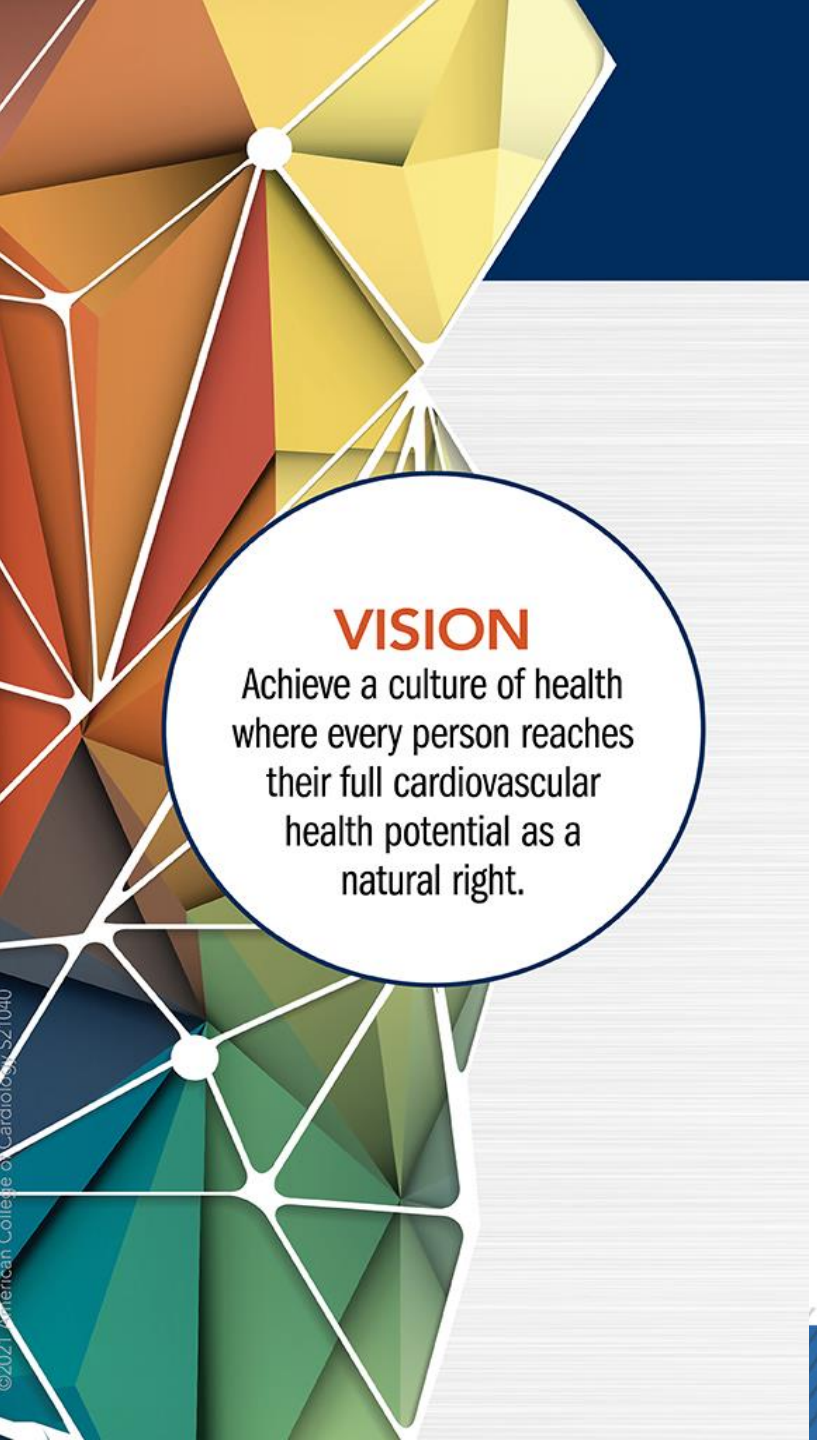
AMERICAN COLLEGE of CARDIOLOGY®

ACC Health Equity Series

#ACCDiversity #HealthEquity

Implementing Innovative Solutions to Achieving Equitable PAD Care

Sept. 10 at 7 p.m. ET



Welcome!

Melvin R. Echols, MD, MSCR, FACC, FHFSA, FASPC - ACC Chief Health Equity, Diversity, & Inclusion Officer

- All attendees will be muted
- **Please place all questions in the chat**
- This webinar has four 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!

