Revisiting concepts of evidence in implementation science

Implementation Science Seminar Series

UTHealth Houston
Institute for
Implementation Science

Prevention
Research Center

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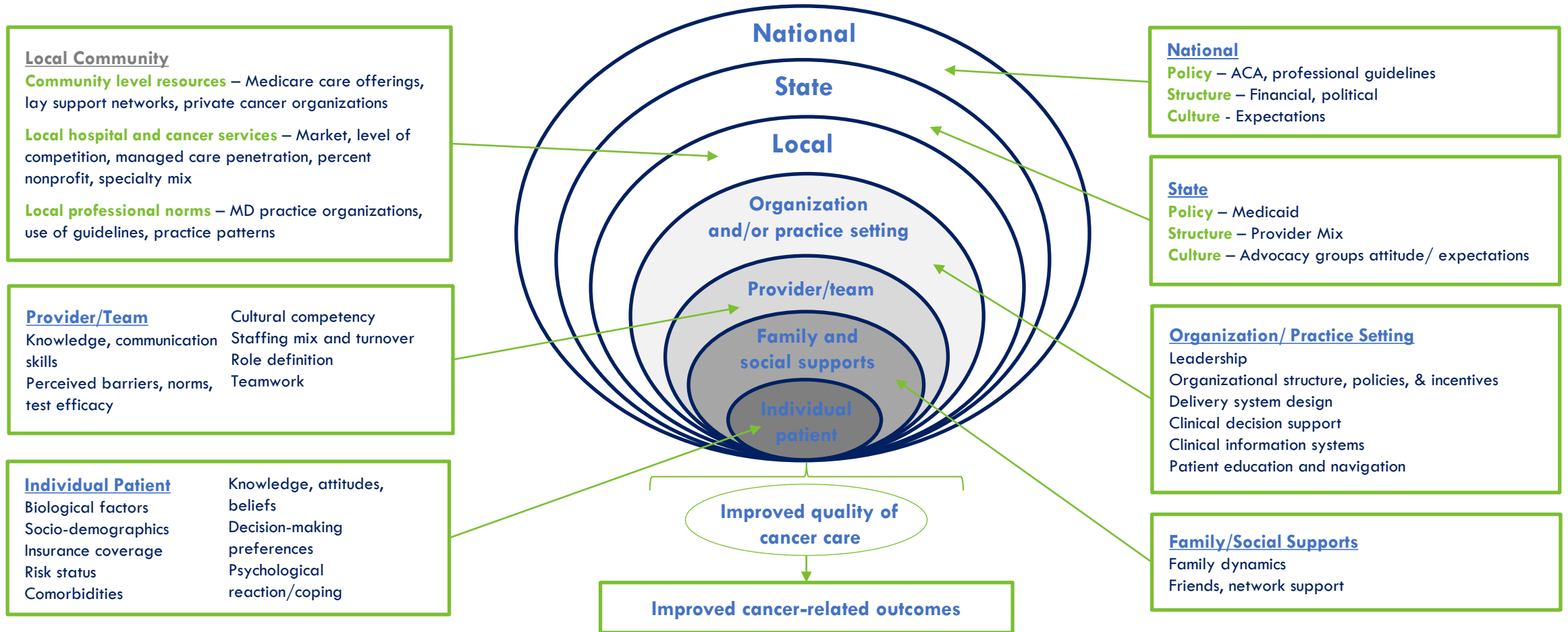**Washington University in St. Louis**

Objectives

1. Identify key types of evidence and methods of evidence generation.

2. Explore several core concepts, including context, external validity, and health equity.

3. Describe uses and thresholds of evidence among various audiences (research, practice, policy).

4. Describe tools and resources for enhancing uses of evidence.

The backdrop and brief history

We operate in a complex, multilevel world

Local Community

Community level resources – Medicare care offerings, lay support networks, private cancer organizations

Local hospital and cancer services – Market, level of competition, managed care penetration, percent nonprofit, specialty mix

Local professional norms – MD practice organizations, use of guidelines, practice patterns

Provider/Team
Knowledge, communication skills
Perceived barriers, norms, test efficacy
Cultural competency
Staffing mix and turnover
Role definition
Teamwork

Individual Patient
Biological factors
Socio-demographics
Insurance coverage
Risk status
Comorbidities
Knowledge, attitudes, beliefs
Decision-making preferences
Psychological reaction/coping

National
Policy – ACA, professional guidelines
Structure – Financial, political
Culture - Expectations

State
Policy – Medicaid
Structure – Provider Mix
Culture – Advocacy groups attitude/ expectations

Organization/ Practice Setting
Leadership
Organizational structure, policies, & incentives
Delivery system design
Clinical decision support
Clinical information systems
Patient education and navigation

Family/Social Supports
Family dynamics
Friends, network support

National
State
Local
Organization and/or practice setting
Provider/team
Family and social supports
Individual patient

Improved quality of cancer care

Improved cancer-related outcomes

Taplin, Stephen H et al. "A multilevel research perspective on cancer care delivery: the example of follow-up to an abnormal mammogram." Cancer epidemiology, biomarkers & prevention : a publication of the American Association for Cancer Research, cosponsored by the American Society of Preventive Oncology vol. 21,10 (2012): 1709-15.

