



Tackling the Disproportionate Burden of Resistant Hypertension in Black Adults: Perspectives and Advances

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Agenda

- Overcoming Barriers to Hypertension Control and Cardiovascular Disease: We Need to Do Better – Dr. Ferdinand
- Resistant Hypertension: Definitions, Current Treatment and Emerging Approaches – Dr. Cohen



Overcoming Barriers to Hypertension Control and Cardiovascular Disease: We Need to Do Better

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Disclosures

Speaker's Bureau- None

Consultant- Amgen, Novartis, Lilly, Medtronic,
Janssen

Stocks- None

Patents- None

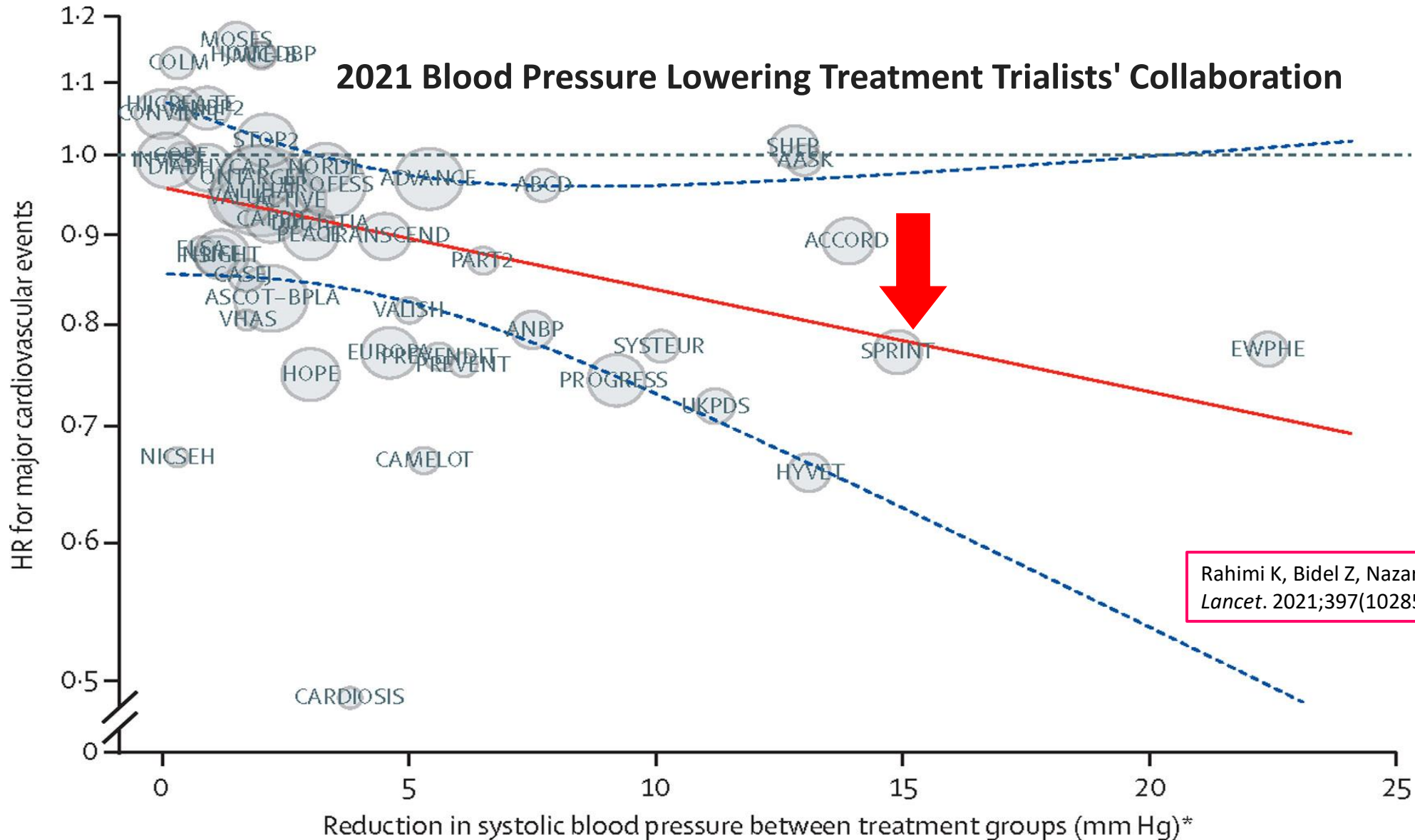


Goals

- • Recognize the disproportionate burden of HTN in racial/ethnic minority populations and especially in African Americans
- • Reveal multilevel factors contributing to HTN disparities
- • Discuss uncontrolled HTN as a major driver of CV mortality gap and suboptimal outcomes in Blacks vs. Whites
- • Highlight the importance of assessing and addressing social determinants of health in hypertension

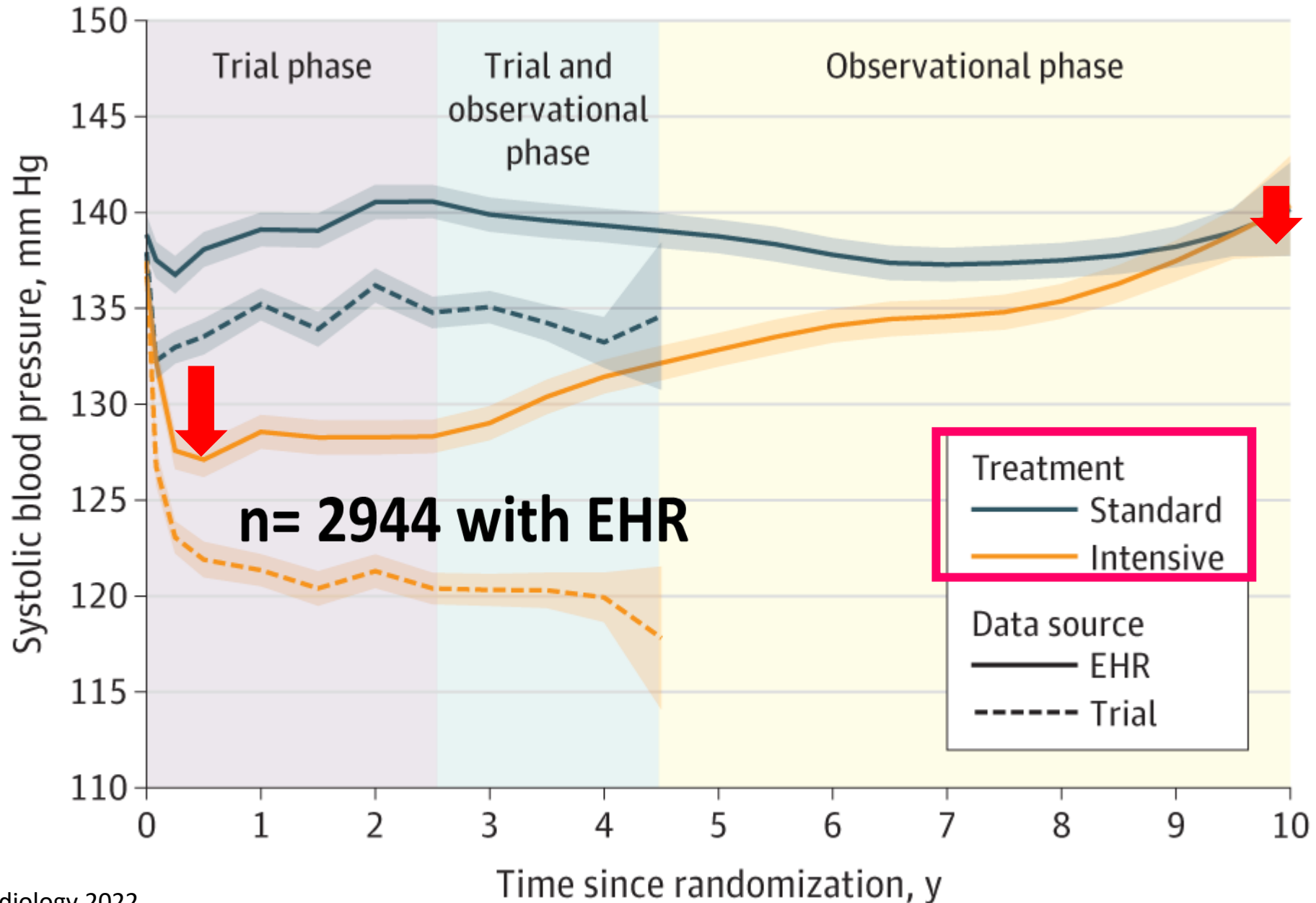


Association between Intensity of BP Reduction and Relative Treatment Effects for Prevention of Major CV Events



Rahimi K, Bidel Z, Nazarzadeh M, et al. *The Lancet*. 2021;397(10285):1625-1636.

SPRINT Long Term Follow-up



Mortality rates by Cardiovascular Disease

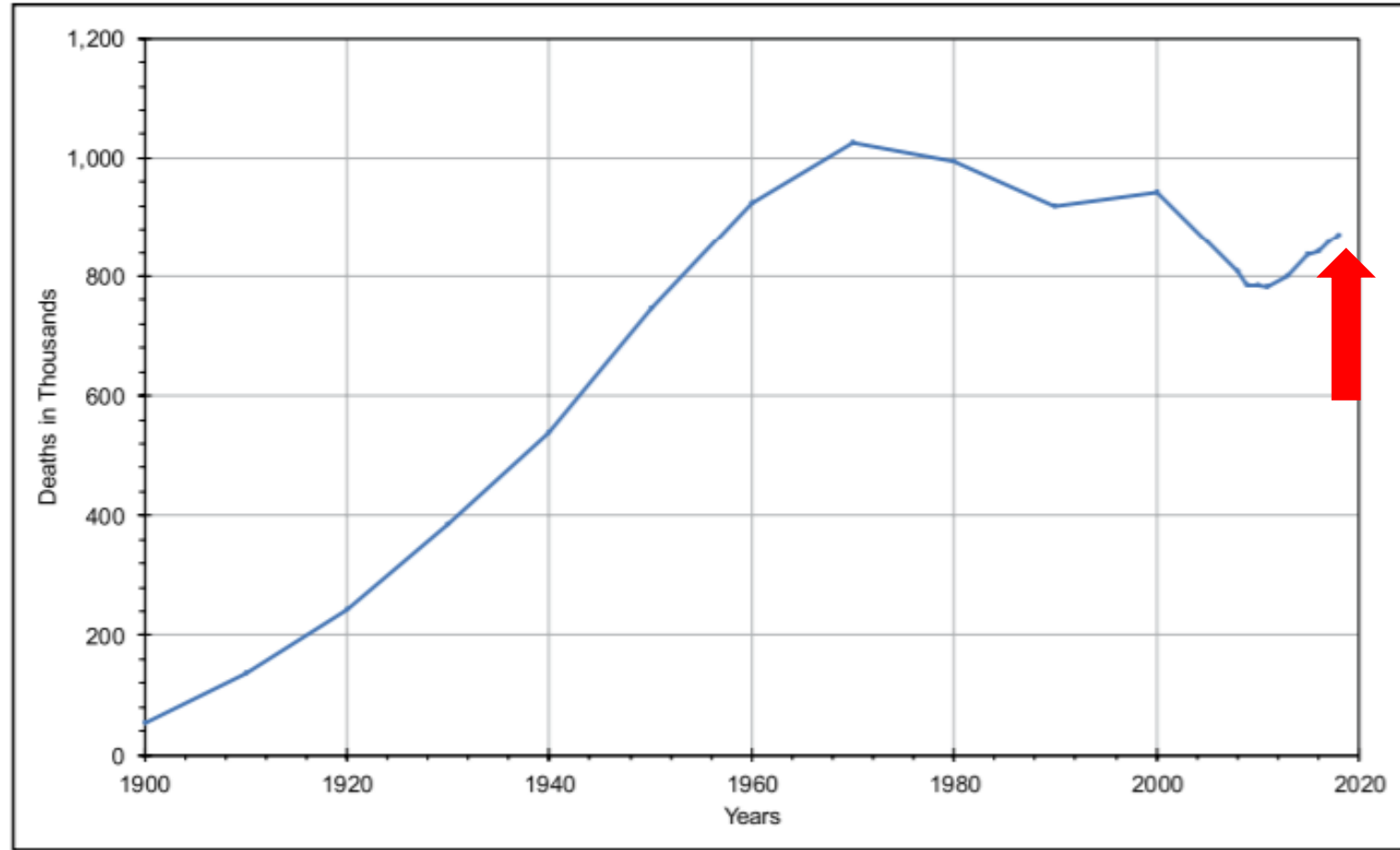


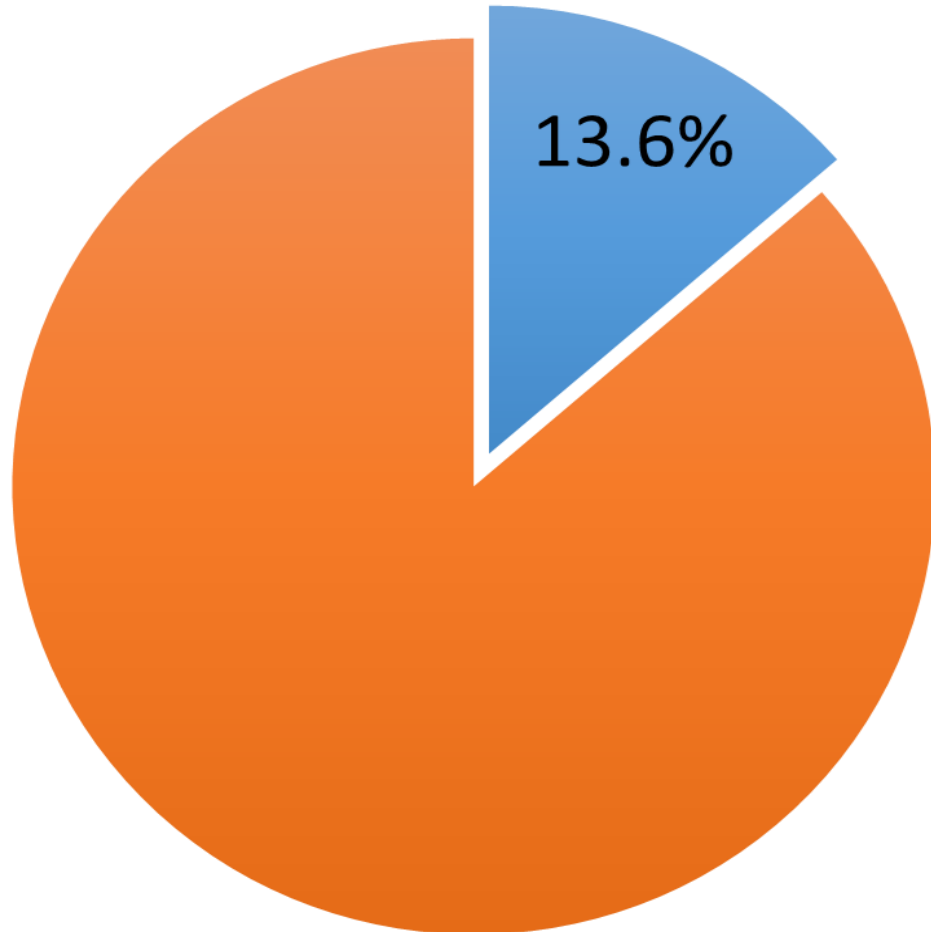
Chart 14-3. Deaths attributable to cardiovascular disease (CVD), United States, 1900 to 2018.

