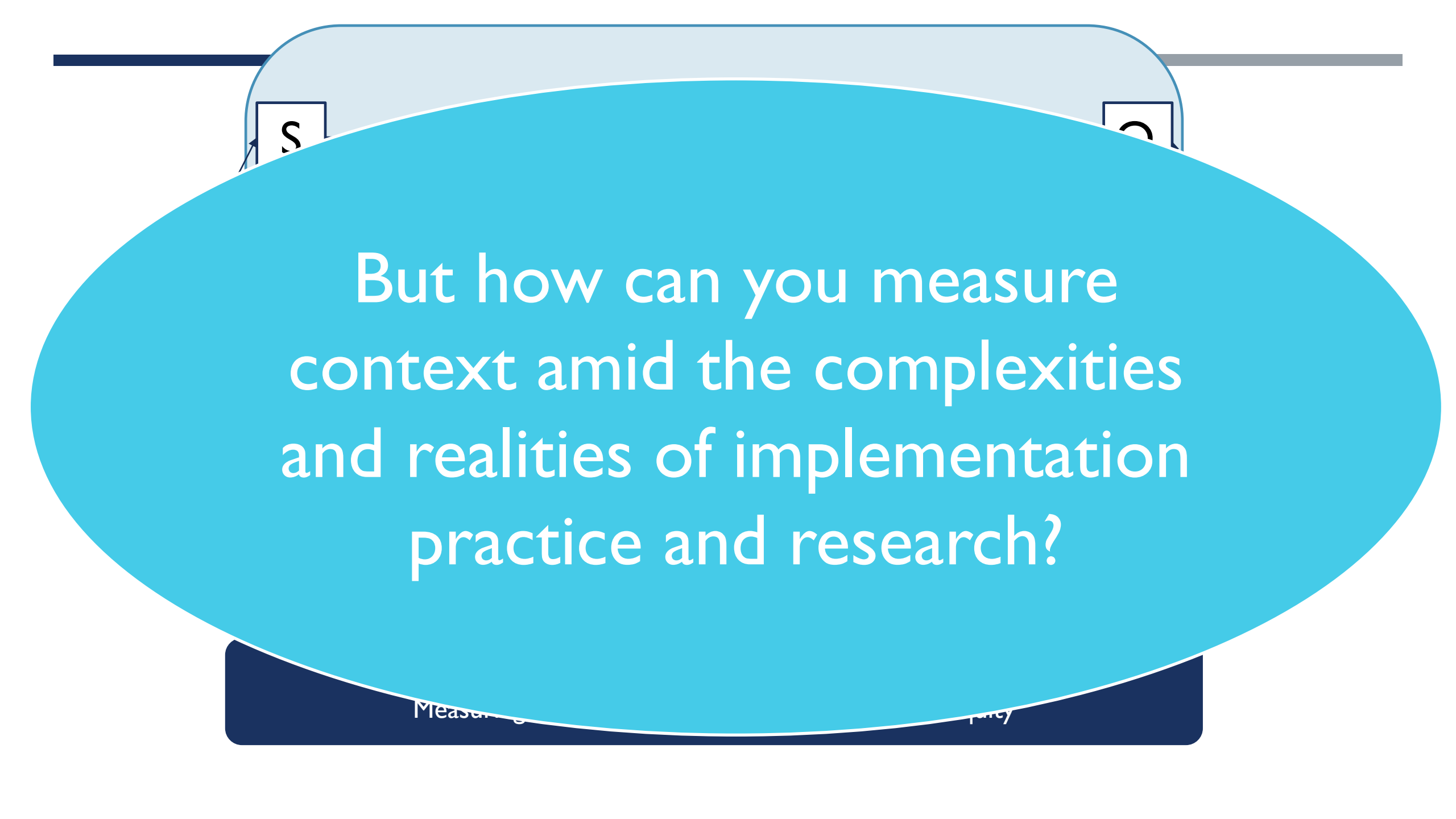
Understanding context at each phase is essential for interpretation and success of your specific project – but ALSO to guide and inform how transferable your findings/strategies may be to another setting (or not).

BEFORE:
Contextual inquiry informs strategies to be used & equity gaps



OUTCOME:
What is your primary implementation outcome(s) and how will you measure equity?

DURING AND AFTER:
Measuring and assessing multilevel context with an (monitoring) eye on equity



But how can you measure
context amid the complexities
and realities of implementation
practice and research?