AMERICAN COLLEGE of CARDIOLOGY

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.

Panelist

Osama A. Ibrahim, MD, FACC, FSCAI
Interventional Cardiovascular Medicine and Endovascular Medicine Specialist
Vanderbilt Tullahoma Harton Hospital
President
Pinnacle Vascular Solutions, PLLC (PVS)
Physician Lead - Vascular Service Line
Director of Vascular Medicine
Director of The Vein Clinic
Cardiology and Vascular Associates, PLLC

Panelist

Marc Bonaca, MD, MPH
Cardiology,
Vascular Medicine Specialist
Executive Director of CPC
Director of Vascular Research
Professor of Medicine
University of Colorado Anschutz

Panelist

Demetria M. Bolden, PhD, MBA
Communication Scientist,
Dissemination and Implementation Scholar, Vascular Disease Researcher
Assistant Professor
Division of General Internal Medicine
University of Colorado School of Medicine Anschutz Medical Campus

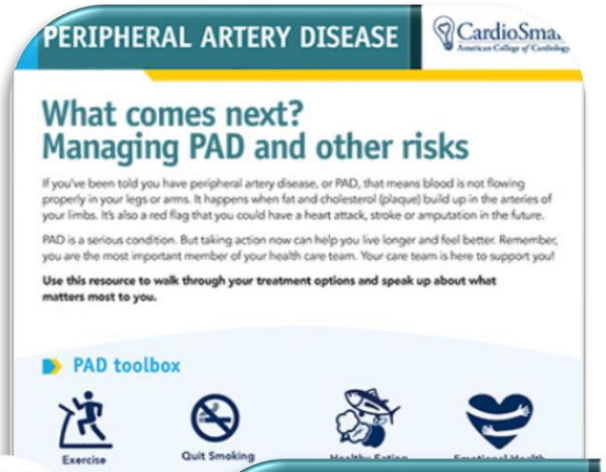
Panelist

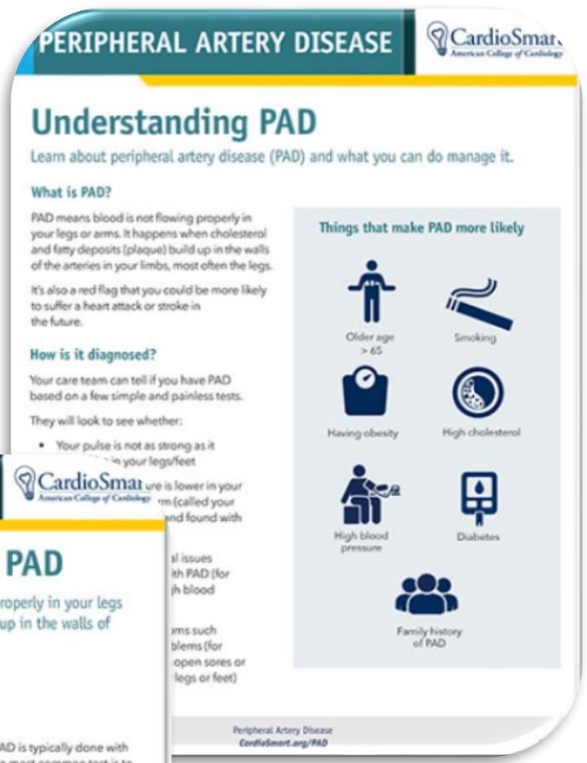
Michael Nguyen Young, MD
Section Chief,
Interventional Cardiology,
Vascular Medicine Specialist
Assistant Professor of Medicine
Geisel School of Medicine
Dartmouth