CVD (*International Classification of Diseases, 10th Revision codes I00–I99*) does not include congenital heart disease. Before 1933, data are for a death registration area, not the entire United States.

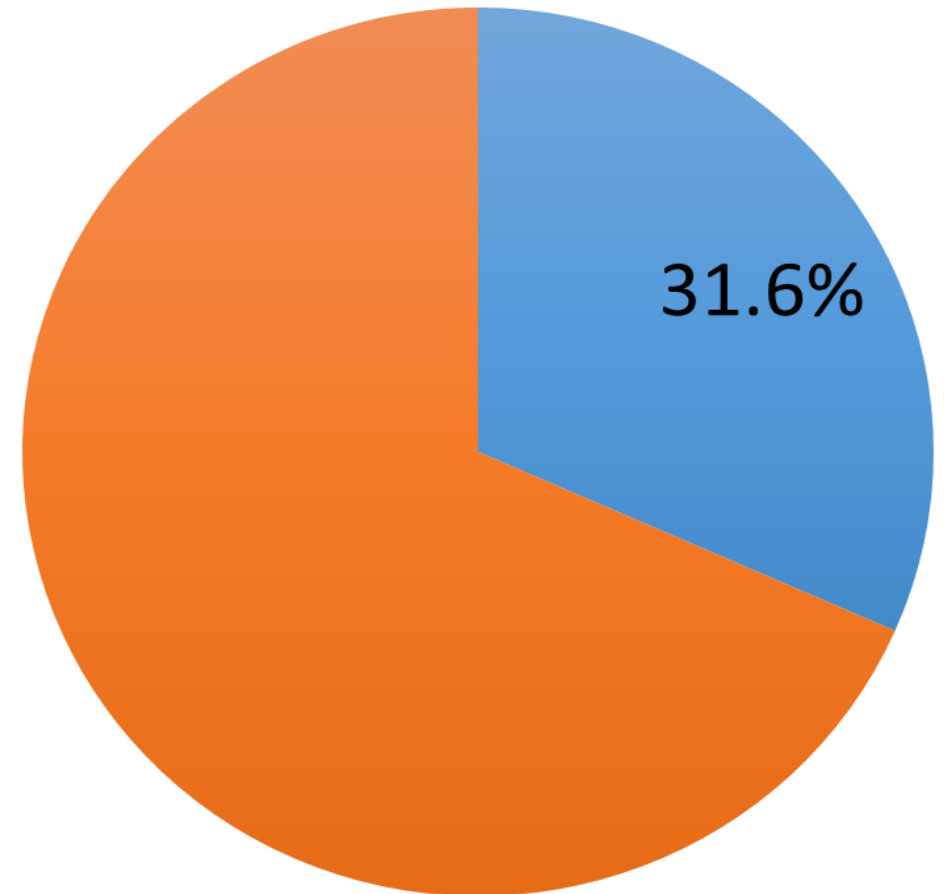
Source: Unpublished National Heart, Lung, and Blood Institute tabulation using National Vital Statistics System.³⁶

ESRD: Racial differences in prevalence USRD, 2019

US African American Population

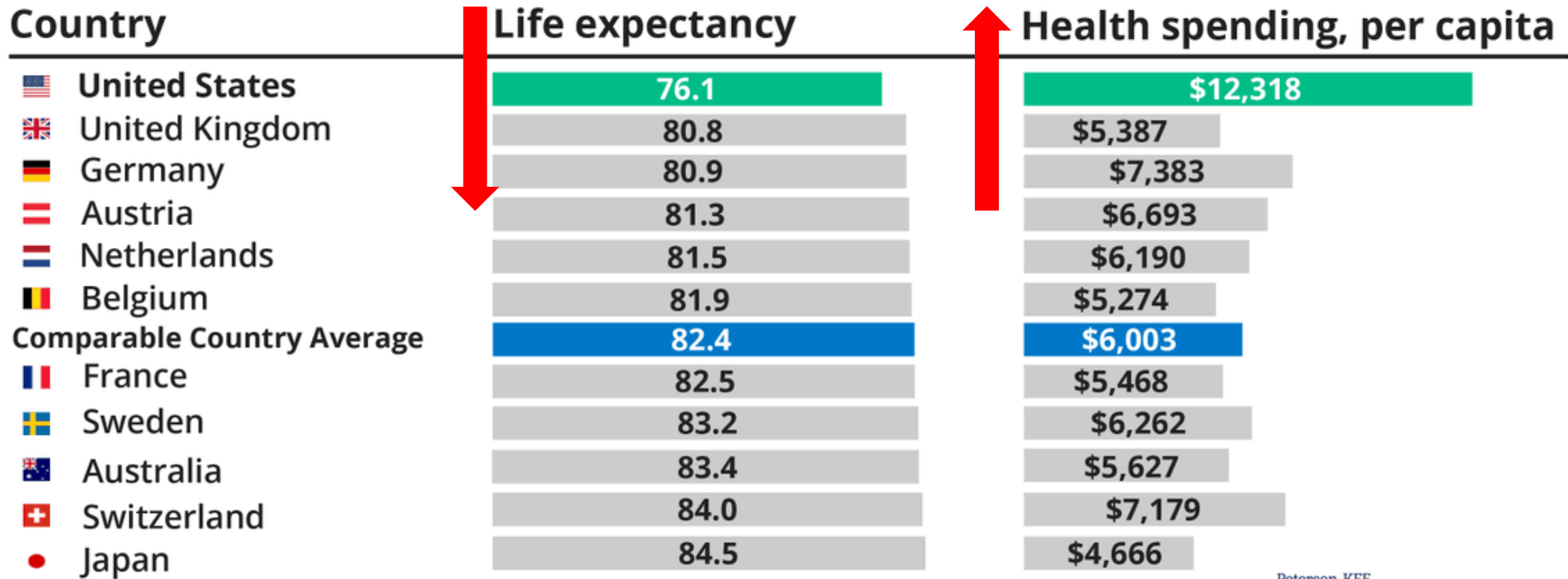


US ESRD Population



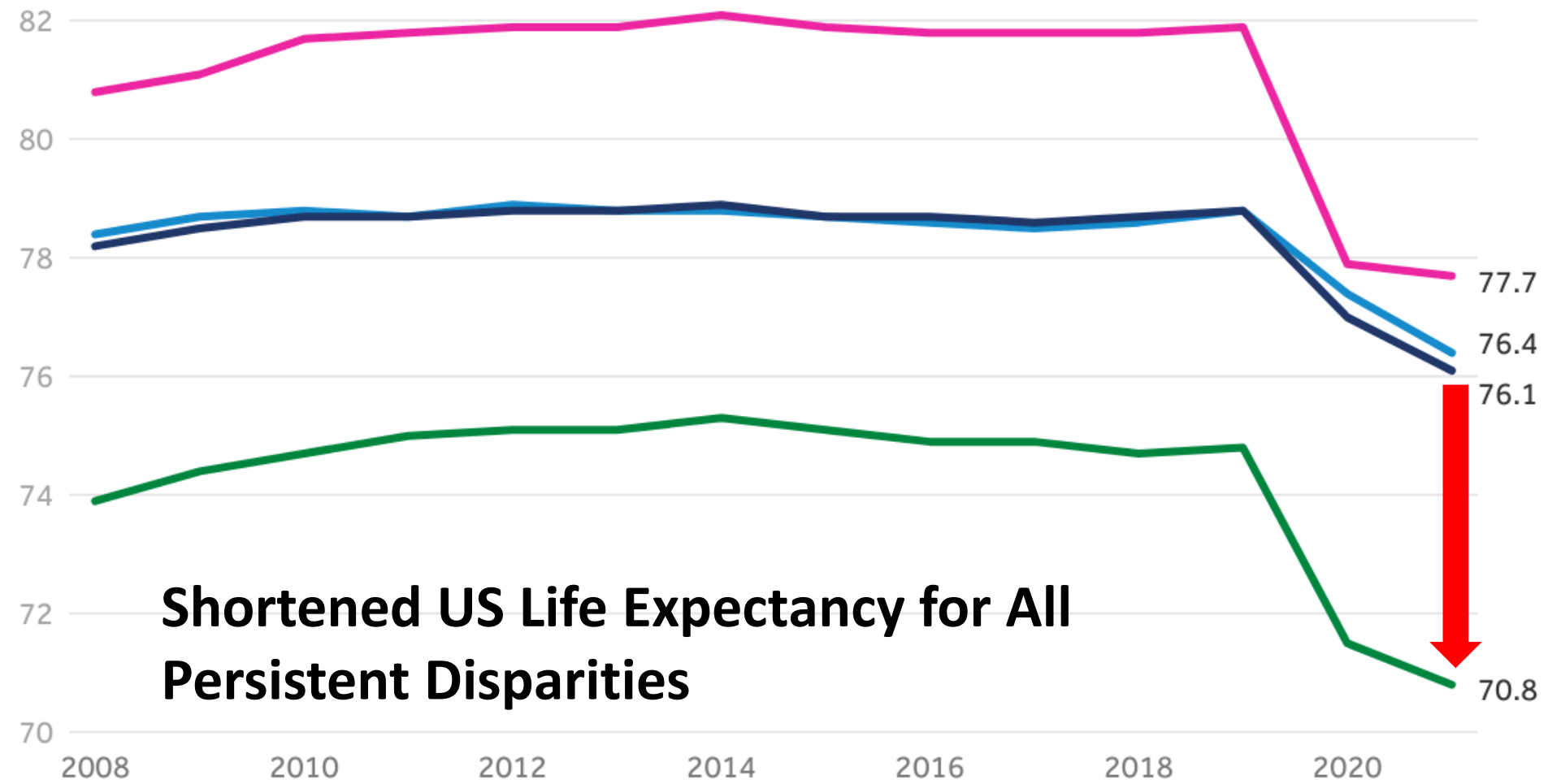
The U.S. Has the Lowest Life Expectancy Among Large, Wealthy Countries While Far Outspending Them on Health Care

Life expectancy (2021) and per capita healthcare spending (2021 or nearest year)



Peterson-KFF
Health System Tracker

All races and origins Hispanic Non-Hispanic White Non-Hispanic Black

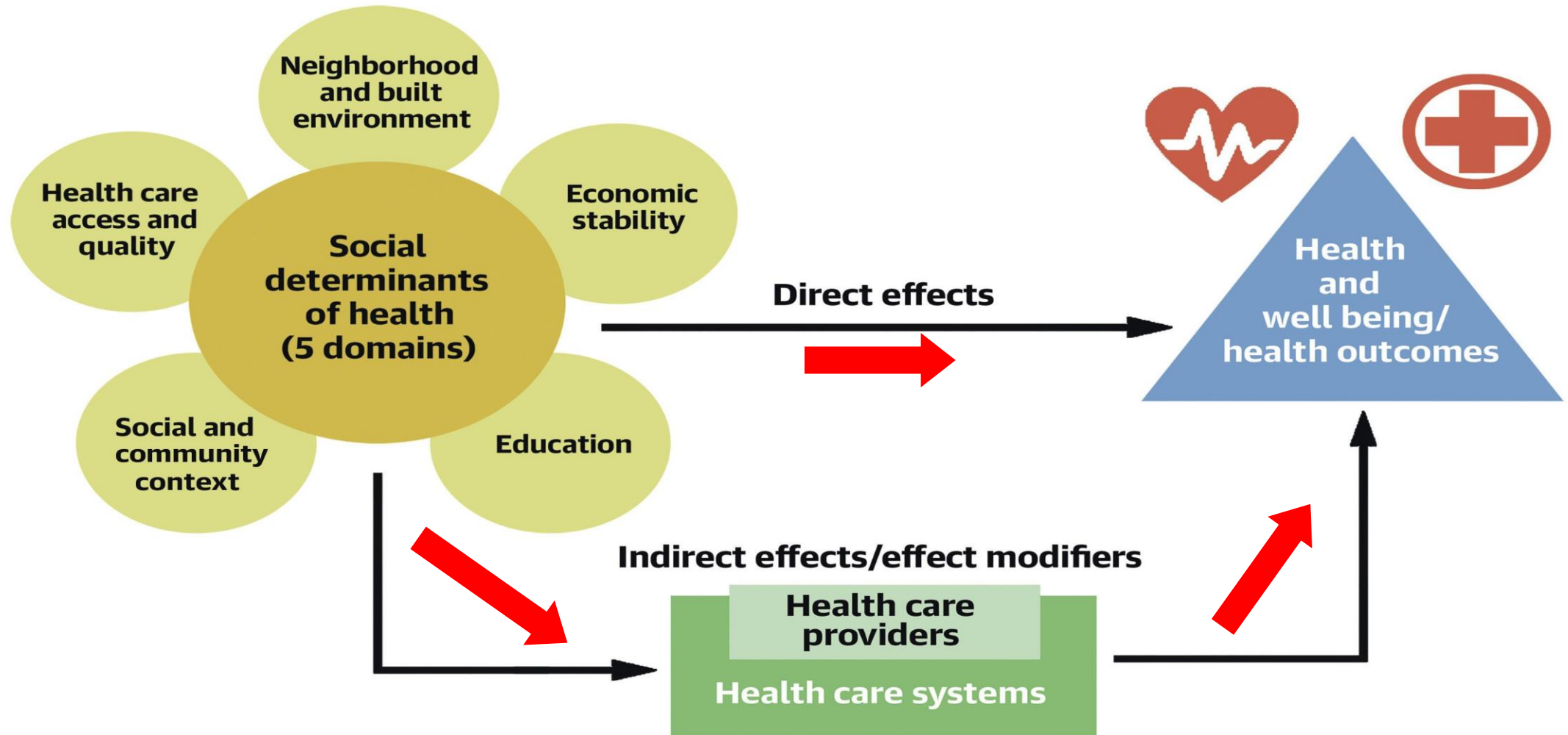


Shortened US Life Expectancy for All Persistent Disparities

Note: Starting with 2018 data, race is presented as single-race estimates (only one race was reported on the death certificate). Data on life expectancy by racial groups is provisional for 2021.

KFF health system tracker

CENTRAL ILLUSTRATION: Impact of Social Determinants of Health on Health Through Health Care Providers and Systems



Brandt EJ, et al. J Am Coll Cardiol. 2023;81(14):1368-1385.