Few Broad Street pump handles left to remove

John Snow's Map of London

1849: 53K cholera deaths in England & Wales

1854: 700 deaths to ~0

Removal of Pump Led to Immediate Reduction in Cholera Deaths

Evidence synthesis has been around a long time

- The US National Academy of Sciences began in 1863
  - To "investigate, examine, experiment, and report upon any subject of science or art"
- Meta-analysis introduced by Glass in 1976
- EBM officially in early 1990s and EBPH in late 1990s
  - Rooted in work of Archie Cochrane in early 1970s
- Large growth in methods and uses in past few decades
  - Cochrane Collaboration (UK, 1993)
  - Campbell Collaboration (Norway, 2000)
  - US Clinical Guide (1984) and Community Guide (1996)

Diffusion of innovations (evidence)

I. Perceived Attributes of Innovation
1. Relative Advantage
2. Compatibility
3. Complexity
4. Trialability
5. Observability

II. Type of Innovation-Decision
1. Optional   2. Collective   3. Authority

III. Communication Channels
Increased by more and better mediums

IV. Nature of Social System
E.g, traditional versus modern, isolated or interconnected to other systems

V. Efforts of Change Agents
Educational and promotional efforts

DIFFUSION OF INNOVATIONS

FIFTH EDITION
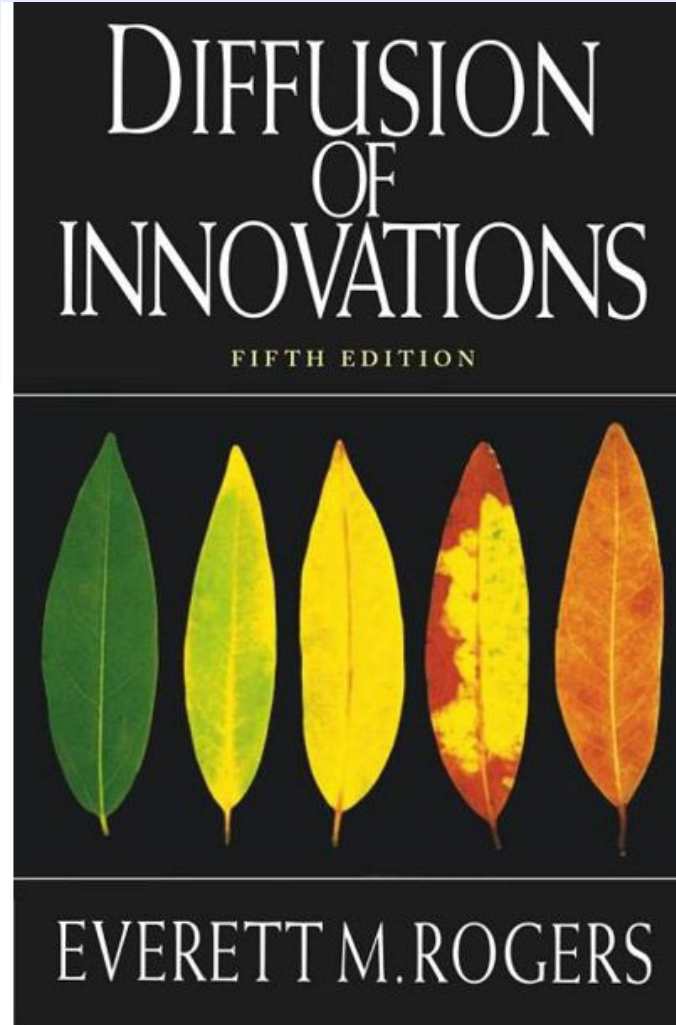
EVERETT M. ROGERS

- Published in 1962

- Everett Rogers – Ohio State University

- Second most cited book ever

- Widely applied today

Core concepts

" The best is the enemy of the good."

-Voltaire

"Then we've agreed that all the evidence isn't in, and that even if all the evidence were in, it _still_ wouldn't be definitive."

Defining evidence for implementation research

- Comes in many forms, evidence on:
  - From etiology to intervention effectiveness to implementation within context
- Too often narrowly focused on the evidence-based intervention
- Contextual evidence is essential
  - Circumstances or unique factors related to the clinical or community setting that surround a particular implementation effort
  - Multilevel and dynamic
  - Closely related to external validity
- Many gaps in equity-focused and equity-relevant evidence
- Need for a more robust definition of evidence

What is "Evidence"?

Objective

- Scientific literature in systematic reviews
- Scientific literature in one or more journal articles
- High quality patient or surveillance data
- Program evaluation data
- Qualitative data
    - Patients, community members
    - Other partners
- Combined professional judgment
- Media/marketing data
- Word of mouth
- Personal experience
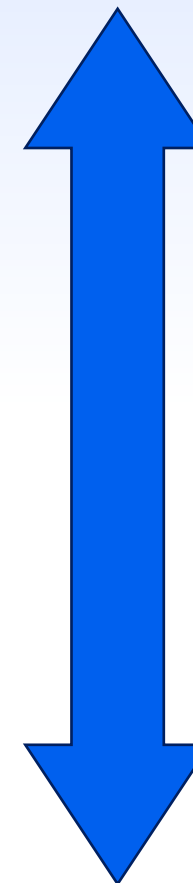
Subjective

Like beauty or art, evidence is in the eye of the beholder…

An evidence hierarchy or typology?

- Evidence typologies to complement hierarchies may be the most useful approach
  - Hierarchies in isolation, less useful for policy and community level interventions
  - "Horses for courses" (Petticrew & Roberts)
- Typology for intervention research and implementation science (Hasson *et al.*)
  - Interventions
    - Including core components and appropriate adaptations
  - Strategies to support–high-quality implementation
  - Generalizations about the evidence in a variety of contexts
  - Outcomes based on end users' preferences and knowledge

Petticrew M, Roberts H. Evidence, hierarchies, and typologies: horses for courses. *J Epidemiol Community Health*. Jul 2003;57(7):527-9.

Hasson H, et al. A typology of useful evidence: approaches to increase the practical value of intervention research. *BMC Med Res Methodol*. May 28 2020;20(1):133.

Evidence <u>for what?</u>

Characteristic	Type One	Type Two	Type Three
Typical Data/ Relationship	Size and strength of preventable risk—disease relationship (measures of burden, etiologic research)	Relative effectiveness of public health or clinical intervention	Adaptation and implementation in context
Common setting	Clinic or controlled community setting	Socially intact groups or community-wide	Socially intact groups or community-wide
Example	Smoking causes lung cancer	Price increases with a targeted media campaign reduce smoking rates	Addressing the political challenges of price increases
Quantity of evidence	(Too?) Plentiful	Moderate (less than type 1)	Least (less than type 2)
Action	Something should be done.	This/these should be done	How it should be done

Evidence <u>on what?</u>
Considering measurement & evaluation issues

THEORETICAL FRAMEWORK/MODEL

What question are you asking?