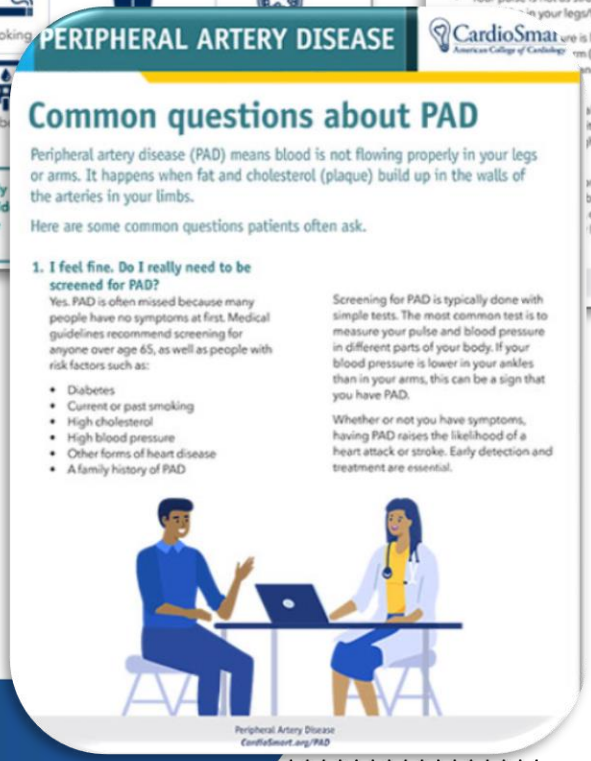
Agenda

- “Why Should We Focus on PAD?”
- “What are the Key Takeaways from the 2024 ACC Guideline for L.E PAD Management?”
- “What are the disparities and inequities surrounding diagnosis, management, treatment, and patient outcomes in PAD?”
- “How do we implement appropriate therapeutic algorithms and treatment plans for PAD Management?”

ACC Suite of PAD Patient Resources





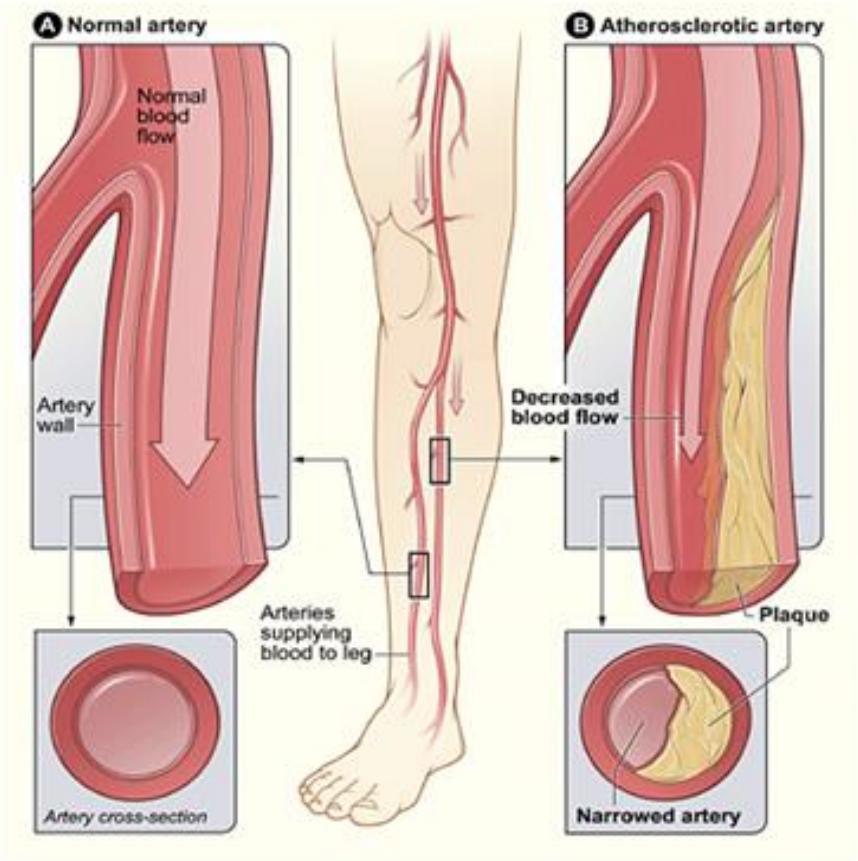


AMERICAN COLLEGE of CARDIOLOGY

“Why should we focus on PAD?”

Peripheral Artery Disease (PAD)