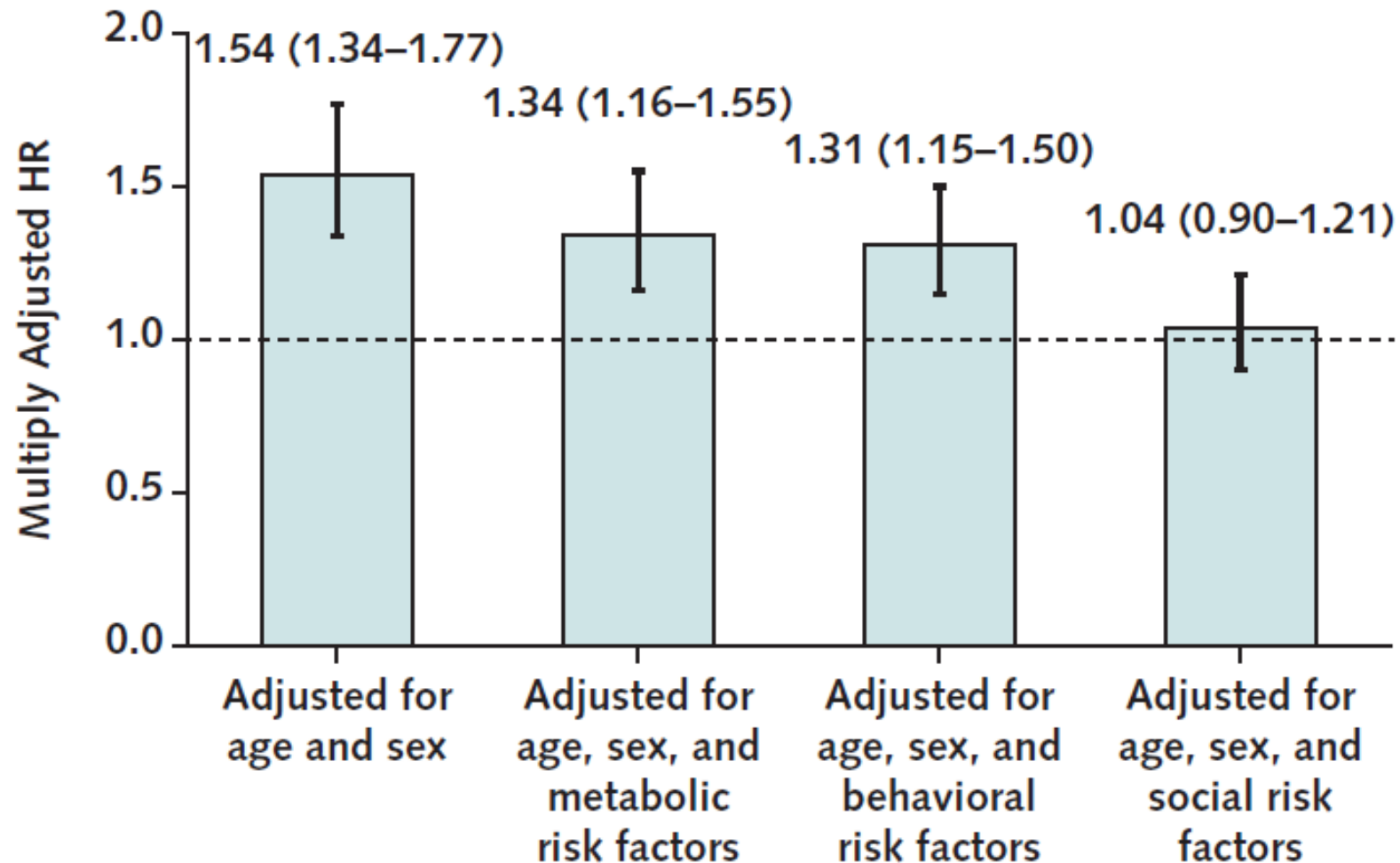
Social, Behavioral, and Metabolic Risk Factors and Racial Disparities in Cardiovascular Disease Mortality in U.S. Adults

An Observational Study

Jiang He, MD, PhD; Joshua D. Bundy, MPH, PhD; Siyi Geng, MS; Ling Tian, MS; Hua He, PhD; Xingyan Li, MSPH; Keith C. Ferdinand, MD; Amanda H. Anderson, MPH, PhD; Kirsten S. Dorans, ScD; Ramachandran S. Vasan, MD; Katherine T. Mills, MSPH, PhD; and Jing Chen, MD, MSc

Conclusion: The Black-White difference in CVD mortality diminished after adjustment for behavioral and metabolic risk factors and completely dissipated with adjustment for social determinants of health in the U.S. population.

HR of Black–White difference CVD mortality, adjusted for metabolic, behavioral, and social risk factors, in U.S. adults aged ≥ 20 y.



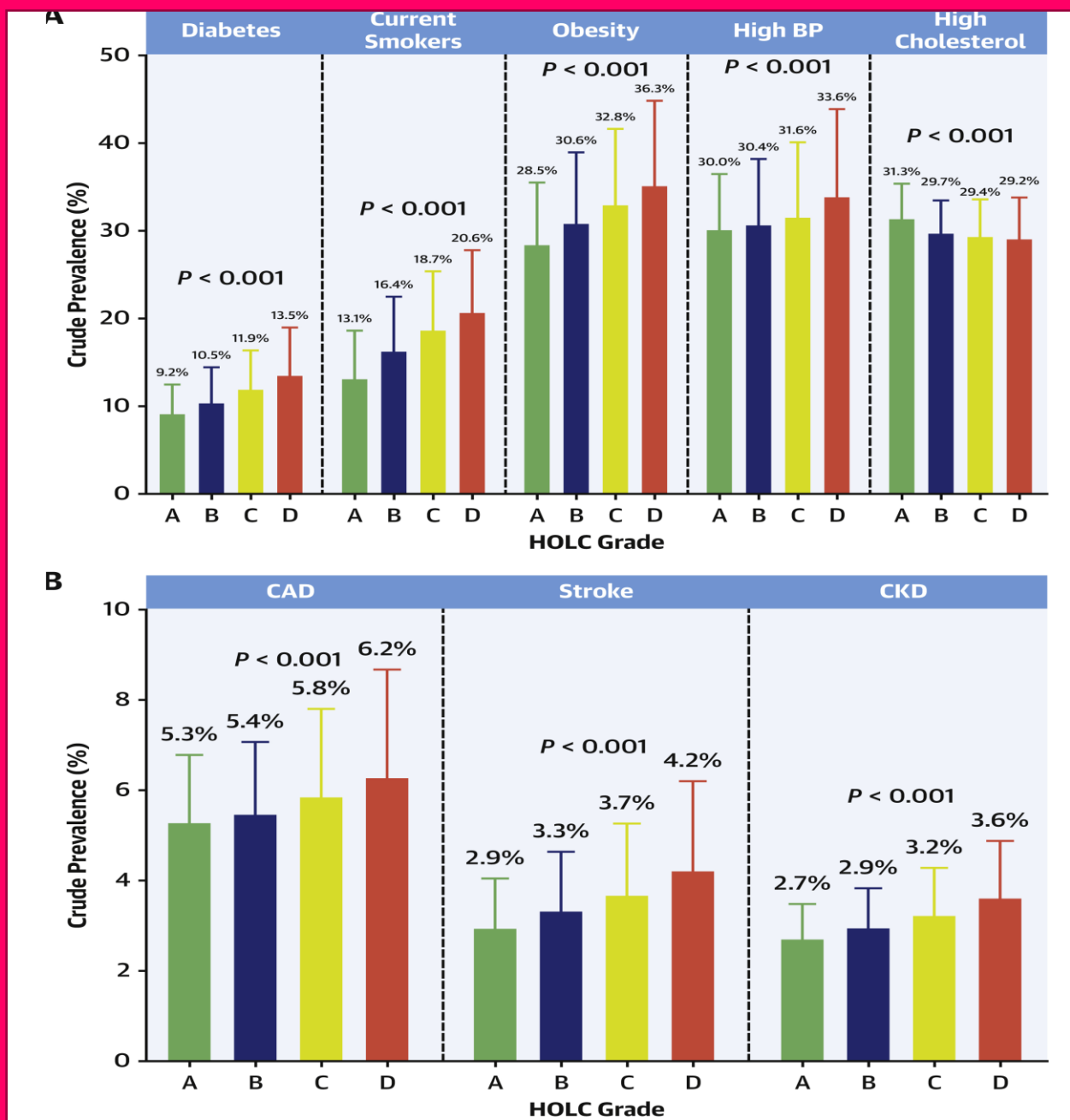
Mean Prevalence of Cardiometabolic Health Indicators: Redlining

(A) Cardiometabolic health according to HOLC grade.

(B) Cardiometabolic health risk factors to HOLC grade.

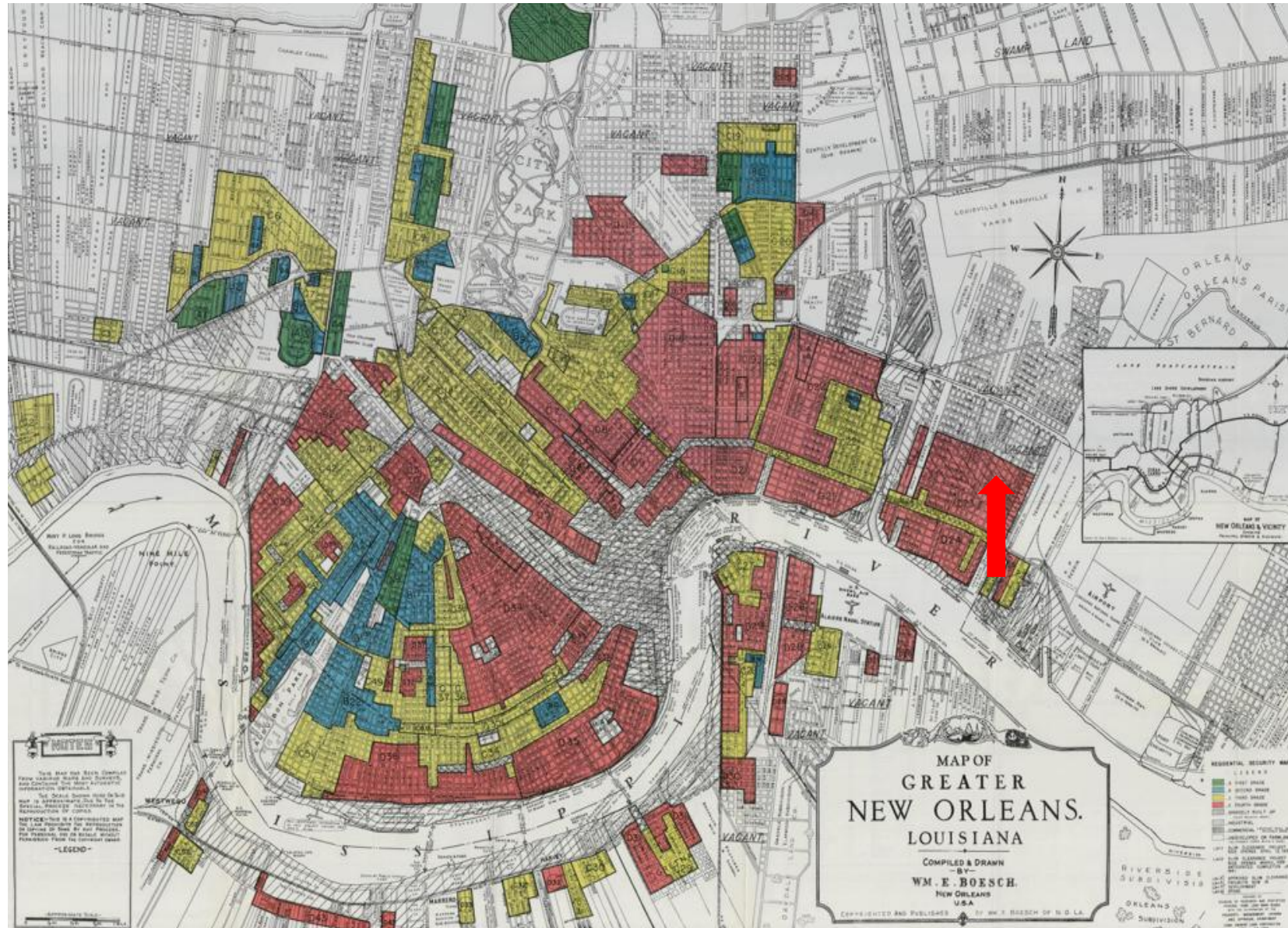
- A (“best” or green),
- B (“still desirable” or blue),
- C (“definitely declining” or yellow), and
- D (“hazardous” or red).

- **HOLC** =Home Owners’ Loan Corporation.
- 1935- Federal Home Loan Bank Board tasked Home Owners' Loan Corporation: determine U.S. "residential security“ mark up maps (239 cities)



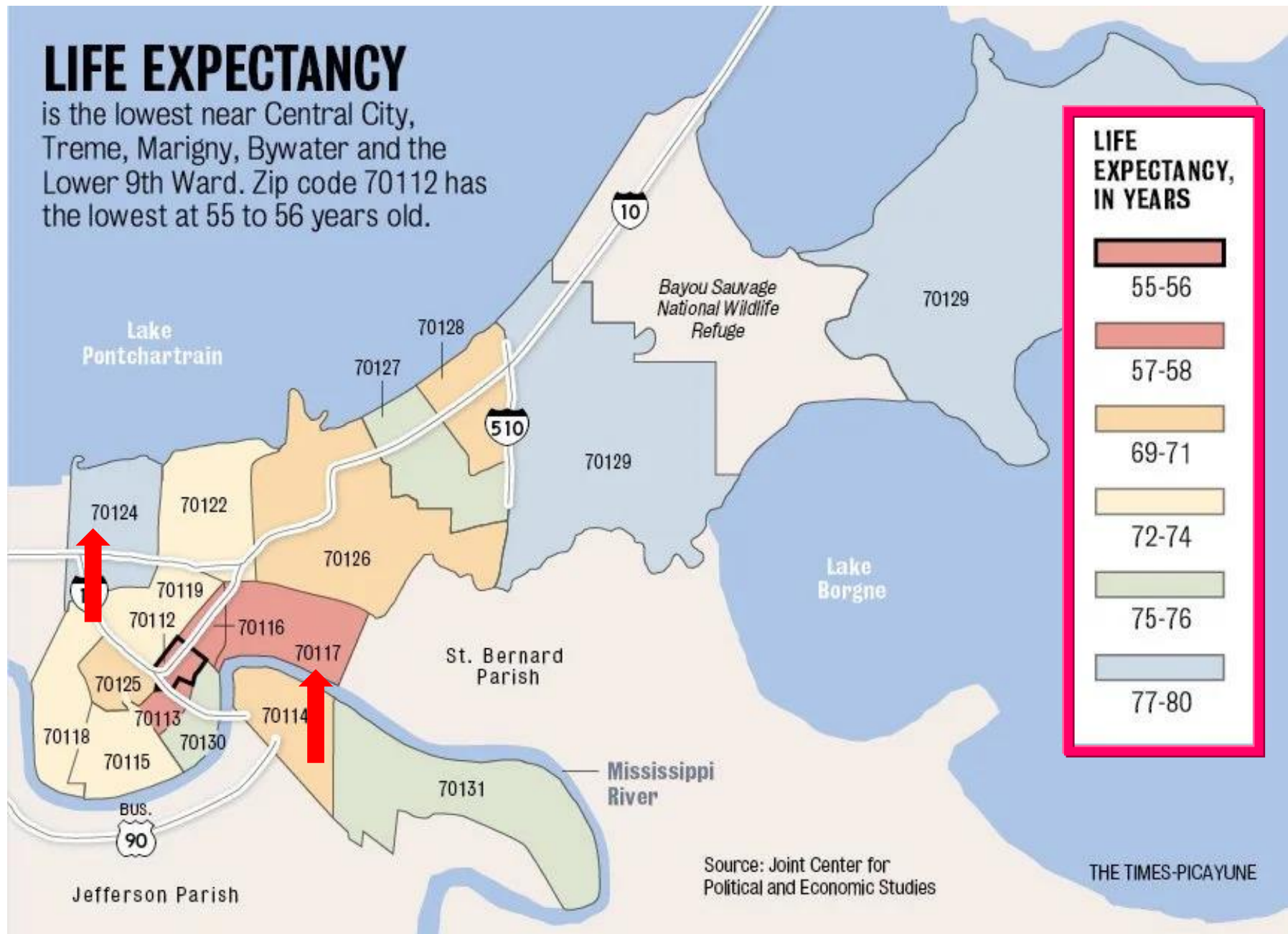
How 'redlining' shaped New Orleans neighborhoods—is it too late to be fixed

- **Green** "Type A" neighborhoods "safe" suburbs
- **Yellow** "Type C" neighborhood "declining" areas/riskier investments
- **Red** "Type D" neighborhood (largely Black, poor, working class) "hazardous" for "infiltration of inharmonious racial or nationality groups."



