



AMERICAN
COLLEGE of
CARDIOLOGY®

ACC Health Equity Series

#ACCDiversity **#HealthEquity**

**Enhancing Cardiovascular Health
in Rural Communities: Identifying
Challenges and Opportunities**

Aug. 20 at 7 p.m. ET

Welcome!

Melvin R. Echols, MD, MSCR, FACC, FHFA, FASPC

ACC Chief Health Equity, Diversity, and Inclusion Officer

VISION

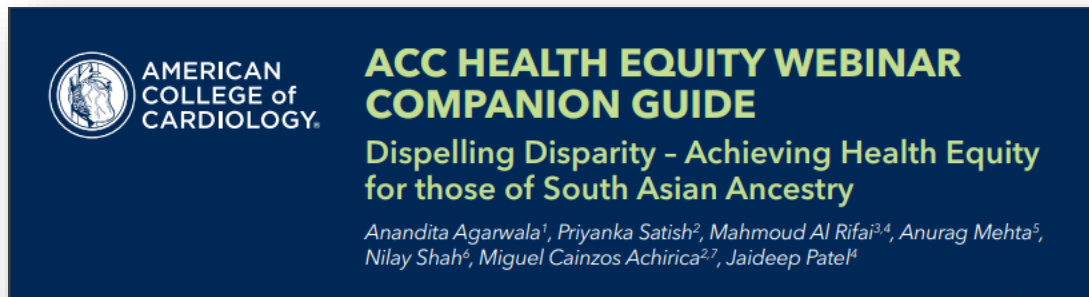
Achieve a culture of health where every person reaches their full cardiovascular health potential as a natural right.


- All attendees will be muted
- **Please place all questions in the chat**
- This webinar has two presentations, followed by a Q&A
- The On-Demand recording will be available on ACC.org
- Please join us on X (Twitter) - @ACCinTouch and use #ACCDiversity #HealthEquity
- Thank you for joining and your commitment to advancing cardiovascular health equity for all!

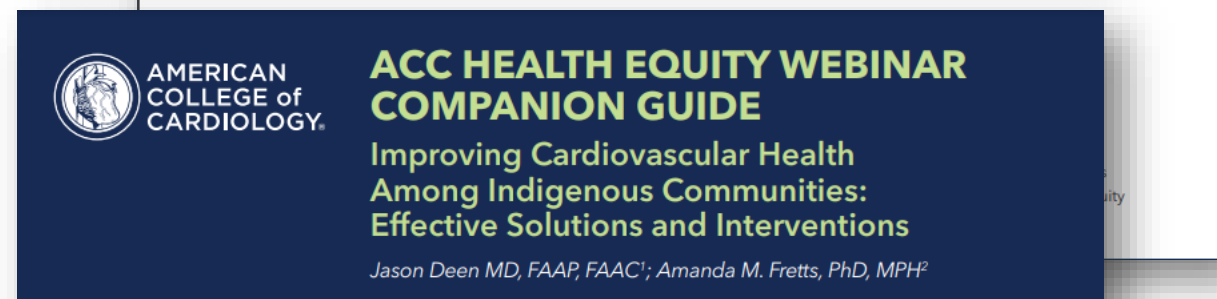
Background


The ACC Health Equity Webinar Series focuses on healthcare disparities in minority racial and ethnic groups and underrepresented populations.

A companion guide developed by the panelists accompanies each webinar.



 AMERICAN COLLEGE of CARDIOLOGY. **ACC HEALTH EQUITY WEBINAR COMPANION GUIDE**
Dispelling Disparity - Achieving Health Equity for those of South Asian Ancestry
Anandita Agarwala¹, Priyanka Satish², Mahmoud Al Rifai^{3,4}, Anurag Mehta⁵, Nilay Shah⁶, Miguel Cainzos Achirica^{2,7}, Jaideep Patel⁴



 AMERICAN COLLEGE of CARDIOLOGY. **ACC HEALTH EQUITY WEBINAR COMPANION GUIDE**
Improving Cardiovascular Health Among Indigenous Communities: Effective Solutions and Interventions
Jason Deen MD, FAAP, FAAC¹; Amanda M. Fretts, PhD, MPH²

BACKGROUND

The ACC Health Equity Webinar Companion Guides are a complementary resource for the ACC Health Equity Webinar series. The webinar series, produced by the ACC Diversity and Inclusion Committee, offers clinically relevant, evidence-based findings focused on health care disparities as they pertain to minority racial and ethnic groups and under-represented populations in cardiovascular care. This guide provides the background, highlights, and clinical pearls from the "Improving Cardiovascular Health Among Indigenous Communities: Effective Solutions and Interventions" webinar.

Goals



Identify CV risk factors in rural communities



Discuss structural and systemic challenges to equitable care



Discuss the impact of policy on rural health

Moderator



Modele Ogunniyi MD, MPH

Professor,
Emory University School of
Medicine
Associate Medical Director,
Grady Heart Failure Program

Panelist



Karen E. Joynt Maddox, MD, MPH

Associate Professor,
Washington University School of
Medicine
Co-Director,
Center for Advancing Health
Services, Policy & Economics
Research (CAHSPER)

Panelist



Rishi Wadhera, MD, MPP, Mphil

Associate Professor of Medicine,
Harvard Medical School
Associate Director of the Richard
A. And Susan F. Smith Center for
Outcomes Research,
Beth Israel Deaconess Medical
Center

Agenda

“What is Rural, and What is the State of Rural Health in the US?”

“What are the Main Causes of Rural Health Inequities?”

- Cardiovascular risk factors
- Social determinants of health
- Health care insurance and access
- Health system quality and capacity

“What are Opportunities for Change?”

“What are Our Conclusions?”

What is Rural?

Table 1. Comparison of Rural Definitions

Definition & Agency	Geographic Unit Used	What is Included in "Rural"	U.S. Rural Population*
Urban and Rural Areas U.S. Census Bureau	Census Blocks and Block Groups	Rural areas encompass all population, housing, and territory not included within an urban area.	66,610,922 Percent of Total Population: 19.88%
Core Based Statistical Areas (Metropolitan, Micropolitan, Noncore) U.S. Office of Management & Budget Metropolitan areas contain a core urban area population of 50,000 or more. Nonmetropolitan areas contain a population of less than 50,000. This includes both micropolitan areas, with urban cluster populations of 10,000 to 50,000, and all counties that lack an urban core, which are referred to as noncore counties.	County	All nonmetropolitan areas (counties) including micropolitan and noncore counties	46,293,406 Percent of Total Population: 14.99%
Rural-Urban Commuting Areas (RUCAs) Economic Research Service Utilizes the U.S. Census Bureau's UAs and UCs definitions with information on work commuting. Classification delineates metropolitan, micropolitan, small town, and rural commuting areas with whole numbers 1-10 and further subdivides into 21 secondary codes based on commuting flows — local or to another census tract.	Census Tract, ZIP Code approximation	Primary RUCA codes 4 and above (Micropolitan Area Core, population up to 49,999)	51,112,552 Percent of Total Population: 16.55%

Sources: [2020 Census Urban Areas Facts](#), U.S. Census Bureau; [2010 Rural Urban Commuting Area Codes](#), USDA-ERS; [Urban Influence Codes, Documentation, 2013](#), USDA-ERS

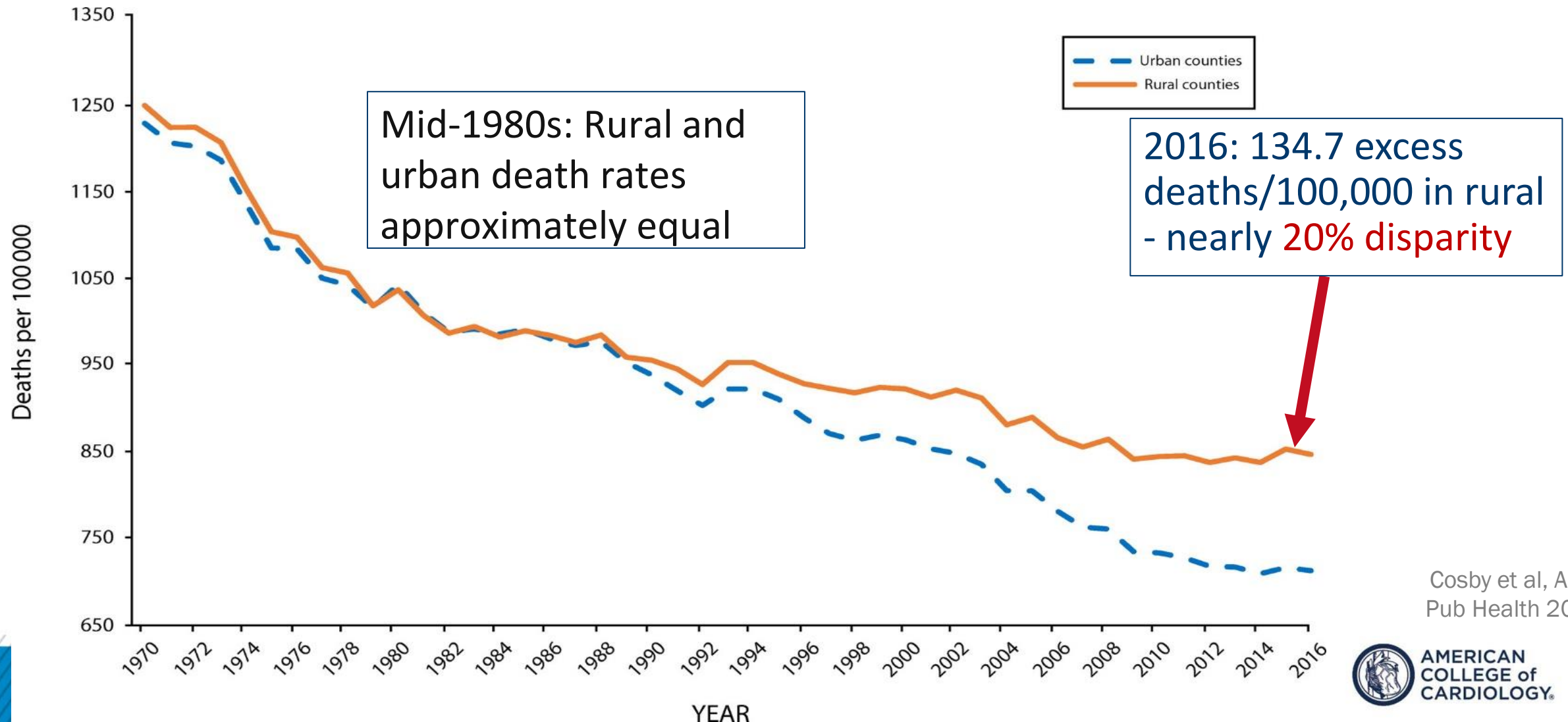
*Note: U.S. Census Bureau uses 2020 Census data. OMB and USDA-ERS population figures are based on 2010 Census data. OMB and USDA-ERS will release updated population figures using 2020 U.S. Census data in 2023/2024. All data includes the 50 states, District of Columbia, and Puerto Rico. For more information, see [What changes to rural definitions are occurring following the 2020 Census?](#)

46-66.6 million people, 15-20% of the US population

<https://www.ruralhealthinfo.org/topics/what-is-rural>



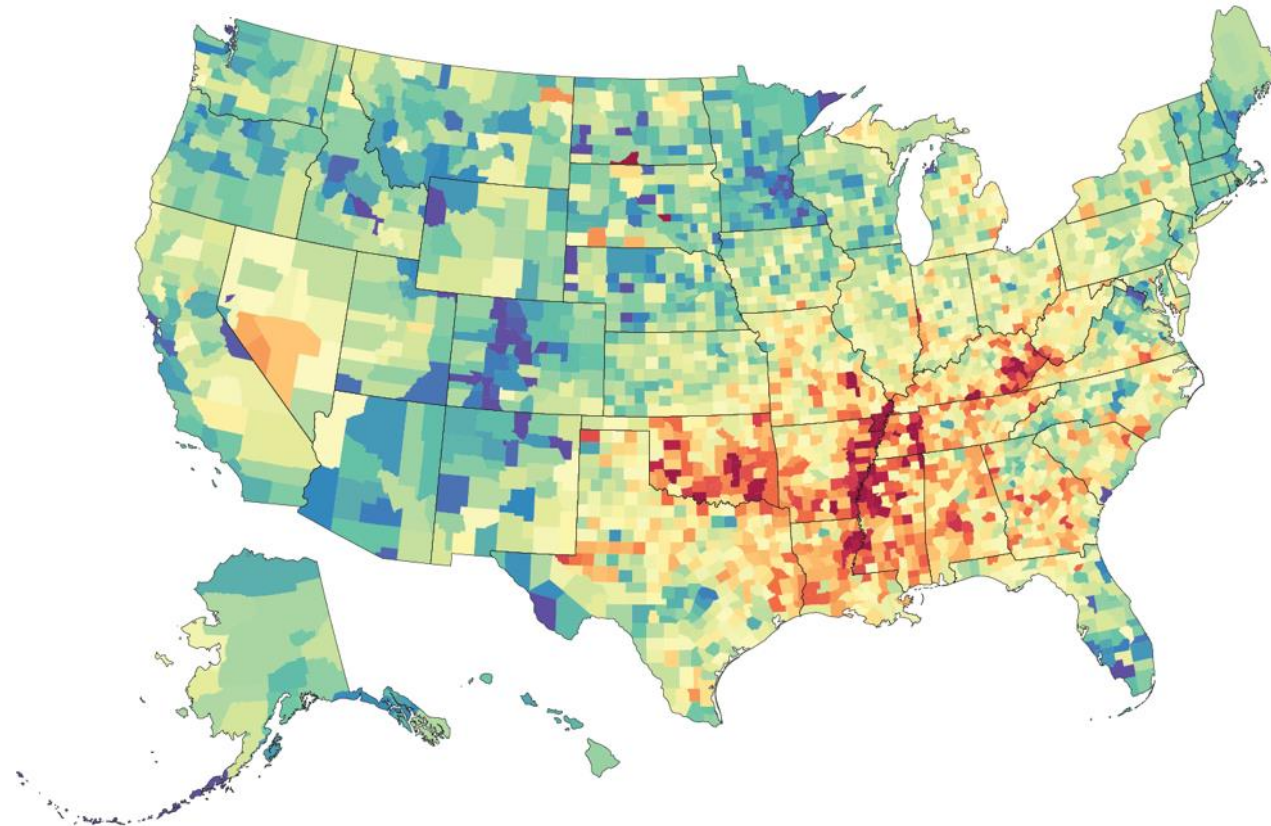
Rural health inequities are a recent phenomenon, and widening quickly