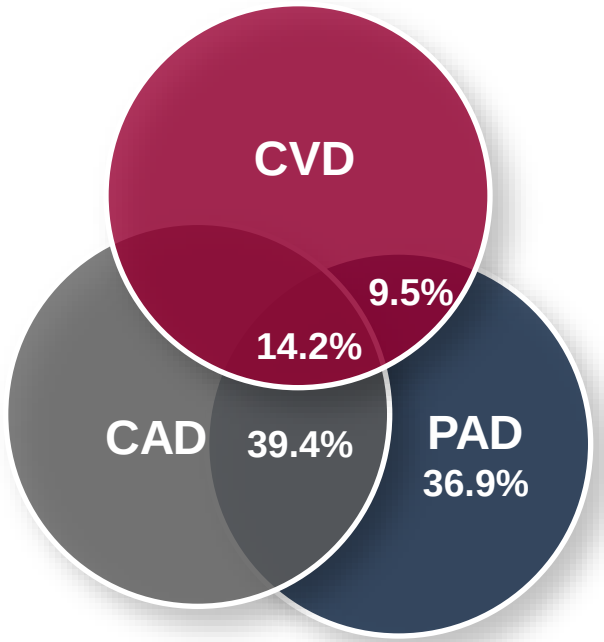
- Disease of arteries outside the heart and brain that can lead to loss of a limb and can be life threatening
- Manifestation of systemic atherosclerosis, characterized by narrowing and hardening of the arteries that supply blood to the legs and feet
- Narrowing of the vessels reduces flow of oxygen-rich blood to lower limbs and results in nerve and tissue injury
- Can lead to development of foot ulcers and gangrene
- Iliac, femoropopliteal, and infrapopliteal arteries are commonly affected



http://www.nhlbi.nih.gov/health/health-topics/topics/pad

Definition of PAD

- The presence of a stenosis or occlusion in the aorta or arteries of the limbs
- One of the three cardinal manifestations of atherosclerosis in addition to CAD and CVD
- Associated with an increased risk of cardiovascular and cerebrovascular events, including death, MI and stroke

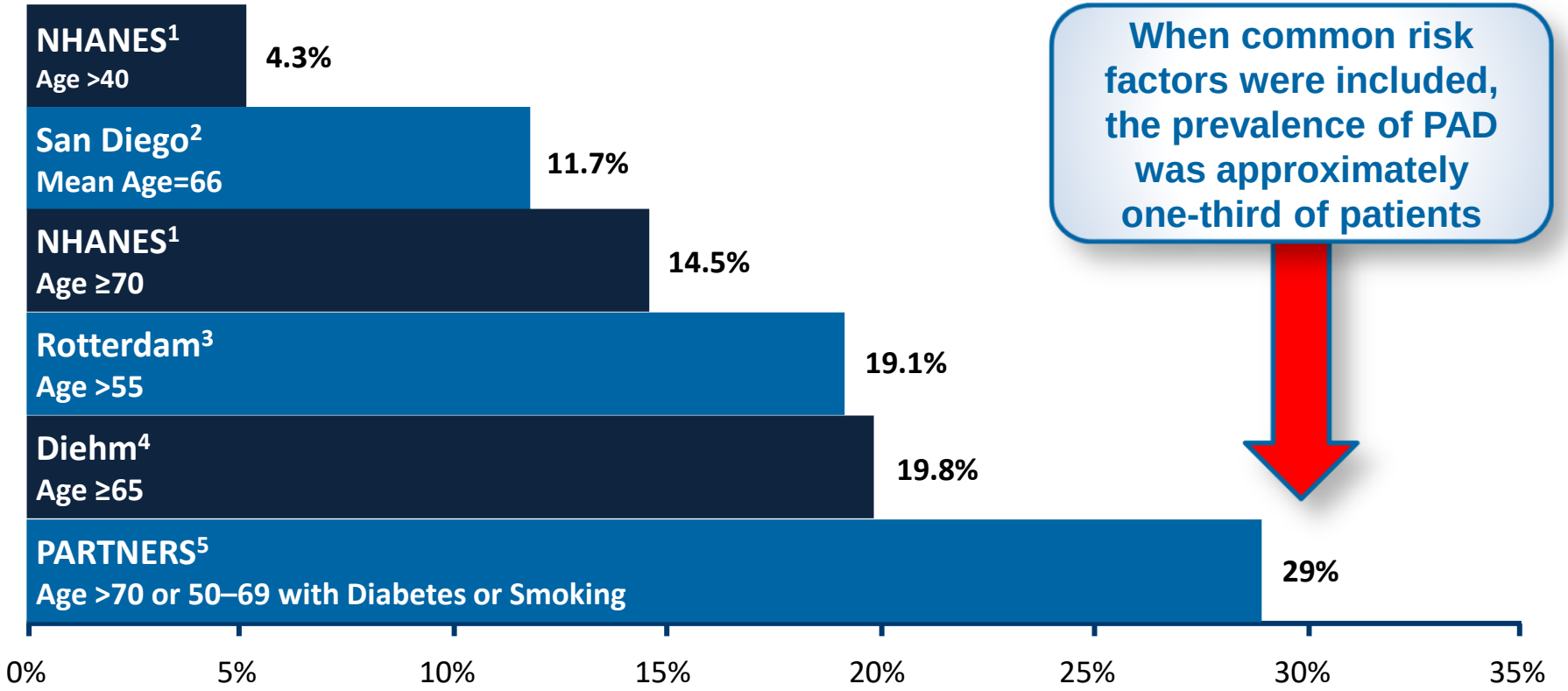


Patients with one manifestation often have coexistent disease in other vascular beds[1]

CAD=coronary artery disease; CVD=cardiovascular disease; MI=myocardial infarction.