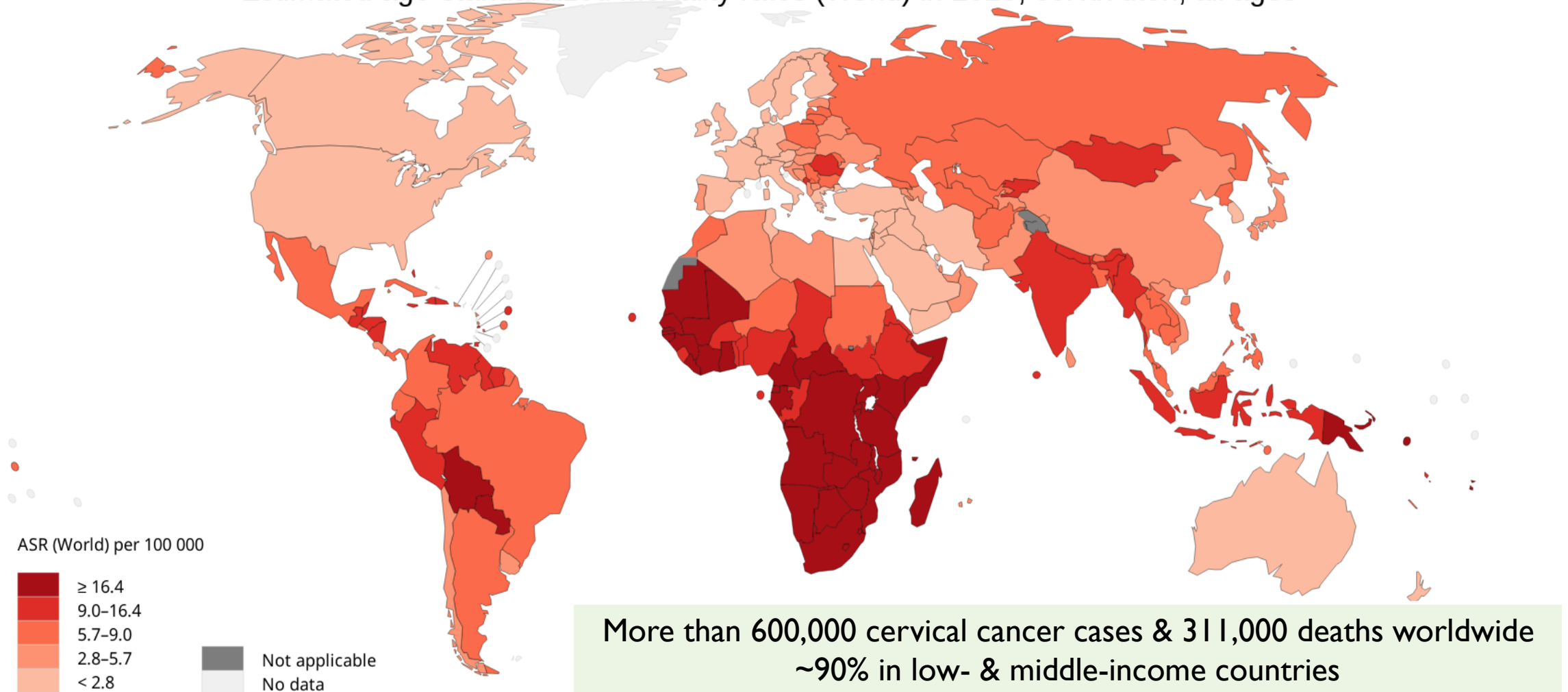


USING CONTEXT TO DESIGN STRATEGIES

BOTSWANA U01



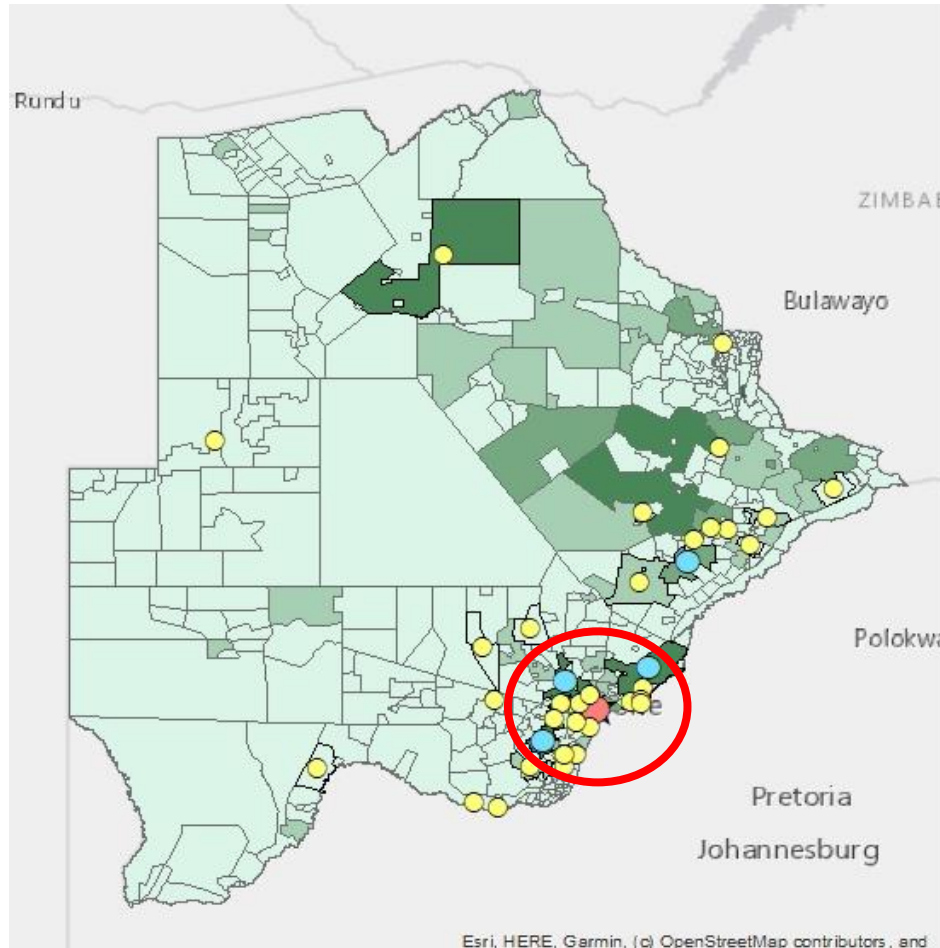
Estimated age-standardized mortality rates (World) in 2020, cervix uteri, all ages



All rights reserved. The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the World Health Organization / International Agency for Research on Cancer concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate borderlines for which there may not yet be full agreement.