LIFE EXPECTANCY

is the lowest near Central City, Treme, Marigny, Bywater and the Lower 9th Ward. Zip code 70112 has the lowest at 55 to 56 years old.



New Orleans Life Expectancy by Zip - Cross posted from /r/mapporn March 2008

The Southern Diet: REGARDS Study (N=6,897)

- **High Southern diet intake: largest mediator of HTN difference Black vs. White individuals for both men and women.**
- Fried foods, organ meats, processed meats, eggs/egg dishes, added fats, high-fat dairy foods, sugar-sweetened beverages, and bread.
- Other research, associated increased risk of incident stroke, CHD, ESRD, CKD, sepsis, cancer mortality, and cognitive decline.



Howard G, et al. *JAMA*. 2018;320(13):1338.

Weighing Factors That Impact Higher ASCVD Risk in Black Adults

Factors to Maximize

1. SDOH

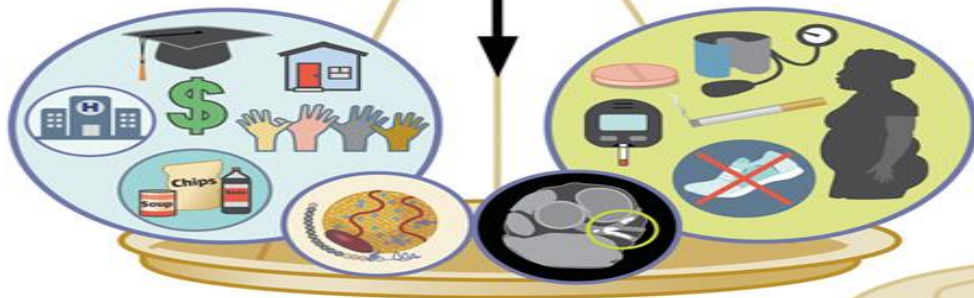
- Adverse environments
- Inadequate health access
- Low SES
- Limited educational attainment
- Food deserts
- Structural inequities
- Intrinsic bias

2. Uncontrolled major risk factors

- HTN
- Obesity (especially Black females)
- T2DM
- Smoking
- Physical inactivity
- Suboptimal LDL goal attainment and statin intensity

3. CAC scoring with intermediate risk score

4. Elevated Lp(a)



Factors to Minimize

1. Skin color or self-identified race
2. Unmeasured genetic factors
3. Low HDL-C as increased risk
4. High HDL-C and low triglycerides as indicating lower risk



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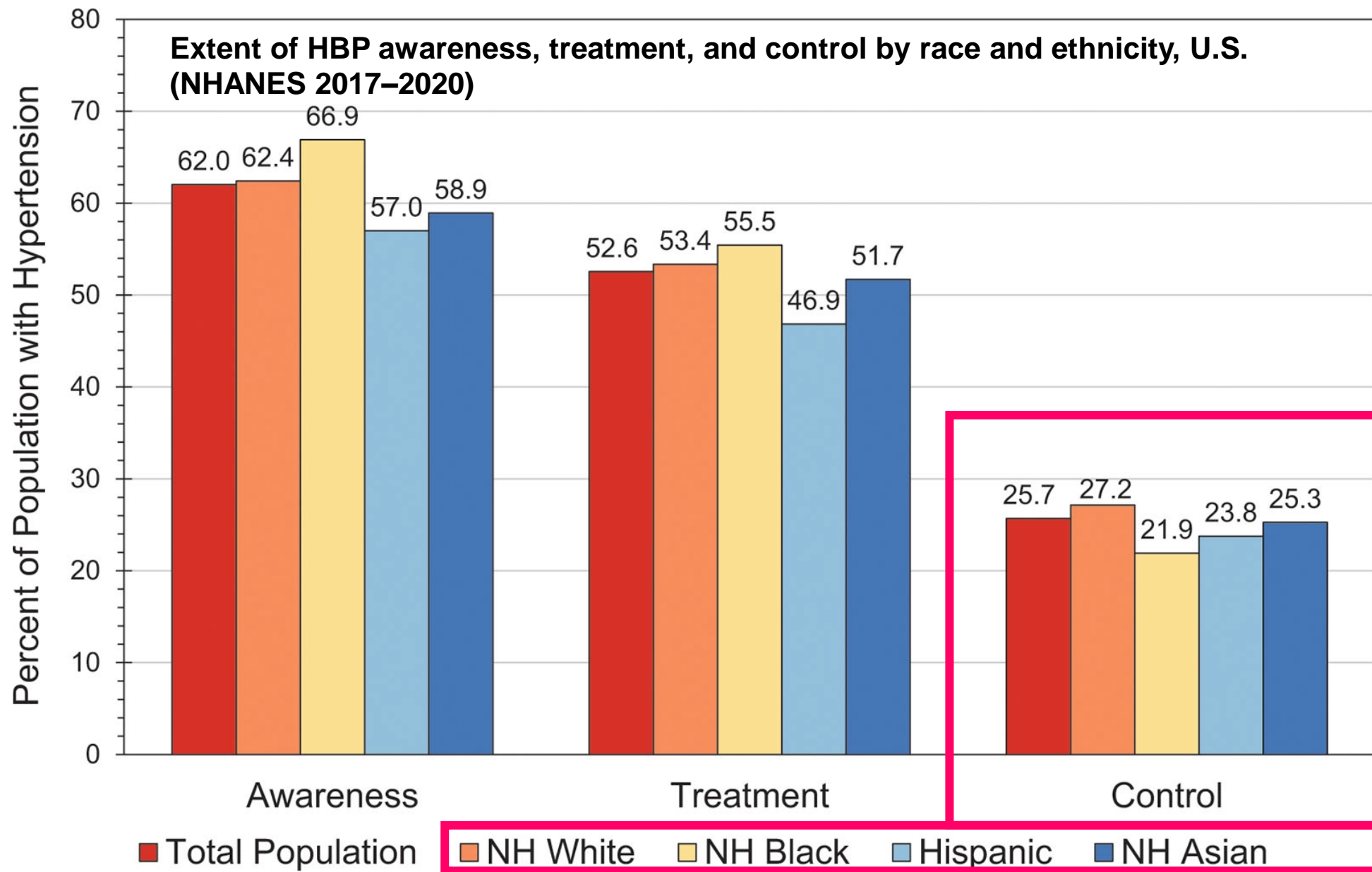
VOL. 80, NO. 22, 2022

EDITORIAL COMMENT

HDL-C in Black Adults for ASCVD Risk Calculation

Benefit or Barrier to Achieving Health Equity?*

Keith C. Ferdinand, MD



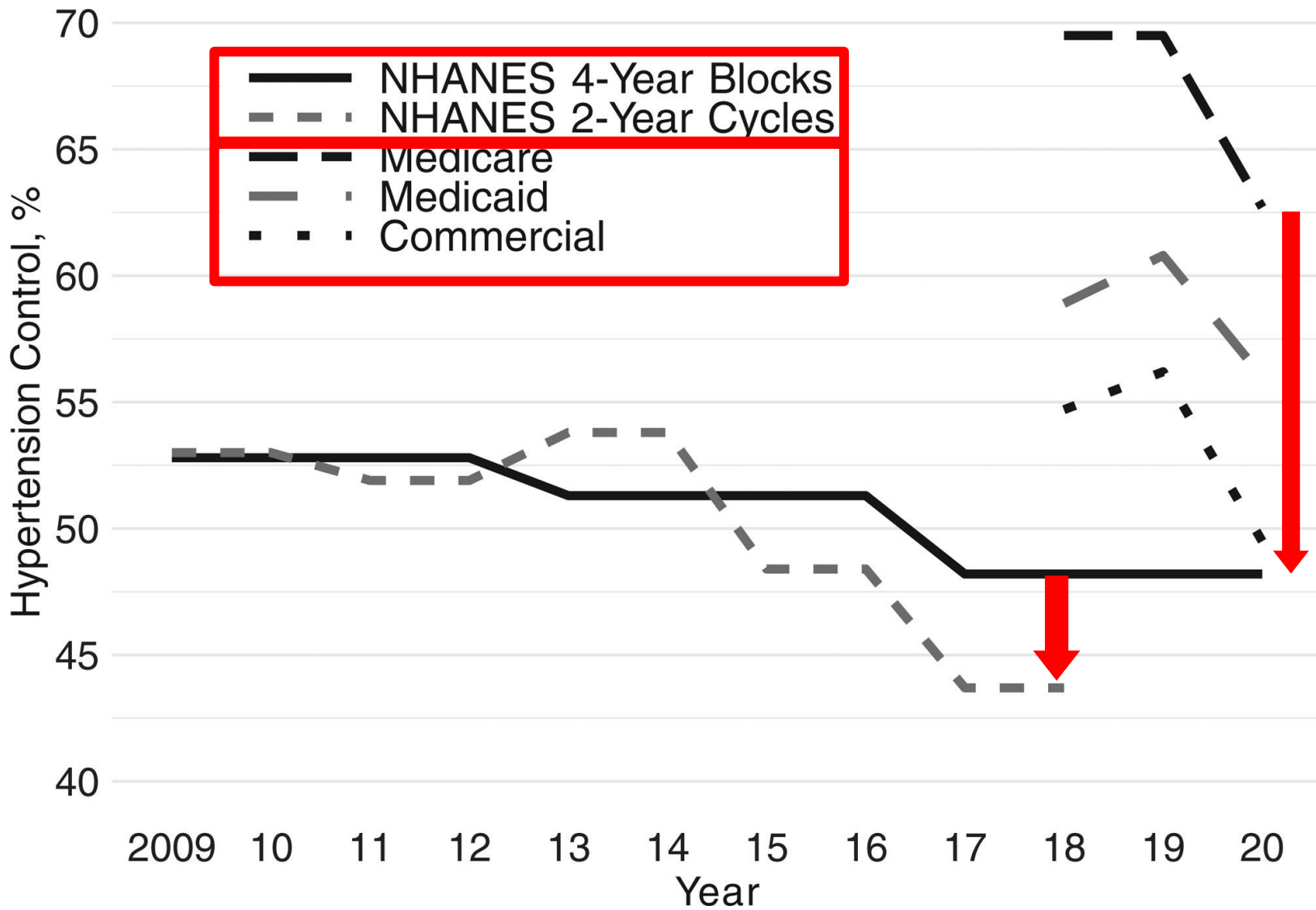


EDITORIAL

Hypertension Control Among US Adults, 2009 to 2012 Through 2017 to 2020, and the Impact of COVID-19

HTN control changes: NHANES and 3 health plans- Commercial, Medicaid, and Medicare

Brent M. Egan. Hypertension. 79(9).



Who is Uncontrolled vs Controlled?

Subgroup analyses for BP control

- BP control less:

- N-H Black vs. N-H white adults (aPR = 0.88; 95% CI, 0.81-0.96).
- Age <45 yrs. or >75 yrs.

- BP control more likely:

- Private insurance vs. without (aPR = 1.4; 95% CI, 1.08-1.8);
- Medicare vs. without (aPR = 1.47; 95% CI, 1.15-1.89);
- Usual health care facility vs. without (aPR = 1.48; 95% CI, 1.13-1.94);
- Health care visit in past yr. vs. without (aPR = 5.23; 95% CI, 2.88-9.49).

Implementation of HBP Guidelines: We Must Do Better

- ➔ NHLBI clinical practice guidelines (CPGs) 1970s
- ➔ Joint National Committees(JNC) of the National High Blood Pressure Program(NHBEP)
- ➔ The uneven implementation of evidence-based CPGs is widely recognized as a continuing challenge to improving public health

REVIEW

Annals of Internal Medicine

Comparative Effectiveness of Implementation Strategies for Blood Pressure Control in Hypertensive Patients

A Systematic Review and Meta-analysis

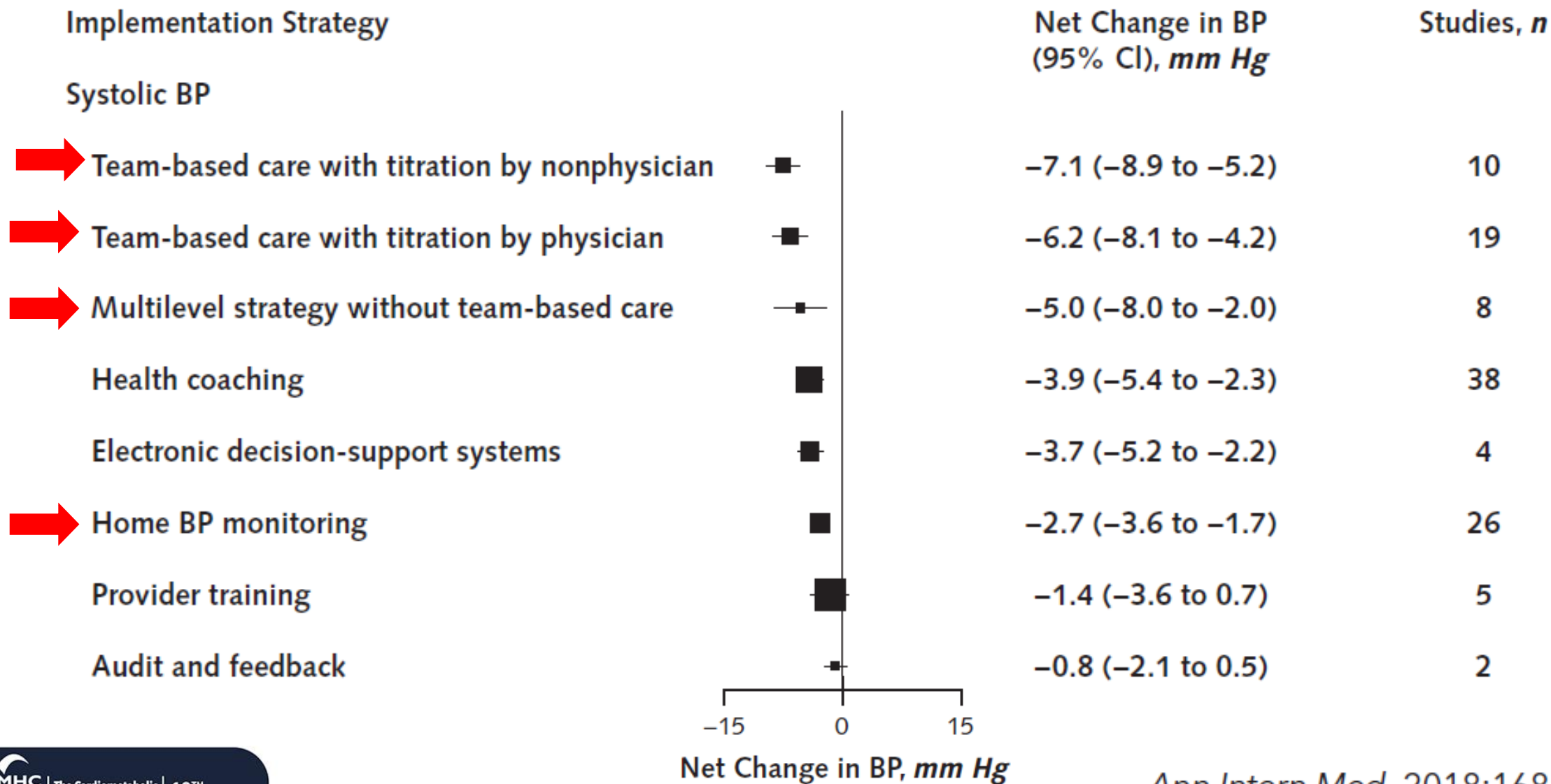
Katherine T. Mills, PhD; Katherine M. Obst, MS; Wei Shen, MS; Sandra Molina, MPH; Hui-Jie Zhang, MD, PhD; Hua He, PhD; Lisa A. Cooper, MD, MPH; and Jiang He, MD, PhD

121 comparisons

100 articles n= 55,920

Ann Intern Med. 2018;168:110-120.