What type of evidence do you need?

What design & evaluation options do you have?

What do you need to measure?
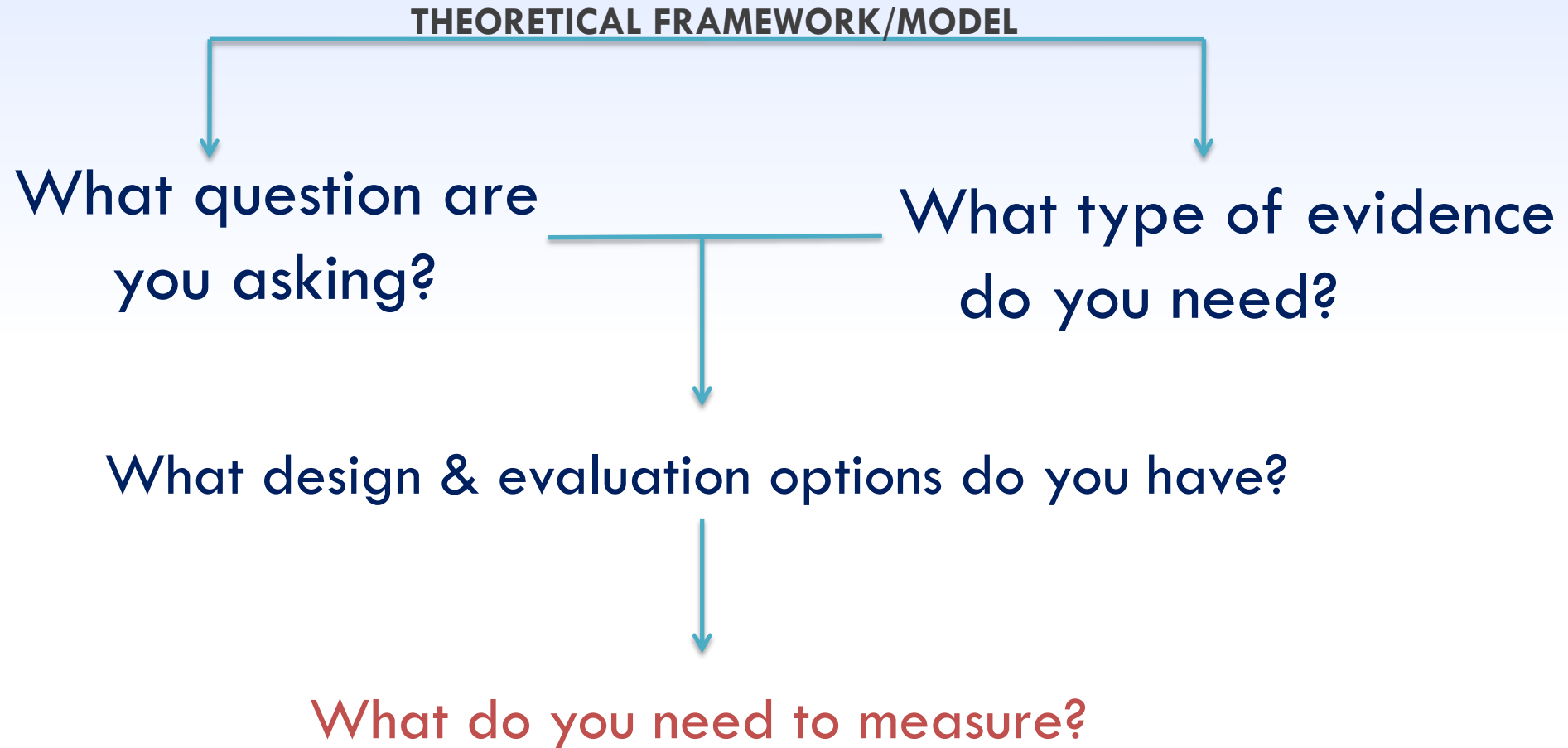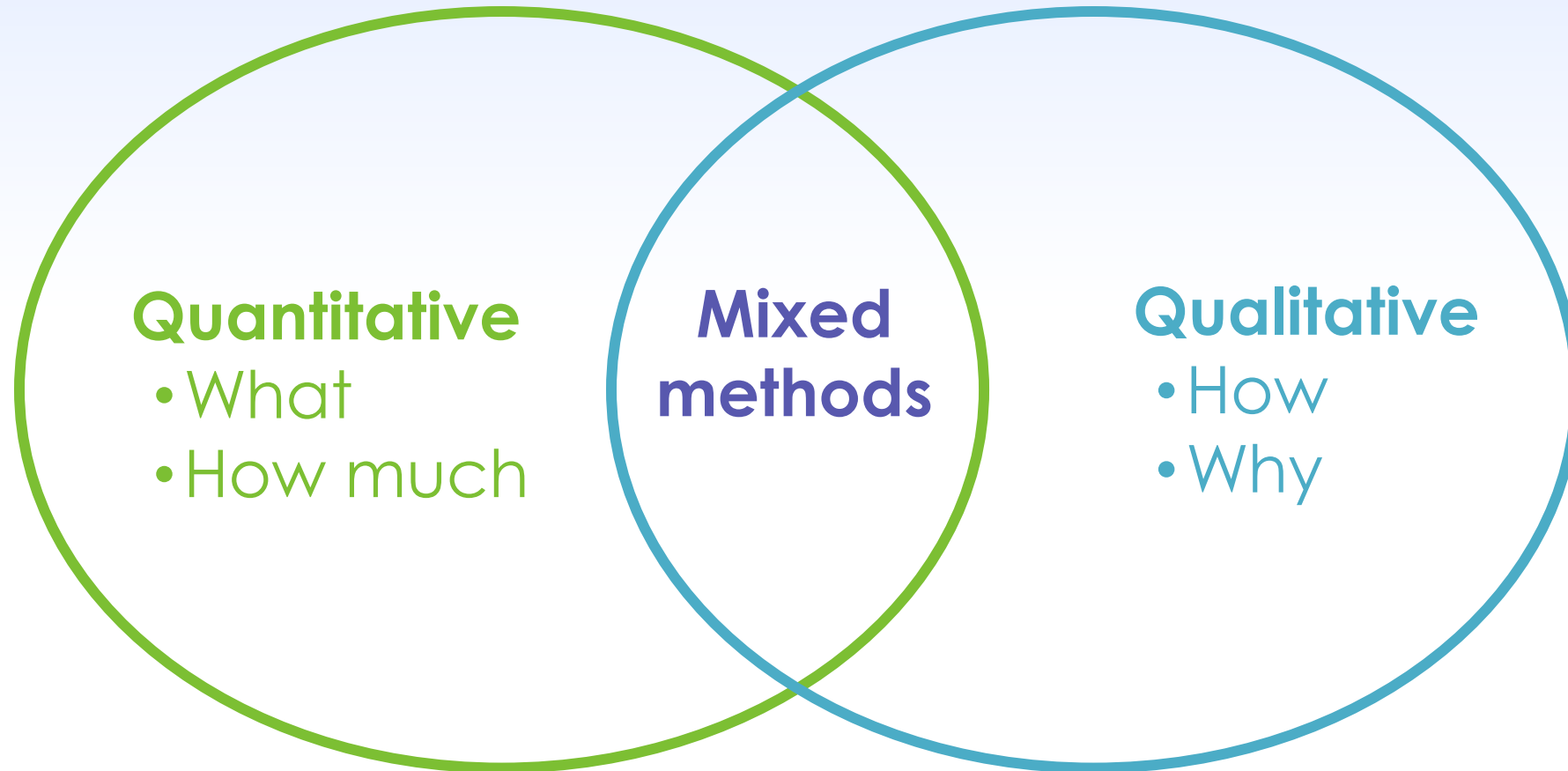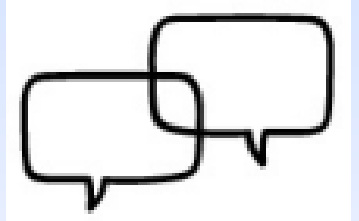
What is evidence-based medicine?

