

Precision Public Health

A Primary Strategy for Reaching Health Equity

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Oak Ridge Institute for Science and Education (ORISE)
Genomics and Precision Public Health Issues Enrichment Event

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Disclaimer and Disclosure Statements

- I have no conflicts of interest to disclose.
- The contents of this presentation should not be construed as representing an official position of the NIH or the United States Department of Health and Human Services.

Lecture Objectives

1. Provide a comprehensive understanding of precision public health (**PPH**) as a primary strategy for attaining health equity.
2. Examine how PPH can leverage social and environmental determinants of health to inform public health interventions and help shape outcomes for health equity.
3. Highlight core competencies necessary for PPH to have sustainable impact on advancing health equity.
4. Identify the crucial role of continued social/behavioral/biomedical **research** for advancing PPH for reaching health equity.

**Precision
Public
Health**



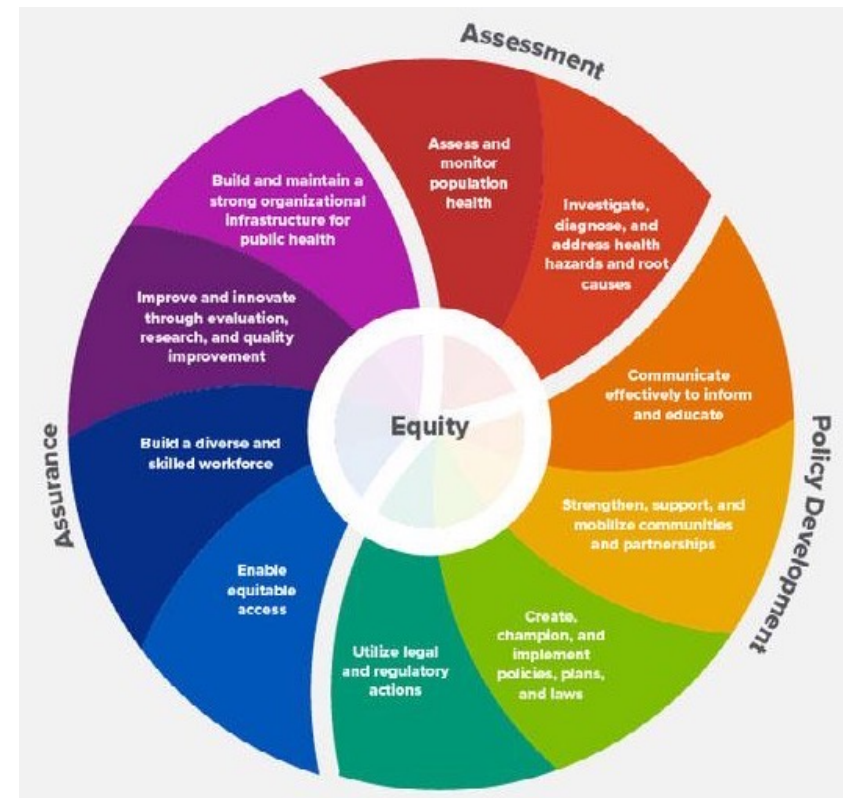
Social Determinants of Health



Definition of terms and the primary question we want to answer in this session

- **Precision Public Health (PPH):** It is about delivering the right intervention at the right time, every time, to the right population with the right results.
- **Health Equity:** The state in which everyone has a **fair and just** opportunity to attain the highest level of health.
- **Primary Strategies in Public Health:** Approaches, tools, technologies, and/or sets of interventions that enable the successful execution of the 10 essential public health services.

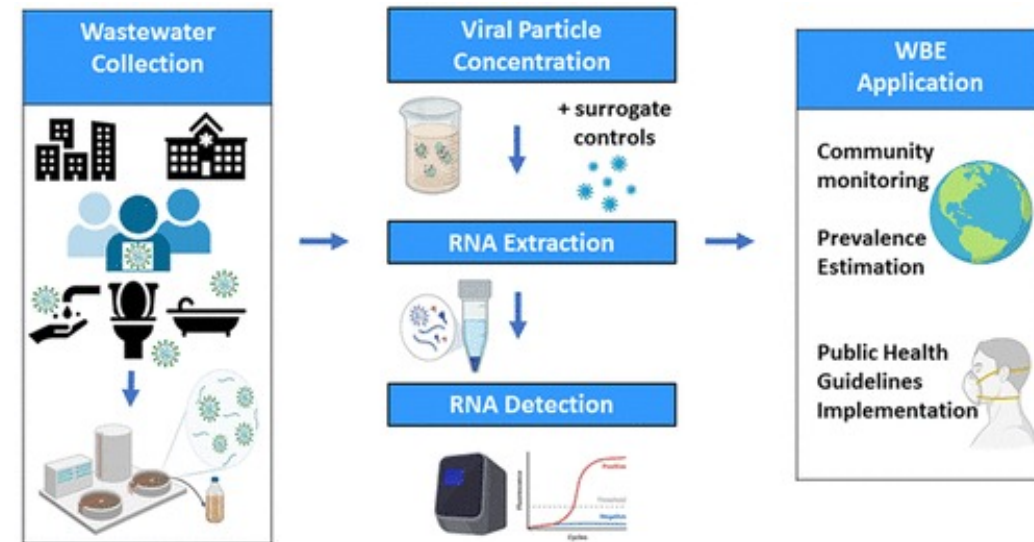
In what ways can PPH serve as a primary strategy for reaching Health Equity?



1. Monitor
2. Investigate
3. Communicate
4. Strengthen
5. Champion
6. Utilize
7. Enable
8. Build
9. Improve
10. Maintain

ES-1: Assess and monitor population health status, factors that influence health, and community needs and assets

1. **Newborn Screening and Rare Diseases**
2. **Population-Level screening** for disease susceptibility genes (e.g., BRCA1 and BRCA2).
3. **Family-Level (Cascade) Screening** for early detection & increased surveillance of high-risk individuals (e.g.: FH).
4. **Genomic Surveillance for Emerging Threats**
5. **Pharmacogenomics for Drug Response:** On a population level, pharmacogenomics can guide drug formulary decisions and inform prescribing guidelines.
6. **Environmental Exposome Mapping:** Genomic data can be integrated into exposome research to understand how environmental factors impact health of communities.



