Advancing health equity among rural residents through translational health behavior research

Nancy E. Schoenberg, Ph.D.

Marion Pearsall Professor of Behavioral Science

Director, Center for Health Equity Transformation (CHET)

University of Kentucky

nesch@uky.edu

Center for Health Equity Transformation

Objectives

Upon completion of this presentation, you will be able to:

- Define and describe health challenges in rural contexts
- Improve your understanding of cultural adaptation of evidence-based interventions
- Describe translational behavioral approaches designed to mitigate such inequities, including community-based interventions

Disclosure

Dr. Schoenberg has no relevant financial relationships to disclose and does not plan to discuss the off-label use of a product.

Some background on rural US

The 46 million U.S. residents living in rural areas in 2020 made up 14 percent of the U.S. population.

65% of rural residents live west of the MS river, but only 10% of Westerners are considered rural

Nearly half (28 million, 47%) of the rural population lives in the South.

Highest % of rural residents (61%): ??

Lowest % of rural residents (5%): ??

Definitions:

"All counties that are not part of a Metropolitan Statistical Area (contains an urban core area of 50,000+ population)." - Office of Management and Budget

"Any population, housing, or territory not in an urban area (population between 2,500 and 50,000)." - Census Bureau

Some emergent trends in rural US

https://www.brookings.edu/blog/the-avenue/2021/09/28/mapping-rural-americas-diversity-and-demographic-change/