Always an honest word
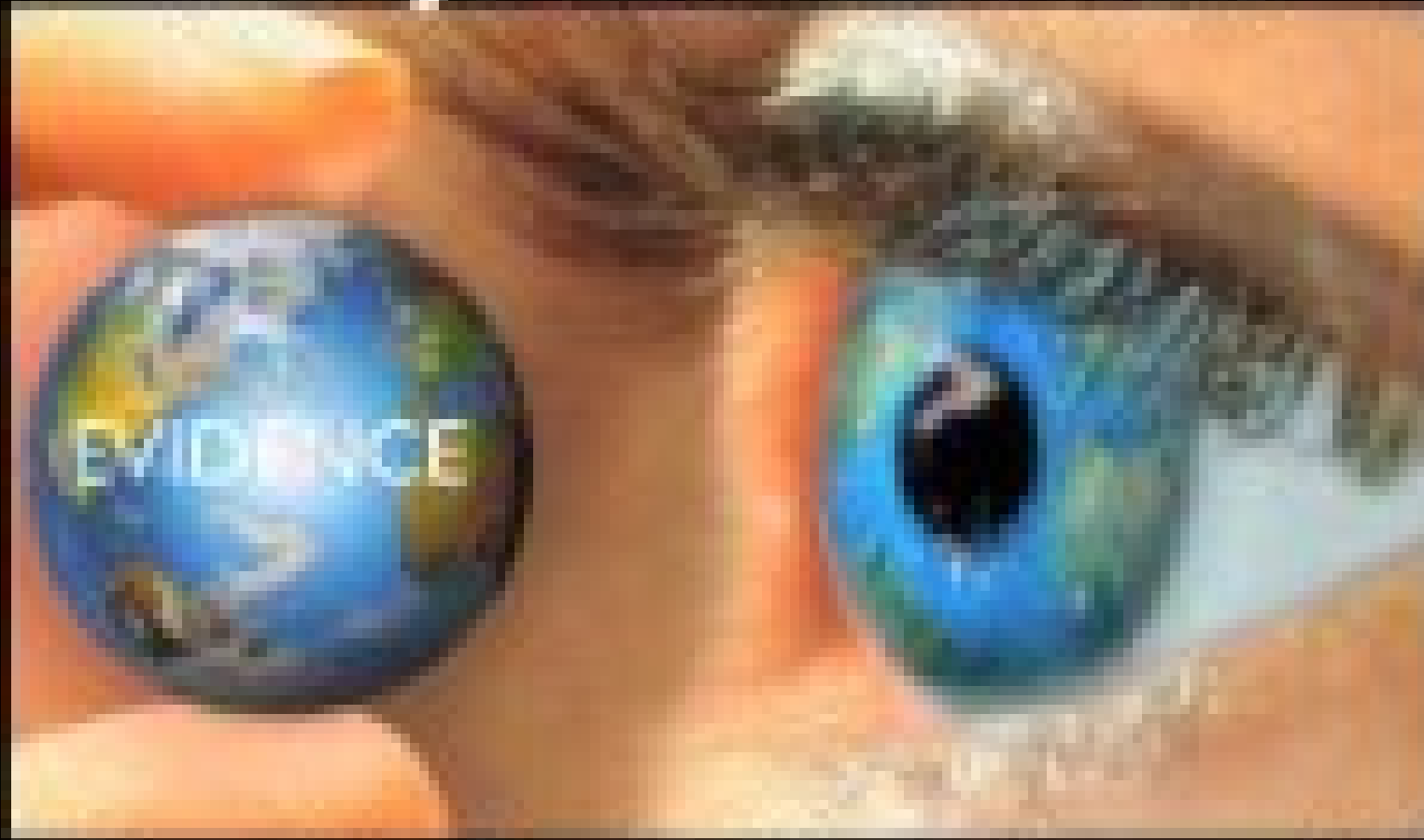
Now it's how I view the world