1. **Bhatt** DL **et al**, on behalf of the **REACH** Registry **Investigators**. JAMA 2006; 295(2): 180-189
2. Rooke T et al. 2011 ACCF/AHA focused update of the guideline for the management of patients with peripheral arterial disease (updating the 2005 guideline): a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. *Circulation*. 2011;124:2020–2045.

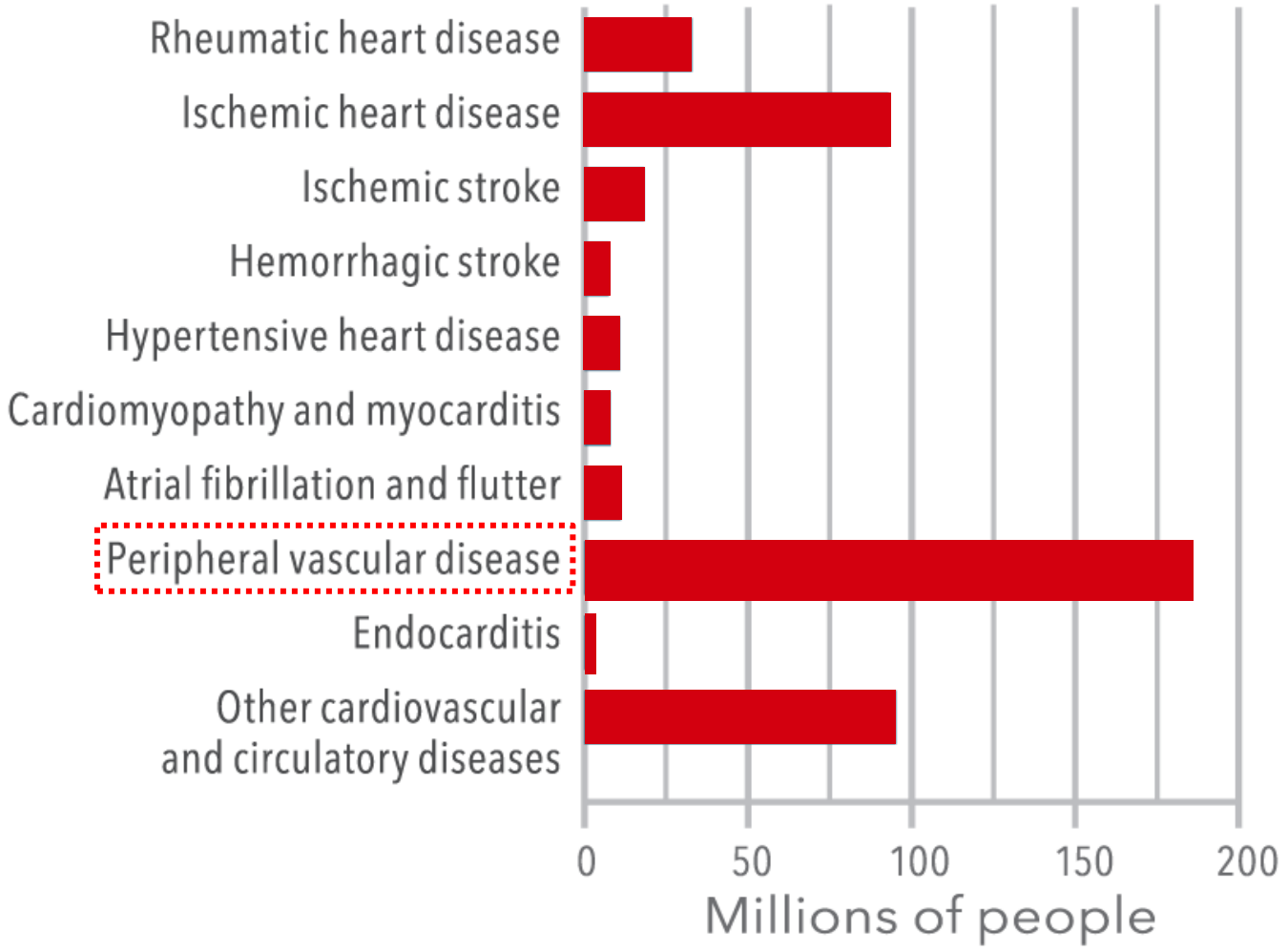
Prevalence of PAD



NHANES=National Health and Nutrition Examination Survey.