Cosby et al, Am J
Pub Health 2019

CVD and stroke are major contributors to rural-urban inequities, especially in the South

A Age-standardized mortality rate from cardiovascular diseases, both sexes, 2014



Deaths per 100000 population



Roth et al, JAMA 2019



Heart failure incidence is higher in rural areas, particularly among minoritized groups

Table 2. Incident HF by Rurality Status, Overall and Stratified by Race-Sex Group

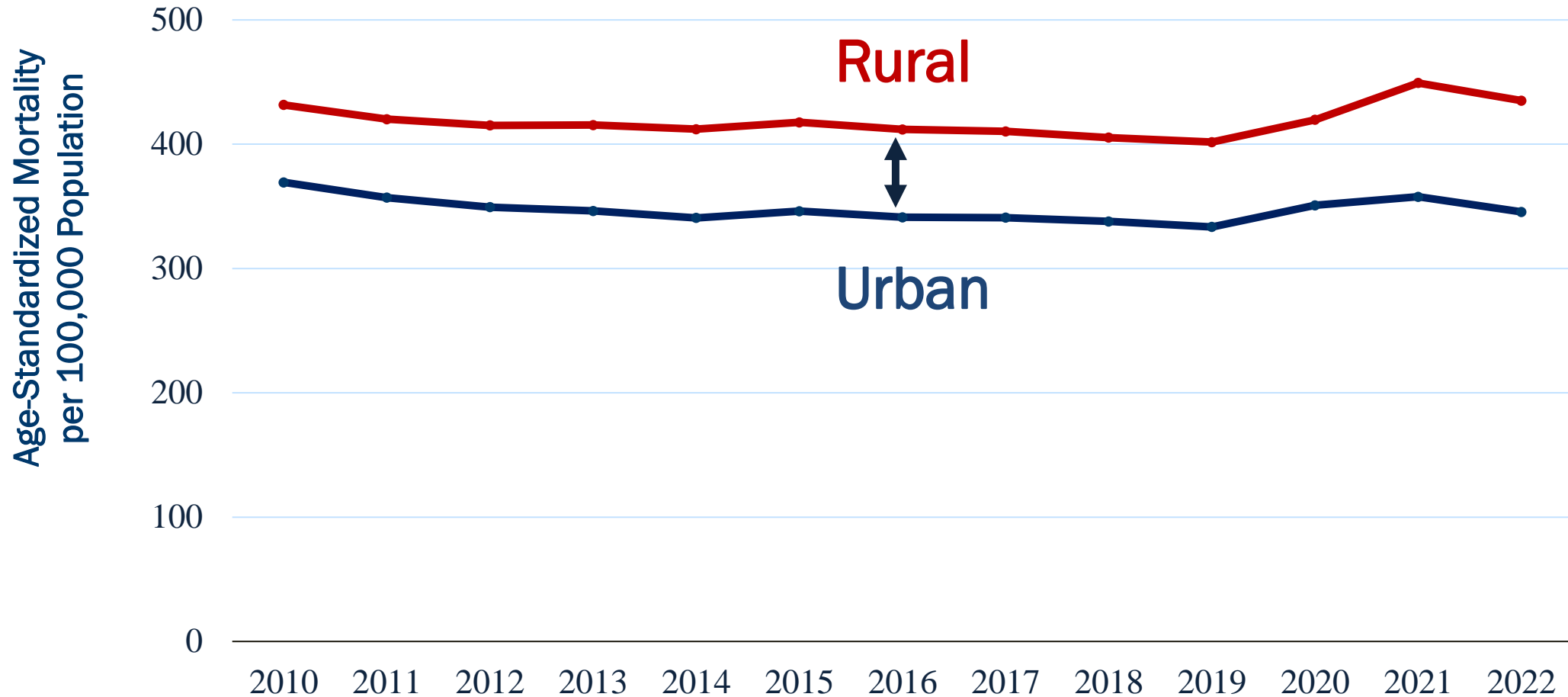
	Overall		Black men		White men		Black women		White women	
	Urban (n = 21 559)	Rural (n = 5556)	Urban (n = 5632)	Rural (n = 1318)	Urban (n = 2523)	Rural (n = 685)	Urban (n = 9230)	Rural (n = 2467)	Urban (n = 4174)	Rural (n = 1086)
Incident HF cases	5677	1865	1368	455	710	210	2433	846	1166	354
Person-years	193 931	49 286	50 324	11 140	20 479	5613	87 048	23 283	36 080	9249
Incident rate per 1000 PY (95% CI)	29.3 (28.5-30.0)	37.8 (36.1-39.6)	27.2 (25.7-28.6)	40.8 (37.1-44.6)	34.7 (32.1-37.2)	37.4 (32.4-42.5)	28.0 (26.8-29.1)	36.3 (33.9-38.8)	32.3 (30.5-34.2)	38.3 (34.3-42.3)
Age-adjusted incidence rate per 1000 PY (95% CI)	29.6 (28.9-30.5) ^a	36.5 (34.9-38.3) ^a	28.9 (27.4-30.6) ^a	40.4 (36.8-44.3) ^a	33.3 (30.8-35.9)	35.9 (30.5-41.5)	29.2 (28.1-30.4) ^a	35.8 (33.5-38.3) ^a	31.1 (29.3-33.0) ^b	36.2 (32.3-40.3) ^b

Abbreviations: HF, heart failure; PY, person-years.

^a $P < .001$ for rural vs urban age-adjusted incidence rate.

^b $P = .001$ for rural vs urban age-adjusted incidence rate.

Rural-urban inequities in cardiovascular mortality persist

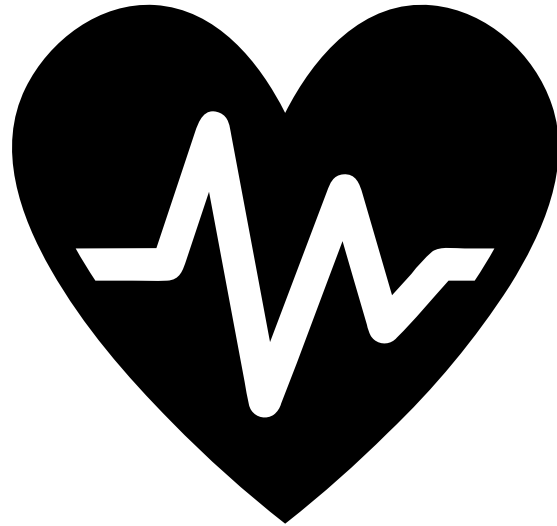


Marinacci...Wadhwa. Under Review. 2024

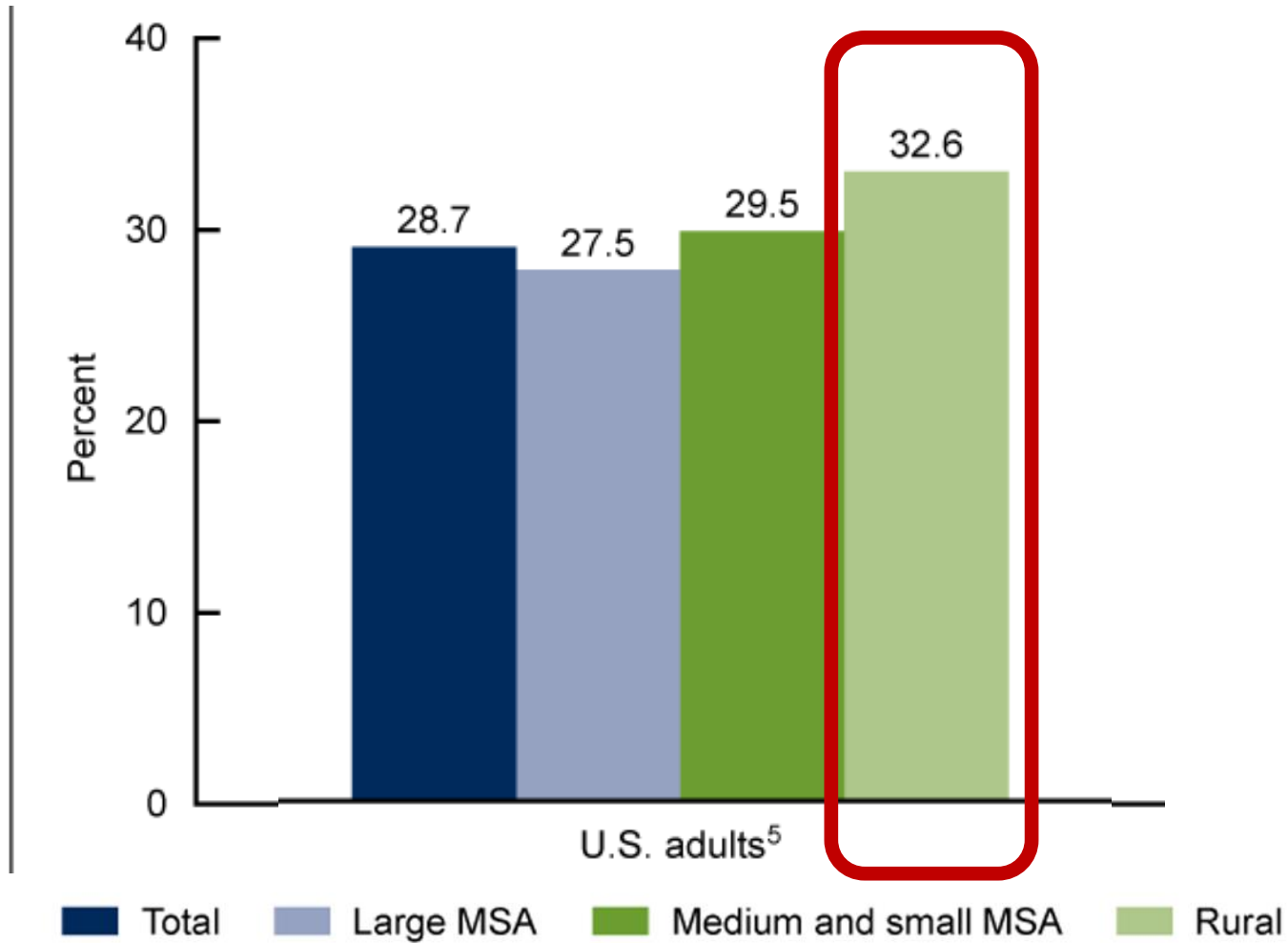
Why?