Data source: GLOBOCAN 2020
Graph production: IARC
(<http://gco.iarc.fr/today>)
World Health Organization

While people live & receive primary care across Botswana...



Princess Marina Hospital and Oncology Clinic, Gaborone

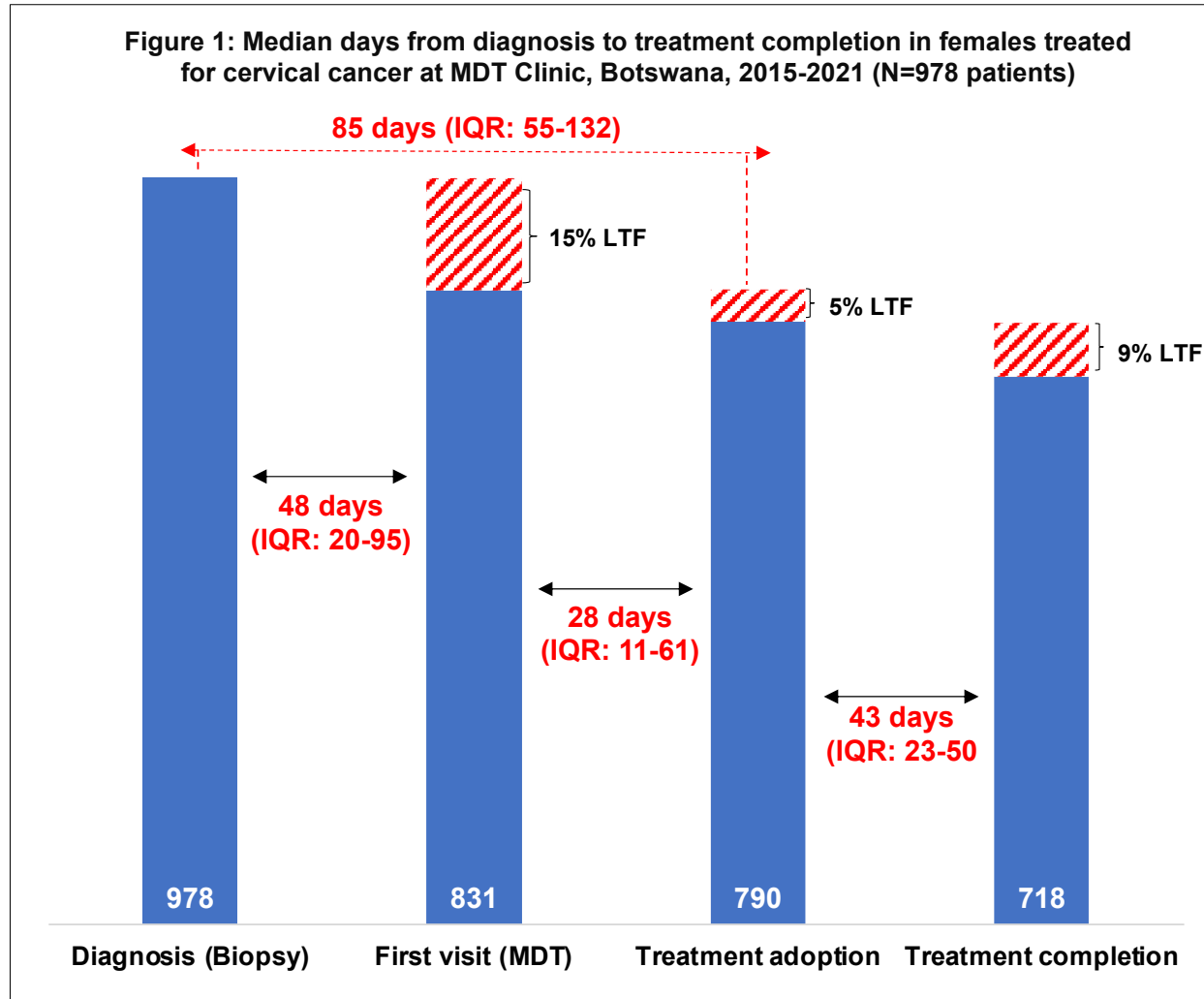


Gaborone Private Hospital (Radiation Treatment)

...there is only one radiation oncology facility in Botswana & thus treatment is centralized

Cervical cancer mortality rate at 20.1 per 100,000 in Botswana (2.2/100,000 in USA)