ES-3: Communicate effectively to inform and educate people about health, factors that influence it, and how to improve it

1. Online Genomic Information Portals
2. Community Genomic Education Programs
3. Community Genetics Workshops
4. Multilingual Genomic Materials
5. Cultural Competence in Genomic Communication
6. Genomic Health Literacy Campaigns
7. School-Based Genomics Education
8. Genomic Risk Assessment Campaigns



Public Health Genomics and Precision Health Knowledge Base

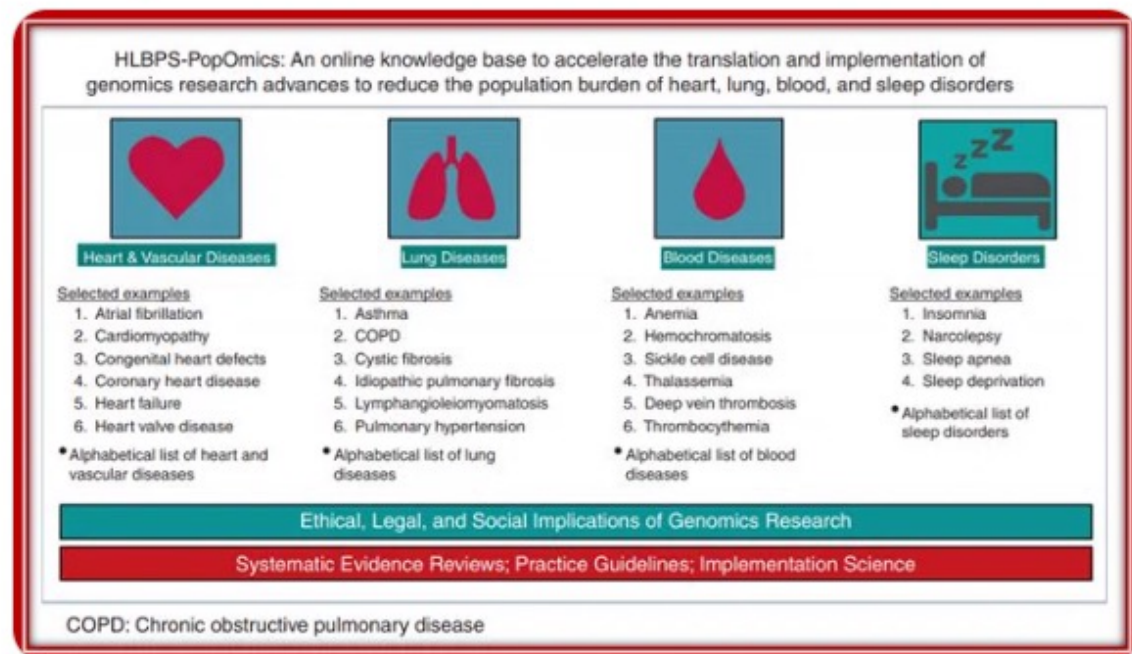
 **George Mensah, MD** @NHLBI_Translate · 31s Promote ...
Check out [#HLBS-PopOmics](#): an online, continuously updated, searchable database of published scientific literature. @CDCgov @NIH resources & other materials on the translation of [#Genomics](#) and other [#Precision](#) Health discoveries into improved health. bit.ly/3GQktR5 [#CTRIS](#)



The screenshot shows the website for the Public Health Genomics and Precision Health Knowledge Base (v8.7). At the top is the CDC logo and tagline. Below is a navigation bar with 'MENU', 'CDC A-Z', and 'SEARCH'. The main heading is 'Public Health Genomics and Precision Health Knowledge Base (v8.7)'. A large banner features the 'HLBS-PopOmics' logo and social media share buttons. Below the banner, it says 'Last Posted: Sep 01, 2023'. There is a search bar with the text 'all' and a 'Search' button. A 'Spotlight' section highlights a proclamation on National Sickle Cell Awareness Month, 2023. An 'About HLBS-PopOmics' section states it is an online, continuously updated, searchable database.

NIH NHLBI and 9 others

 **George Mensah, MD** @NHLBI_Translate · Sep 10, 2018 ...
Just published. [HLBS-PopOmics](#). @NIH and @CDC scientists publish an online knowledge base to accelerate [#dissemination](#) and [#implementation](#) of research advances in population [#genomics](#) to reduce the burden of heart, lung, blood, and sleep disorders. rdcu.be/6a08



The screenshot displays the content of the HLBS-PopOmics knowledge base. The title is 'HLBS-PopOmics: An online knowledge base to accelerate the translation and implementation of genomics research advances to reduce the population burden of heart, lung, blood, and sleep disorders'. Below the title are four categories, each with an icon and a list of 'Selected examples':

- Heart & Vascular Diseases** (Heart icon):
 - 1. Atrial fibrillation
 - 2. Cardiomyopathy
 - 3. Congenital heart defects
 - 4. Coronary heart disease
 - 5. Heart failure
 - 6. Heart valve disease

• Alphabetical list of heart and vascular diseases
- Lung Diseases** (Lungs icon):
 - 1. Asthma
 - 2. COPD
 - 3. Cystic fibrosis
 - 4. Idiopathic pulmonary fibrosis
 - 5. Lymphangioleiomyomatosis
 - 6. Pulmonary hypertension

• Alphabetical list of lung diseases
- Blood Diseases** (Blood drop icon):
 - 1. Anemia
 - 2. Hemochromatosis
 - 3. Sickle cell disease
 - 4. Thalassemia
 - 5. Deep vein thrombosis
 - 6. Thrombocythemia

• Alphabetical list of blood diseases
- Sleep Disorders** (Sleeping person icon):
 - 1. Insomnia
 - 2. Narcolepsy
 - 3. Sleep apnea
 - 4. Sleep deprivation

• Alphabetical list of sleep disorders

Below the categories are two horizontal bars: a teal bar for 'Ethical, Legal, and Social Implications of Genomics Research' and a red bar for 'Systematic Evidence Reviews; Practice Guidelines; Implementation Science'. At the bottom, a note defines 'COPD: Chronic obstructive pulmonary disease'.

NIH NHLBI and 3 others

<https://phgkb.cdc.gov/PHGKB/specificPHGKB.action?topic=HLBS&query=home>

ES-5: Create, champion, and implement policies, plans, and laws that impact health

1. Policies on Genomic Data Sharing and Research Collaboration
2. Regulation of Genetic Testing and Research
3. Policies on Informed Consent in Genomic Research
4. **Genetic Non-Discrimination Laws**
5. Policies on Privacy and Security in Genetics and Genomics Data
6. Policies on Ethical Use of Genetic Data



ES-7 Assure an effective system that enables equitable access to the individual services and care needed to be healthy

1. Promote Genetics & Genomics Workforce Diversity.
2. Promote Genetic Counseling Resources in Underserved Communities.
3. Create Community-Based Genomic Screening Programs.
4. Ensure affordability and accessibility to precision medicine and genomics resources and services.
5. Promote Health Education and Literacy in Genomics.
6. Support Telehealth and Remote Genetic Services.