Viva La Evidence
Credit to Canadian Band Aivia

RCTs and the real world

- Traditional RCTs, the gold standard for assessing causality (for internal validity)

- Often study the effectiveness of treatments delivered to carefully selected populations under ideal, higher resource conditions
  - We do not design for dissemination, implementation, and sustainment
  - Too often, not pragmatic
  - Policy evaluation (will return to this)

- Makes it difficult to translate results to the real world

- Often, when we implement a tested intervention into everyday practice, we often see a "voltage drop"—a dramatic decrease in effectiveness

The three little paradoxes

- The internal validity – external validity paradox
  - The more rigorously controlled a study testing the efficacy of an intervention, the less reality-based it becomes, impacting on scalability and generalizability

- The specificity – generalizability paradox
  - The more relevant and particular to the local context, the less generalizable to other contexts

- The homophily – distancing paradox
  - Effectiveness of researchers goes up with increased interaction with the community of interest, may influence real-work utility of findings

"If you build it…(we have evidence)"

If you disseminate it… (the mismatch in D4D)

Method	Typically used, %	Most impact on career, %	Most impact on practice/policy, %
Academic journals	88	94	16
Reports to funders	74	0	6
Face-to-face meetings with stakeholders	55	0	40
Seminars or workshops	51	1	9
Social media	42	0	3
Press releases	33	0	4

From: Knoepke et al, *PLoS ONE* 2019:14(11).

Equity and implementation research

People are living (much) longer

In 2022,
76.1 years

In 1900,
47 years

Remarkable progress!!

Legend: 2019, 2020, 2021

	Hispanic	Asian	White	Black	AIAN[1]
2019	81.9	85.6	78.8	74.8	71.8
2020	77.9	83.6	77.4	71.5	67.1
2021	77.7	83.5	76.4	70.8	65.2