- Cardiovascular risk factors
- Social determinants of health
- Health care insurance and access
- Health system quality and capacity

Cardiovascular Risk Factors



Hypertension highest in rural areas



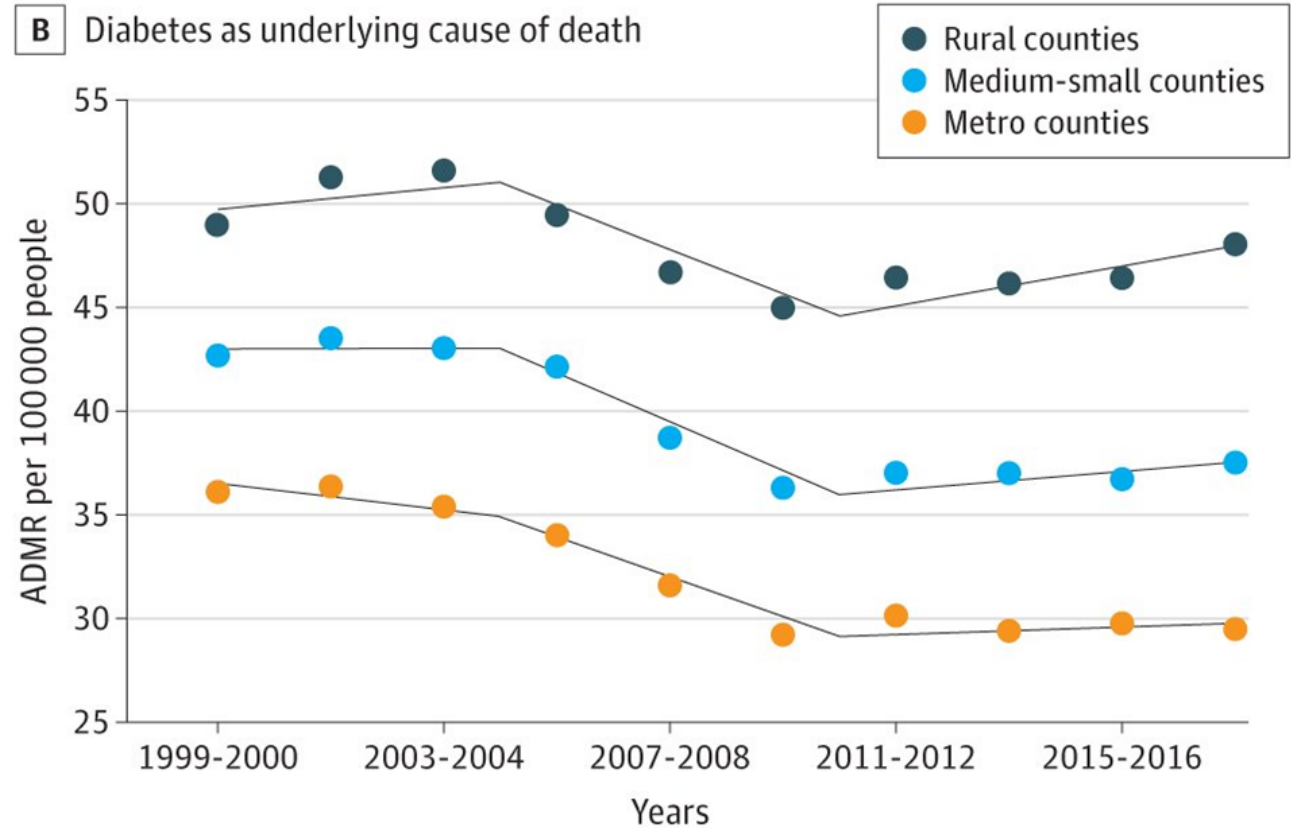
Villarroel et al. NCHS 2020

Diabetes more common in rural areas

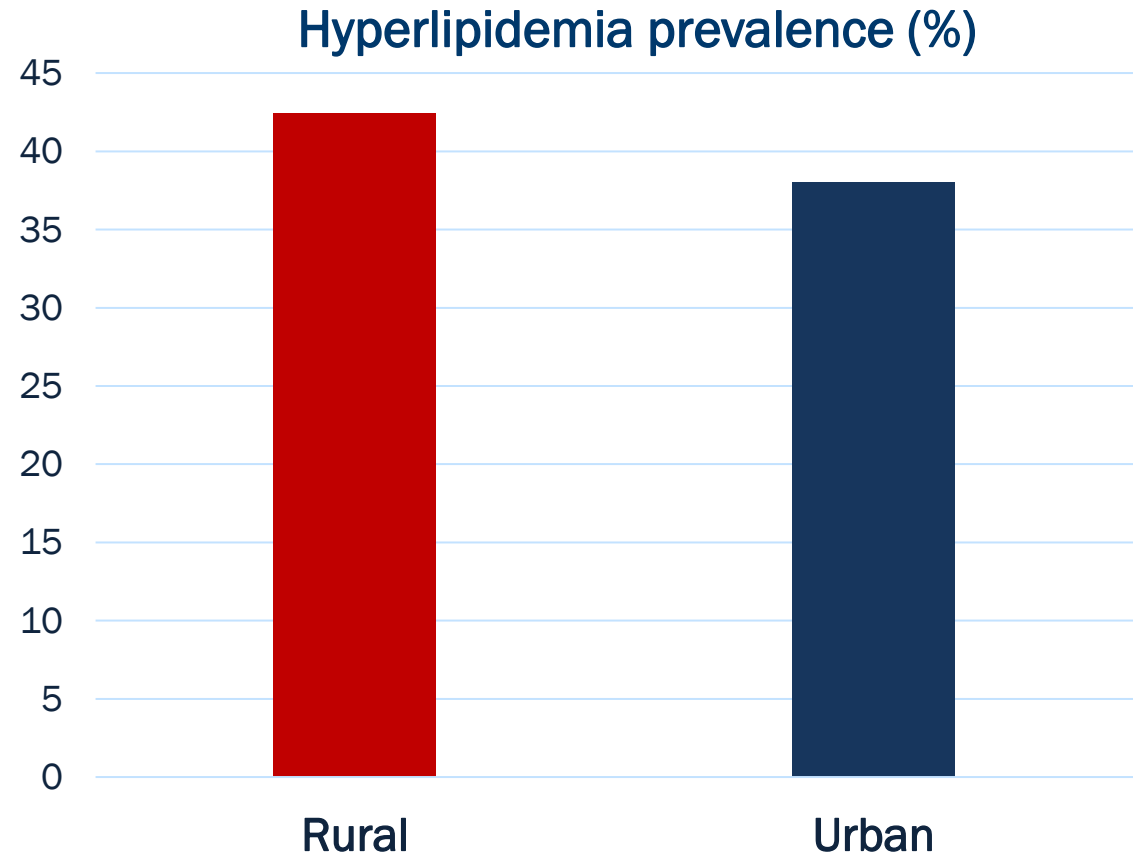
Diabetes is more common in rural areas.

Nearly 10% of adults in rural areas and about 8% of adults in urban areas were diagnosed with diabetes.

CDC 2023
U.S Department of Health and Human Services

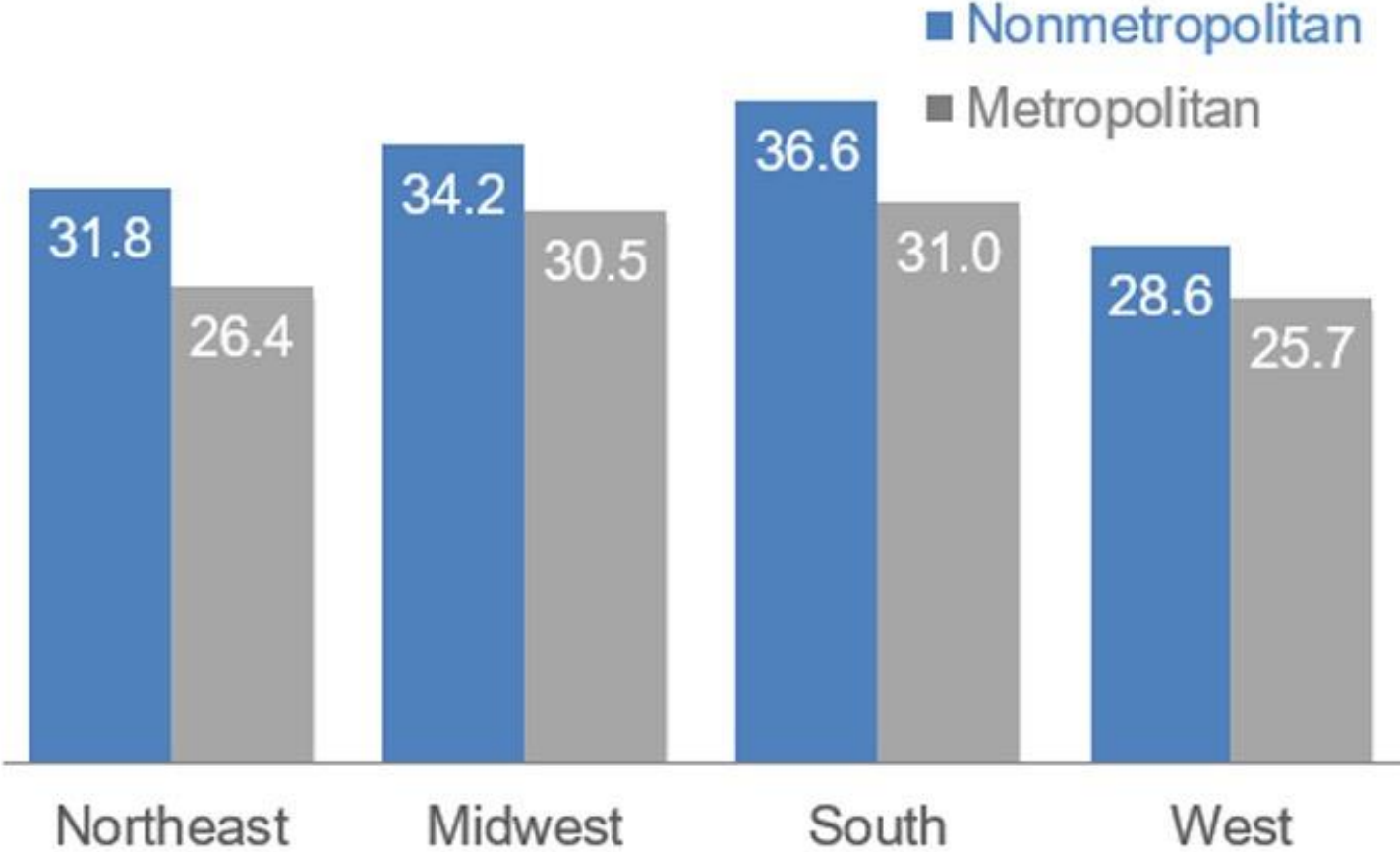


Hyperlipidemia more common in rural areas



Aggarwal...Wadhwa. JAMA 2022
Shaw et al. Prev Chron Dis 2016

Obesity has disproportionately increased in rural areas



Lundeen et al. MMWR 2018

Lifestyle and behavioral factors contribute to worse health in Rural America



Smoking rates nearly 2-times higher in rural vs urban areas



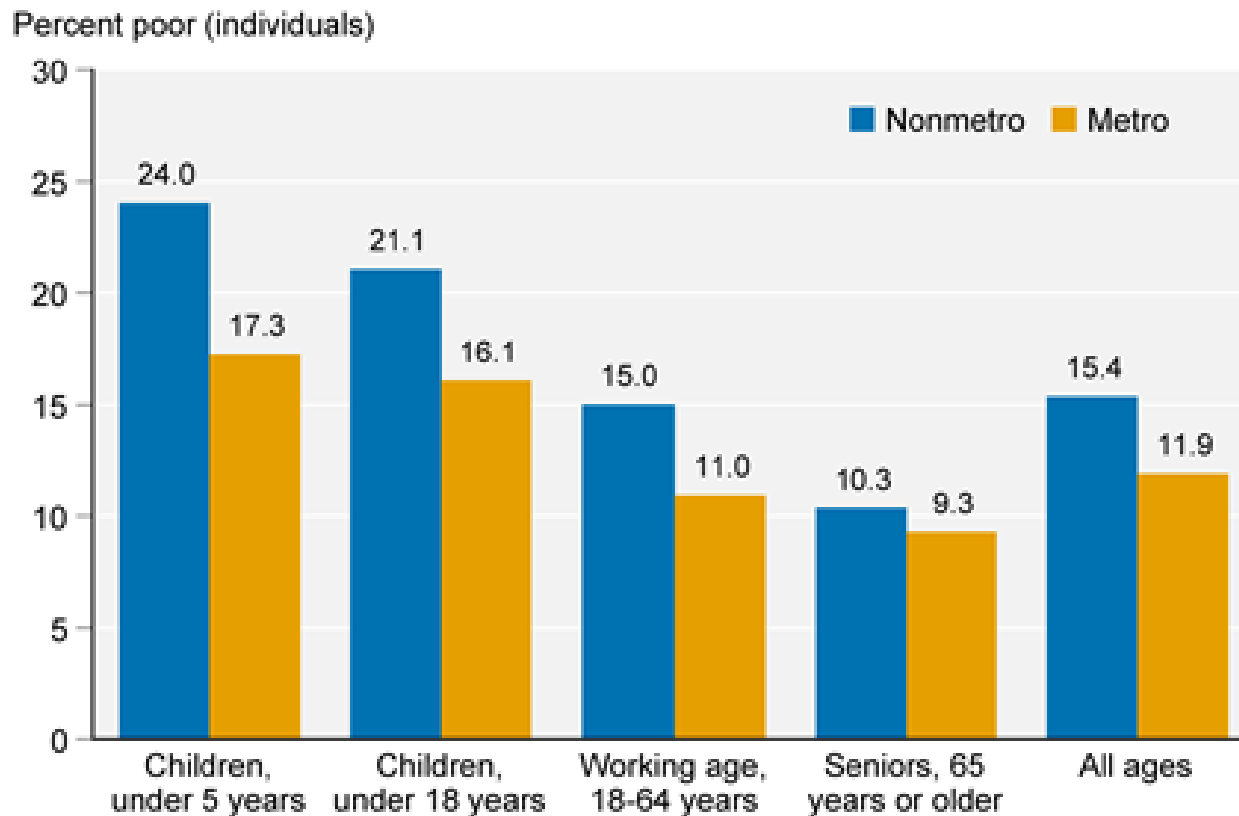
Biden-Harris Administration Announces Launch of Nearly \$50 Million Initiative to Support Opioid Treatment and Recovery Services in Rural Communities