Mean net reduction in BP with implementation strategies



Clinical Practice Guideline

2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ ASH/ASPC/NMA/PCNA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults

**A Report of the American College of Cardiology/American Heart
Association Task Force on Clinical Practice Guidelines**

Hypertension. 2018;71:e13–e115

2017 HBP Guideline :First Step Combination

COR	LOE	Recommendations for Race and Ethnicity
I	C-LD	Two or more anti-HTN medications are recommended to achieve a BP target of less than 130/80 mm Hg in most adults with HTN, especially in black adults with HTN.

Black adults with hypertension (without HF or CKD), initial antihypertensive treatment should include a thiazide diuretic or CCB

2017 HBP Guideline Strategies to Improve HTN Treatment and Control

- Adherence strategies
 - Once daily dosing
 - Combination pills
- Strategies to promote lifestyle modification
- Team-based care
 - Health professionals: physicians, nurses, pharmacists
 - Patient
 - Staff: office staff and community health workers
 - Others: spouse, relatives, friends
- Use EHR and Patient Registries
- Telehealth strategies
- Performance measures and Quality Improvement initiatives
- Financial incentives

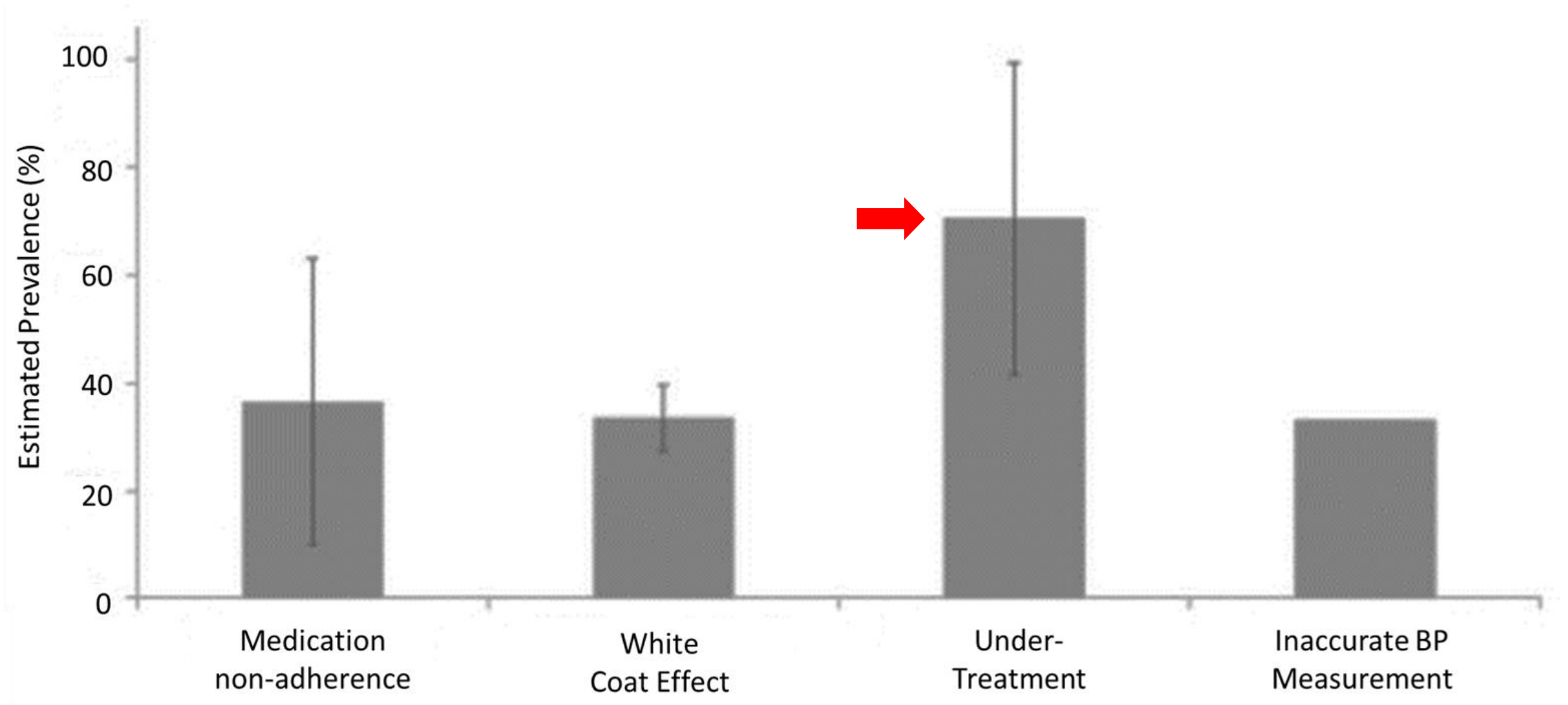
AHA Scientific Statement

Resistant Hypertension: Detection, Evaluation, and Management A Scientific Statement From the American Heart Association

Robert M. Carey, MD, FAHA, Chair; David A. Calhoun, MD, FAHA, Vice Chair;
George L. Bakris, MD, FAHA; Robert D. Brook, MD, FAHA; Stacie L. Daugherty, MD, MSPH;
Cheryl R. Dennison-Himmelfarb, PhD, MSN, FAHA; Brent M. Egan, MD;
John M. Flack, MD, MPH, FAHA; Samuel S. Gidding, MD, FAHA; Eric Judd, MD, MS;
Daniel T. Lackland, DrPH, FAHA; Cheryl L. Laffer, MD, PhD, FAHA;
Christopher Newton-Cheh, MD, MPH, FAHA; Steven M. Smith, PharmD, MPH, BCPS;
Sandra J. Taler, MD, FAHA; Stephen C. Textor, MD, FAHA; Tanya N. Turan, MD, FAHA;
William B. White, MD, FAHA; on behalf of the American Heart Association Professional/Public
Education and Publications Committee of the Council on Hypertension; Council on Cardiovascular
and Stroke Nursing; Council on Clinical Cardiology; Council on Genomic and
Precision Medicine; Council on Peripheral Vascular Disease; Council on Quality of Care
and Outcomes Research; and Stroke Council

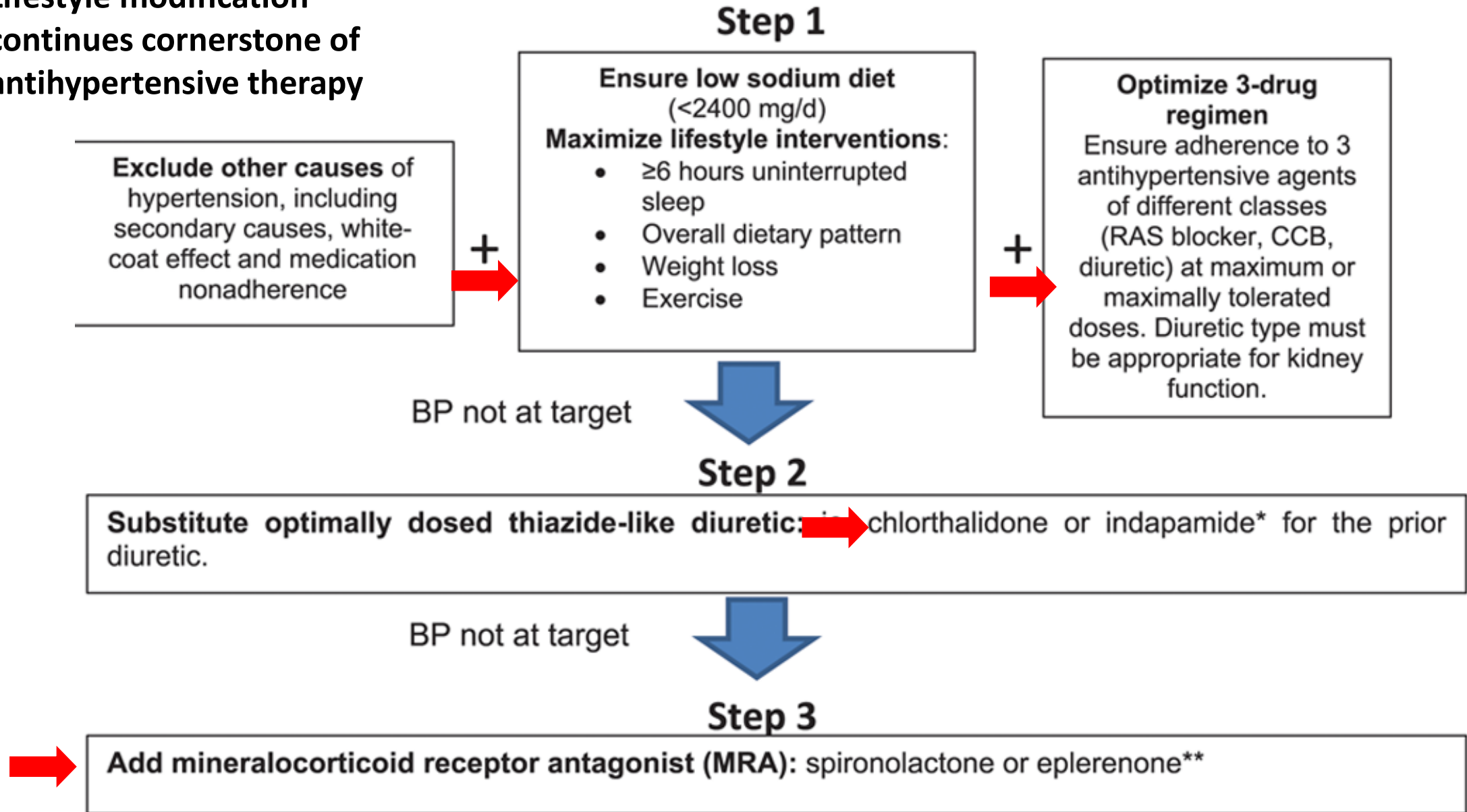
Hypertension. 2018;72:e53–e90

Why Patients Have Resistant HTN?



Management of Resistant Hypertension

Lifestyle modification continues cornerstone of antihypertensive therapy



N=1776 65.9% female

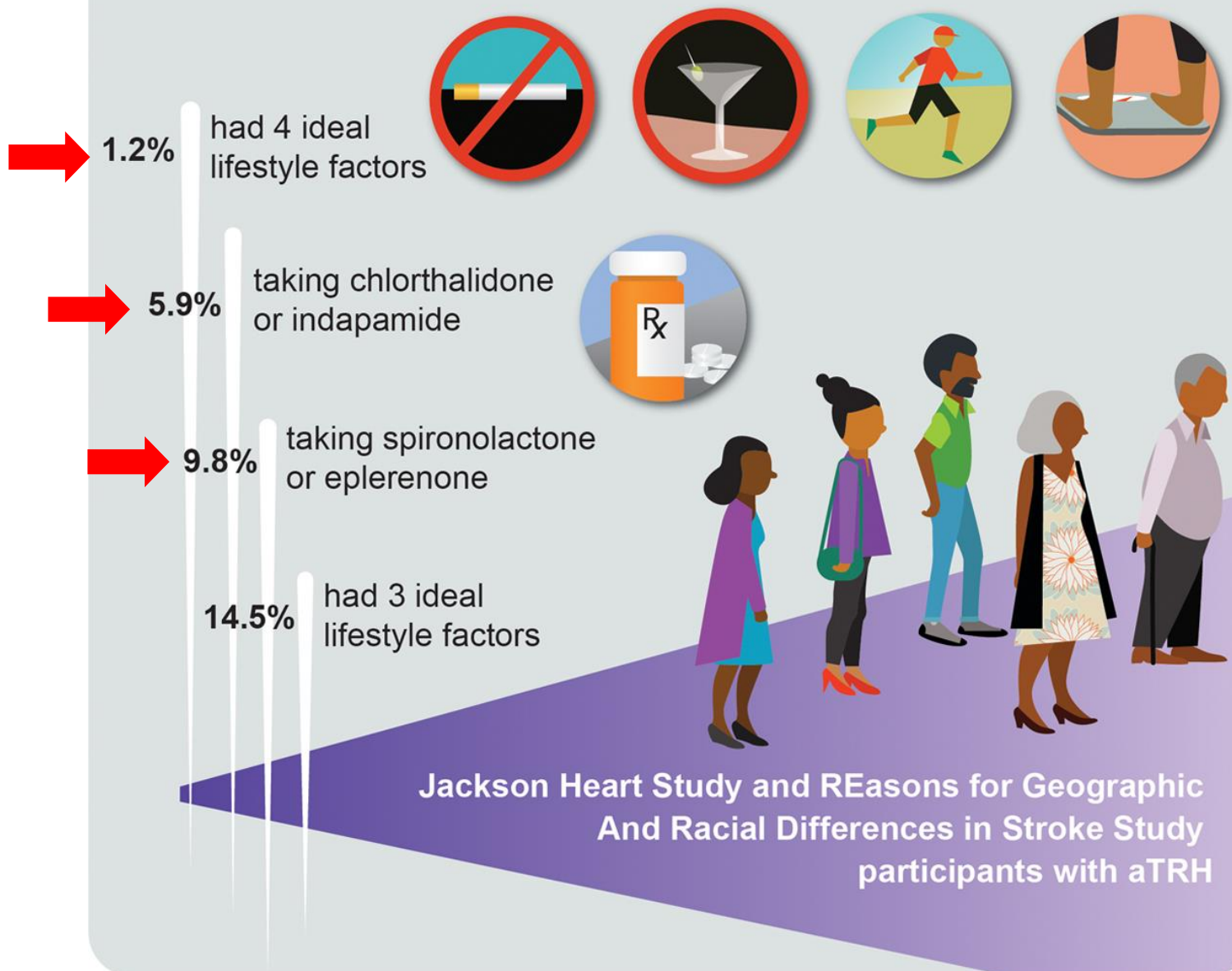
Resistant Hypertension

Underutilization of Treatment for Black Adults With Apparent Treatment-Resistant Hypertension JHS and the REGARDS Study