Improving Diversity of the Genomics Workforce

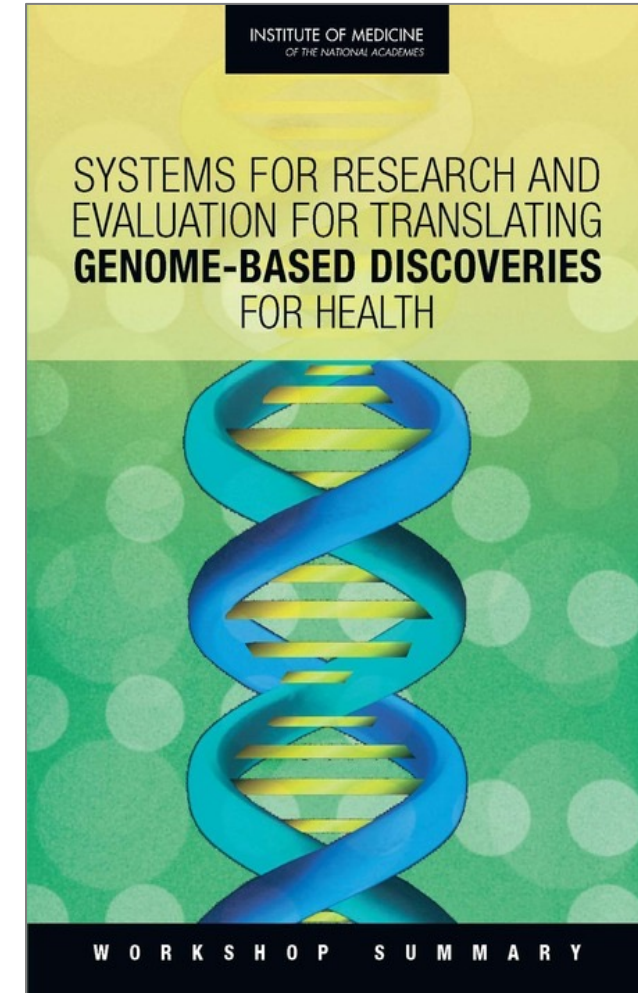
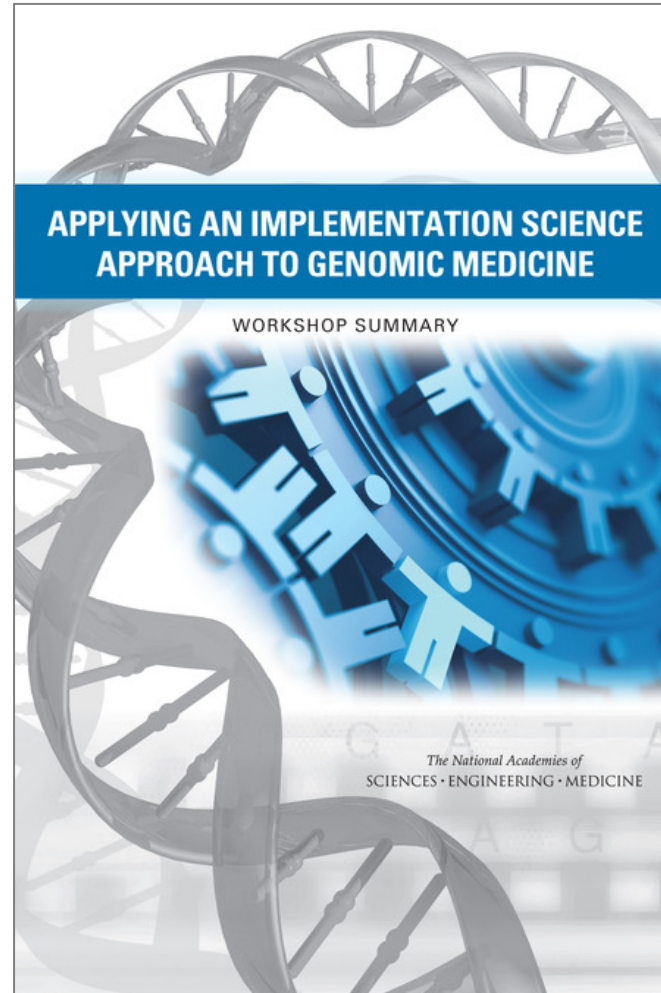
HUMAN GENETICS & GENOMICS WORKFORCE SURVEY

REPORT RELEASED!



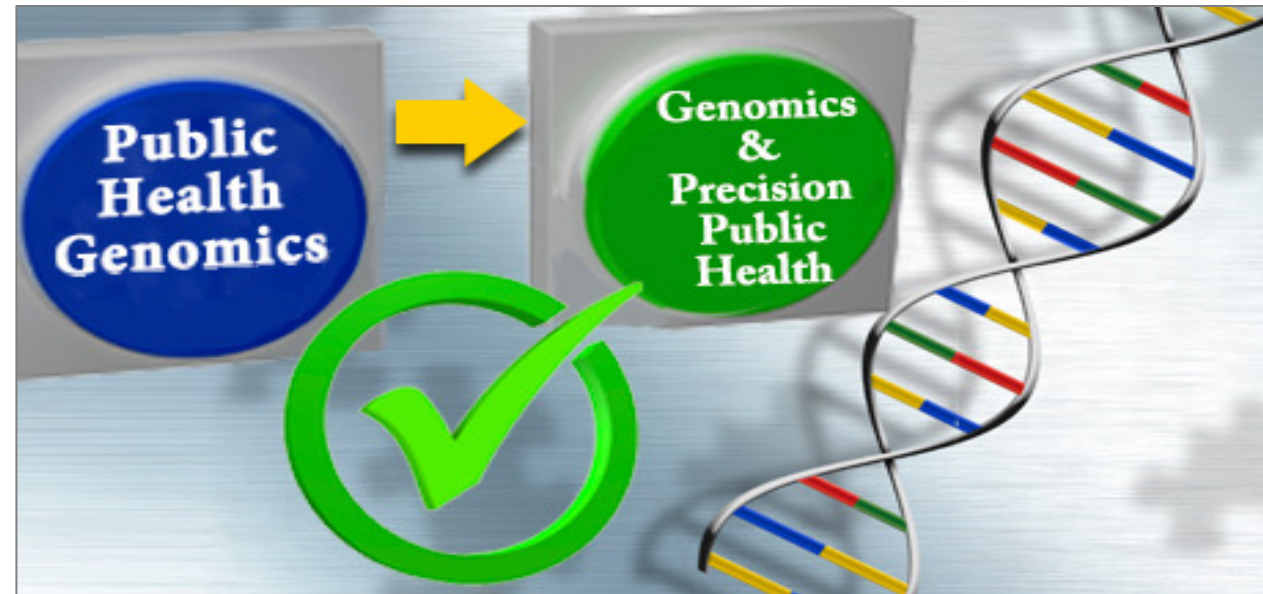
ES-9 Improve and innovate public health functions through ongoing evaluation, research, and continuous quality improvement