RURAL AMERICA BECAME MORE RACIALLY AND ETHNICALLY DIVERSE OVER THE LAST DECADE

THE DISTRIBUTION OF PEOPLE OF COLOR IN RURAL AMERICA IS COMPLEX AND HIGHLY REGIONALIZED

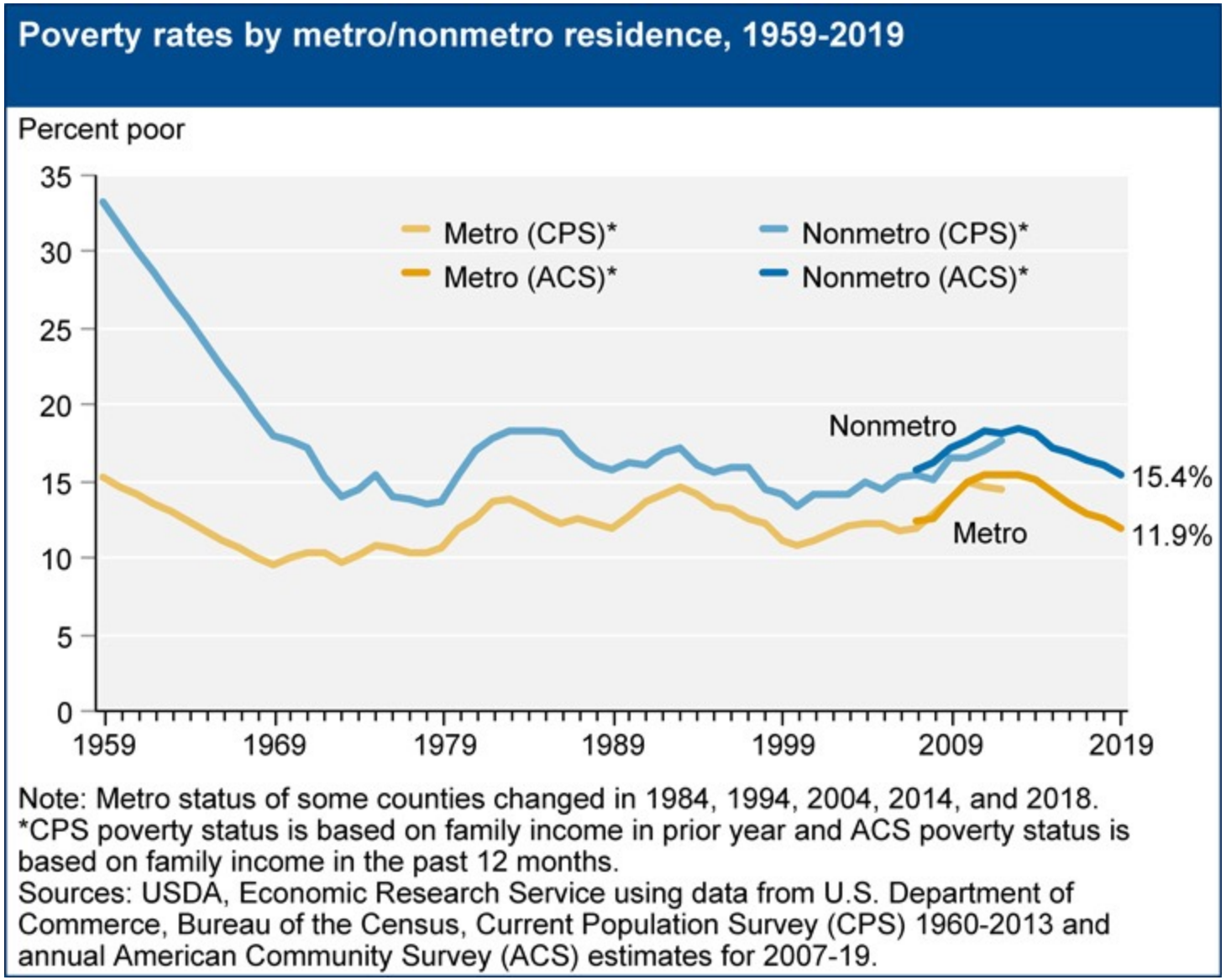
LATINX POPULATIONS DRIVE DIVERSITY IN RURAL AMERICA

What % of rural residents in US are people of color?

Context: rural SDH

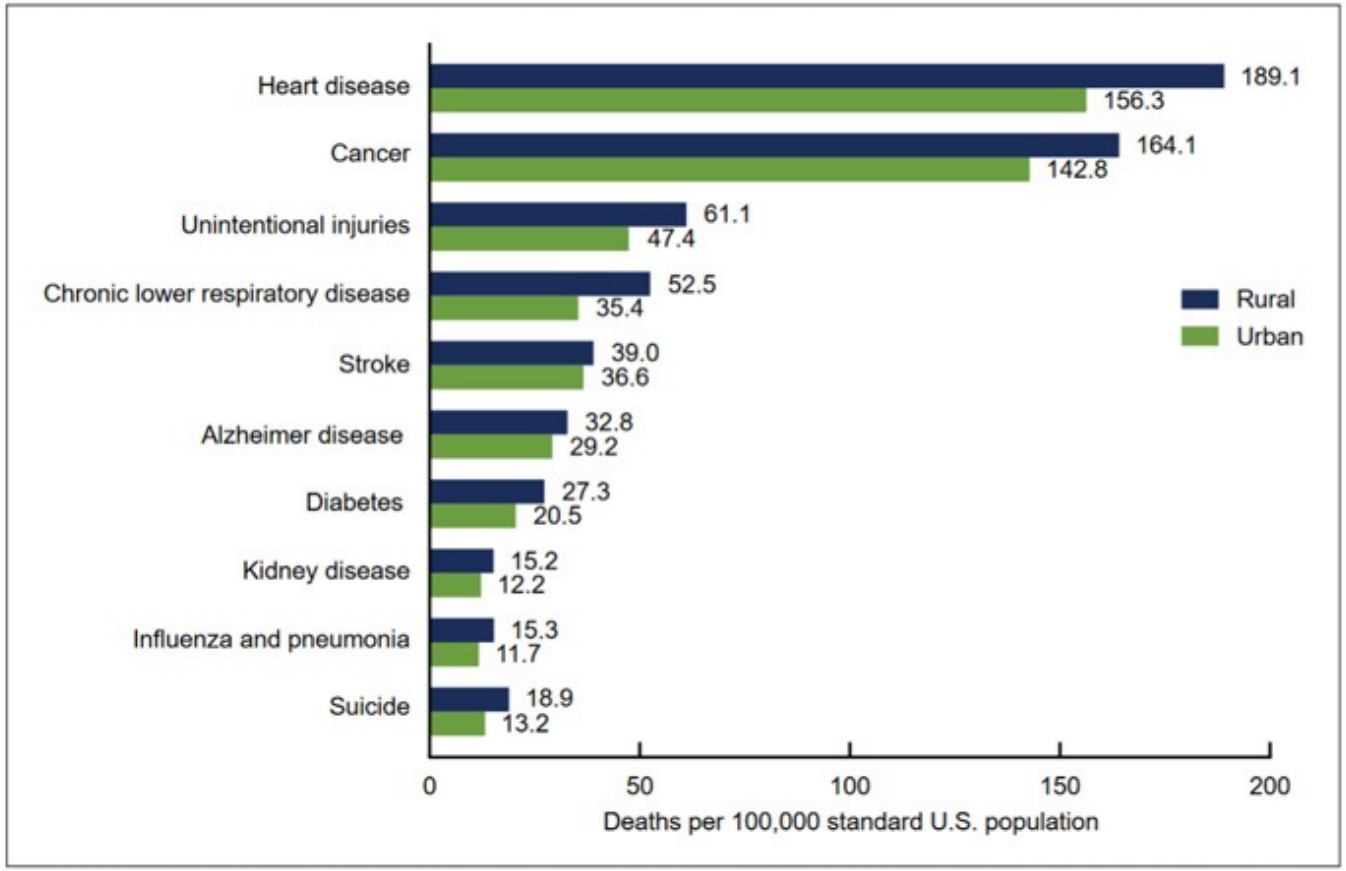
SDH: “the conditions in the environments where people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks”