Aisha T. Langford, Oluwasegun P. Akinyelure, Tony L. Moore Jr, George Howard^{id}, Yuan-I Min^{id}, William B. Hillegass^{id}, Adam P. Bress^{id}, Gabriel S. Tajeu, Mark Butler, Byron C. Jaeger^{id}, Yuichiro Yano, Daichi Shimbo, Gbenga Ogedegbe, David Calhoun, John N. Booth III^{id}, Paul Muntner

Langford AT, Akinyelure OP, Moore TL, et al. *Hypertension*. 2020;76(5):1600-1607. doi:10.1161/hypertensionaha.120.14836

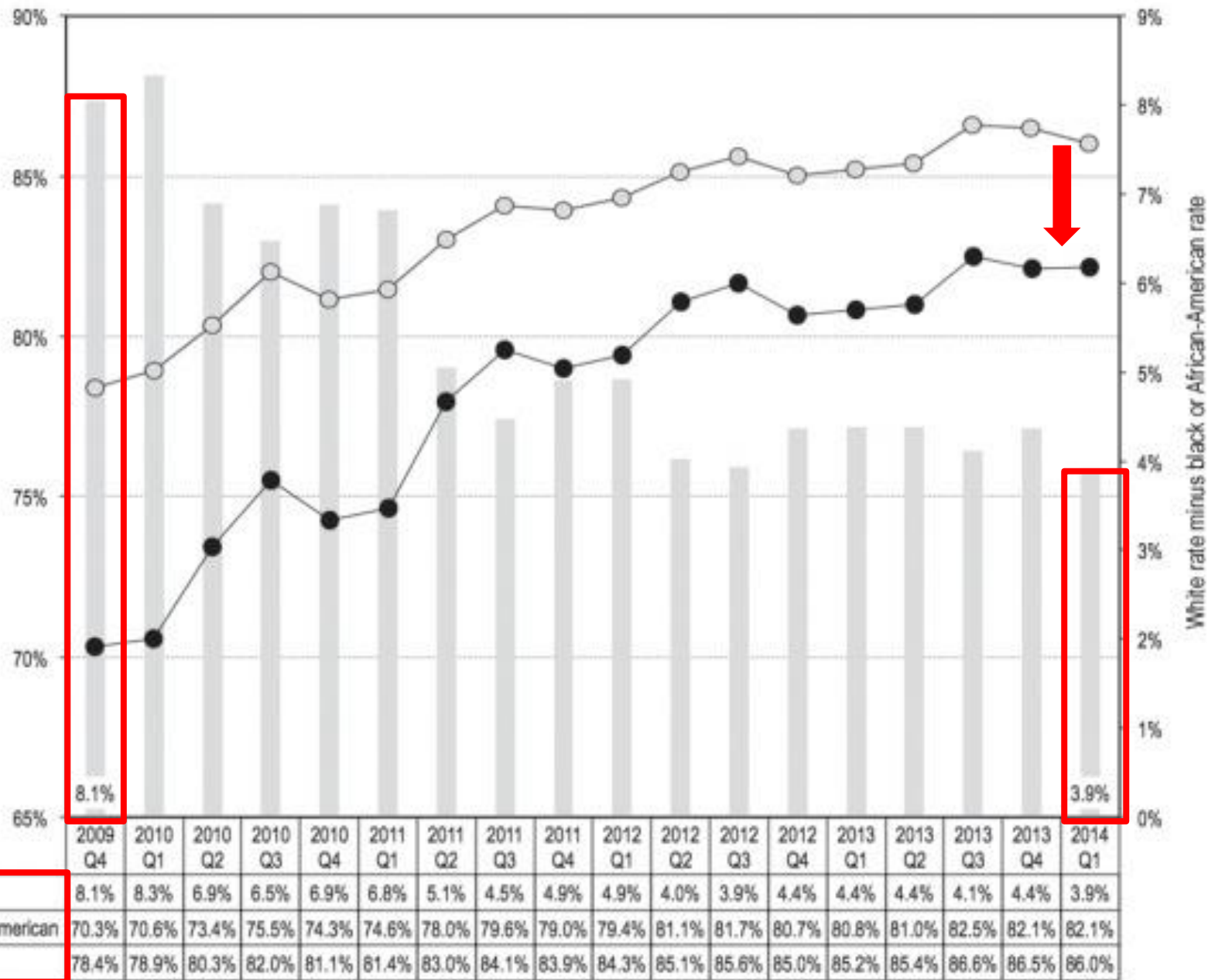
Evidence-Based Lifestyle Factors and Recommended Pharmacological Treatment are Underutilized in Black Adults with Apparent Treatment-Resistant Hypertension (aTRH)



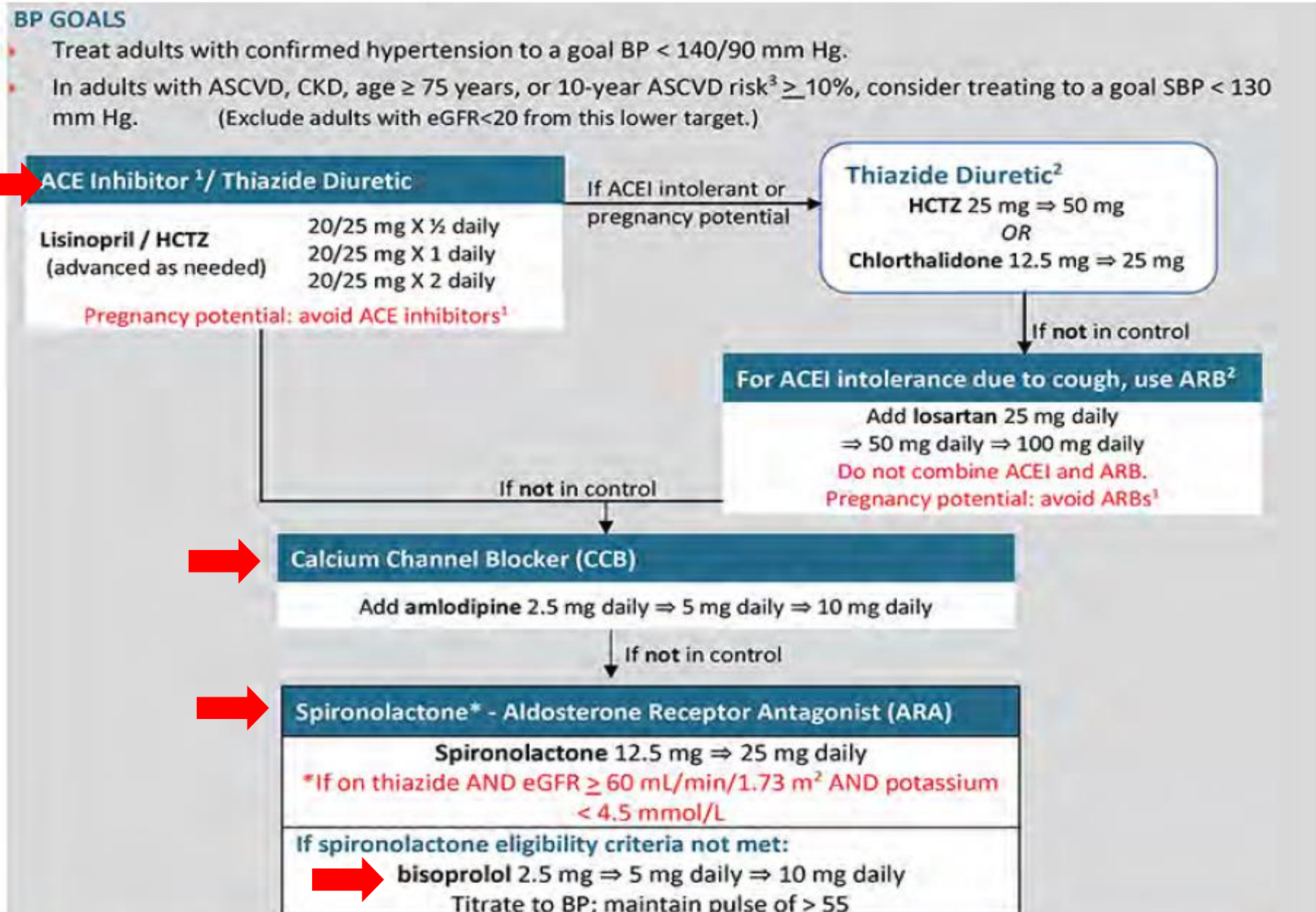
Black Adults With Apparent Treatment-Resistant Hypertension

Langford, A. Clinical implications. *Hypertension*. 2020;76(5):1331-1331.

BP < 140/90 mmHg and disparity control rates for white and black members (bars)



Management of Adult Blood Pressure (BP) KP CLINICAL PRACTICE GUIDELINES | NATL FEBRUARY 2019



Hypertension medication treatment protocol¹

For adults without CHF, CAD, pregnancy, CKD stage 3 or albuminuria ≥ 300 mg/d or ≥ 300 mg/g albumin-to-creatinine ratio*



Check labs at clinician's discretion.

Not on antihypertensive medication

- Prescribe dihydropyridine CCB plus ACEI or ARB in a single-pill combination (SPC).^{1a,2,3}
- If concerned about hypotension, frailty in the very old, increased risk of medication intolerance or other factors, consider a low dose SPC or monotherapy with a CCB.^{1a,1b}

Already on antihypertensive medication

- Prescribe one additional medication from a different class (ACEI or ARB, CCB, or thiazide or thiazide-like diuretic) preferably as a single-pill combination (SPC), if available.^{1a}

If CCB not tolerated (e.g., edema), consider replacing with thiazide-like diuretic.^{1b}
If diabetes with albuminuria and monotherapy desired, use an ACEI or ARB.^{1a}

Reassess BP in 2-4 weeks^{1c}




Use self-measured BP (SMBP) if available.^{1c}

15 minutes

The designated time for the routine clinic visit is not adequate to control conditions which are chronic, ongoing and 80% affected by the SDOH



2017 ACC/AHA HBP Guideline Out-of-Office and Self-Monitoring of BP

COR	LOE	Recommendation for Out-of-Office and Self-Monitoring of BP
I	A ^{SR}	<p>Out-of-office BP measurements are recommended  <u>confirm the diagnosis</u> of hypertension and  <u>titration</u> of BP-lowering medication, in conjunction with  <u>telehealth counseling</u> or clinical interventions.</p> <p style="text-align: center;">SR indicates systematic review.</p>



THE HEALTHY HEART COMMUNITY PREVENTION PROJECT: A MODEL FOR PRIMARY CARDIOVASCULAR RISK REDUCTION IN THE AFRICAN-AMERICAN POPULATION

Keith C. Ferdinand, MD, FACC
New Orleans, Louisiana

J Natl Med Assoc. 1995;87(8 Suppl):638-641

The Healthy Heart Community Prevention Project (HHCPP) was initially conceived as a 1-year pilot program funded by the National Heart, Lung, and Blood Institute (NHLBI) of the National Institutes of Health (NIH). Although the NHLBI funding has expired, the program is being maintained by volunteer coordinators.

The Healthy Heart Community Prevention Project is an outgrowth of the National Medical Association's (NMA) Healthy People 2000 Program, whose mandate is to provide accessible health education and screening for African-Americans in an effort to reduce excessive

the local physicians but also has community support from various professional, voluntary health, and community organizations (Table 1). Thus, by having developed a strong coalition, the HHCPP has been able to sustain a massive health screening and intervention project.

In an effort to highlight the significance of both the heart and the home in the African-American community, the HHCPP chose a logo that incorporates the two. Furthermore, the project's slogan is "You've got to love heart."



Franklin Ave. Baptist Church NOLA



Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

American Heart Journal Plus: Cardiology Research and Practice

journal homepage: [www.sciencedirect.com/journal/
american-heart-journal-plus-cardiology-research-and-practice](https://www.sciencedirect.com/journal/american-heart-journal-plus-cardiology-research-and-practice)



Research paper

TEXT MY BP MEDS NOLA: A pilot study of text-messaging and social support to increase hypertension medication adherence[☆]

Daphne P. Ferdinand^a, Tina K. Reddy^b, Madeline R. Wegener^b, Pavan S. Guduri^b, John J. Lefante^c, Saihariharan Nedunchezian^b, Keith C. Ferdinand^{b,*}

^a Healthy Heart Community Prevention Project (HHCPP), New Orleans, LA, United States of America

^b Tulane University School of Medicine, New Orleans, LA, United States of America

^c Tulane University School of Public Health and Tropical Medicine, New Orleans, LA, United States of America

Text My BP NOLA

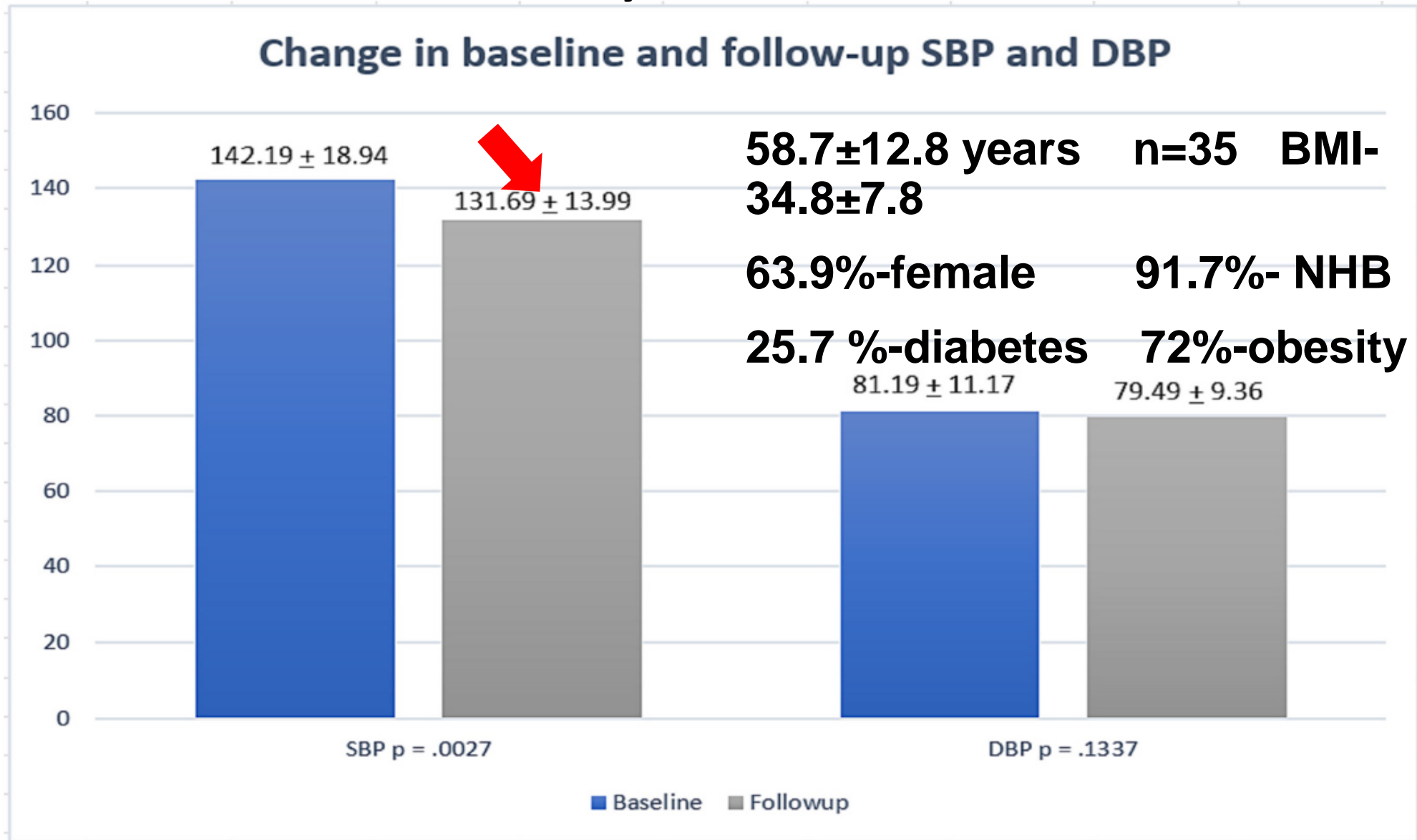


Fig. 2. Change in baseline and follow-up SBP and DBP.