1. Focus on Implementation Science.
2. Prioritize Evaluation Research in Genome-Based Discoveries.
3. Promote Comparative Effectiveness Research in Genetics and Genomics Applications.
4. Support Variant Interpretation Standards in Genomics Research.
5. Advance and Support Genomic Data Validation and Reproducibility.
6. Develop Genomic Decision Support Tools



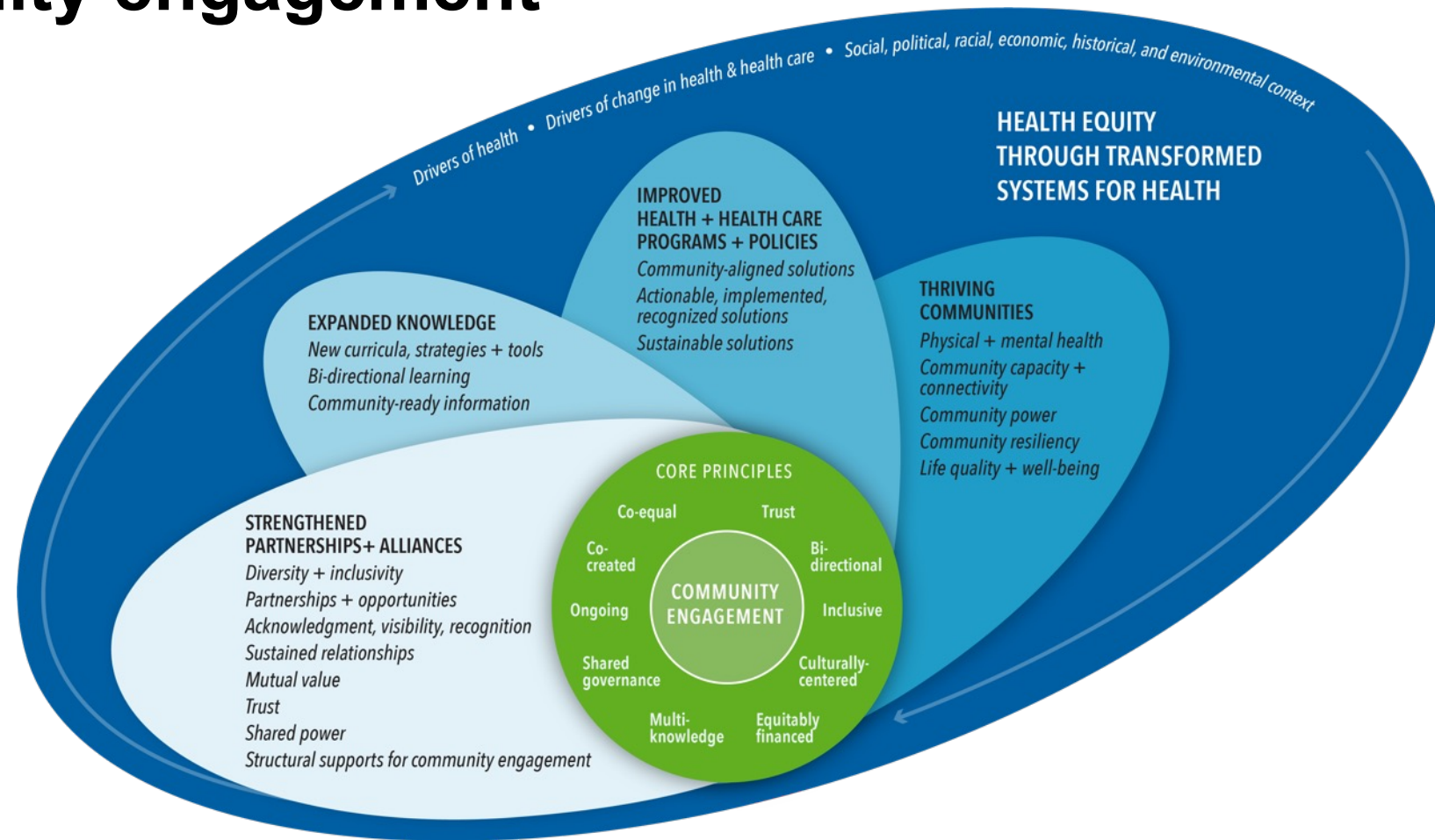
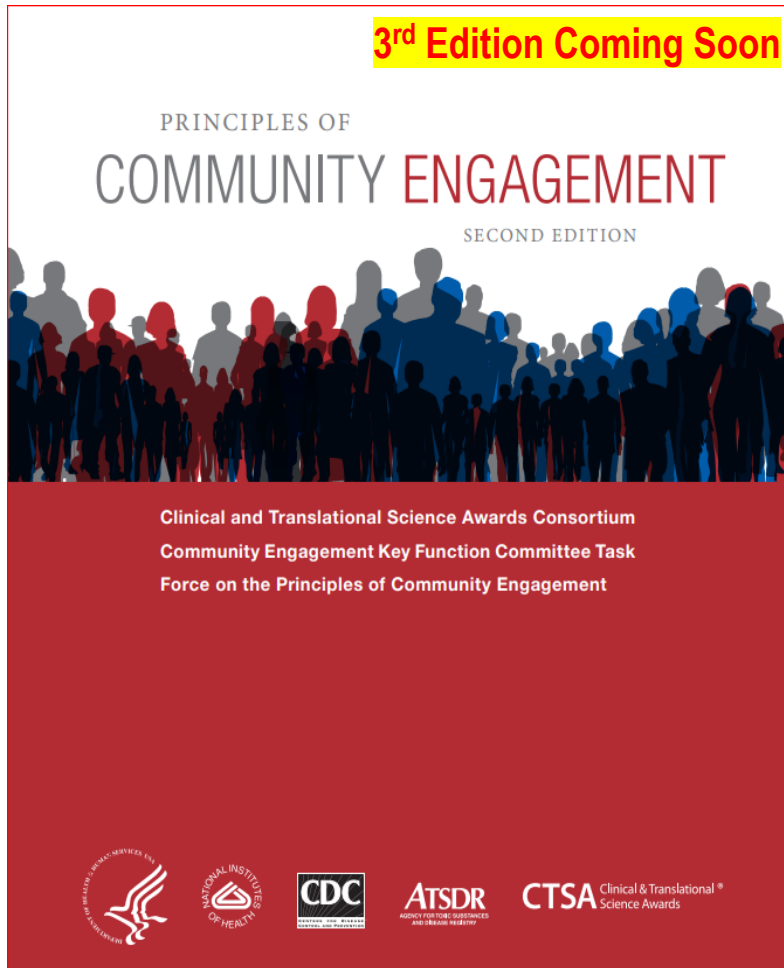
ES-10 Build and maintain a strong organizational infrastructure for public health