Asian, White, Black, AIAN[1] are Non-Hispanic
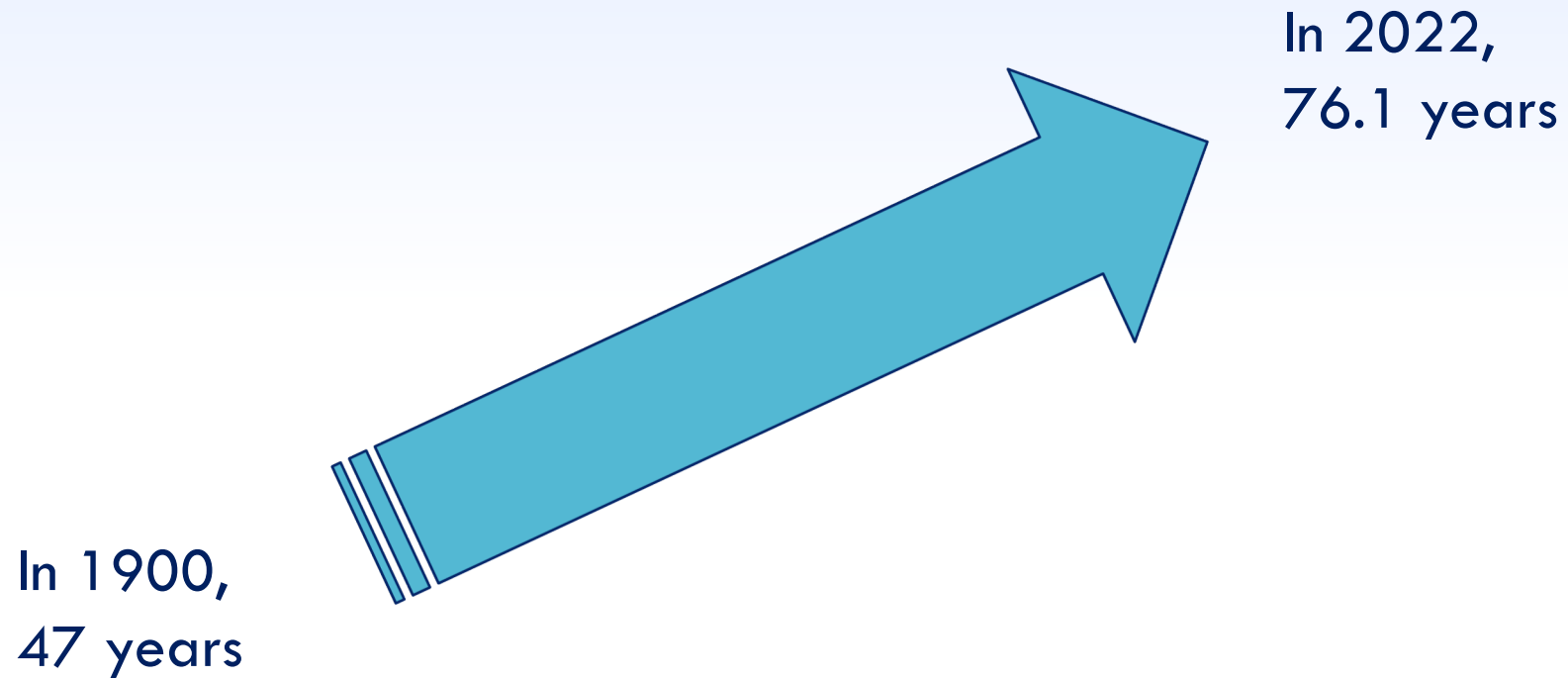
Age (years)
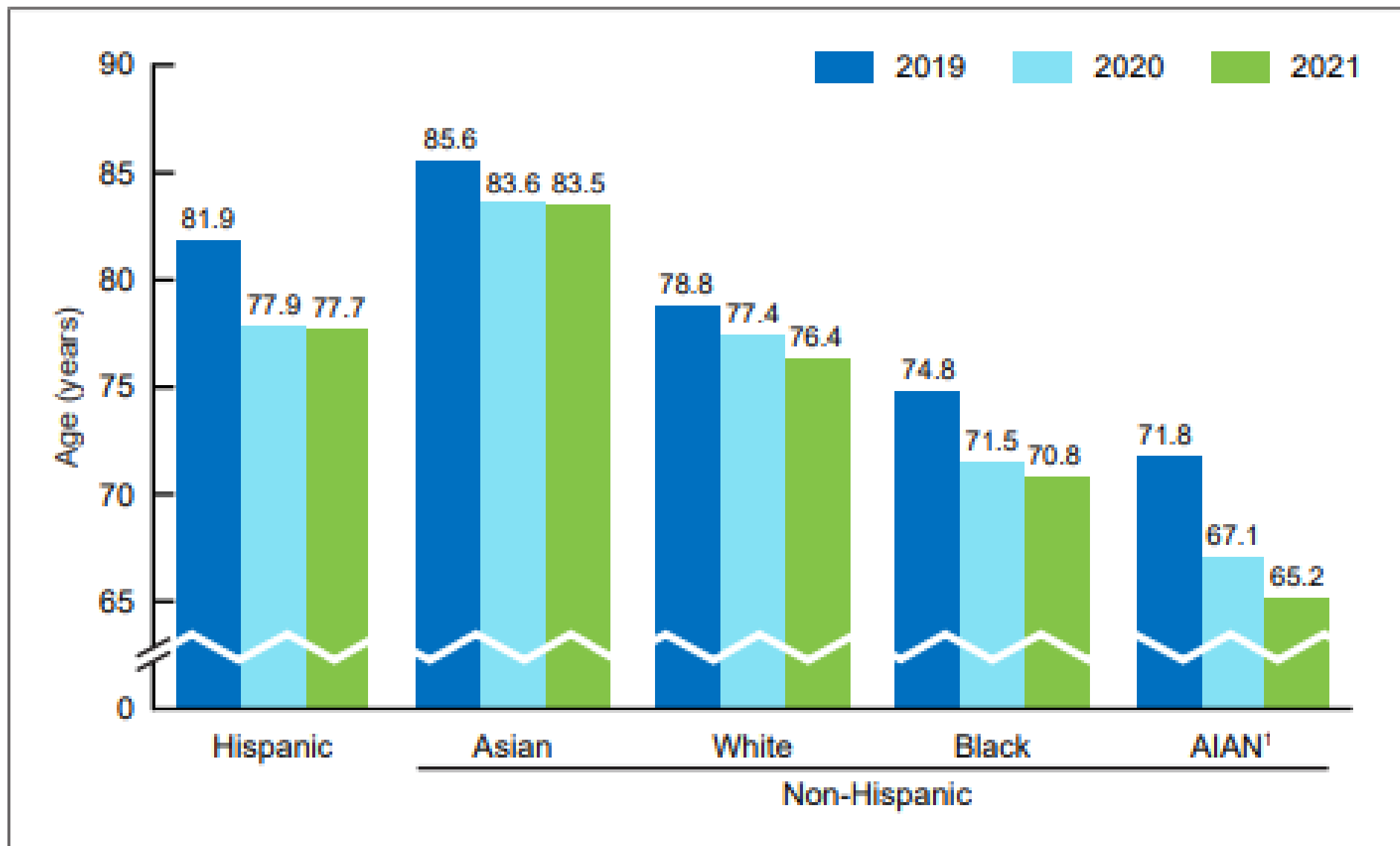
[1]American Indian or Alaska Native.
NOTES: Estimates are based on provisional data for 2021. Provisional data are subject to change as additional data are received. Estimates for 2019 and 2020 are based on final data. Life tables by race and Hispanic origin are based on death rates that have been adjusted for race and Hispanic-origin misclassification on death certificates; see Technical Notes in this report.
SOURCE: National Center for Health Statistics, National Vital Statistics System, Mortality.

Central premise

There is a lack of attention to health equity and social justice in implementation science research and practice

Equality
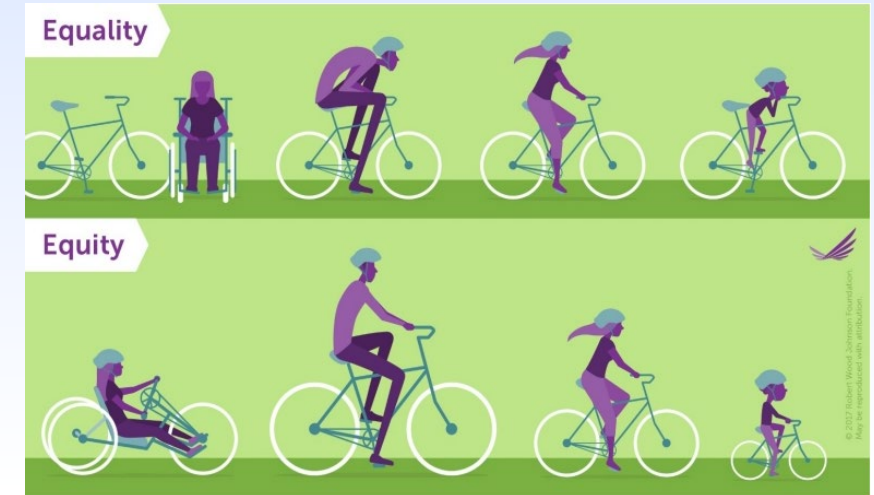
Equity

Implementation Science

DEBATE

Open Access

Check for updates

Implementation science should give higher priority to health equity

Ross C. Brownson[1,2]* , Shiriki K. Kumanyika[3], Matthew W. Kreuter[4] and Debra Haire-Joshu[5]

Key challenges

Limitations of the evidence base

- For example
  - Too few evidence-based interventions adequately include a systems approach/address upstream social determinants

Underdeveloped measures and methods

- For example:
  - Measures and methods for IS have a limited emphasis on equity
  - In our review of policy IS measures, 0 of 170 had an explicit focus on equity

Inadequate attention to context

- For example:
  - Inadequate attention to macro forces that shape implementation
  - Historical, cultural, economic, and political forces

Brownson RC, Shelton RC, Geng EH, Glasgow RE. Revisiting concepts of evidence in implementation science. *Implement Sci*. Apr 12 2022;17(1):26.