SOCIAL DETERMINANTS OF HEALTH



Poverty – a major risk factor for poor cardiovascular outcomes

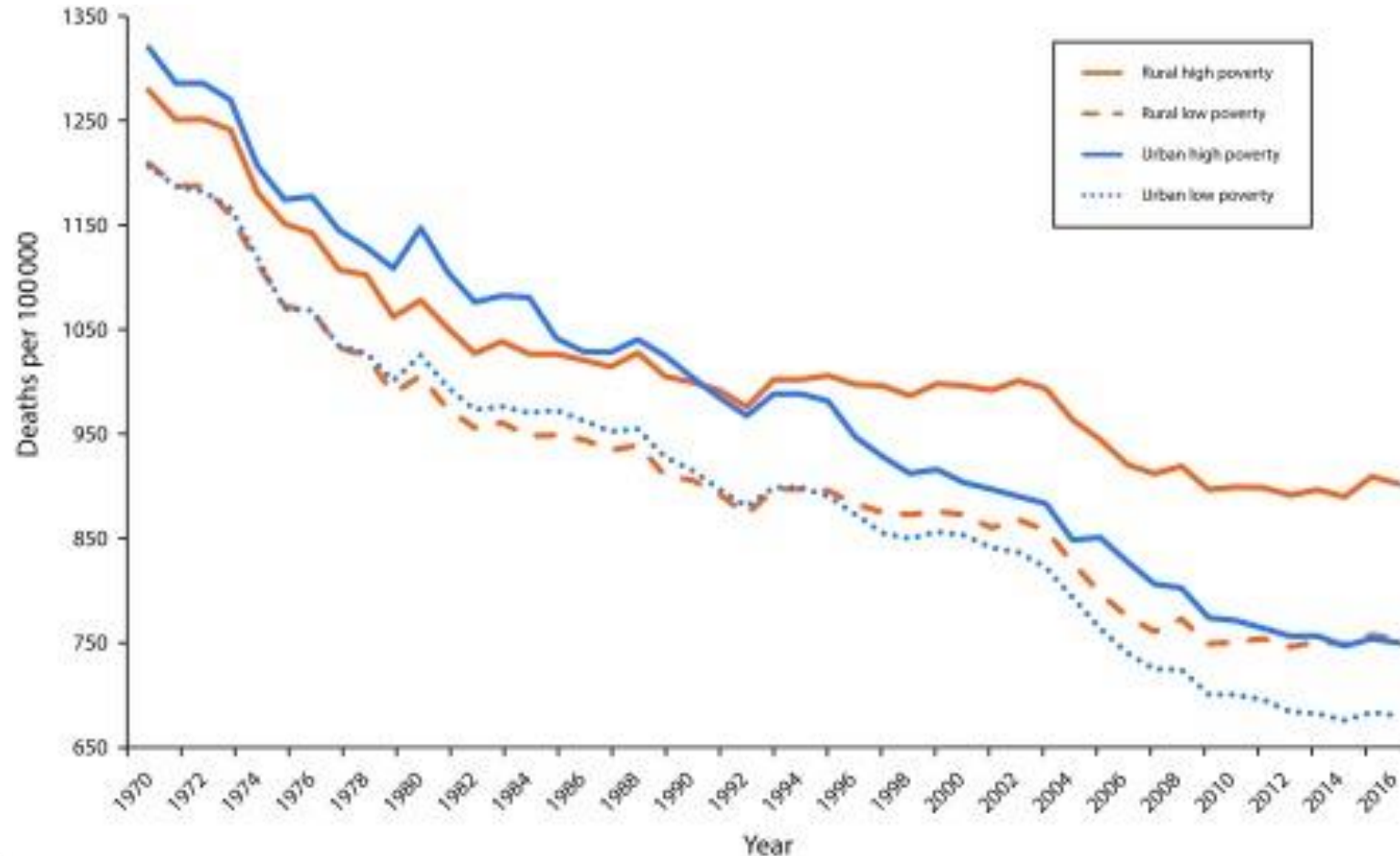
Poverty rates by age group and metro/nonmetro residence, 2019



Poverty rates significantly ↑ across all age groups in rural compared with urban areas

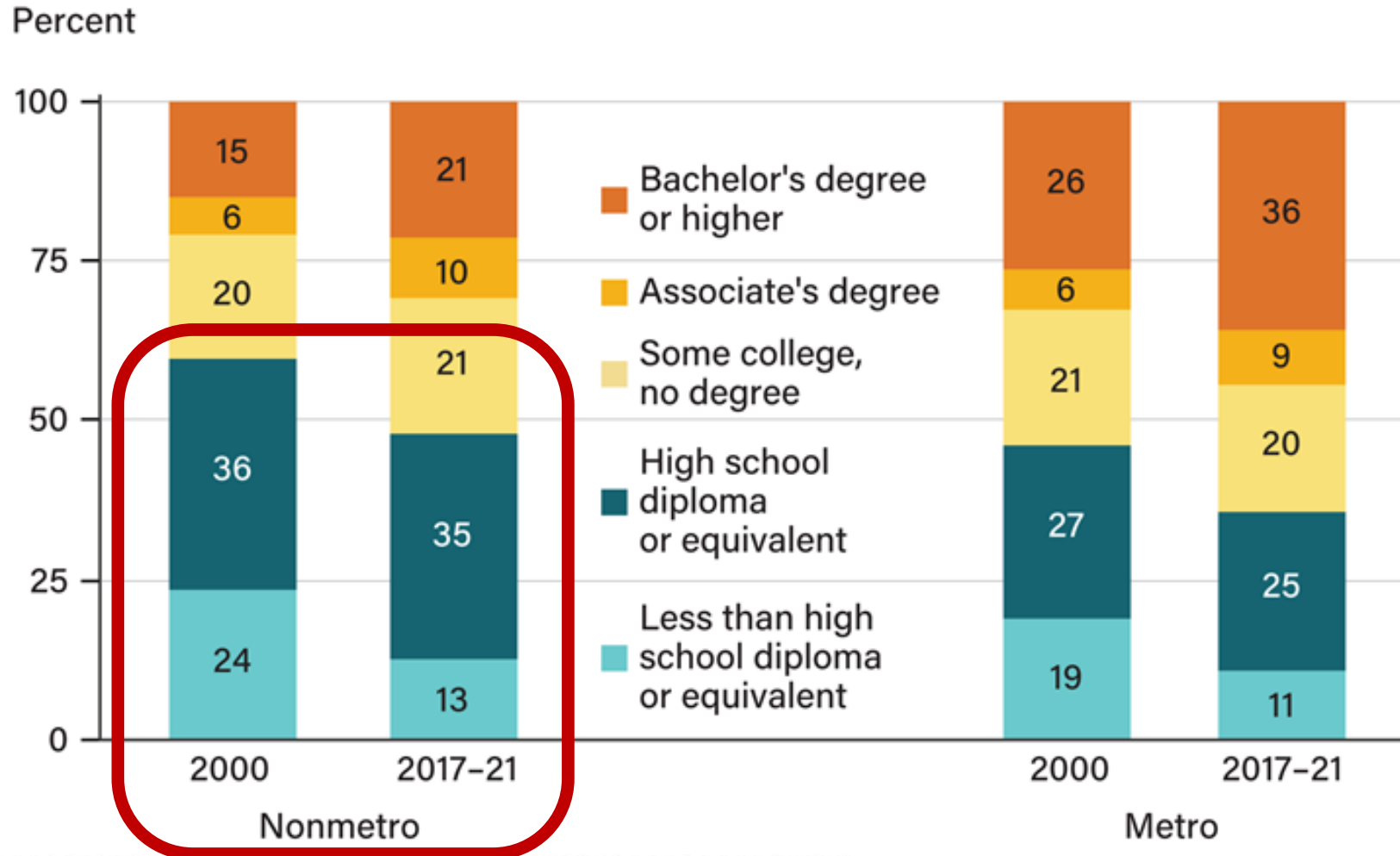
USDA Report. 2023

Where rurality and poverty intersect, health outcomes are worse



Cosby et al, Am J
Pub Health 2019

Rural-urban inequities in educational attainment persist



USDA Report. 2023

Food insecurity strongly linked to cardiovascular health

Percentage of Households Experiencing Food Insecurity

Rural communities generally have higher rates of food insecurity.

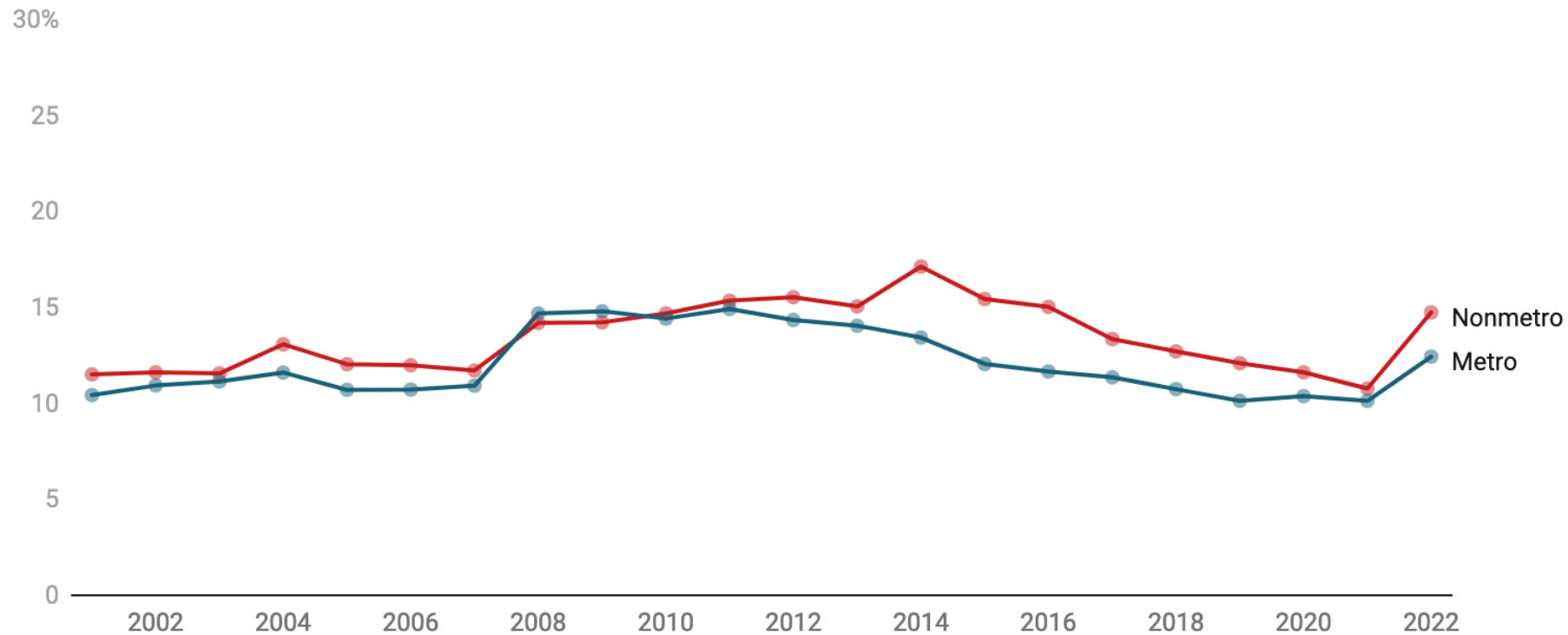


Chart: Daily Yonder / Sarah Melotte • Source: Food and Nutrition Service • [Get the data](#) • Created with [Datawrapper](#)

Emerging rural housing crisis

The Quiet Housing Crisis in Rural America

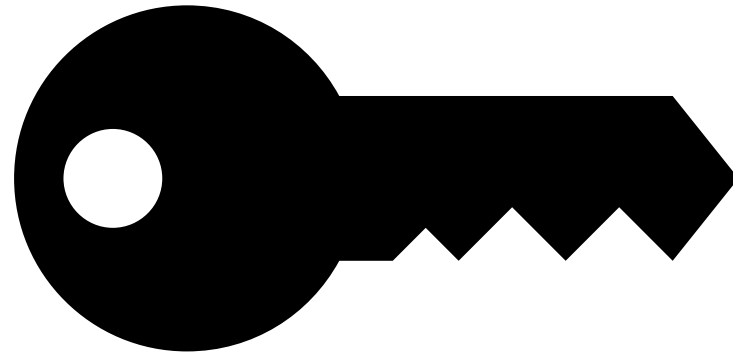
While housing shortages in major cities are grabbing headlines, rural communities are seeing higher rates of growth in housing prices and a silently spreading homelessness crisis.