1. Strong Public Health Agencies.
2. Genomic Epidemiology and Surveillance.
3. Disease and Risk Factor Detection and Monitoring.
4. Pathogen Identification and Strain Characterization.
5. Pharmacogenomics infrastructure for Public Health Programs.
6. Public Health Genomic Databases.
7. **Genomic Education and Training.** →



Core competencies necessary for PPH to have sustainable impact on advancing health equity - 1

1. Meaningful community engagement

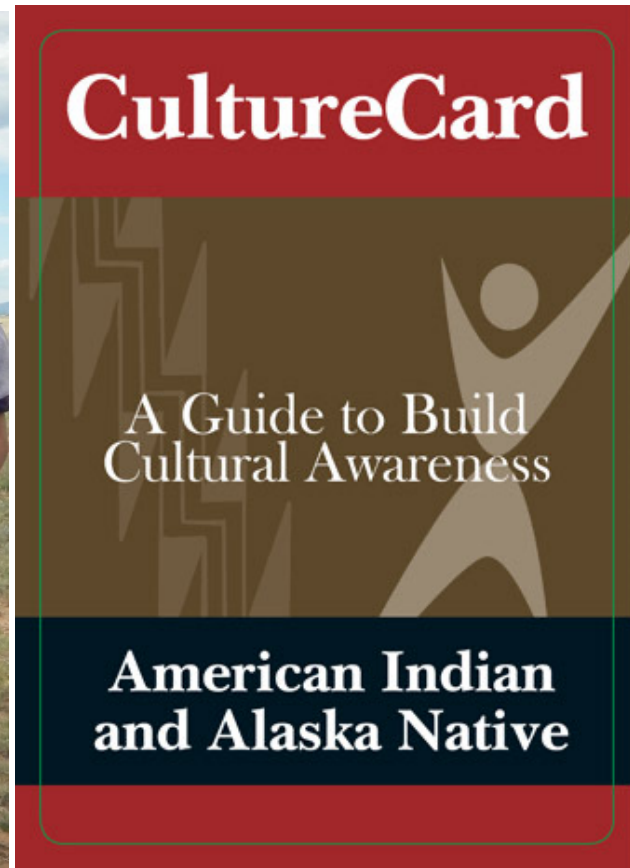


https://www.atsdr.cdc.gov/communityengagement/pdf/PCE_Report_508_FINAL.pdf

<https://nam.edu/programs/value-science-driven-health-care/achieving-health-equity-and-systems-transformation-through-community-engagement-a-conceptual-model/>

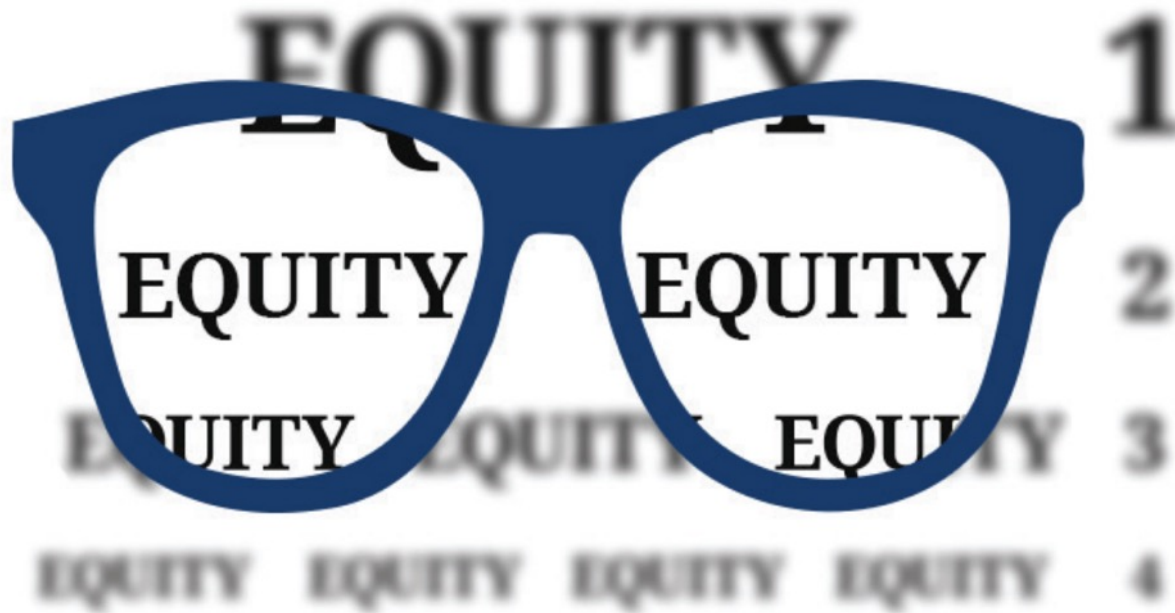
Core competencies necessary for PPH to have sustainable impact on advancing health equity - 2

2. Cultural Competence: Understanding and respecting the diverse cultural backgrounds, beliefs, and values of populations to design interventions that resonate with different communities.



Core competencies necessary for PPH to have sustainable impact on advancing health equity - 3

3. Competency in Application of a Health Equity Lens in all Practices, Processes, and Policies



The **Equity Lens** is like a pair of glasses. It helps us see things from a new perspective and helps us to be more effective in our everyday work by getting a clearer focus and a more complete view of equity and inclusion.

Core competencies necessary for PPH to have sustainable impact on advancing health equity - 4

4. Data Science Literacy and Numeracy in Genetics & Genomics



Training Opportunity in Genomics and Precision Public Health, Atlanta, September 7- 8, 2023