10 recommendations

Table 2 Recommendations to advance health equity within implementation science

Domain	Recommendation	Core elements	Actors[a]
Evidence base			
	1. Link social determinants with health outcomes	• Build literature linking social determinants with health outcomes of importance to key stakeholders (e.g., funders) • Build the literature on implementation processes in low-resource settings • Identify opportunities to address social risk in primary care • Describe the role of social determinants as moderators of behavior change • Apply equity-relevant guidelines and evidence frameworks	• Funders • Researchers
	2. Build equity into all policies	• Incorporate health and equity consideration in policy decisions across sectors (Equity in All Policies) • Analyze barriers to change with an equity focus • Frame and communicate policy information in new ways (e.g., framing for audience segments, use of narratives)	• Advocates • State and local practitioners • Policy makers

10 recommendations (cont.)

Methods and Measures

3. Use equity-relevant metrics

4. Study what is already happening

5. Integrate equity into implementation models

6. Design and tailor implementation strategies

Context

7. Connect to systems and sectors outside of health

8. Engage organizations in internal and external equity efforts

Cross-cutting issues

9. Build capacity for equity in IS

10. Focus on equity in dissemination efforts

A few bottom lines

- Health equity begins with justice
- Every project should include an equity focus –
  - Main goal and central feature
  - Research questions, conceptual model, project activities, dissemination of findings

  OR

  - Part of a project but not the singular focus
  - Ensure that we "leave no one behind" and that existing disparities are not inadvertently widened

Evidence <u>for whom</u>: know your audience

Our frequent audiences

- Key audiences for evidence
  - Practitioners
    - Public health
    - Clinical
  - Policy makers

- Communication and framing
  - Gain *versus* loss mindset (dollars saved *versus* lives lost)
  - How messages are perceived (unbiased, credible)
  - How to deliver (appropriately packaged, understandable)

Basic communication/dissemination model

Brownson RC, et al. Getting the Word Out: New Approaches for Disseminating Public Health Science. *J Public Health Manag Pract*. Mar/Apr 2018;24(2):102-111.
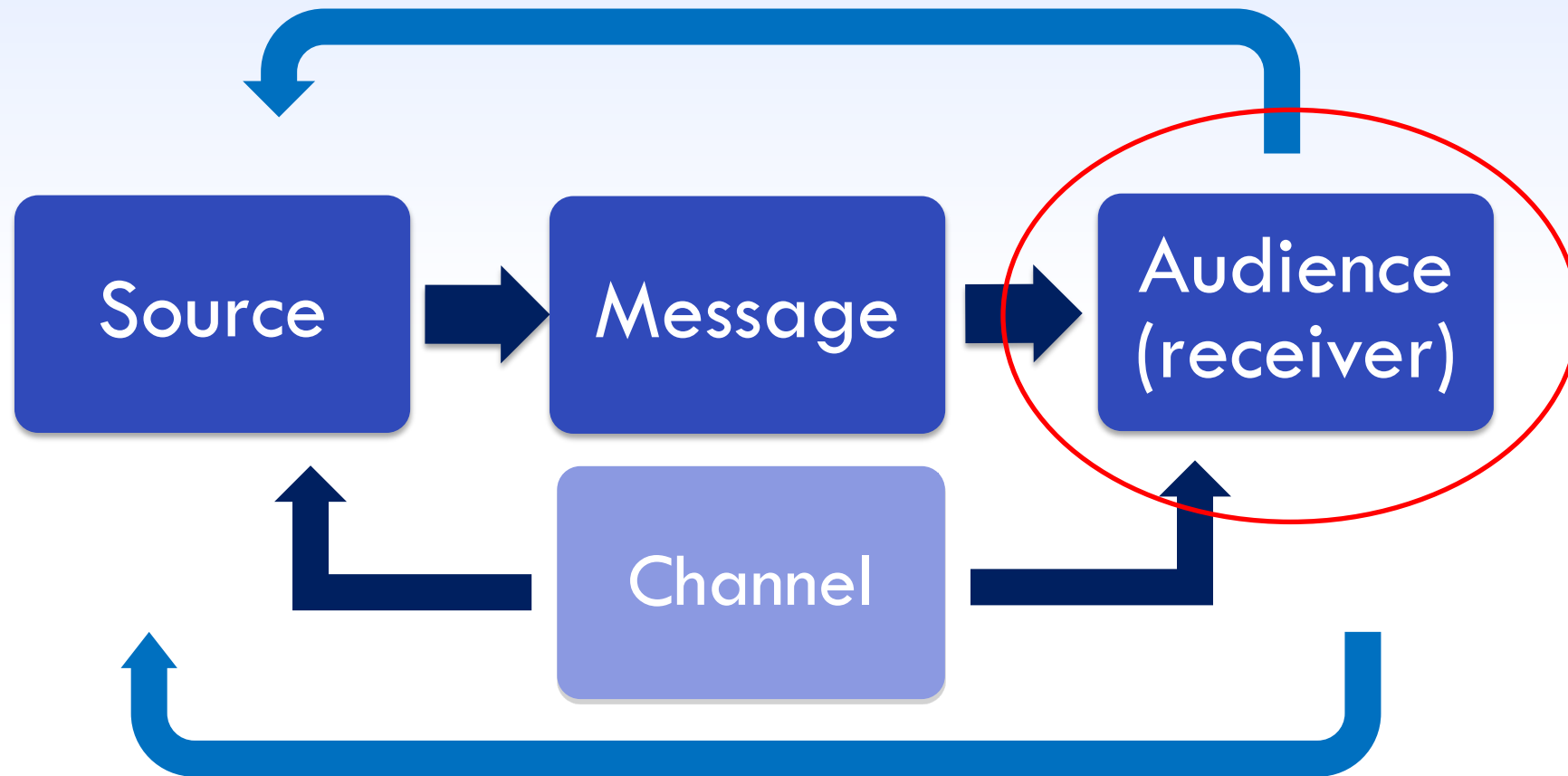
Planning matrix