-Healthy People 2030, https://health.gov/healthypeople/priority-areas/social-determinants-health



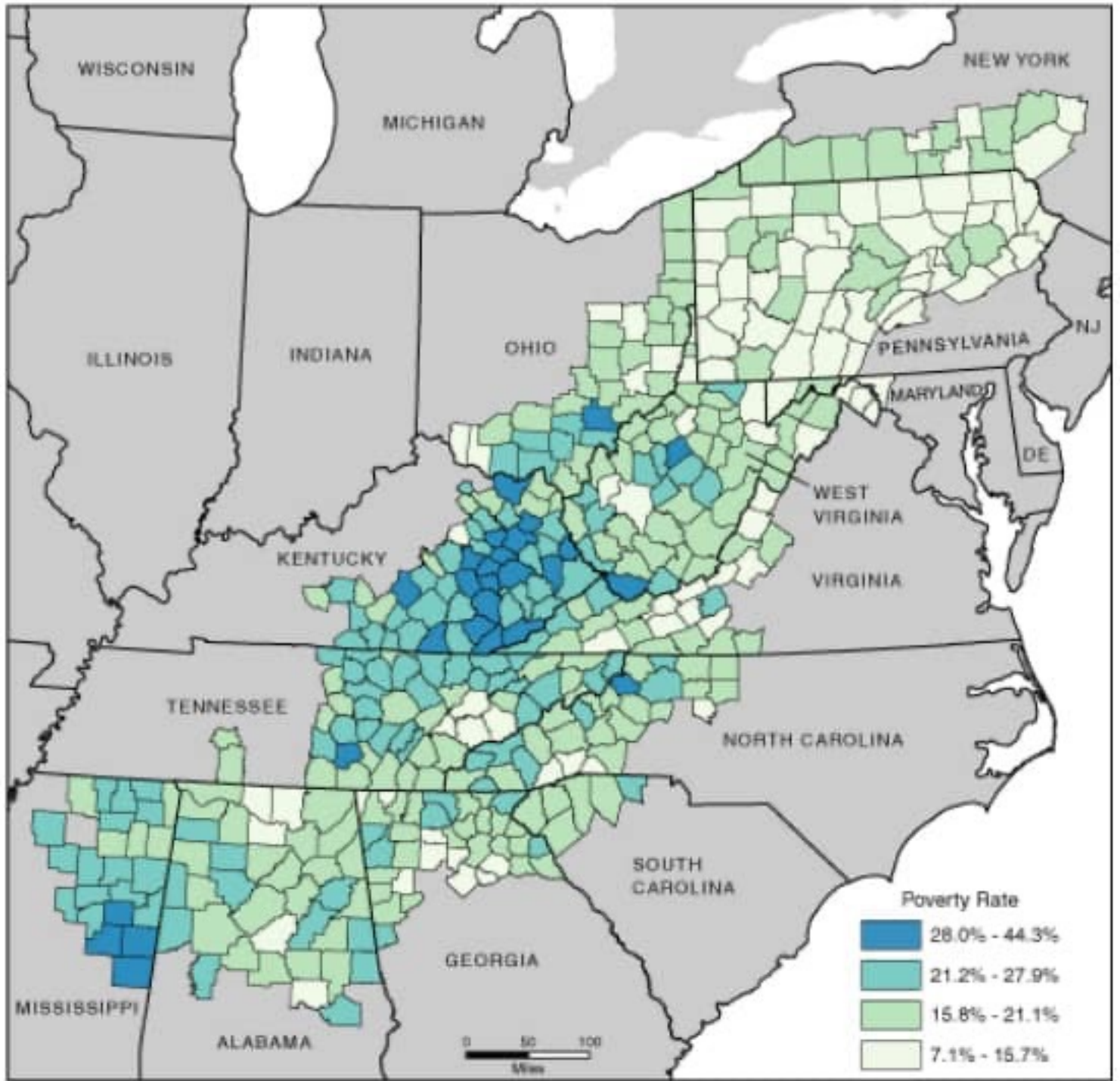
Age-adjusted death rates for 10 leading causes of mortality by rural-urban classification, US 2019

Figure 3. Age-adjusted death rates for the 10 leading causes of death, by urban-rural classification: United States, 2019