SXSW 

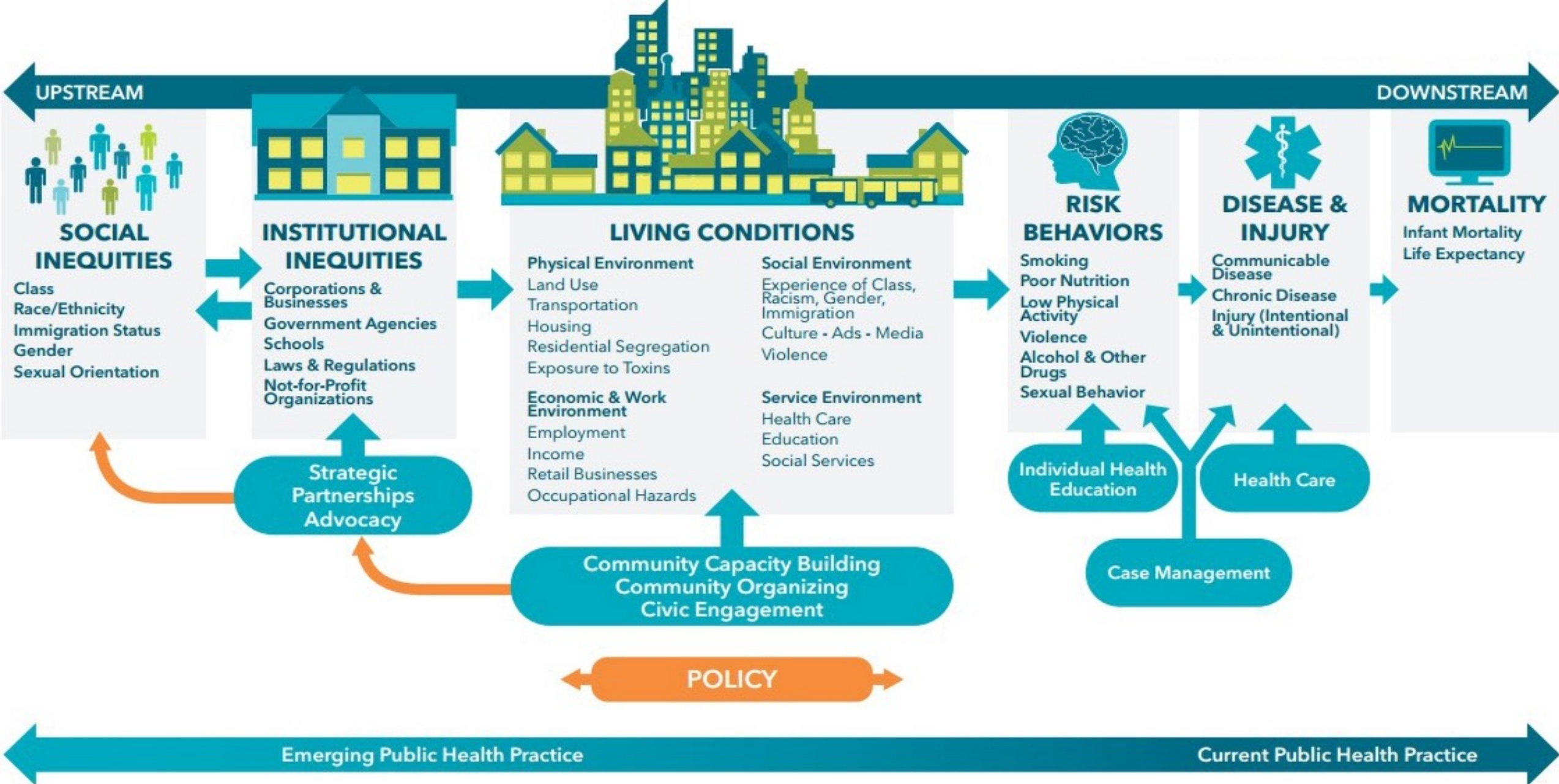
<https://www.genome.gov/about-genomics/educational-resources/outreach/SXSW>

Core competencies necessary for PPH to have sustainable impact and success in advancing health equity

1. Meaningful community engagement
2. Cultural Competency
3. Competency in Health Equity Lens Application
4. Data Science Literacy and Numeracy in Genetics and Genomics
5. Advanced Analytics
6. Strategic Collaborations
7. Continuous Evaluation and Improvement
8. Health Communications Science
9. Policy Development, Research, and Advocacy
10. **Dissemination Science and Implementation Research**

Social Determinants of Health





Source: PennMedicine. <https://www.chca.upenn.edu/health-disparities-and-social-determinants-of-health/>

Reducing Health Disparities through Community-Engaged Implementation Research: **The DECIPHeR Alliance**

Objective 3: Population Differences



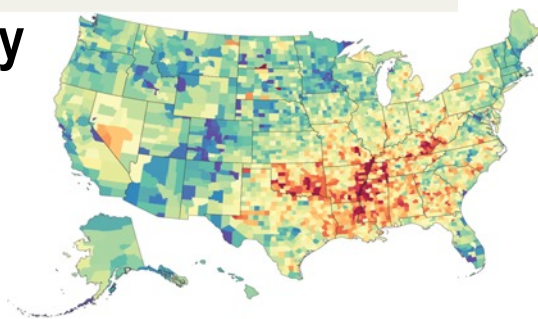
JAMA The Journal of the American Medical Association

EDITORIAL

JAMA. 2017;317(19):1955-1957.