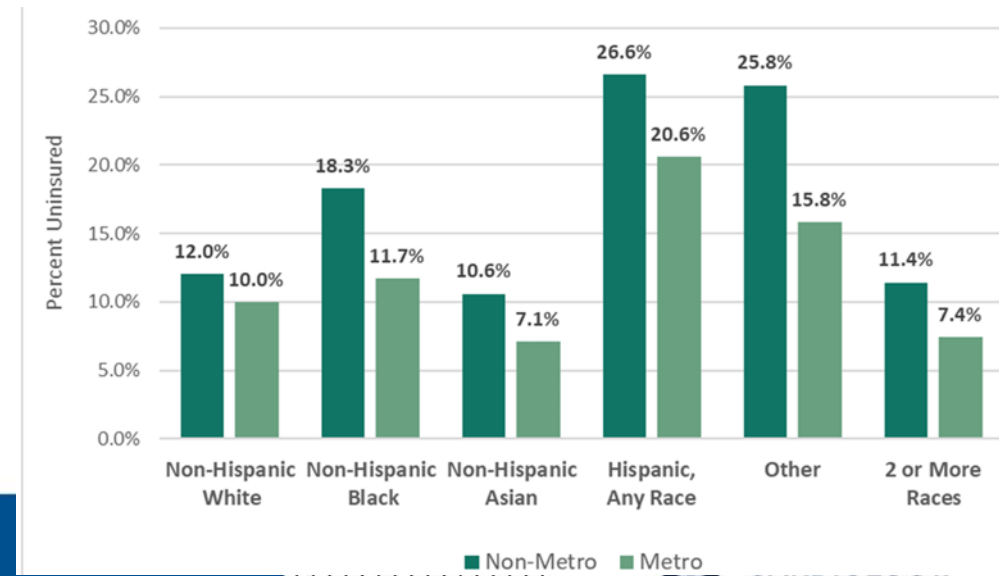
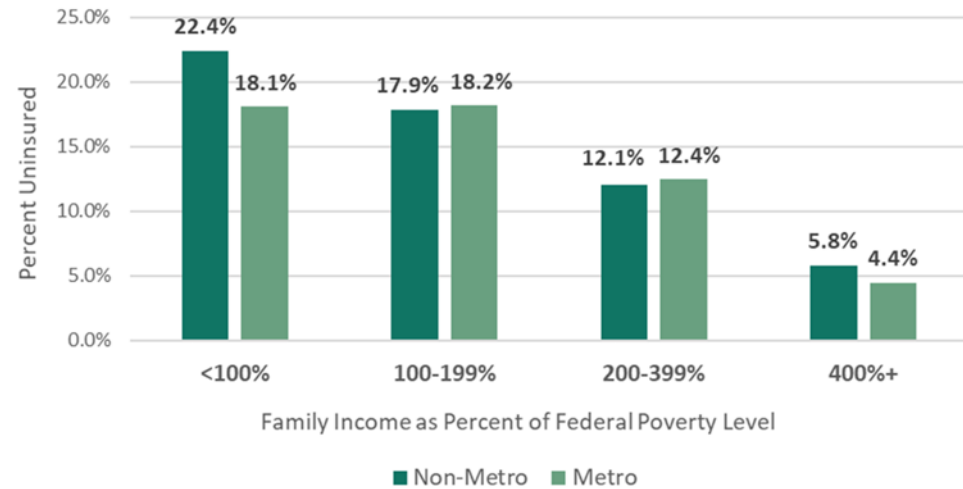
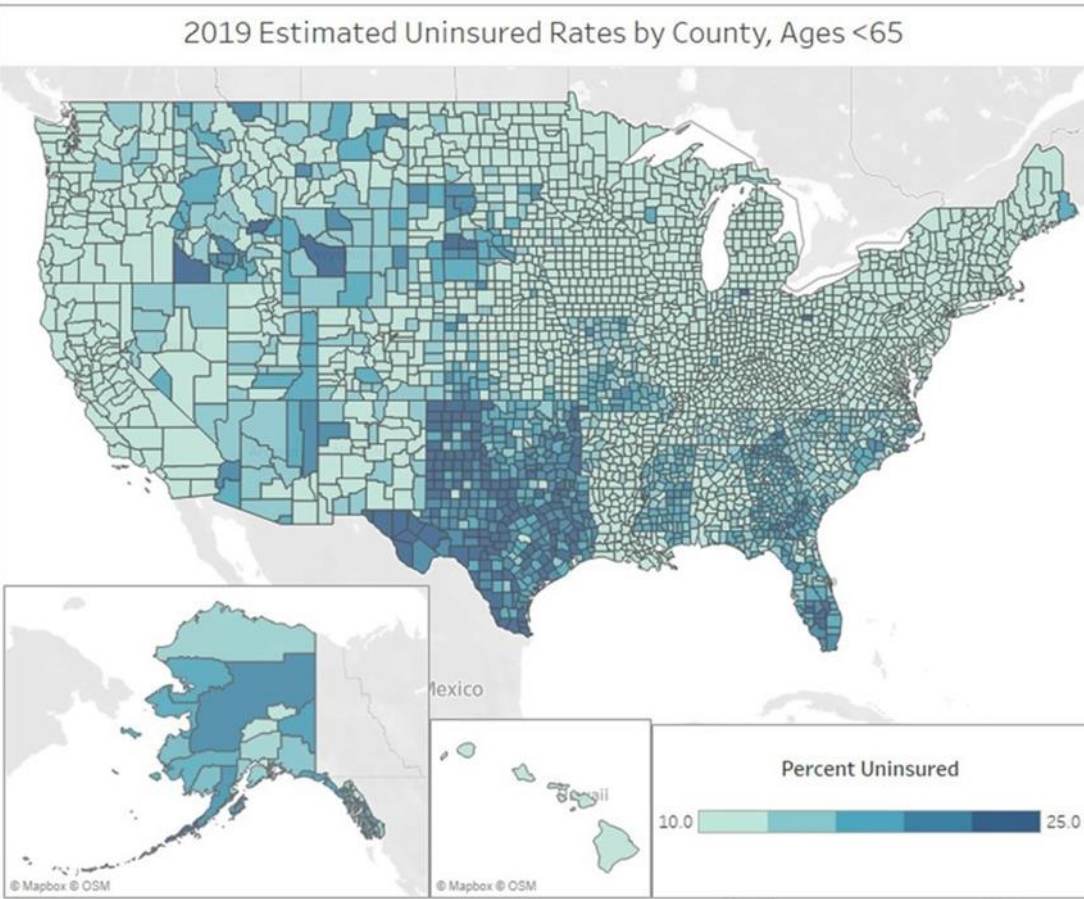
Homelessness ↑ by 6%
in rural communities
between 2020-2022,
compared with <0.5%
nation-wide

Ionescu. Planetizen. 2023
Photo: Sabrina Gordon

Healthcare Insurance and Access

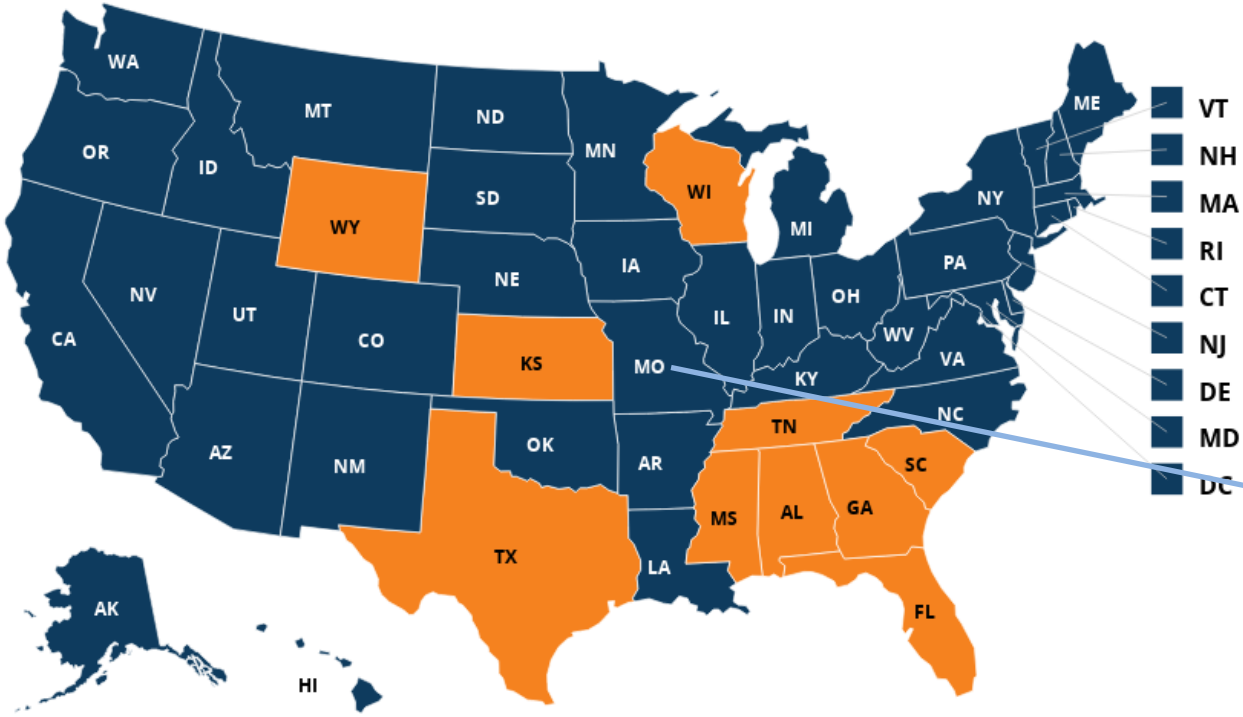


Rural areas have higher levels of uninsurance than urban ones



Medicaid expansion (or lack thereof) is a major contributor

Status of State Action on the Medicaid Expansion Decision



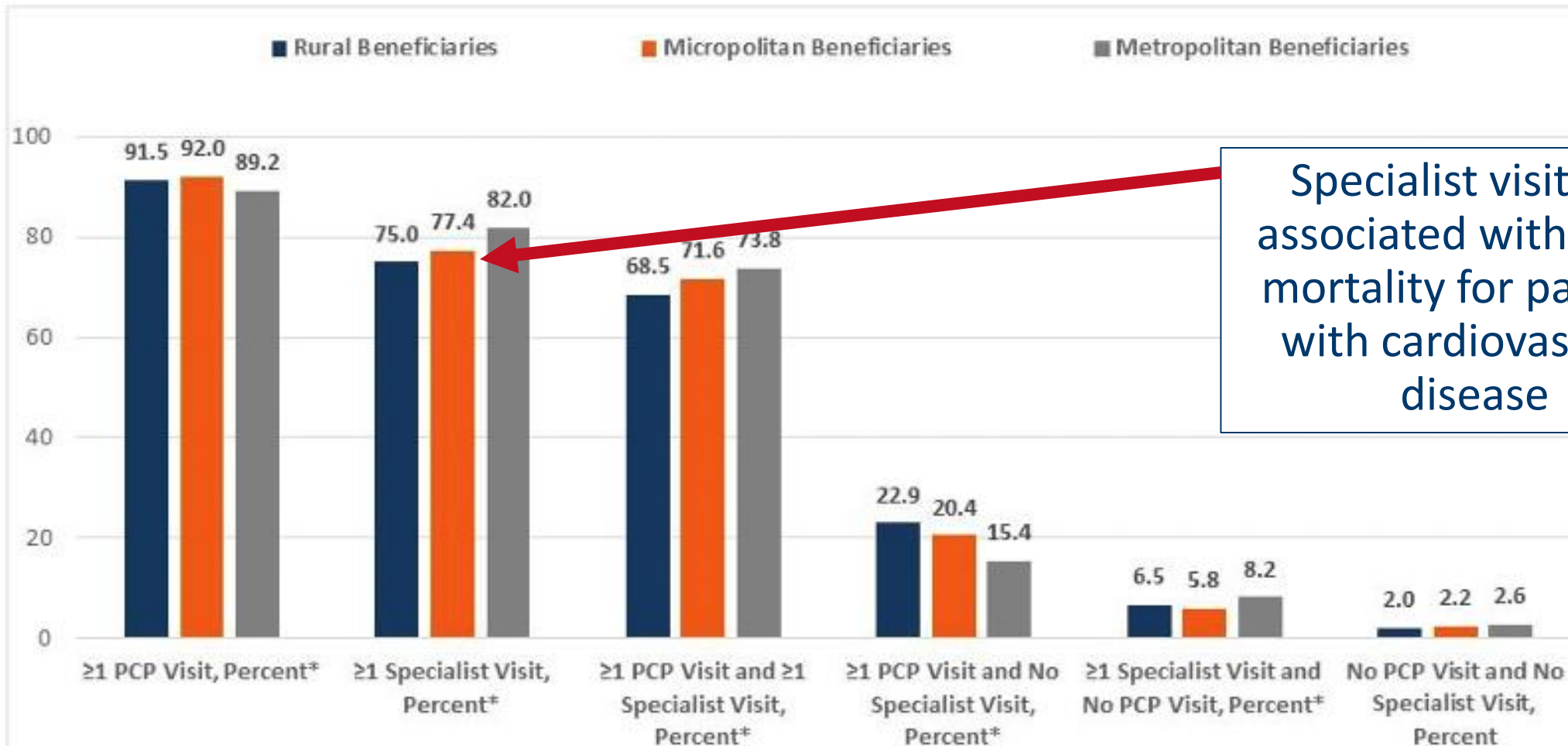
In Missouri, before expansion you had to a) have dependent children; b) make less than ~\$2400 per year; and c) have less than ~\$2000 of assets to qualify. Now, with or without children, individuals qualify up to \$20,783 in annual income.