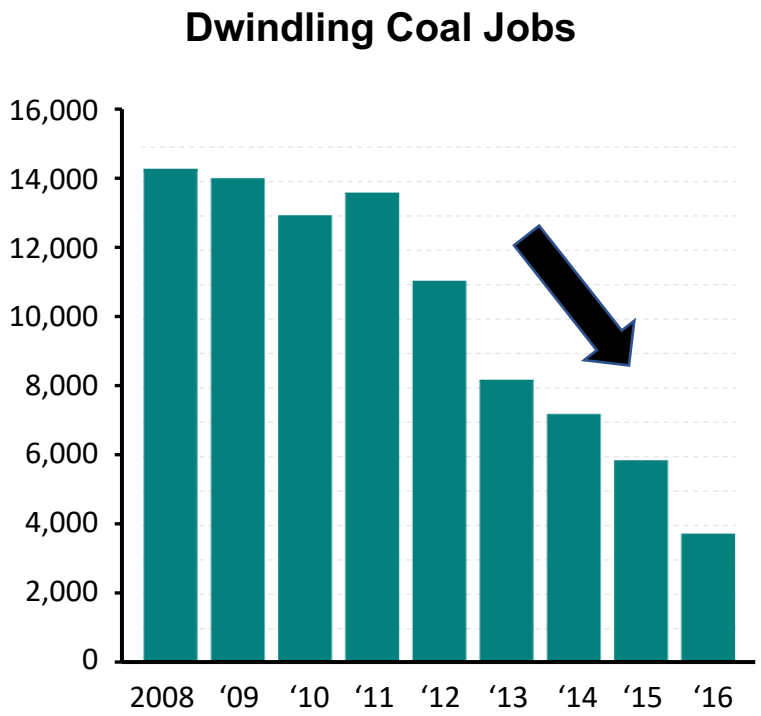


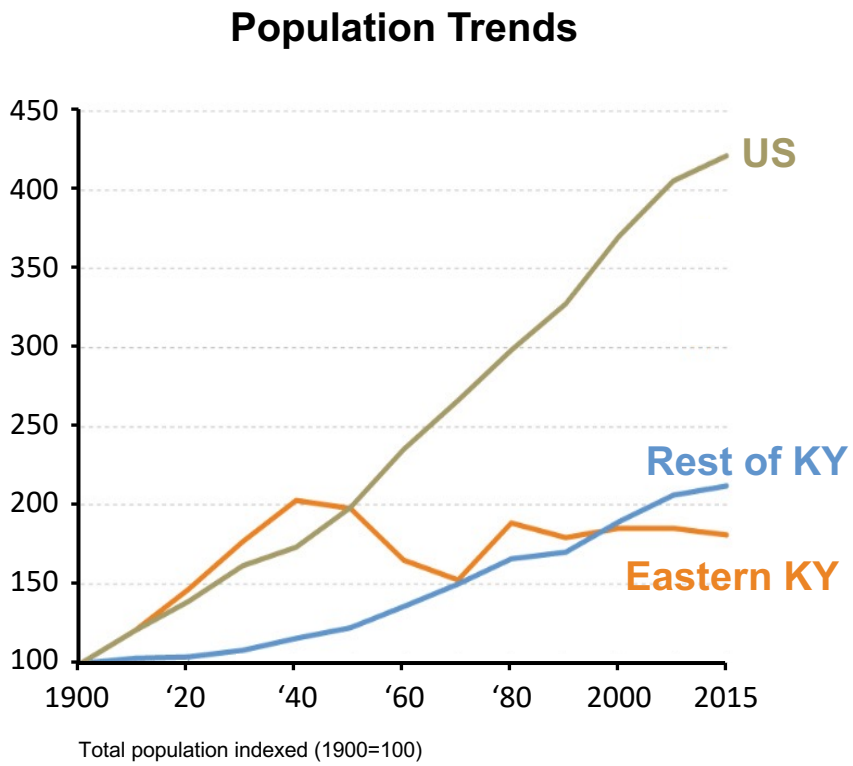
NOTES: Urbanicity of county of residence is based on the 2013 NCHS Urban-Rural Classification Scheme for Counties; see Data source and methods. Causes of death are ranked according to the number of deaths for the total population. Rates for all causes in rural areas were significantly higher than rates in urban areas ($p < 0.05$). Access data table for Figure 3 at: https://www.cdc.gov/nchs/data/databriefs/db417-tables.pdf#3.
SOURCE: National Center for Health Statistics, National Vital Statistics System, Mortality.