I. BEFORE: IDENTIFIED GAPS & DETERMINANTS OF DELAYS



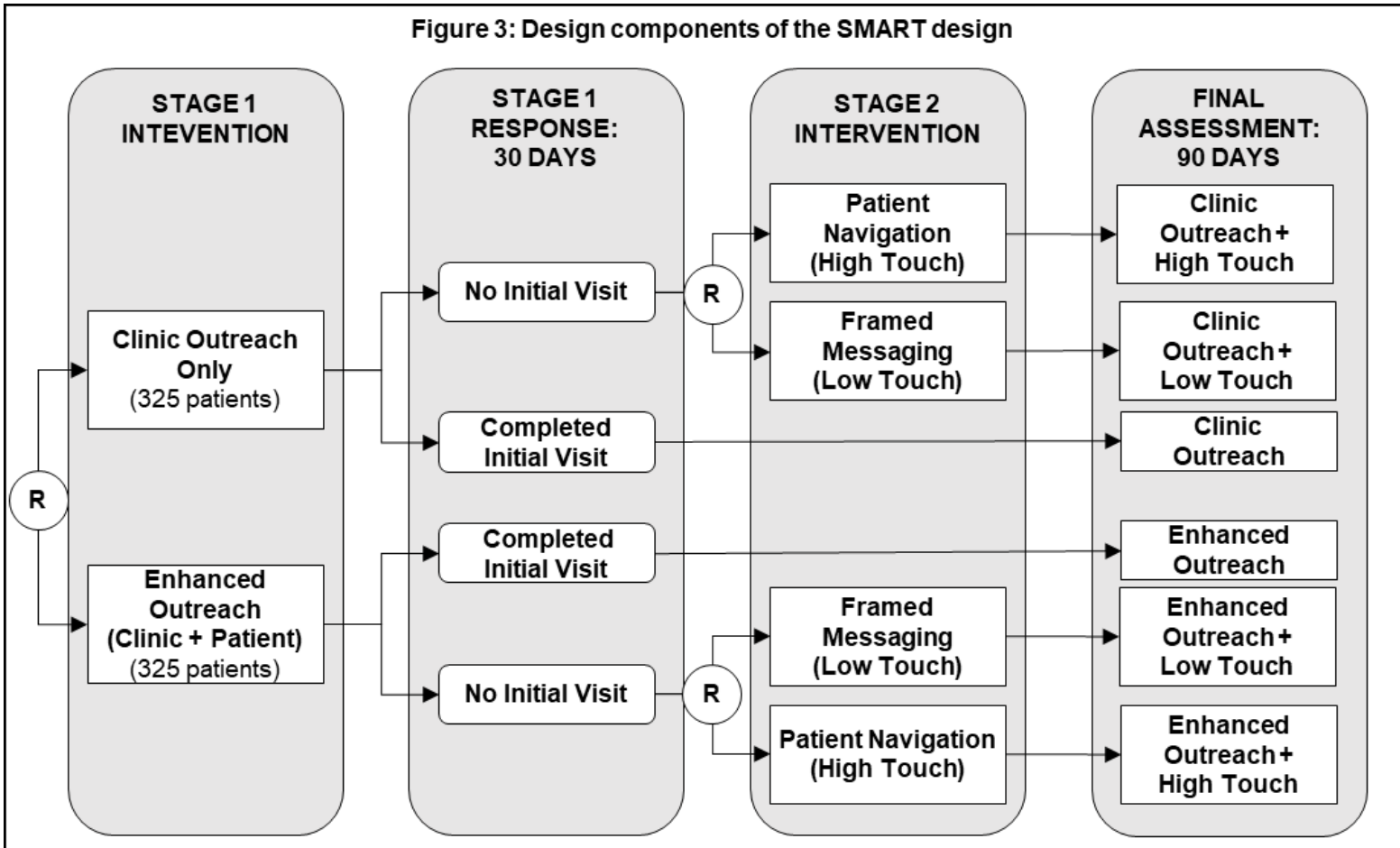
“The challenge for me then becomes leaving to go [to the treatment clinic] and **how I get there if that place is far from me.**”

“I screened when I went for [an] antenatal check-up in Thamaga. **I always tested but did not receive any results [so] I gave up.**”

Rendle et al. 2022 *BMC Women's Health*

2. DESIGN STRATEGIES TO WORK WITH CONTEXT, NOT AGAINST IT: APPLICATION FOR ANY SYSTEM WITH RESTRAINTS (NCI U01)

Figure 3: Design components of the SMART design



- Use **centralized strategy** to enhance outreach and support to patients across the country
- Use **pragmatic and adaptive approach** to identify what combination of low and high strategies are needed to equitably increase care
- Use **embedded mixed methods** evaluation to understand mechanisms pragmatically
- Build **capacity & sustainability** with stakeholders across sectors: government, pathology, clinicians, patients, community members, researchers



MEASURING CONTEXT TO UNDERSTAND MECHANISMS & EQUITY IN PRAGMATIC TRIALS

PENN ISC3



PENN ISC³ (BEIDAS, SCHNOLL, BEKELMAN, MPI)

Mission: To apply insights from **behavioral economics** to rapidly accelerate the pace at which evidence-based practices for cancer care are deployed and the extent to which they are delivered **equitably**, thereby **increasing their reach and impact on the health and health equity of individuals with cancer.**

Design: First two Signature Pilot Projects (**tobacco cessation, serious illness conversations**) in analysis and selected three more for next phase.