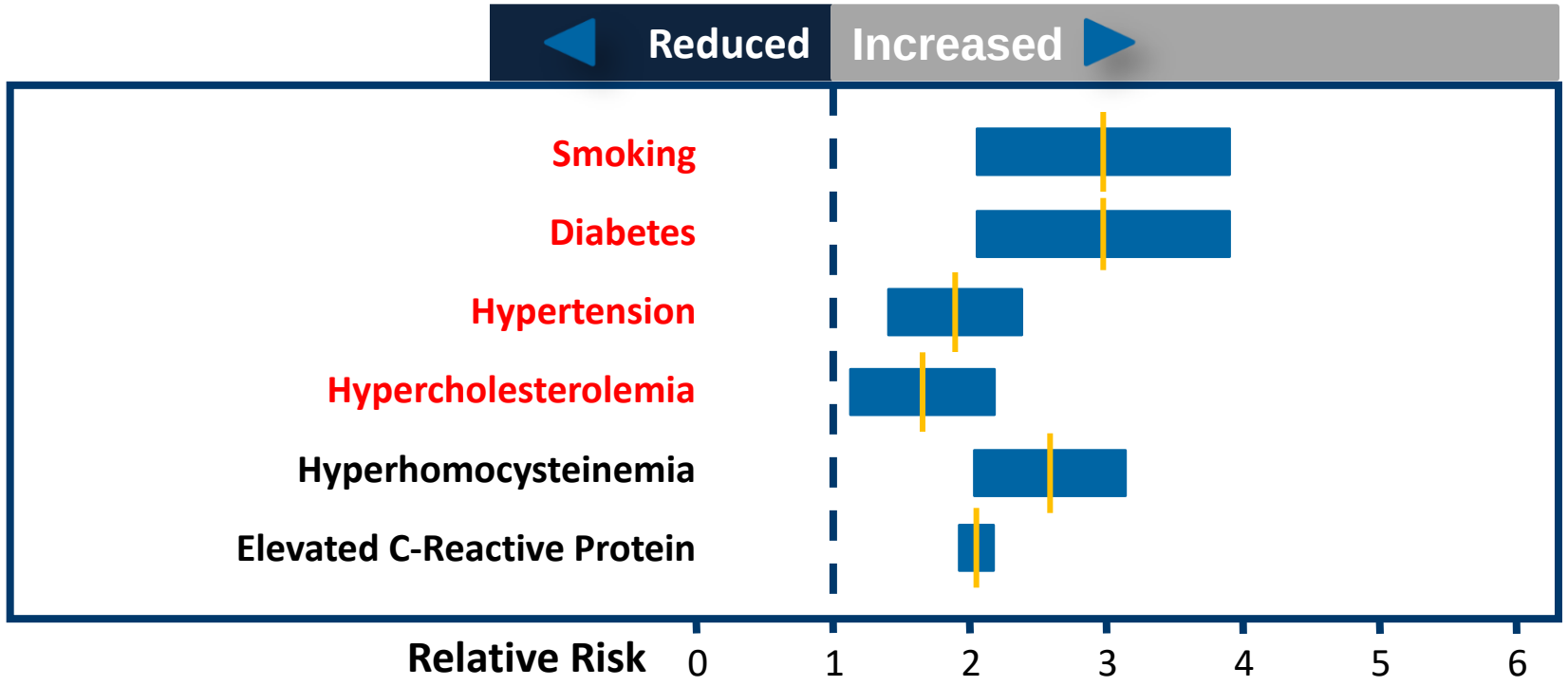
1. Selvin E, Erlinger T. Prevalence of and risk factors for peripheral arterial disease in the United States: results from the National Health and Nutrition Examination Survey, 1999–2000. *Circulation.* 2004;110:738–743.
2. Criqui M et al. The prevalence of peripheral arterial disease in a defined population. *Circulation.* 1985;71:510–515.
3. Meijer W et al. Peripheral arterial disease in the elderly: the Rotterdam Study. *Arterioscler Thromb Vasc Biol*. 1998;18:185–192.
4. Diehm C et al. High prevalence of peripheral arterial disease and co-morbidity in 6880 primary care patients: cross-sectional study. *Atherosclerosis.* 2004;172:95–105.
5. Hirsch A et al. Peripheral arterial disease detection, awareness, and treatment in primary care. *JAMA.* 2001;286:1317–1324.