Appalachian Kentucky: Poverty Rate

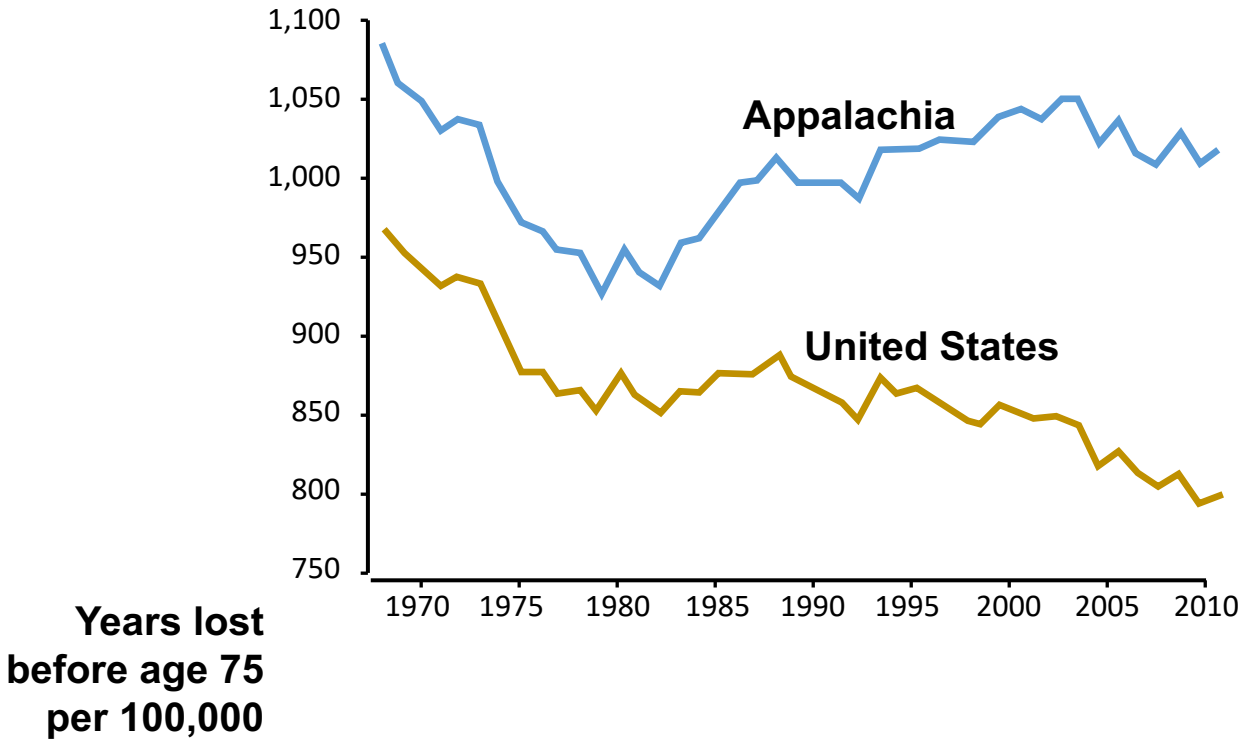


Community Challenges in Appalachian Kentucky





Premature Mortality in Appalachia



Singh, *Health Affairs*, 2017; US CDC NCHS

Leveraging Assets:
faith-based engagement, going where people are, & clinical partnerships