■ Adopted and Implemented ■ Not Adopted

SOURCE: KFF, kff.org



Access to specialty care is lower in rural areas



Specialist visit was associated with lower mortality for patients with cardiovascular disease

Johnston and Joynt Maddox, HealthAffairs 2019

Lack of access to specialists also means lack of access to organ transplantation

Table 3. Unadjusted and Adjusted Transplant Rates for Heart, Liver, and Kidney Transplantation for 5-Year Cohort^a

	Unadjusted Transplant Rates							
	Metropolitan (Urban)		Micropolitan			Rural/Small Town		
	Listings per Million	RR (95% CI)	Listings per Million	RR (95% CI)	P Value (vs Urban)	Listings per Million	RR (95% CI) ^b	P Value (vs Urban)
Heart	33.0	1 [Reference]	32.1	0.97 (0.91-1.04)	.40	31.2	0.94 (0.89-1.00)	.07
Liver	79.2	1 [Reference]	63.8	0.81 (0.77-0.85)	<.001	66.5	0.84 (0.80-0.87)	<.001
Kidney	247.4	1 [Reference]	214.4	0.87 (0.84-0.89)	<.001	218.1	0.88 (0.86-0.90)	<.001
	Adjusted Transplant Rates							
Heart	33.1	1 [Reference]	31.4	0.95 (0.88-1.02)	.17	29.0	0.88 (0.81-0.94)	.004
Liver	81.4	1 [Reference]	65.5	0.80 (0.76-0.85)	<.001	65.5	0.80 (0.77-0.84)	<.001
Kidney	242.5	1 [Reference]	221.4	0.91 (0.89-0.94)	<.001	219.2	0.90 (0.88-0.93)	<.001

Abbreviations: CI, confidence interval; RR, rate ratio.

^aListings per million population for a zip code with median household income = \$31 400; percent female = 51.2; percent age 0-17 y = 25.6, 18-34 y = 23.7, 35-49 y = 23.0, 50-64 y = 14.4, ≥ 65 y = 13.3; percent black = 12.1, Asian = 3.5, Hispanic = 11.2, and other race/ethnicity = 0.9. Quantities equal US average/median for these characteristics.

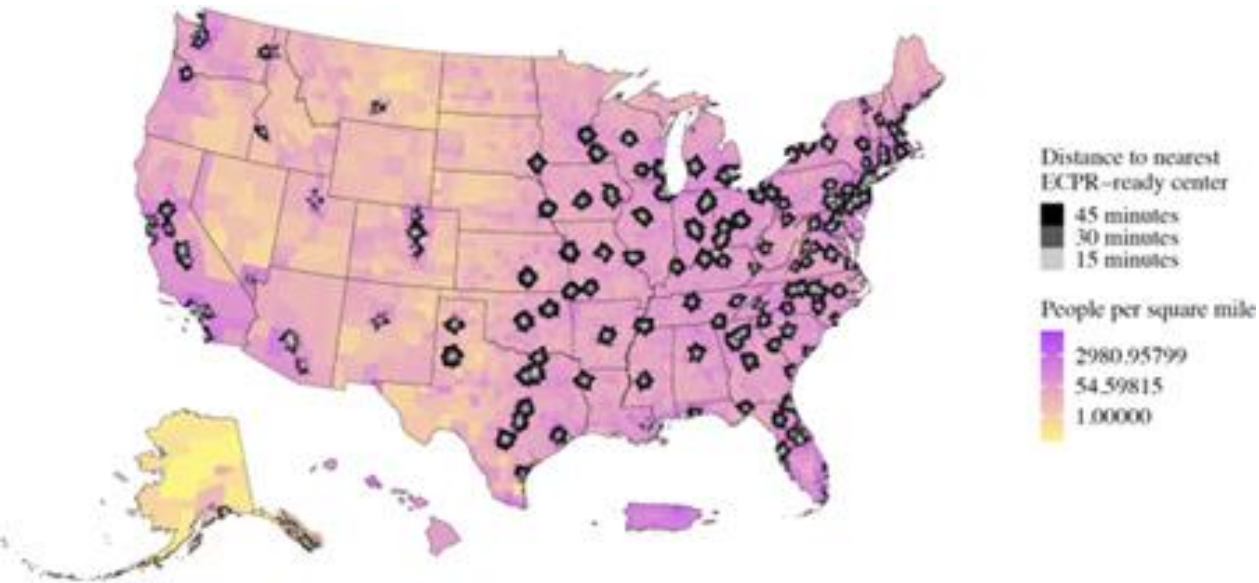
^bAdjusted rate ratio is derived from a multivariate regression analysis using a Poisson distribution to control for population demographic differences at the zip code level (age, race, sex, and median household income).

Axelrod et al, JAMA 2008

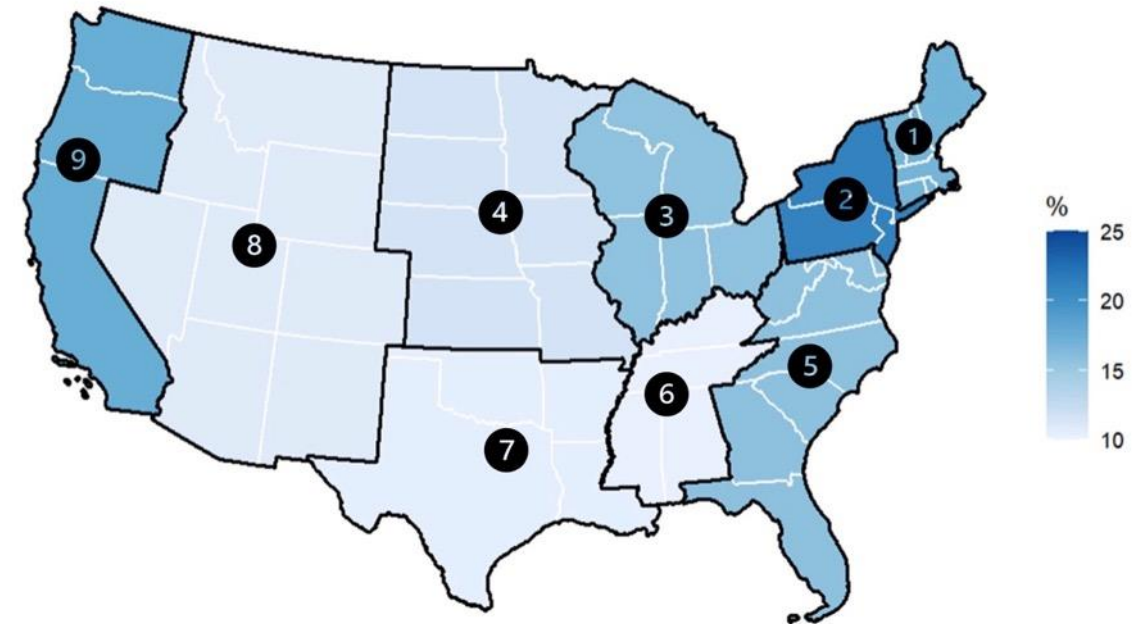
Breathett et al, J Heart Lung Trans 2022



Lack of access to technology is a growing problem in cardiovascular care



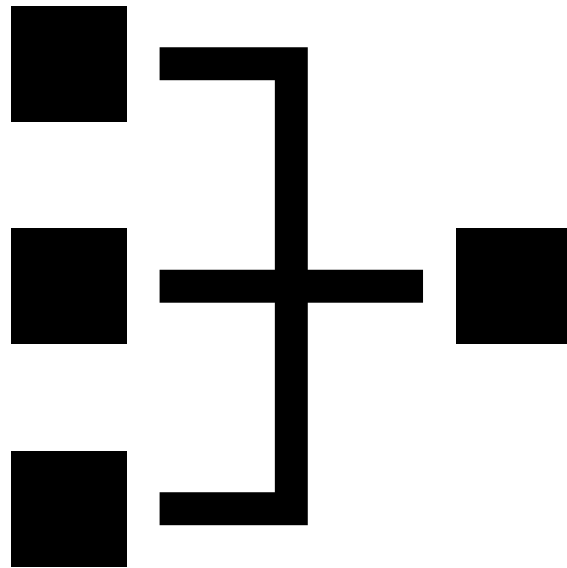
Percentage of Hospitals Performing at Least 5 Hypothermia Procedures by Census Division



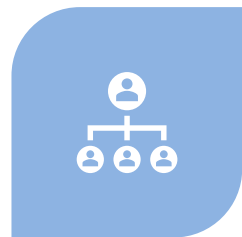
Alaska and Hawaii included in Pacific Census Division.

Van Wyck et al AHA 2023 and Wolfe... Joynt Maddox, AHA 2022

Health System Quality and Capacity



Rural hospitals face barriers to providing high-quality, guideline-concordant care



FEWER
RESOURCES



FEWER STAFF



FEWER OR NO
SPECIALISTS ON
STAFF



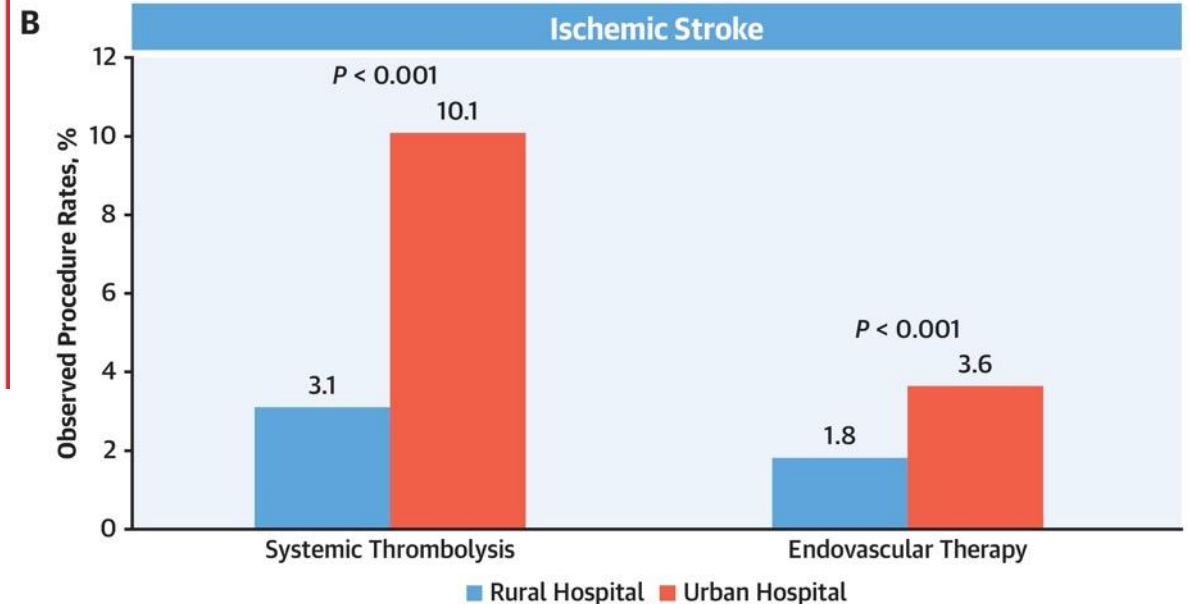
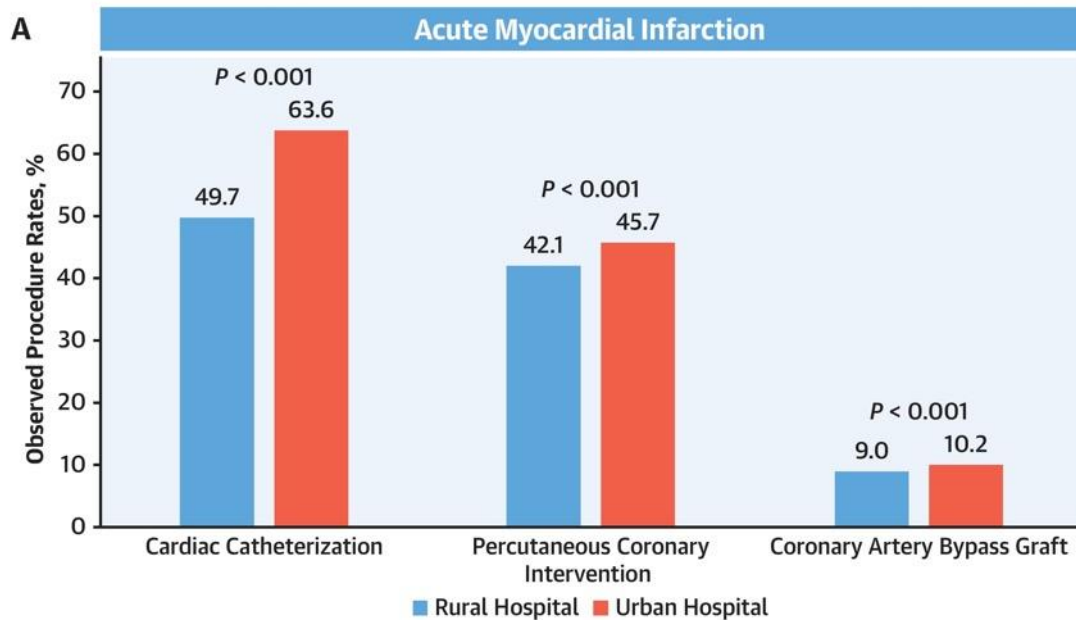
LONGER EMS
RESPONSE TIMES