- Similar trial designs: pragmatic & factorial (usual care, patient, clinician, both) with embedded mixed methods cohort
- BE guided strategies to increase use of evidence-based cancer care with specific focus on **rapid cycle approaches, health equity, & mixed-methods analysis**

Penn ISC3 Equity Model

Social Determinants

Implementation Strategies

Mechanisms

Outcomes

Race and ethnicity

Income

Education

Zip Code

Patient
Nudges

Clinician
Nudges

Multilevel

- Patient
- Clinician
- Organizational
- Community & Policy

Equity Lens

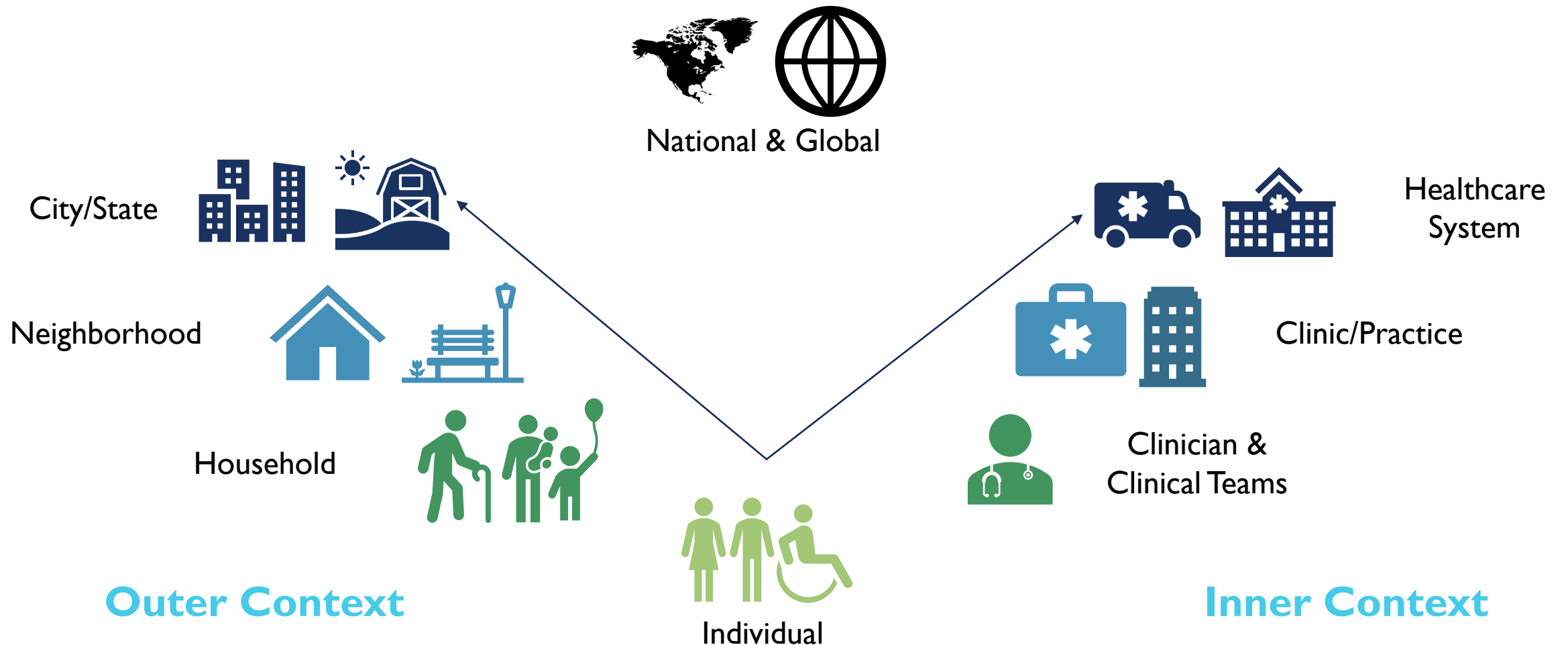
- Mistrust, Racism, Stigma, Discrimination, Health Literacy
- Sampling & Recruitment

Effectiveness of strategies overall & by social determinants

Implementation overall & by social determinants
(RE-AIM for equity/sustainability)

Rapid cycle approaches to design strategies to reduce barriers & increase equity

CONCEPTUALIZE YOUR CONTEXT & ASSESS WHAT YOU CAN MEASURE



HOW WE OPERATIONALIZED IN THE CONTEXT OF A PRAGMATIC TRIAL? CENTRALIZED METHODS CORE

Baseline Clinician Survey across Penn ISC3 iLAB:
Prior to launching of the trials
149 respondents (60.3% response rate)

- Organizational and clinician mediators for trials
- Conditions for qualitative comparative analysis (QCA)