Programmatic orientations

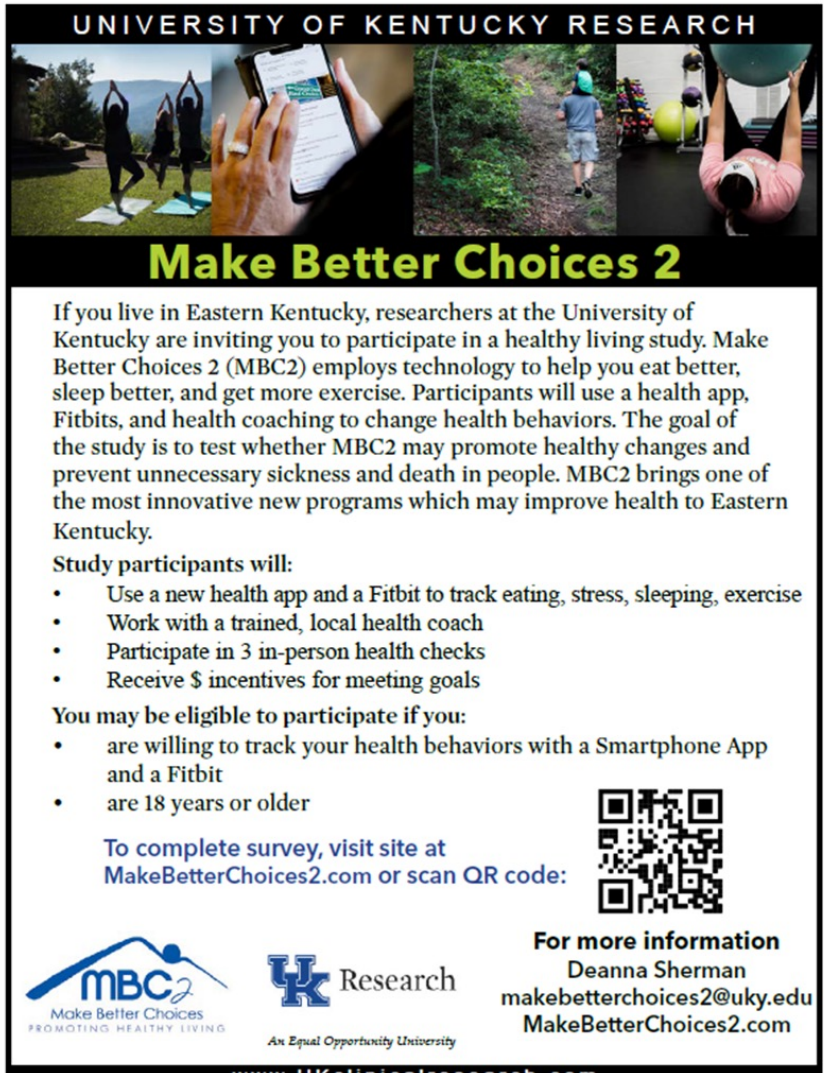
EMBED IN SUSTAINABLE INSTITUTIONS

INVEST IN LOCAL & COMMITTED PEOPLE

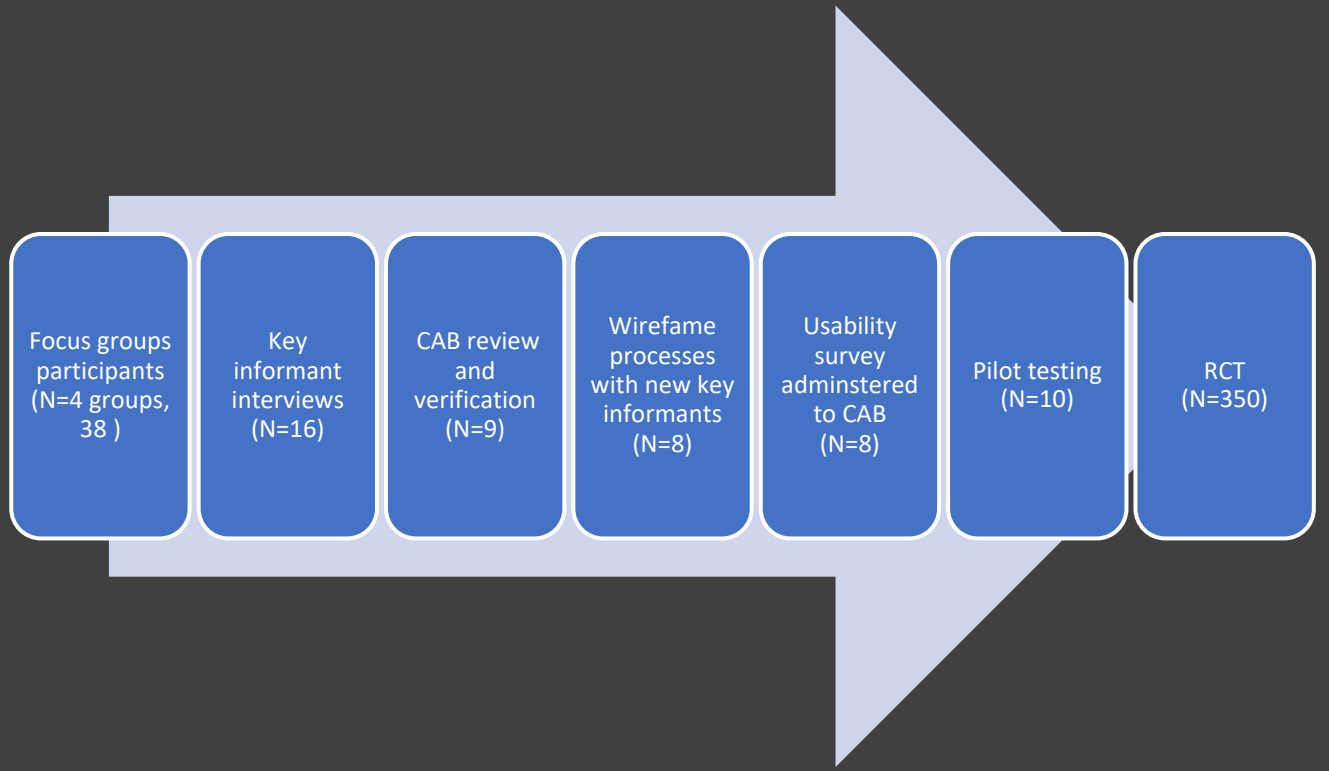
DRAW FROM THE EVIDENCE BASE

Core features:

- App
- Personalized health coaching
- Accelerometer
- Financial incentives



The Process of Adapting MBC2 to a Rural, Appalachian Population



Adapting for Local Use

MBC2 Component	Local Challenge/ Preference	Adaptation
Eligibility criterion: age	Rural communities have older populations	Open up to all eligible people 18+--no upper age limits
Recruitment	Lack of urban recruitment sites (e.g., public transit)	Use social media, community locations (church, centers)
Smartphone	Concern about data costs; less tech experience	Special health coach training on data use/cost
Health Coaching	Sparse personal & local resources undermine behavior change	Local coaches have inventory to local food and activity resources, informed by community needs assessment
Individual-level intervention	Tight knit communities like group gatherings	Quarterly group events
App messaging	Fit Appalachian context	Highlight success stories, fun activities

Provocative questions remain…

- What is the true active ingredient in this mHealth intervention?
- Would in-person coaching be more effective than remote telehealth delivery?
- How sustainable are mHealth approaches in the absence of grant-funding?
  - How likely are mHealth or telehealth approaches to be included in health care or social service policy and programming?
  - How might evidence-based behavioral interventions become reimbursable?

Despite these efforts, interventions oftentimes do not achieve desired outcomes

Intersectionality/identity

and

Balance between fidelity to existing EBI and adaptation

and

The ever evolving landscape: ex. NRT and smoking cessation

And …most trials fail to achieve desired outcomes

Clinical trials:

90% fail, likely due to:*

- lack of clinical efficacy (40-50%)
- unmanageable toxicity/side effects (30%)
- poor pharmacokinetic properties, (e.g., drug absorption/excretion) (10=15%)
- Lack of commercial interest & poor strategic planning (10%)

10-15 years to develop, cost $1 billion to develop one successful medication.

*https://www.nature.com/articles/nrd.2016.184

Acta Pharmaceutica Sinica B 2022;12(7):3049–3062

Chinese Pharmaceutical Association
Institute of Materia Medica, Chinese Academy of Medical Sciences

Acta Pharmaceutica Sinica B

www.elsevier.com/locate/apsb
www.sciencedirect.com

PERSPECTIVE

Why 90% of clinical drug development fails and how to improve it?

Duxin Sun[a,*], Wei Gao[a], Hongxiang Hu[a], Simon Zhou[b]

[a]Department of Pharmaceutical Sciences, College of Pharmacy, University of Michigan, Ann Arbor, MI, 48109, USA
[b]Translational Development and Clinical Pharmacology, Bristol Meyer Squibb Company, Summit, NJ, 07920, USA

Received 20 November 2021; received in revised form 3 February 2022; accepted 6 February 2022

KEY WORDS
Drug development;
Drug optimization;
Clinical trial;
Structure–tissue exposure/selectivity relationship (STR);
Structure–tissue exposure/selectivity–activity relationship (STAR)

Abstract Ninety percent of clinical drug development fails despite implementation of many successful strategies, which raised the question whether certain aspects in target validation and drug optimization are overlooked? Current drug optimization overly emphasizes potency/specificity using structure–activity-relationship (SAR) but overlooks tissue exposure/selectivity in disease/normal tissues using structure–tissue exposure/selectivity–relationship (STR), which may mislead the drug candidate selection and impact the balance of clinical dose/efficacy/toxicity. We propose structure–tissue exposure/selectivity–activity relationship (STAR) to improve drug optimization, which classifies drug candidates based on drug's potency/selectivity, tissue exposure/selectivity, and required dose for balancing clinical efficacy/toxicity. Class I drugs have high specificity/potency and high tissue exposure/selectivity, which needs low dose to achieve superior clinical efficacy/safety with high success rate. Class II drugs have high specificity/potency and low tissue exposure/selectivity, which requires high dose to achieve clinical efficacy with high toxicity and needs to be cautiously evaluated. Class III drugs have relatively low (adequate) specificity/potency but high tissue exposure/selectivity, which requires low dose to achieve clinical efficacy with manageable toxicity but are often overlooked. Class IV drugs have low specificity/potency and low tissue exposure/selectivity, which achieves inadequate efficacy/safety, and should be terminated early. STAR may improve drug optimization and clinical studies for the success of clinical drug development.