LONGER DRIVING
TIMES

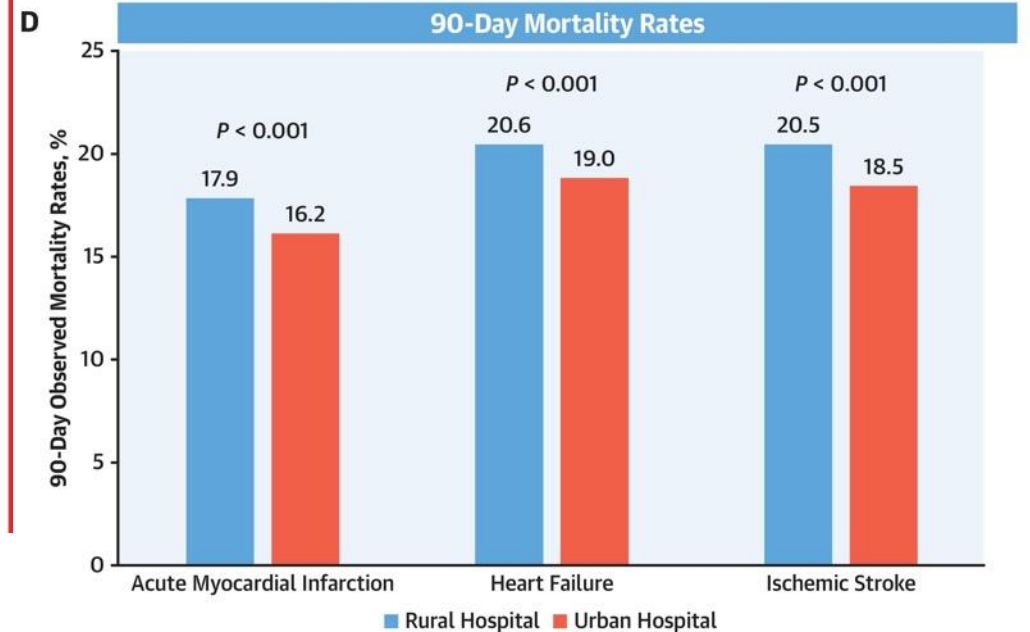
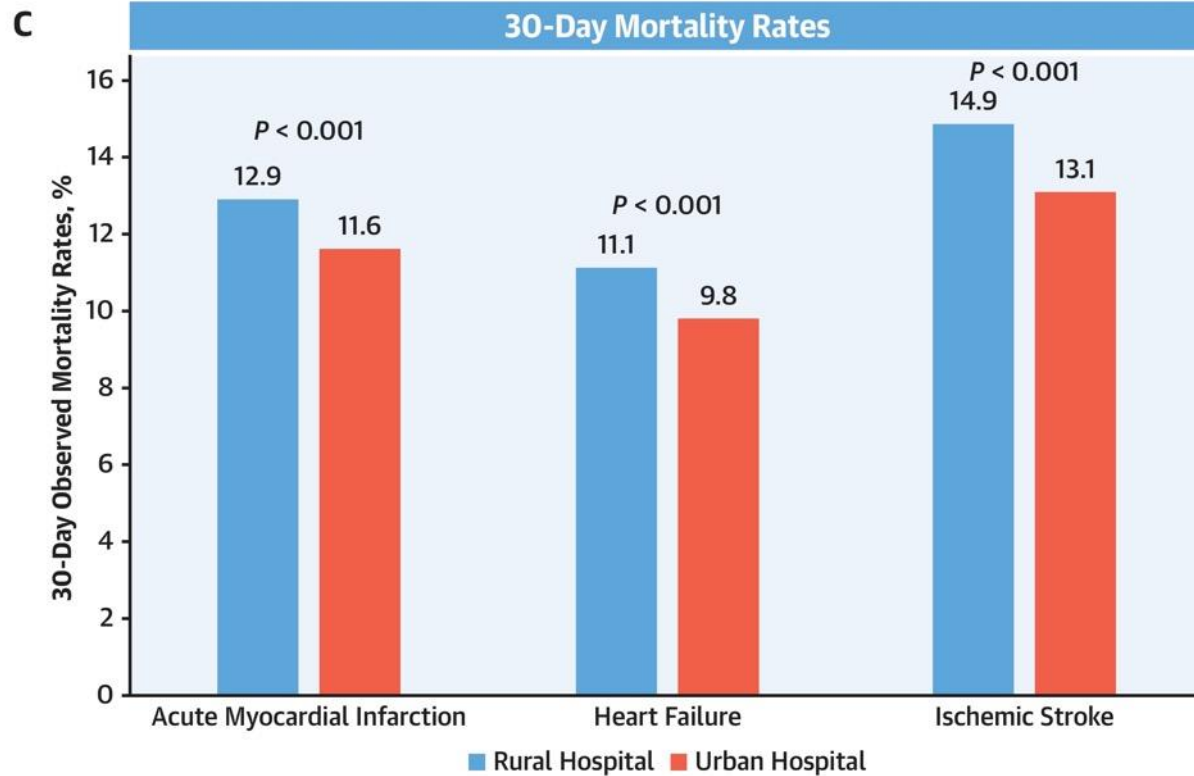
Lower use of revascularization in AMI and stroke

CENTRAL ILLUSTRATION: Observed Procedure and Mortality Rates for Acute Cardiovascular Conditions at Rural Versus Urban Hospitals



Worse clinical outcomes for these conditions, and for heart failure

CENTRAL ILLUSTRATION: Continued

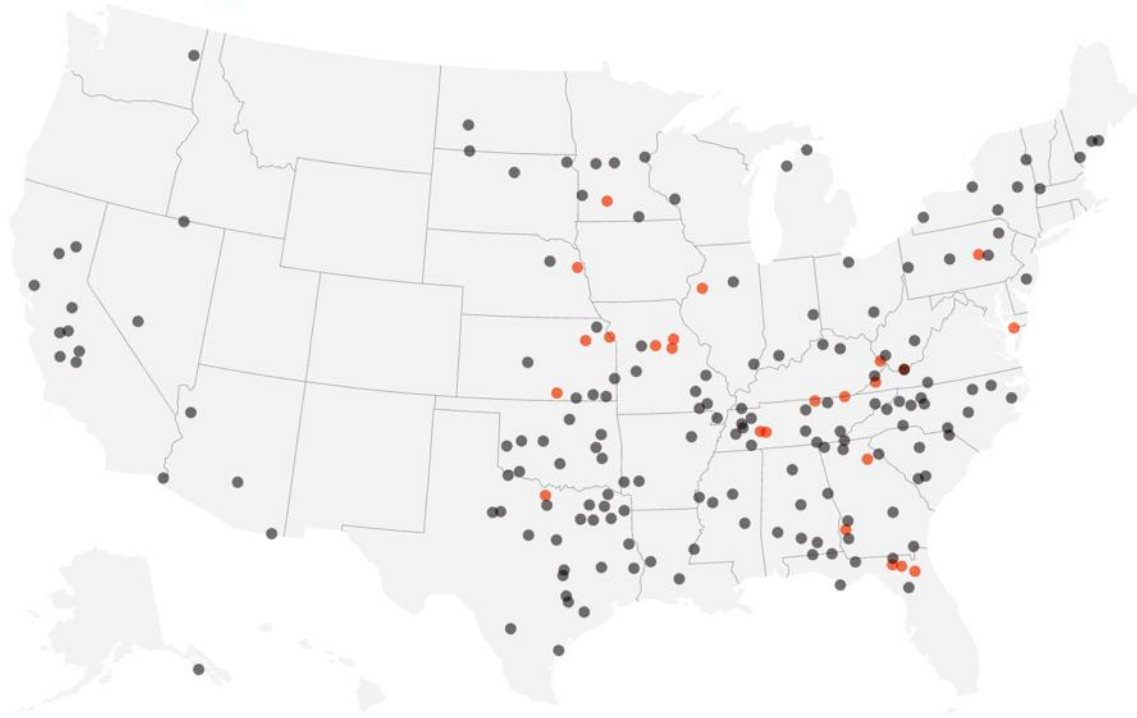


Hospital closures worsen rural care capacity, impact on outcomes is complex

Rural hospital closures, by year

2005-2022 (as of July 1, 2022)

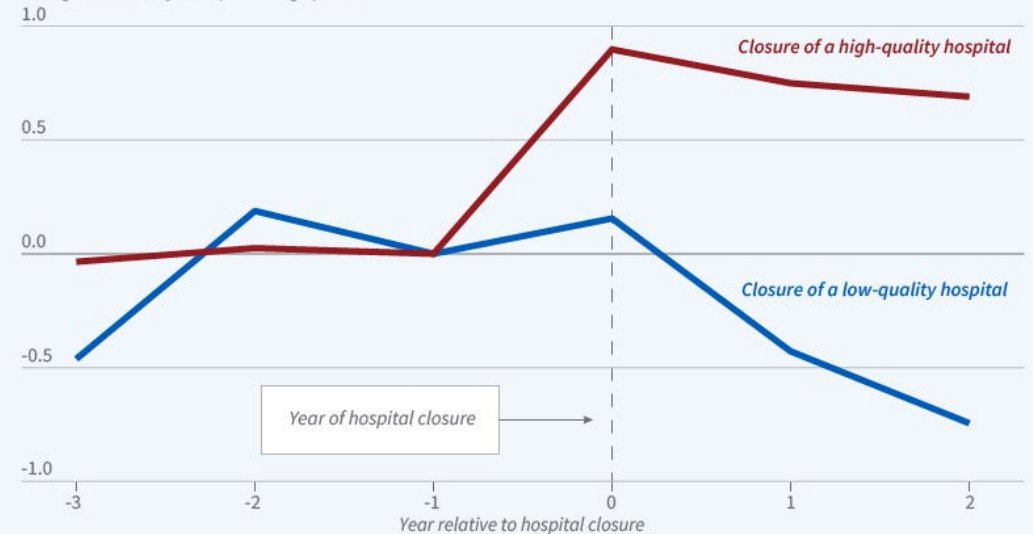
■ 2005-2019 (159 total) ■ 2020-2022 (24)



Data: [UNC](#); Map: Baidi Wang/Axios

Mortality Rates and Hospital Closures

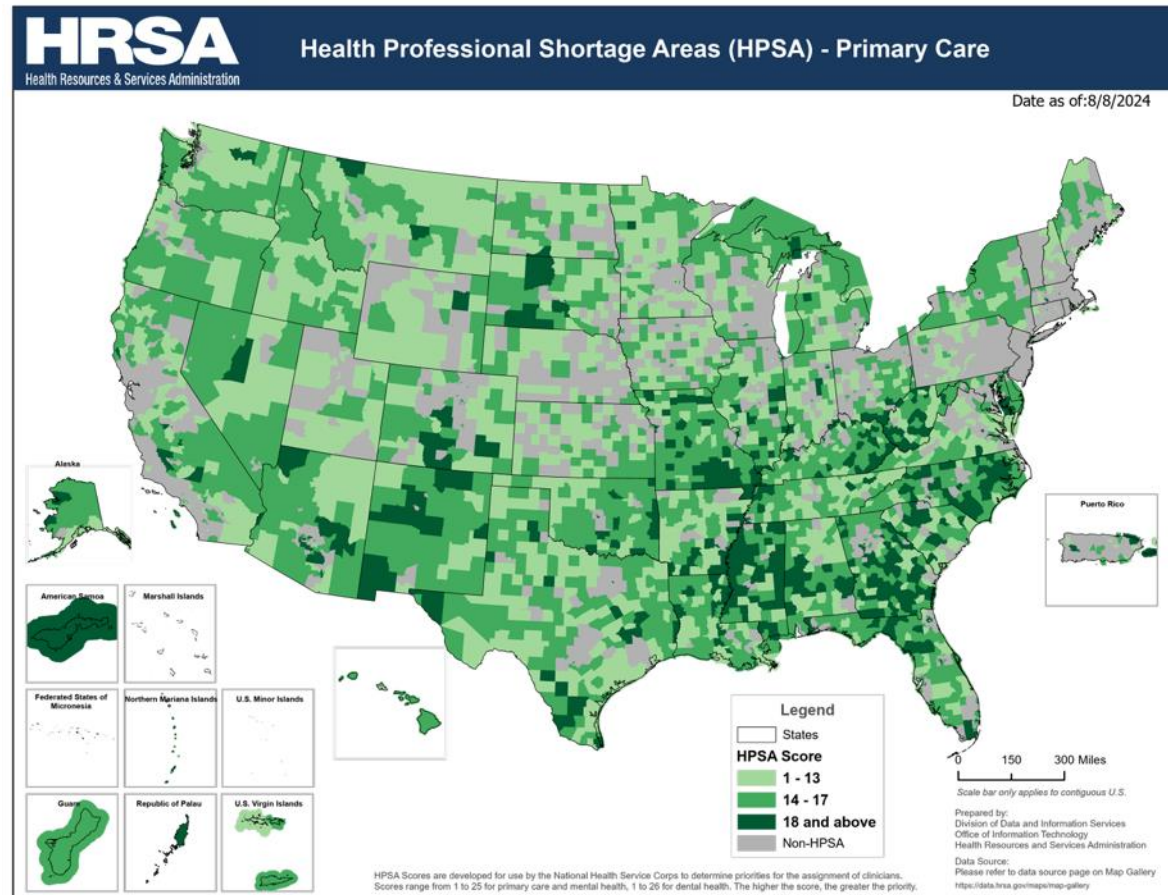
Change in mortality rate, percentage points



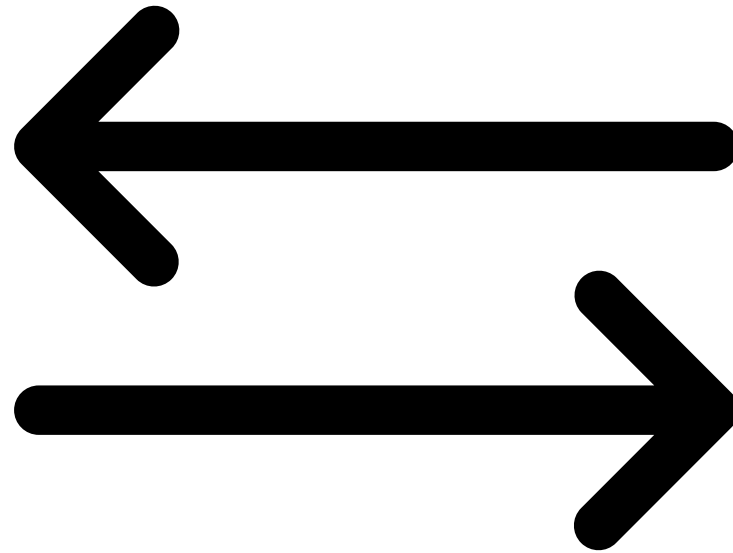
Source: Researchers' calculations using Medicare data.