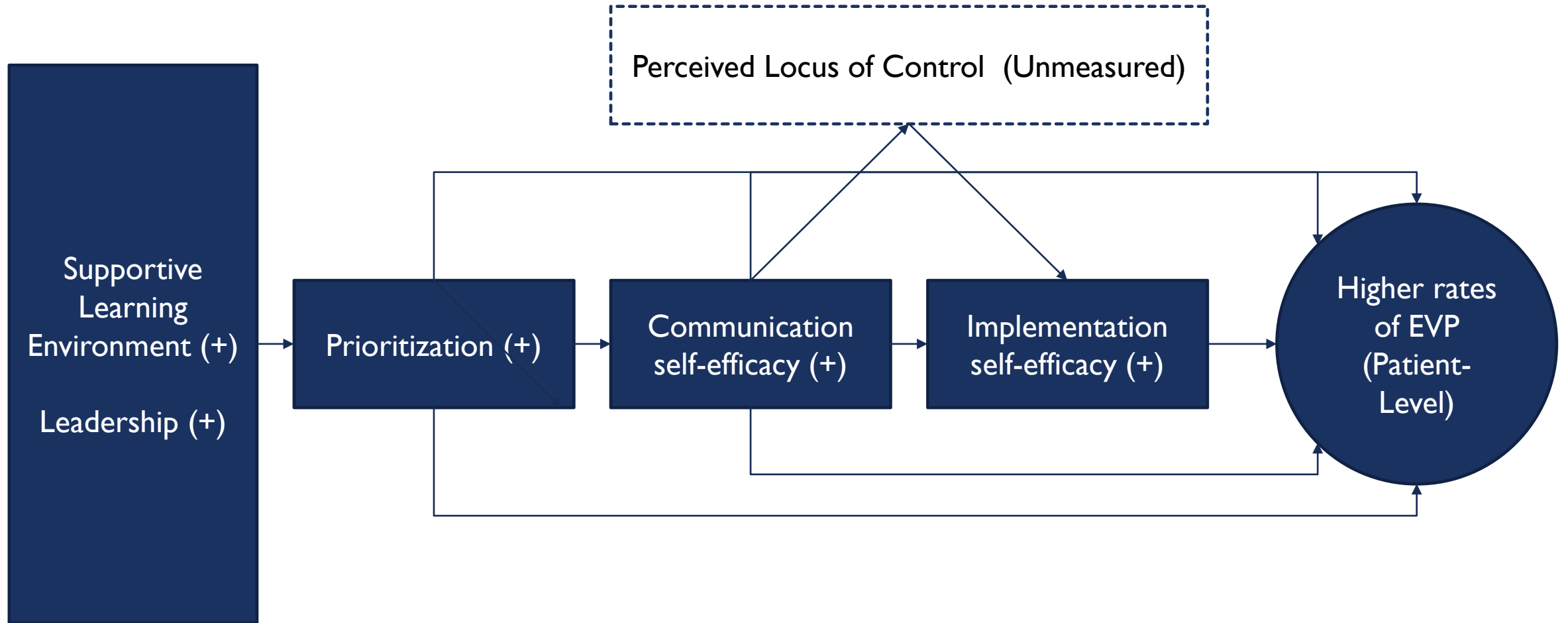
Geocode all patients across pilot projects and link to census-tract SDOHs:
Outer and Inner Context

- Effect moderators & assess reach for trials
- Use to guide stratified sampling for interviews
- Compare area vs individual SDOH (interviews)
- Assess implementation of social risk factors

Embedded Mixed Methods Cohort & QCA
Post-trial interviews with patients, clinicians, and clinical leaders

- Evaluate conditions associated with success & failure within and across pilot trials (cross-cutting constructs)
- Evaluate mechanisms of inequities

BEFORE/DURING: Hypothesized Mechanisms (Baseline Survey)



Baseline Clinician Survey: Cross-Cutting Domains Assessed



Clinical Practices

- Tobacco cessation (SPPI)
- Serious illness conversations (SPP2)
- Financial costs and burden
- Social needs



Clinic-Level

- Supportive learning environment: psychological safety, appreciation of differences, openness to new ideas (5 items)
- Supportive learning environment: Time for reflection (2-items)
- Leadership reinforces learning (4-items)



Clinician-Level

- Self-efficacy to discuss each clinical practice
- Self-efficacy to implementation each clinical practice
- Prioritization of each clinical practice
- Characteristics: Demographics, Training, Clinical Sessions

Baseline Clinician Survey: Cross-Cutting Domains Assessed



Clinical Practices

- Tobacco cessation (SPPI)
- Serious illness conversations (SPP2)
- Financial costs and burden

The rationale for collecting these contextual data were to inform strategies AND to evaluate potential mechanisms that may impact success/failure of the trial.