© 2022 Chinese Pharmaceutical Association and Institute of Materia Medica, Chinese Academy of Medical Sciences. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

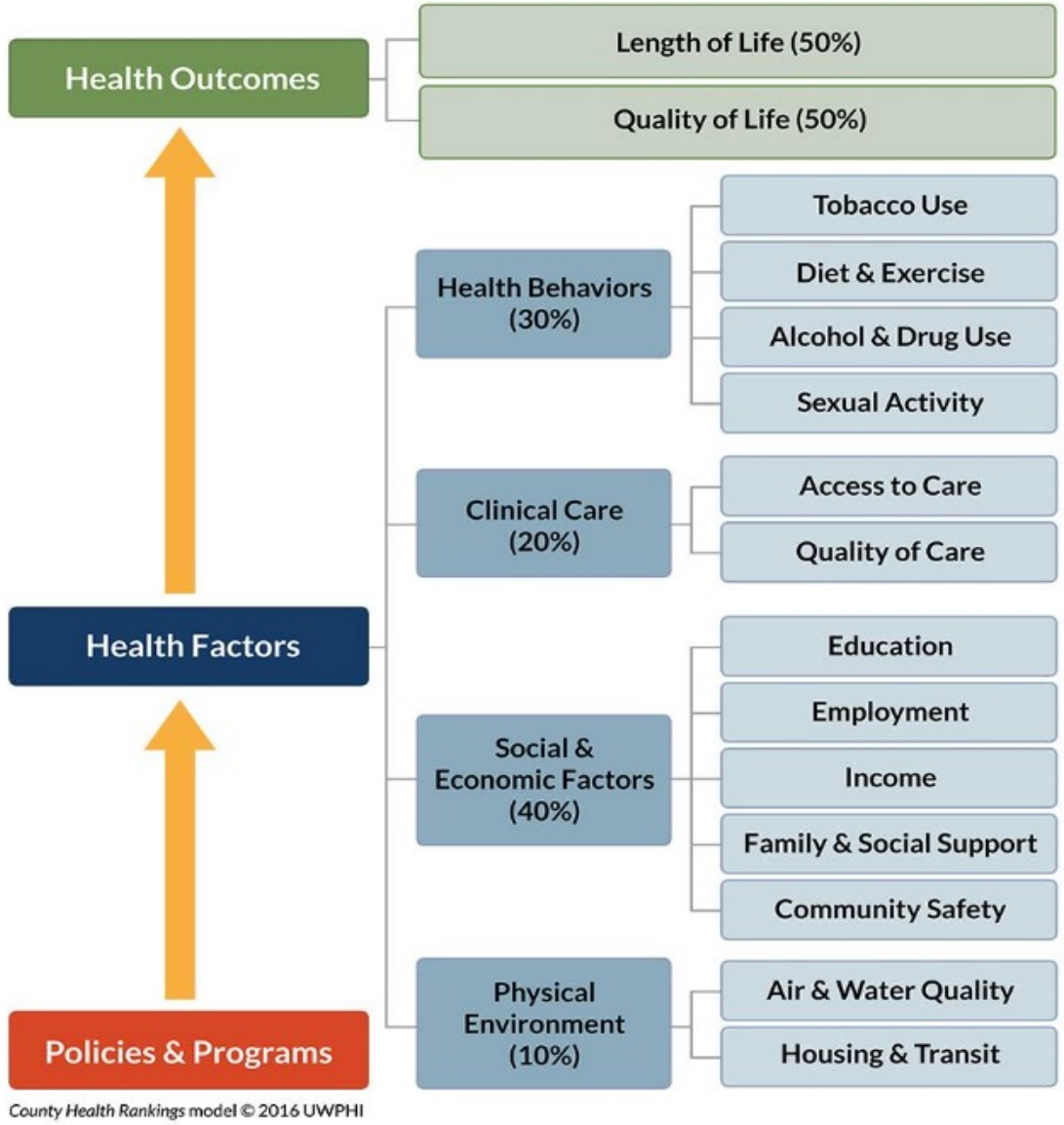
*Corresponding author.
E-mail address: duxins@umich.edu (Duxin Sun).

Peer review under responsibility of Chinese Pharmaceutical Association and Institute of Materia Medica, Chinese Academy of Medical Sciences

https://doi.org/10.1016/j.apsb.2022.02.002

2211-3835 © 2022 Chinese Pharmaceutical Association and Institute of Materia Medica, Chinese Academy of Medical Sciences. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

How to authentically and sustainably address fundamental causes of health inequities?



Magnan, S. 2017. Social Determinants of Health 101 for Health Care: Five Plus Five. *NAM Perspectives*. Discussion Paper, National Academy of Medicine, Washington, DC. https://doi.org/10.31478/201710c

Thank you and questions

https://chet.med.uky.edu/
Facebook: @UKYCHET
Twitter: @CHET_UKY
Instagram: @ukychet
Video - https://youtu.be/6uuY4xRl6JU