Cardiovascular Mortality Differences — Place Matters

George A. Mensah, David C. Goff, Gary H. Gibbons



Circulation Research

JOURNAL OF THE AMERICAN HEART ASSOCIATION



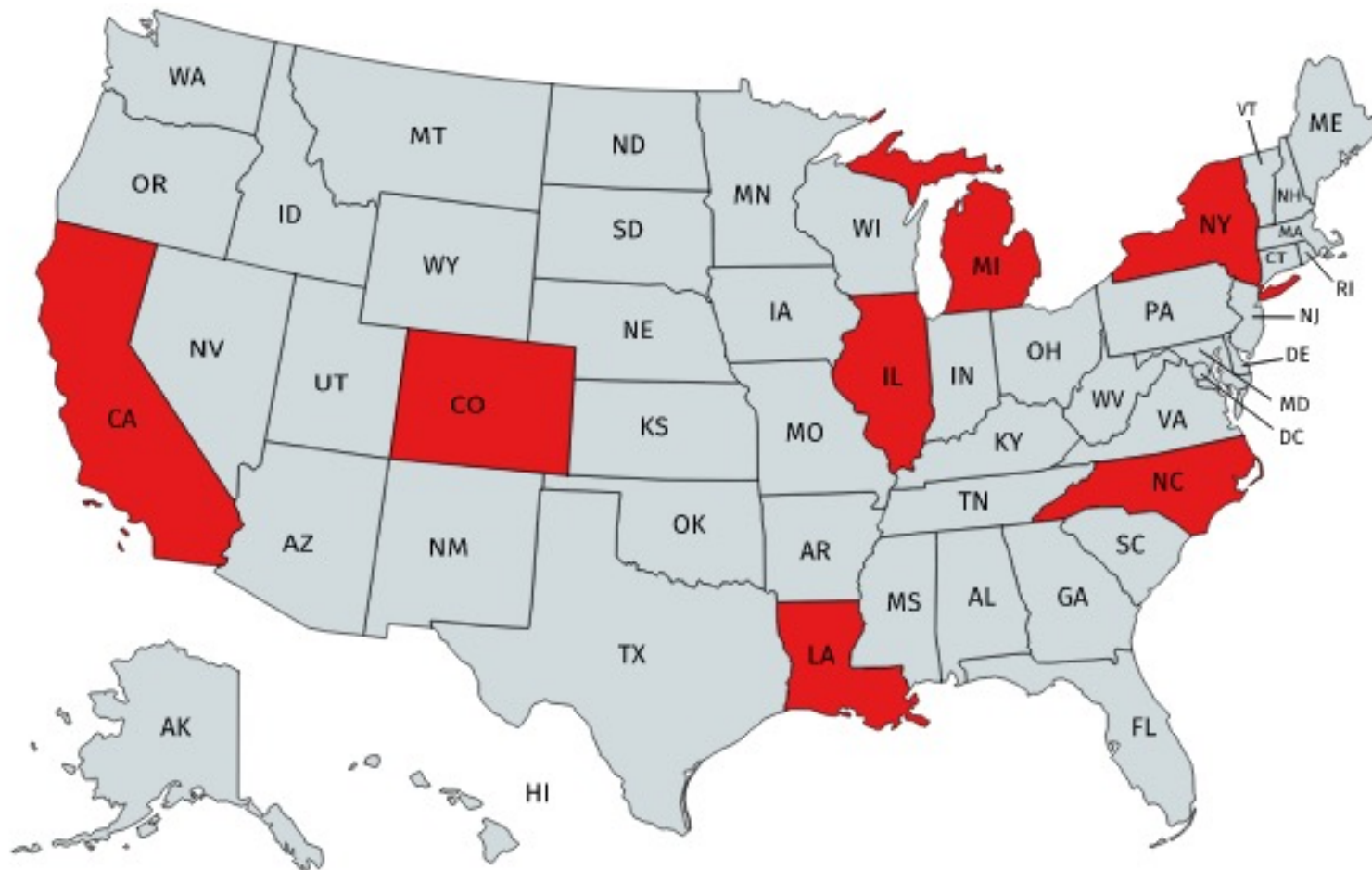
Reducing Cardiovascular Disparities Through Community-Engaged Implementation Research: A National Heart, Lung, and Blood Institute Workshop Report
George A. Mensah, Richard S. Cooper, Anna Maria Siega-Riz, Lisa A. Cooper, Justin D. Smith, C. Hendricks Brown, John M. Westfall, Elizabeth O. Ofili, LeShawndra N. Price, Sonia Arteaga, Melissa C. Green Parker, Cheryl R. Nelson, Bradley J. Newsome, Nicole Redmond, Rebecca A. Roper, Bettina M. Beech, Jada L. Brooks, Debra Furr-Holden, Samson Y. Gebreab, Wayne H. Giles, Regina Smith James, Tené T. Lewis, Ali H. Mokdad, Kari D. Moore, Joseph E. Ravenell, Al Richmond, Nancy E. Schoenberg, Mario Sims, Gopal K. Singh, Anne E. Sumner, Roberto P. Treviño, Karriem S. Watson, M. Larissa Avilés-Santa, Jared P. Reis, Charlotte A. Pratt, Michael M. Engelgau, David C. Goff, Jr and Eliseo J. Pérez-Stable

DECIPHeR: Community-engaged participatory research to reduce disparities in heart, lung, blood, and sleep disorders.

Mensah, Goff, Gibbons. *JAMA*. 2017 May 16;317(19):1955-1957.

Mensah, Cooper, Siega-Riz, et al. *Circ Res*. 2018 Jan 19;122(2):213-230

NHLBI DECIPHeR Alliance and Grantees

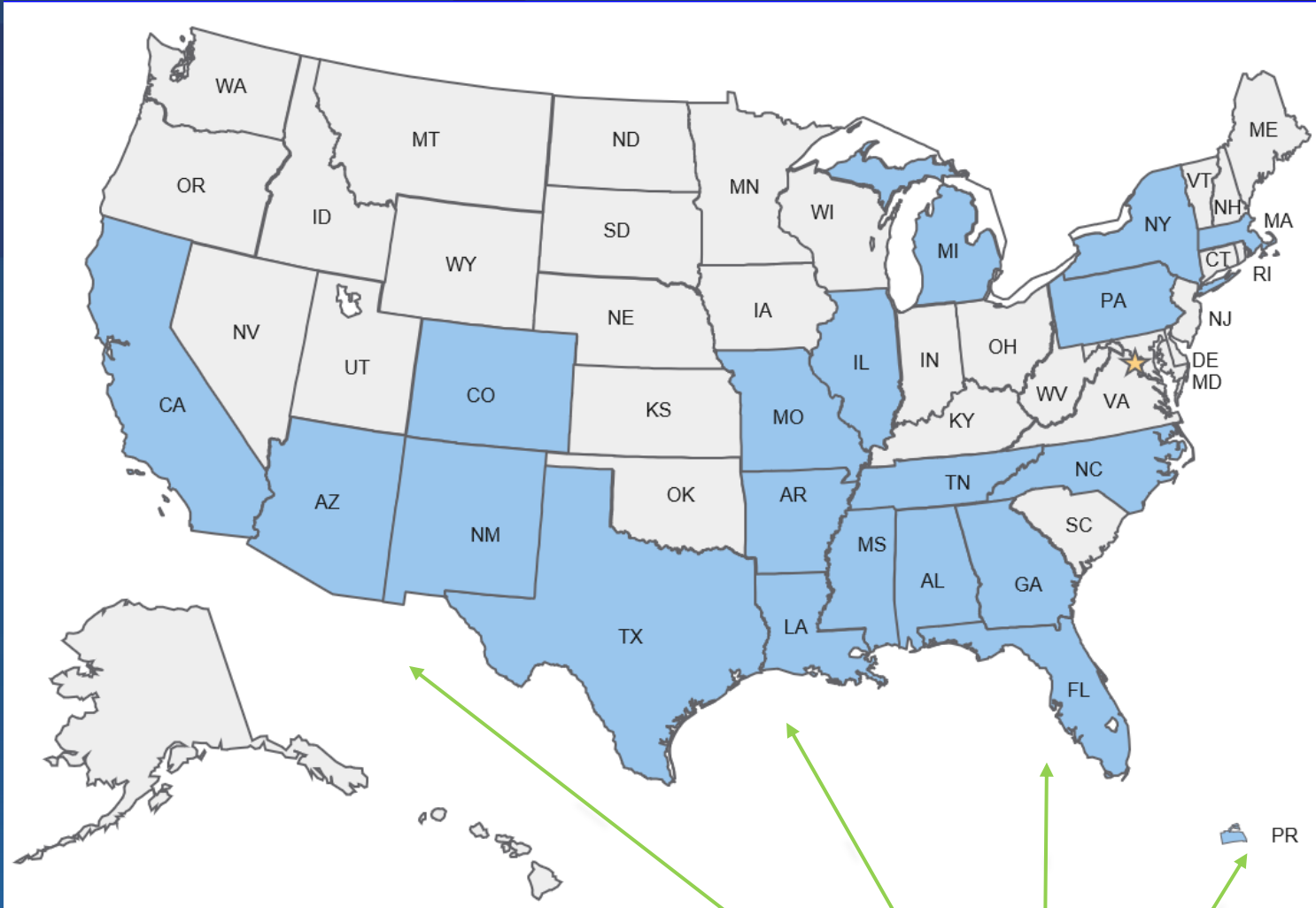


DECIPHeR Grantees

1. UCLA, CA
2. University of Colorado Denver, CO
3. University of Illinois at Chicago, IL
4. University of Michigan, MI
5. Northwestern Univ. at Chicago, IL
6. NYU School of Medicine, NY
7. Tulane University, LA
8. UNC, NC (Coordinating Center)