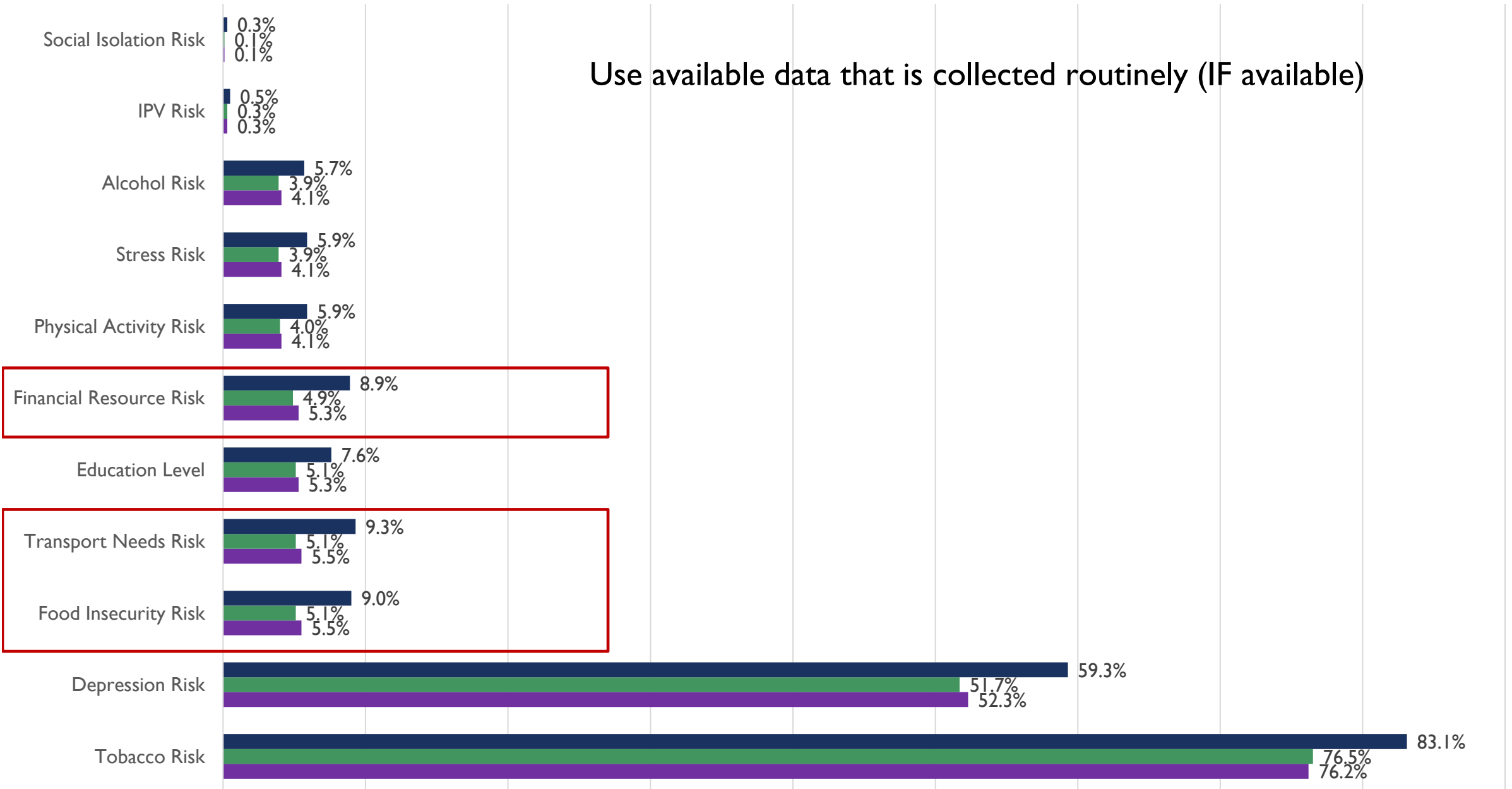
We also used EHR data to identify gaps and disparities associated with each evidence-based practice before and during the trials.



Clinician-Level

- Self-efficacy to implementation each clinical practice
- Prioritization of each clinical practice
- Characteristics: Demographics, Training, Clinical Sessions

Use available data that is collected routinely (IF available)



USING OUTER CONTEXT AS PRAGMATIC APPROACH TO SAMPLING FOR INTERVIEW PARTICIPANTS & MODERATION ANALYSIS

How

1. Geocoded all trial participants (in both SPPs) using ArcGIS Pro: EMR address → Census tract
2. Match patients to outer context variables (e.g., % living in poverty in tract) using 2012-2016 American Community Survey Data (NCI SDOH File) or Outer Context file (now created!)
3. Identify key constructs for moderation analysis specific to project & known disparities
4. Identify key constructs for interview sampling specific to project & known disparities
 1. Randomly sample & invite participants based on key constructs
 2. Monitor enrollment and adjust sampling (%) as needed
5. Done (😊)

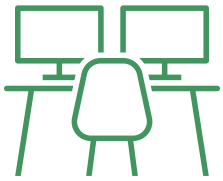
Why

- Neighborhood as pragmatic way to monitor & evaluate equity in trials
- Neighborhood as proxy for individual social risk & needs
- Neighborhood may capture structural effects of inequity & racism

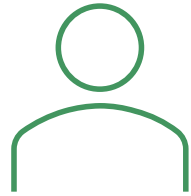


SPP I Interview Participants (n=30)

- 77% HS diploma or lower
- 47% identified as Black
- 47% reported household income <\$30K
- 24% lived in a neighborhood with high poverty rate (25%+)



- Trial starts
- Outcomes assessed at the individual level



- Identify equity domains
- Develop sampling strategies



- Use diverse approaches to recruit participants



- Monitor enrollment
- Adapt sampling strategy if needed to ensure equity



- Analyze for equity
- Analyze for success and failure

Recruit participants for embedded mixed methods study across projects – while monitoring and ensuring equity