Segment	Relevant characteristics	Messages	Channels
Public health practitioners	• High commitment to health • Wide range of professional backgrounds • Access to summaries of evidence but often not the original research • Long term horizon for outcomes	• Make a difference in society • Improve health equity • Enhance resources	• Leadership meetings • Professional associations • Brief summaries of evidence
Clinical practitioners	• High commitment health • Narrow range of professional backgrounds • Time urgency	• Improve patient care • Improve health equity	• Journal articles • Professional associations • Professional conferences • Brief summaries of evidence
Policy makers	• Variable commitment to health (often limited knowledge across many issues) • Wide range of professional backgrounds • Short term horizon for outcomes	• Serve constituents • Create return on investment • Get re-elected	• Real world stories • Brief summaries of evidence • Delivery of messages by opinion leaders

Evidence thresholds
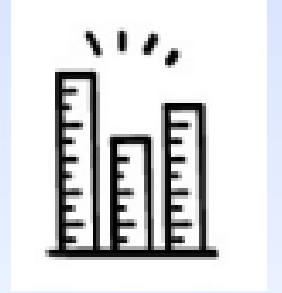
- Analogous to the *burden to proof* in law
- Public health urgency matters
- Thresholds likely to vary by audience
  - Clinical practitioners
    - Generally the highest bar for evidence
    - High financial stakes, regulatory agencies (e.g., FDA)
  - Public health practitioners (state, local)
    - Middle, and highly variable based on setting, resources and funder
    - For CDC support, EBIs often required (but tough to track implementation)
  - Policy makers
    - Less likely to be based in science, but EB policy examples exist
    - A mix of policy, politics, timing, luck, persistence

Notes on policy-related evidence
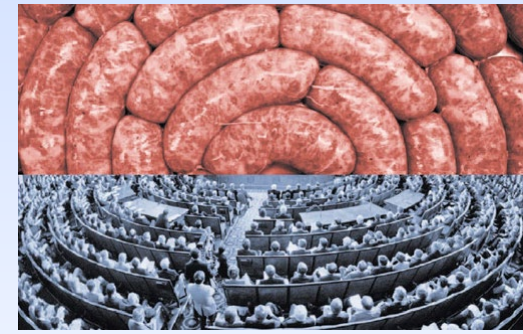
- Policy interventions often have the greatest opportunity to change the systems and environments that create health inequities (the "inverse evidence law")
- *Lack of control over the intervention (policy)*
  - Makes evaluation challenging
- Timeframe may be much shorter for policy maker needs—but much longer for policy outcomes

Gaps in our knowledge

- Null (ineffective) interventions
    - Which parts of an EBI or implementation strategy need to be refined, adapted, or re-invented
    - For whom and under what conditions an EBI or implementation strategy is "evidence-based"
    - Roles of underpowered studies and publication bias

- De-implementation
    - Stopping or abandoning practices that are not proved to be effective, low value, or harmful

- Mis-implementation
    - Discontinuation of effective programs and the continuation of ineffective practices in public health settings

- Often require complex, systems methods

Tools and resources

We describe many resources

Table 6 Selected resources and tools to support practice and research on evidence-based dissemination and implementation

Category	Name	Description	Weblink
Engagement and partnerships	Community Tool Box	The Community Tool Box is a free, online resource for those working to build healthier communities and bring about social change. The Tool Box seeks to promote community health and development by connecting people, ideas, and resources.	https://ctb.ku.edu/en
	Engage for Equity	The tools provide a step-by-step approach for research partnerships to examine where they are now and where they want to be in the future. Each step includes a short description and an interactive exercise or tool.	https://engageforequity.org/tool_kit/
	Advancing Health Equity Toolkit	This practice-oriented toolkit leads agencies, teams, community-based organizations, and community partnerships through different public health processes using a health equity lens. The modules include interactive reflection questions across a framework for evidence-based decision-making.	Home | Evidence-Based Decision Making & Health Equity (wixsite.com)
	Stakeholder Engagement Navigator	The Navigator is designed to help teams select the most appropriate engagement method or tool for a particular project. It is an interactive tool that takes into account the purpose, resources, frequency of engagement, and expertise.	https://dicemethods.org/Tool

Other useful meta-resources

Key take home messages

1. Evidence is complex, multilevel and contextual.

2. Too often, structural and root causes are under addressed.

3. All of us, including funders and reviewers, should adopt a more robust and less narrow definition of evidence.

4. Many tools and resources can assist you in your journey.
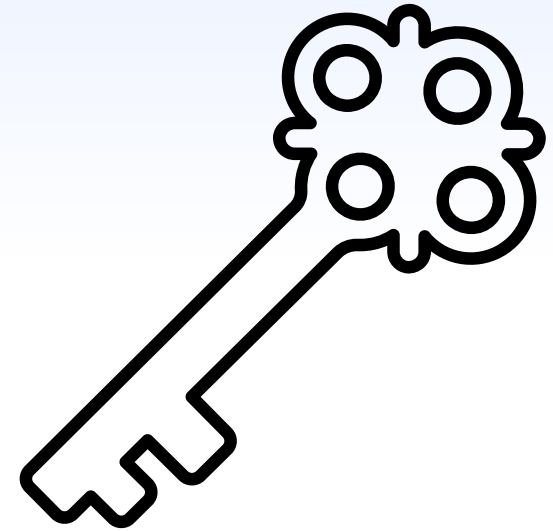
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Readings

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