**TULANE UNIVERSITY TRANSLATIONAL
SCIENCE INSTITUTE (TUTSI)**

Church-based Health Intervention to Eliminate Racial Inequalities in Cardiovascular Health (CHERISH)

Jiang He, MD, PhD, Primary Investigator
Thomas LaVeist, PhD, Co-Investigator
Keith Ferdinand, MD, FACC, FAHA, FASPC, FNLA, Co-Investigator
Marcia Ory, PhD, Co-Investigator
Jing Chen, MD, MMSc, MSc, Co-Investigator
Lydia Bazzano, MD, PhD, MPH, Co-Investigator
Jeanette Gustat, PhD, MPH, Co-Investigator
Katherine Mills, MSPH, PhD, Co-Investigator
Hua He, PhD, Co-Investigator
Lizheng Shi, PhD, Co-Investigator
Caryn Bell, PhD, Co-Investigator

March 12, 2018

ORIGINAL ARTICLE

Los Angeles Barbershop Blood Pressure Study (LABBPS)

A Cluster-Randomized Trial of Blood-Pressure Reduction in Black Barbershops

*

Ronald G. Victor, M.D., Kathleen Lynch, Pharm.D., Ning Li, Ph.D.,
Ciantel Blyler, Pharm.D., Eric Muhammad, B.A., Joel Handler, M.D.,
Jeffrey Brettler, M.D., Mohamad Rashid, M.B., Ch.B., Brent Hsu, B.S.,
Davontae Foxx-Drew, B.A., Norma Moy, B.A., Anthony E. Reid, M.D.,
and Robert M. Elashoff, Ph.D.

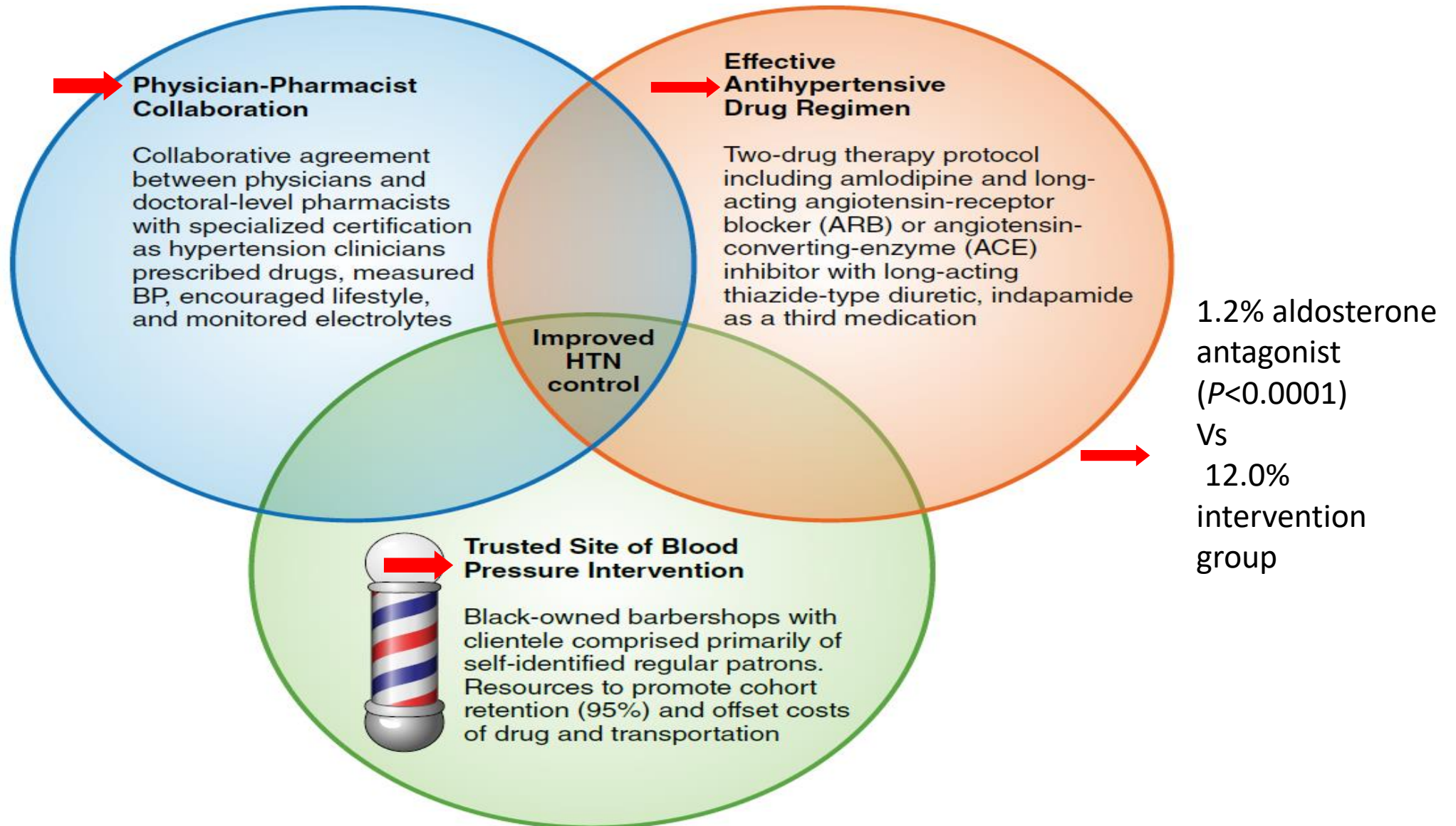
*

BP Reduction in LA Black Barbershops

Table 2. Primary and Secondary Blood-Pressure Outcomes.*

Outcome	Intervention Group (N = 132)	Control Group (N = 171)	Intervention Effect	P Value†
Blood pressure				
Systolic blood pressure — mm Hg‡				
At baseline	152.8±10.3	154.6±12.0		
At 6 mo	125.8±11.0	145.4±15.2		
Change	-27.0±13.7	-9.3±16.0	-21.6 (-28.4 to -14.7)§	<0.001
Diastolic blood pressure — mm Hg				
At baseline	92.2±11.5	89.8±11.2		
At 6 mo	74.7±8.3	85.5±12.0		
Change	-17.5±11.0	-4.3±11.8	-14.9 (-19.6 to -10.3)§	<0.001
Hypertension control at 6 mo — no. (%)				
Blood pressure <140/90 mm Hg	118 (89.4)	55 (32.2)	3.4 (2.5 to 4.6)¶	<0.001
Blood pressure <135/85 mm Hg	109 (82.6)	32 (18.7)	5.5 (2.6 to 11.7)¶	<0.001
Blood pressure <130/80 mm Hg	84 (63.6)	20 (11.7)	5.7 (2.5 to 12.8)¶	<0.001

Positive components of the LABBP intervention



Three Legs on the Stool to Achieve BP Control

- Achieving Million Hearts BP goal by 2022 simultaneously
- 78.1% BP U.S. overall HTN control

Circulation: Cardiovascular Quality and Outcomes

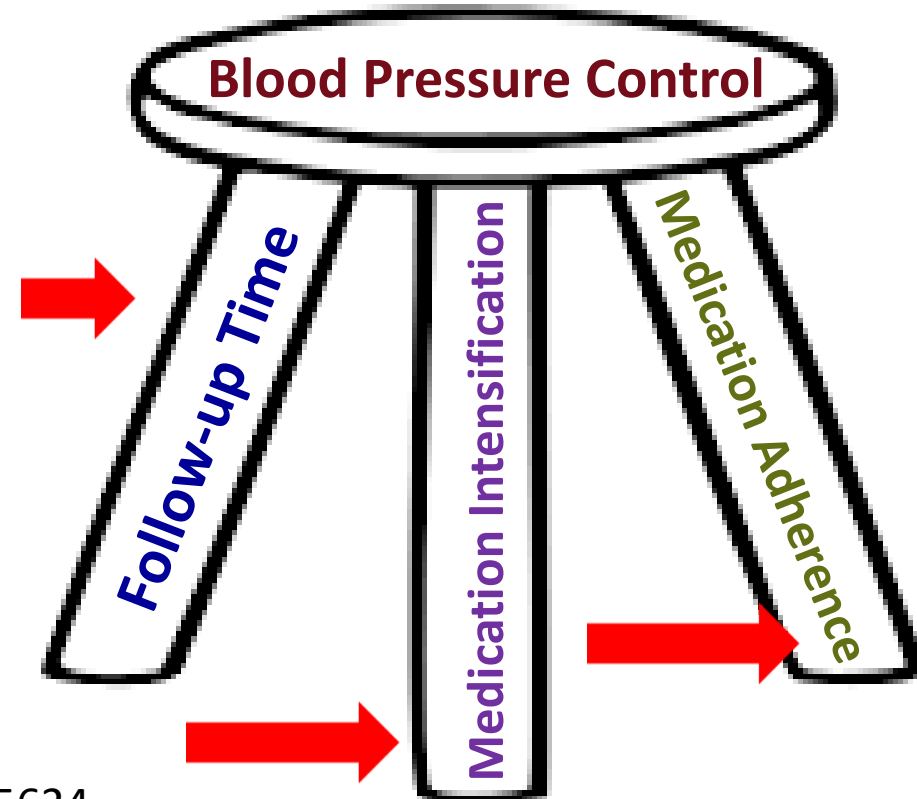
ORIGINAL ARTICLE

Clinic-Based Strategies to Reach United States Million Hearts 2022 Blood Pressure Control Goals

A Simulation Study

BACKGROUND: The Centers for Disease Control and Prevention's Million Hearts initiative includes an ambitious $\geq 80\%$ blood pressure control goal in US adults with hypertension by 2022. We used the validated Blood Pressure Control Model to quantify changes in clinic-based hypertension







Brandon K. Bellows,
PharmD, MS
Natalia Ruiz-Negrón,
PharmD



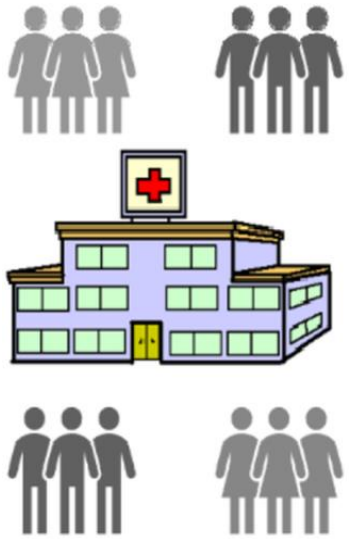
Bellows, B. Et al Circ Cardiovasc Qual Outcomes. 2019;12:e005624

CONTEMPORARY REVIEW

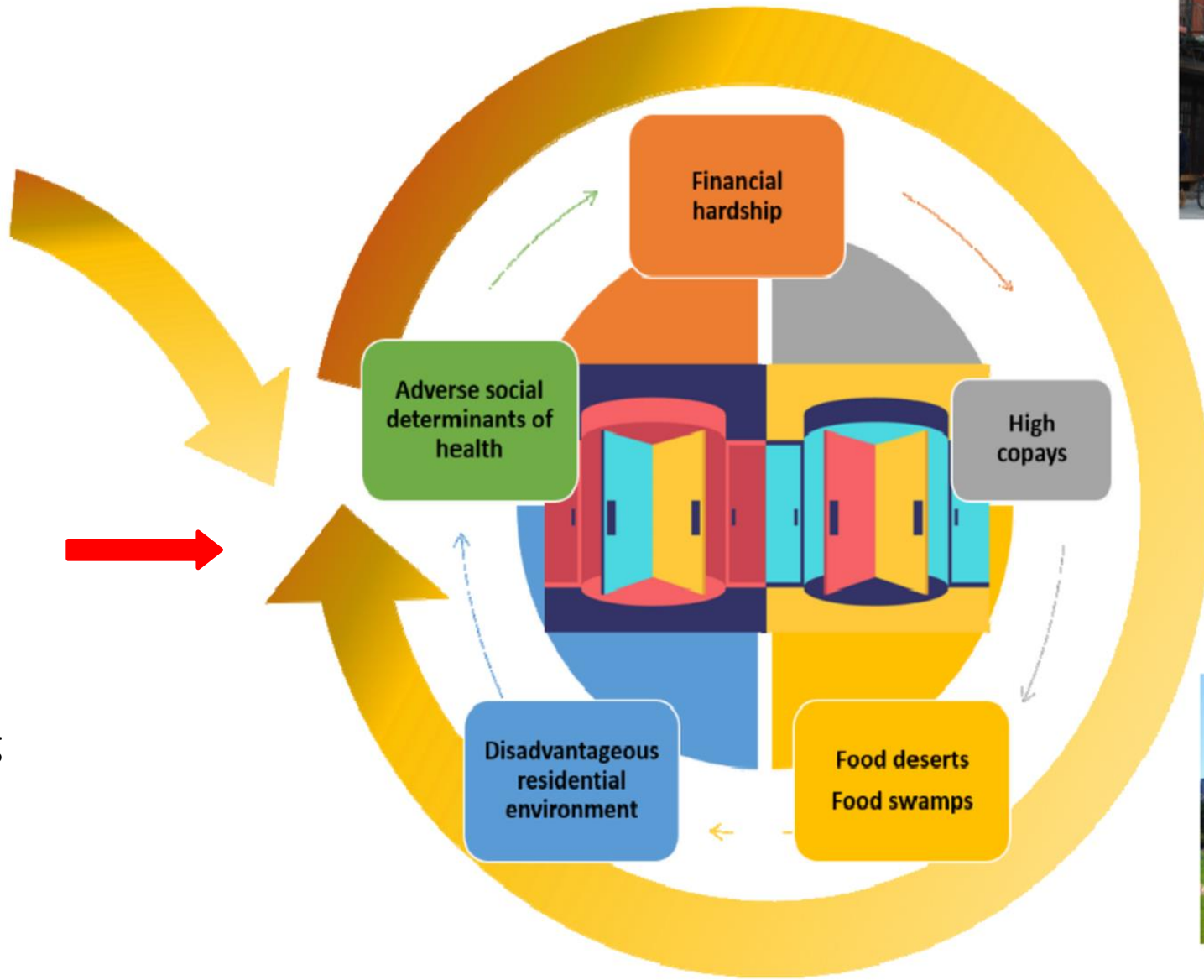
Locking the Revolving Door: Racial Disparities in Cardiovascular Disease

Gladys Velarde , MD; Katia Bravo-Jaimes , MD; Eric J. Brandt , MD, MHS; Daniel Wang, MD; Paul Douglass , MD; Luis R. Castellanos, MD, MPH; Fatima Rodriguez , MD, MPH; Latha Palaniappan, MD, MS; Uzoma Ibebuogu, MD; Rachel Bond , MD; Keith Ferdinand, MD; Gina Lundberg , MD; Ritu Thamman , MD; Krishnaswami Vijayaraghavan, MD; Karol Watson , MD, PhD

J Am Heart Assoc. 2023;12:e025271. DOI: 10.1161/JAHA.122.025271



The revolving door concept: while CV disparities in the in-patient setting have narrowed, they widen after crossing the hospital door.