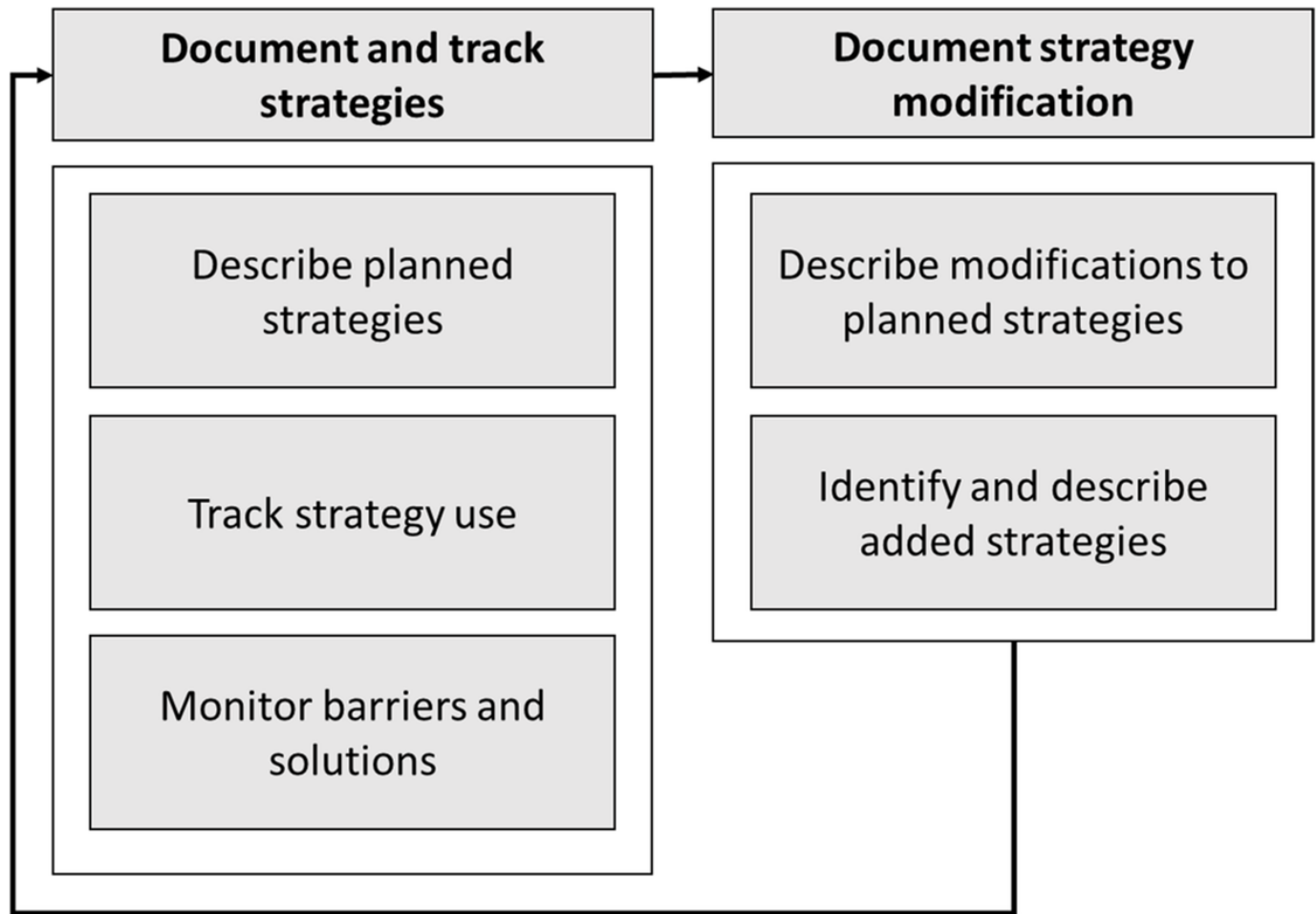
COMBINE DATA FROM PILOT PROJECTS TO EVALUATE PROJECT SPECIFIC & CROSS-PROJECT MECHANISMS: EQUITY FOCUS

Cross-Project Domains of Inquiry

- Baseline Survey Domains
 - Organizational/clinician data
- Structured (Pre-Interview Questionnaire):
 - Medical Mistrust, Financial Toxicity, Patient-Centered Communication, Health Literacy, Social Needs, Project Specific
- Open-Ended (Interview):
 - CFIR guided and tailored to project content/response to nudges
 - Includes health discrimination and health equity (what does health equity mean to you?) questions

Large amount of data for analysis

- 149 baseline clinician surveys
- 60+ patient mixed methods interviews
- 30+ clinician mixed methods interviews



**TRACKING
ADAPTATION OF
STRATEGIES &
CONTEXTUAL SHIFTS
OUTSIDE OF STUDY**

Haley, A.D., Powell, B.J., Walsh-Bailey, C. *et al.* Strengthening methods for tracking adaptations and modifications to implementation strategies. *BMC Med Res Methodol* **21**, 133 (2021). <https://doi.org/10.1186/s12874-021-01326-6>

Context matters not only for your project but so that others can understand what may have drove your findings – and what might need to be in place (or not) to work in another context...





THANK YOU!

QUESTIONS? COMMENTS?



Fundamentals

2024 Implementation Science Seminar Series



Hosted by:

Jeremiah Brown, PhD, DCIS Director
Kelly Aschbrenner, PhD, DCIS Co-Director
Sarah Lord, PhD, DCIS Co-Director

Monthly on the 2nd Tuesday

May

Implementation Frameworks: PRISM & RE-AIM

Tina Studts, PhD
University of Colorado

Samantha Harden, PhD
Virginia Tech

Tuesday, May 14

June

Designing for Dissemination & Sustainability

Allison L'Hotta, OTD, OTR/L, PhD
University of Colorado

Thembekele Shato, PhD, MPH
Washington University in St. Louis

Tuesday, June 11

Recent Sessions

Available at:
geiselmed.dartmouth.edu/dcis/past-events/

From Concept to Impact: Exploring Implementation Models and Frameworks

Sara Malone, PhD
March 2024

[Recording](#) | [Slides](#)

Five Considerations for Formulating an Implementation Science Research Question

Kelly Aschbrenner, PhD
February 2024

[Recording](#) | [Slides](#)



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