POC: Dr. Shahnaz Khan

Community Engagement Alliance (CEAL)



NIH National Institutes of Health
Community Engagement Alliance

CEAL-4-Genomes

Tackling Structural Racism: NIH Commits to Diversity, Equity, and Inclusion in Biomedical Research

- U** — Understanding stakeholder experiences through listening and learning.
- N** — New research on health disparities, minority health, and health equity.
- I** — Improving the NIH culture and structure for equity, inclusion, and excellence.
- T** — Transparency, communication, and accountability with our internal and external stakeholders.
- E** — Extramural research ecosystem: changing policy, culture, and structure to promote workforce diversity.

<https://www.nih.gov/ending-structural-racism>



**Ending
Structural
Racism**



[nih.gov/ending-structural-racism](https://www.nih.gov/ending-structural-racism)



National Heart, Lung,
and Blood Institute

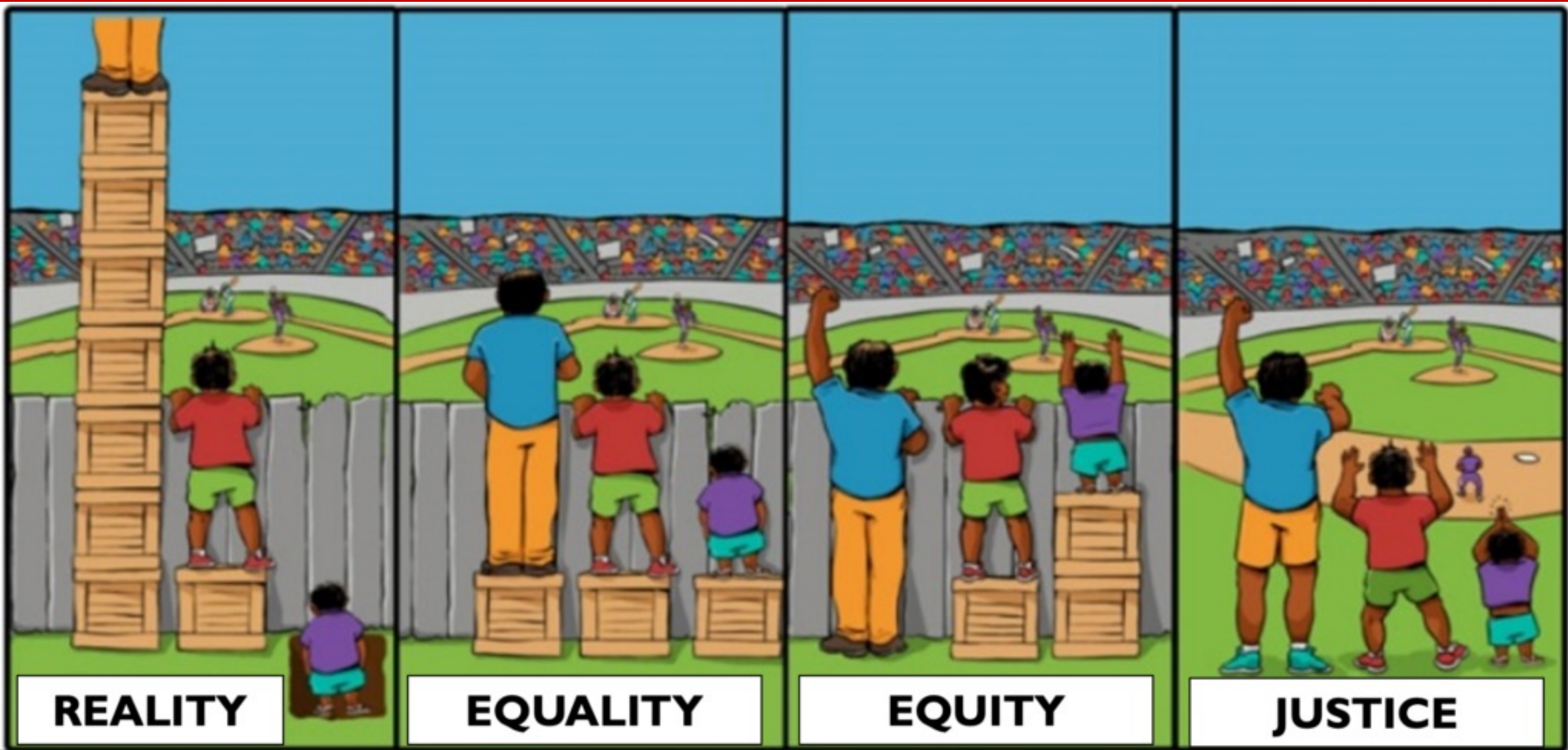
Transformative Research to Address Health Disparities and Advance Health Equity

- [RFA-RM-21-021](#) Transformative Research to Address Health Disparities and Advance Health Equity (U01 Clinical Trial Allowed)
- [RFA-RM-21-022](#) Transformative Research to Address Health Disparities and Advance Health Equity **at Minority Serving Institutions** (U01 Clinical Trial Allowed)



On April 27, 2021, the NIH Common Fund hosted a pre-application webinar <https://www.youtube.com/watch?v=MVT3sVNbnmE>

The Common Fund will begin developing a separate effort in health disparities research planned to launch in fiscal year 2023



Source: Early Learning Alliance (2021) <http://earlylearningntx.org/our-work/racial-equity/>

CONCLUSIONS

1. Precision Public Health (PPH) is all about delivering the right intervention at the right time, every time, to the right population, and with the right expected results.
2. Ideally, PPH will consist of approaches, tools, technologies, and/or sets of interventions that enable the successful execution of the 10 essential public health services.
3. For PPH to serve as a primary strategy for reaching health equity, it must apply a health equity lens with a strong emphasis on **SDOH** in all its methods and applications.
4. The presentation has identified meaningful community engagement and several core competencies necessary for PPH success in helping reach health equity.
5. There is a crucial role for implementation science and continued social, behavioral, and biomedical research for advancing PPH for health equity.
6. At NIH, the **NIH UNITE Initiative** is the main vehicle for **Transformative Research** to address health disparities, eliminate structural racism, and advance health equity.



National Heart, Lung,
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Improving health.**

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