Hypertension

Hypertension. 2023;80:e00–e00.

AHA/AMA SCIENTIFIC STATEMENT

Implementation Strategies to Improve Blood Pressure Control in the United States: A Scientific Statement From the American Heart Association and American Medical Association

Marwah Abdalla, MD, MPH, Vice Chair; Shari D. Bolen, MD, MPH; Jeffrey Brettler, MD; Brent M. Egan, MD; Keith C. Ferdinand, MD; Cassandra D. Ford, PhD; Daniel T. Lackland, DrPH; Hilary K. Wall, MPH; Daichi Shimbo, MD, Chair; on behalf of the American Heart Association and American Medical Association

AHA/AMA scientific statement top strategic priorities

- ➔ Antiracism efforts – Adverse SDOH mitigated through partnership with underrepresented racial/ethnic groups or historically excluded communities
- ➔ Paired with multilevel strategies that support wider adoption of evidence-based interventions for BP control

Hypertension. 2023;80:e00–e00

AHA/AMA scientific statement top strategic priorities

- ➔• Accurate BP measurement and increased use of SMBP—educate and train clinicians and patients to select validated BP devices and measure BP accurately
- ➔• Create robust, integrated, and scalable health information technology infrastructure for efficiently relaying SMBP data to the care team and communicating treatment plan back to the patients

AHA/AMA scientific statement top strategic priorities

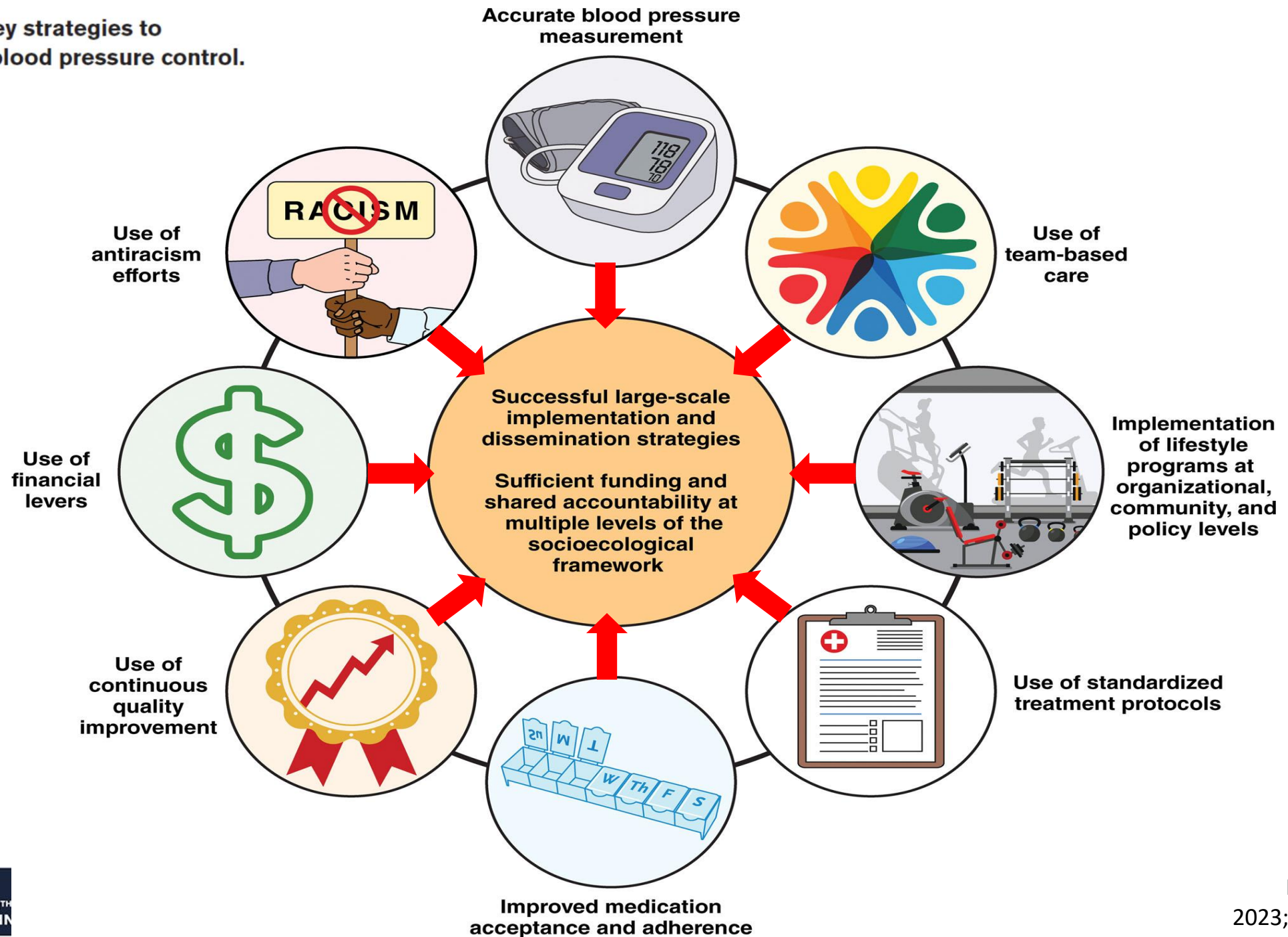
- ➔ Team-based care –disseminate and sustain advanced practice professionals, nurses, pharmacists, care managers, and community health workers
- ➔ Lifestyle modification strategies – individual and system-level strategies reduce sodium in food, increase access to healthy food, and ensure safe areas for physical exercise

Hypertension. 2023;80:e00–e00

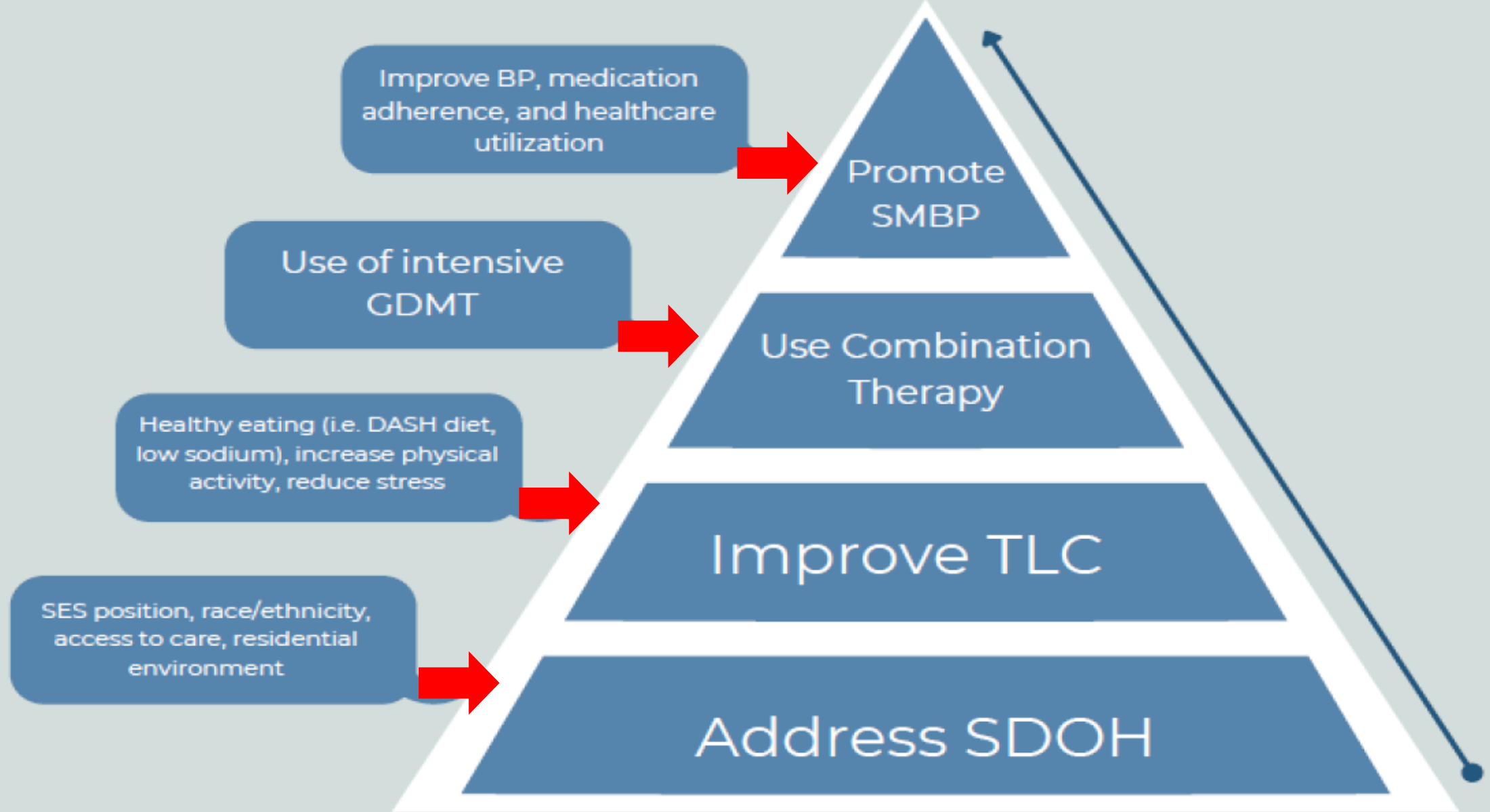
AHA/AMA scientific statement top strategic priorities

- ➔ Standardized treatment protocols using team-based care
- ➔ Once-daily, low-cost, effective BP meds and single-dose combination pill regimens
- ➔ Optimize medication acceptance and adherence
- ➔ Ask patients their preferences about anti-HTN medications
- ➔ Wider implementation continuous QI with clear, time-defined, standardized metrics coupled with reminders and regular feedback to clinicians and practices

Figure. Key strategies to improve blood pressure control.

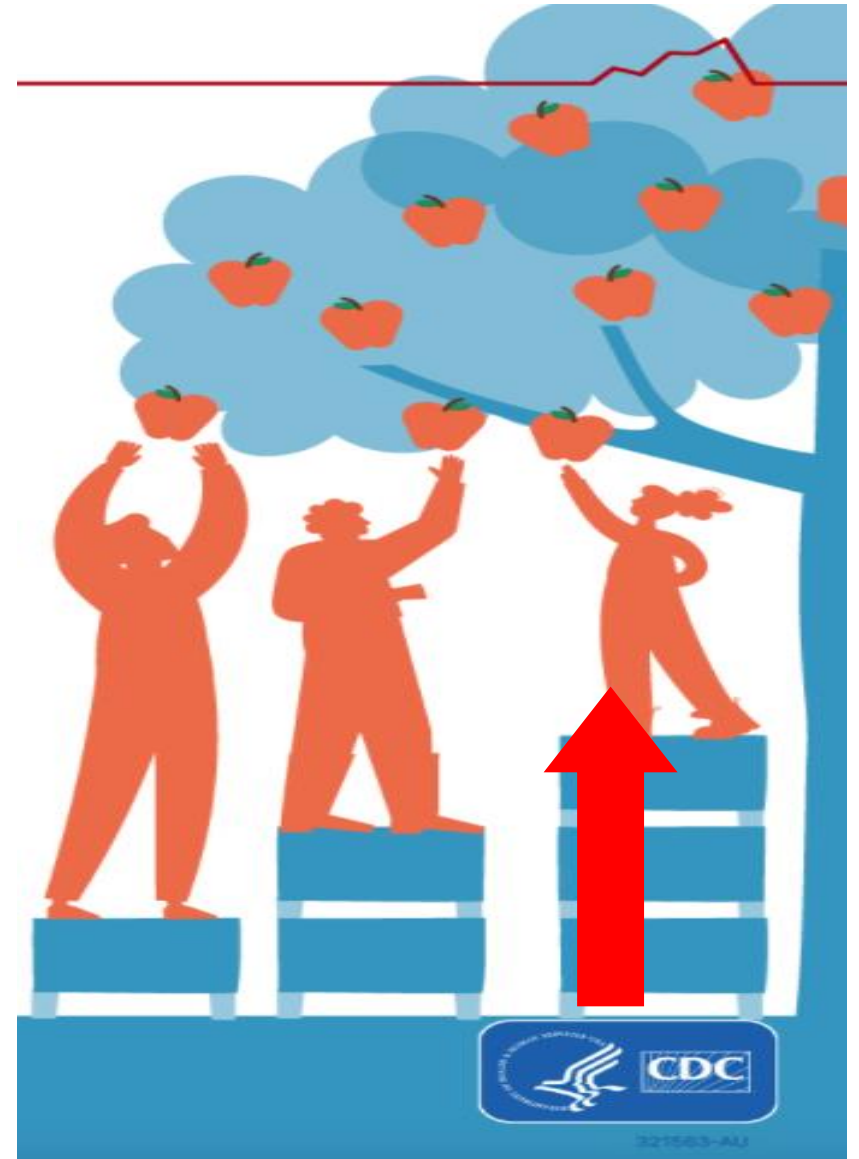


Steps to Eliminating HTN Disparities: Current and Emerging Interventions



Reaching Health Equity

- ➔ Targeted interventions are needed to identify and eliminate disparities, based on race/ethnicity, sex/gender, geography, socioeconomic status, ability or disability
- ➔ Health equity is a moral and practical imperative



Thank you!

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