Cardiovascular Disease Prevalence, 2013



GBD Study 2013 Collaborators, Lancet 2015;3866(9995):743-800

Risk Factors for PAD



Dormandy J, Rutherford R; TASC Working Group, TransAtlantic Inter-Society Consensus (TASC). Management of peripheral arterial disease (PAD). *J Vasc Surg.* 2000;31(1 pt 2):S1–S288.

Clinical Presentation

• Asymtomatic	20-50 %
• Atypical leg pain	40-50 %
• Classic claudication	10-35 %
• Critical limb ischemia	1-2 %

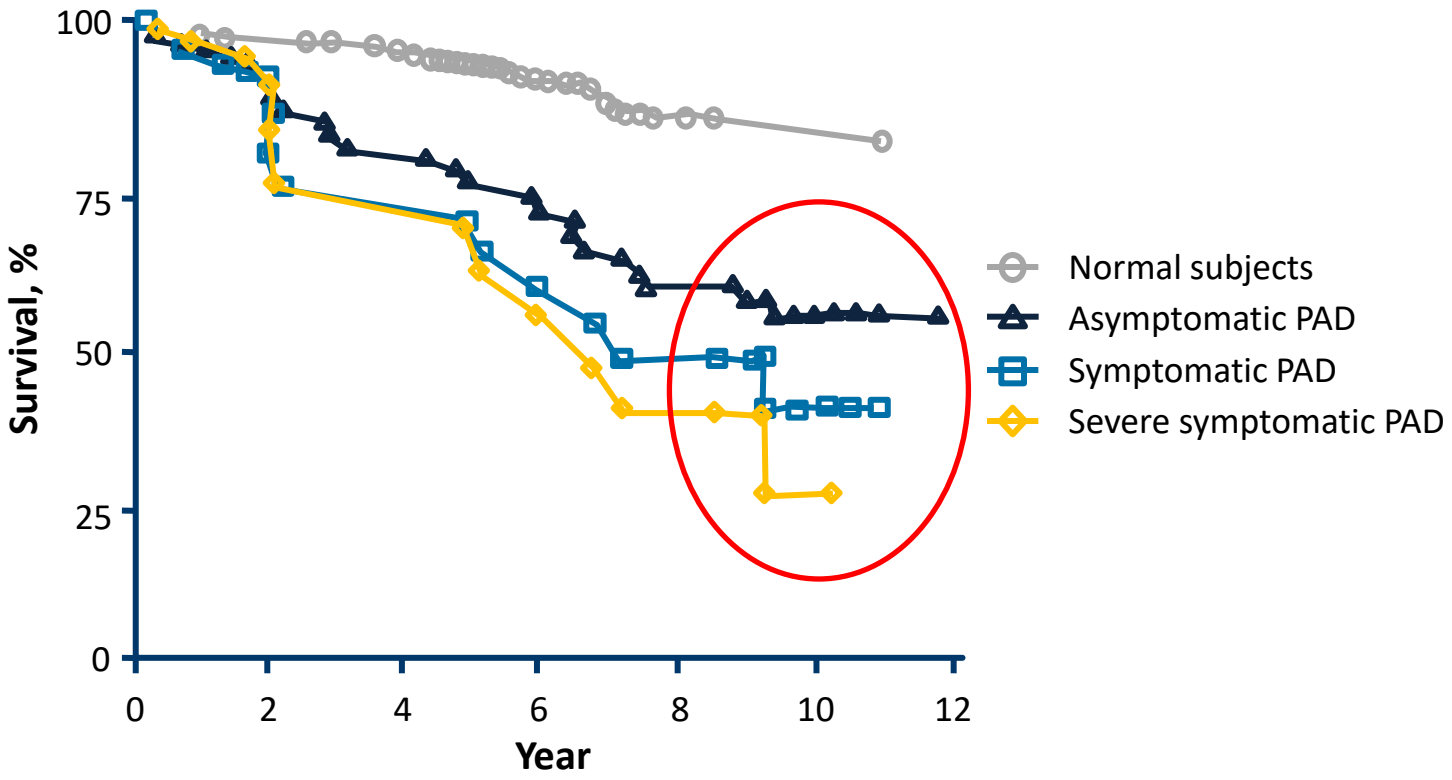
Hirsch, AT et al. ACC/AHA 2005 Practice guidelines for management of patients with PAD, Circ 2006