Chandra, Dalton, and Staiger, NBER Working Paper 31789

Workforce is a major challenge in rural areas



Opportunities for Change



Telehealth is promising but underutilized despite increase during the pandemic



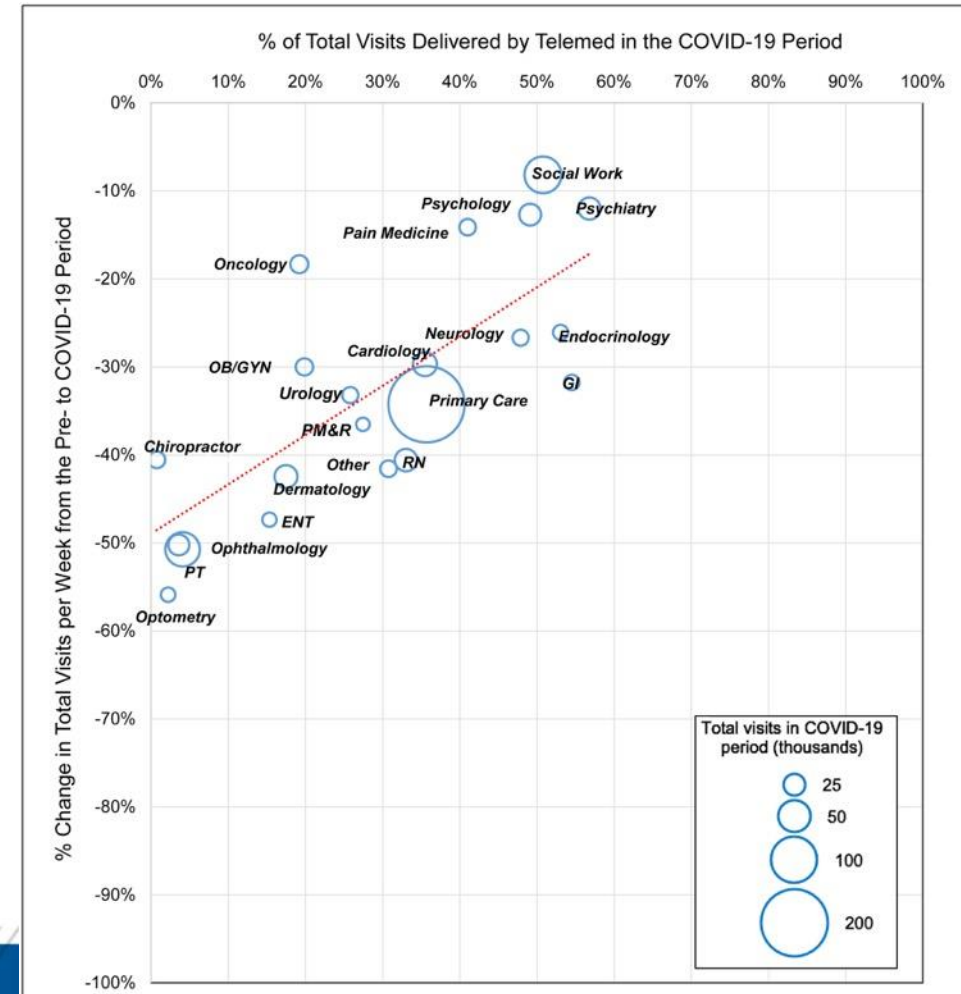
Clinician-to-clinician communication



Patient interaction with health technologies

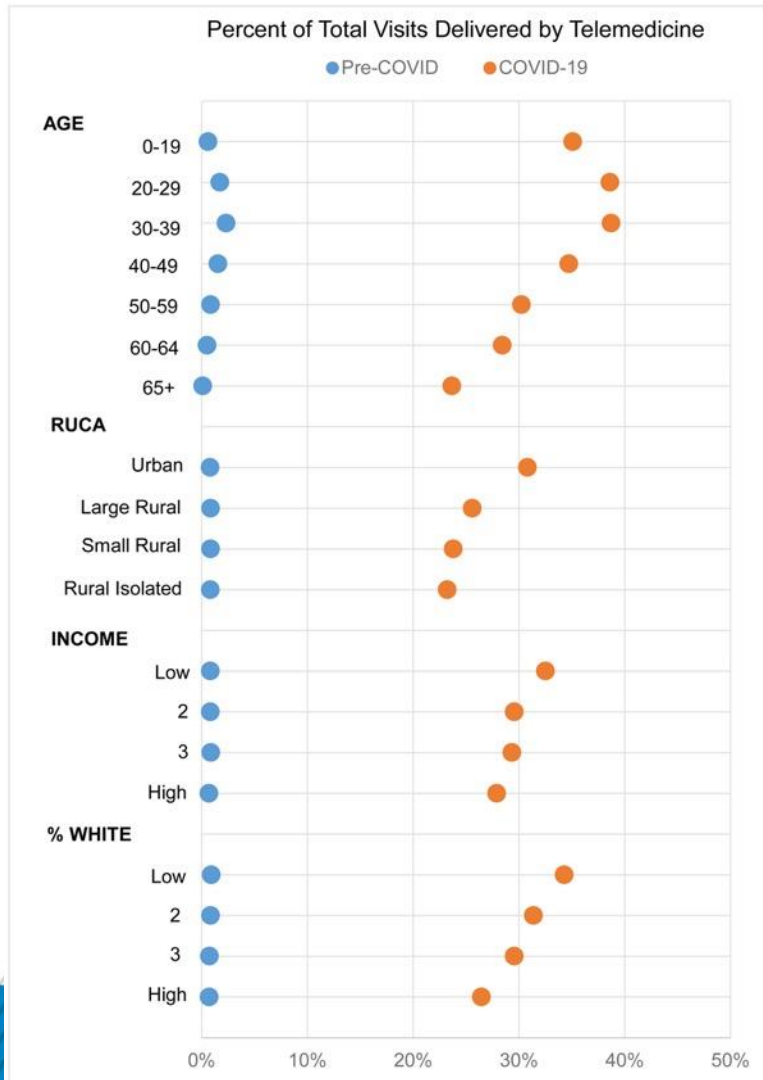


Clinician-to-patient interaction



Fedson and Bozkurt, HF Clinics 2022, Patel et al, HealthAffairs 2022

Has potential to be equity-enhancing but only if done with intention and resources



B. Demographic and Socioeconomic Predictors of Access to Video Visits

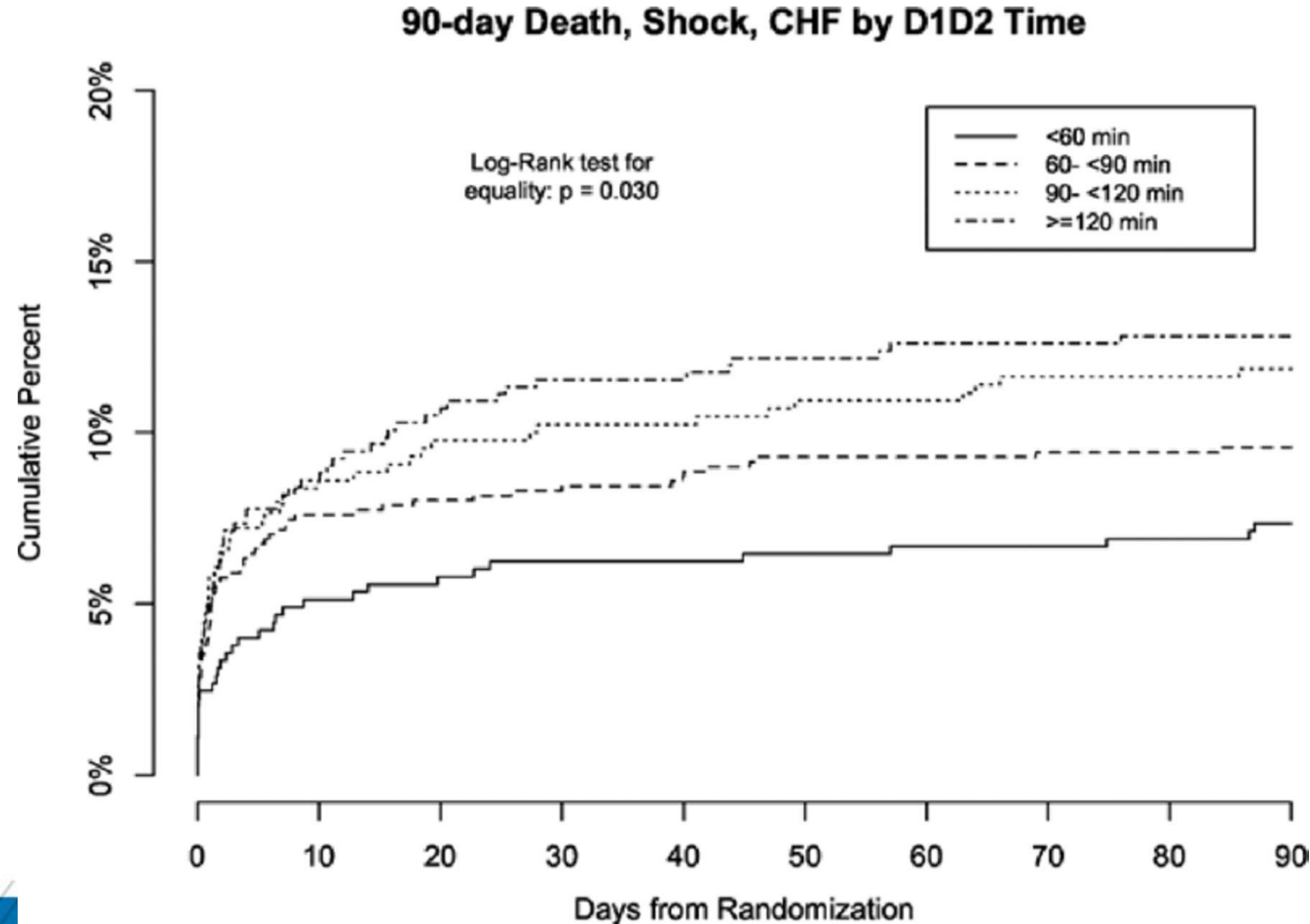
Variable	OR (95% CI)	P-value
Age, per 10 years	0.74 (0.71 – 0.78)	< 0.000001
Female gender	1.14 (0.99 – 1.3)	0.066
African American race	0.67 (0.54 – 0.82)	0.00009
Hispanic ethnicity	0.81 (0.51 – 1.28)	0.36
Lack of spouse or significant other	0.71 (0.62 – 0.82)	0.000003
Lack of college education	0.67 (0.58 – 0.76)	< 0.000001
Median household income, per \$10,000*	1.03 (1.01 – 1.06)	0.025
Medicaid insurance	0.87 (0.64 – 1.18)	0.358
Self-pay	0.62 (0.35 – 1.1)	0.101

0.25 0.5 0.75 1 1.25 1.5
Favors Telephone Visits Favors Video Visits

*Based on the 2019 American Community Survey estimates by zip code.

Patel et al, HealthAffairs 2022; Sammour et al, AJC 2021

Partnerships need to be established and incented to reduce transfer time/burden



Van Diepen et al, Circ: CQO 2012

Insurance expansion is crucial; effects of coverage are now well-established

- Financial protection of individuals and hospitals
- Greater access to primary care, ambulatory care visits, prescription medications
- Better adherence, more access to preventive services
- Better self-reported health (both physical and mental)
- Mixed evidence for utilization (ED, hospitalizations, etc.)
- Lower mortality, including infant mortality, cardiovascular, cancer
- Impacts are largest for racial and ethnic minority communities and in rural areas

Sommers NEJM 2017 and many, many more

Infrastructural investment is also needed

- Economic opportunity is a major driver of health outcomes
- Education is a major driver of health outcomes
- Clinicians from rural areas stay in rural areas – need to invest in training programs
- Broadband
- Stable, consistent, and enhanced funding models for rural hospitals and clinicians – demonstration projects in PA and elsewhere, rural emergency hospital designation

Summary and Conclusions

- Rural health disparities are large and growing
- Multifactorial, including standard and novel cardiovascular risk factors as well as social risk
- Health care access and quality are also challenges
- Solutions include telehealth, insurance expansion, and broader infrastructural investment

Thank You



Webinar Evaluation, Recording, and Companion Guide will be emailed to all registrants.



Upcoming Webinar

“Implementing Innovative Solutions to Achieving Equitable PAD Care”

Tuesday, September 10, 7:00 – 8:00pm ET



For any questions, please contact: Akua Asare, MD (aasare@acc.org)