Classification of PAD

Fontaine Stages		Rutherford Categories		
Stage	**Clinical**	**Grade**	**Category**	**Clinical**
I	Asymptomatic	0	0	Asymptomatic
IIA	Mild claudication	I	1	Mild claudication
IIB	Moderate-severe claudication	I	2	Moderate claudication
		I	3	Severe claudication
III	Ischemic rest pain	II	4	Ischemic rest pain
IV	Ulceration or gangrene	III	5	Minor tissue loss
		IV	6	Ulceration or gangrene

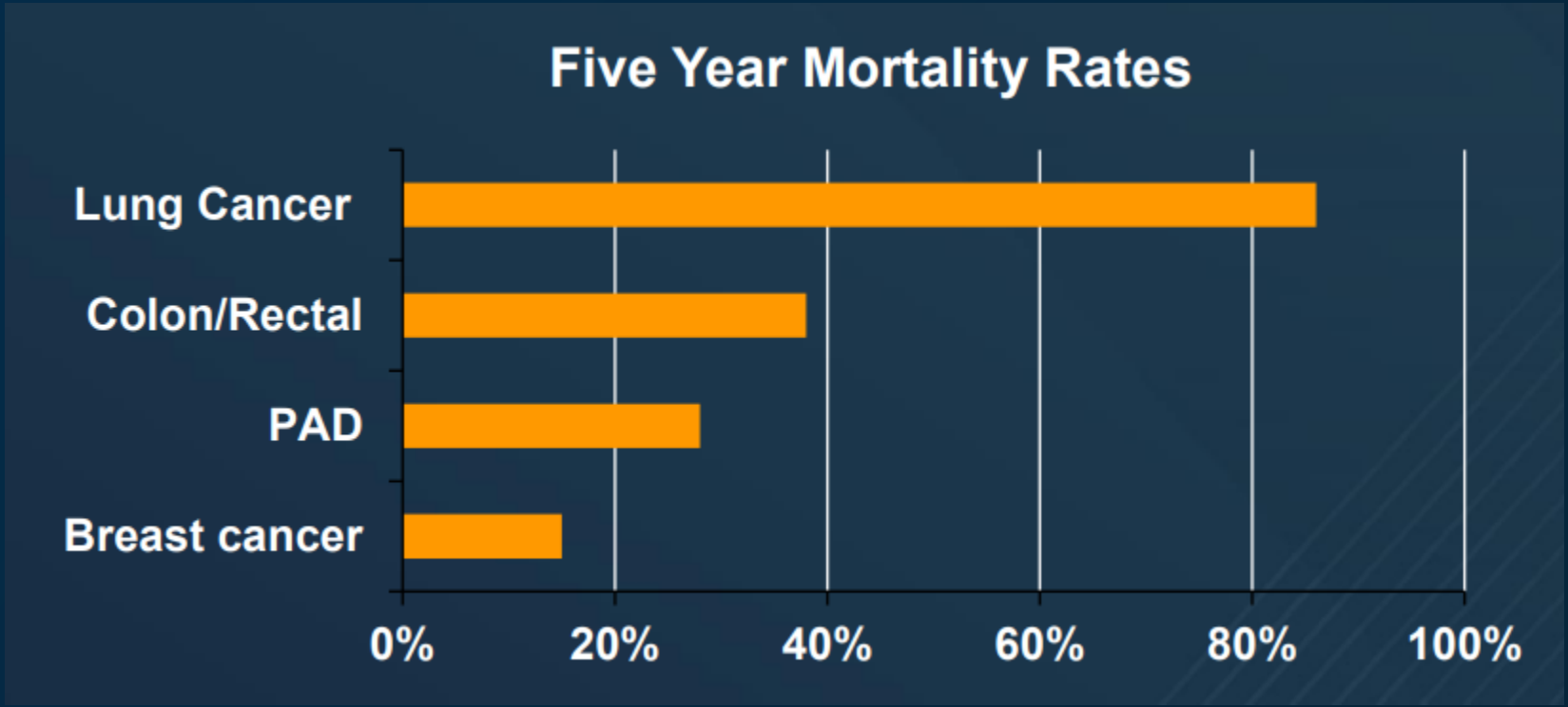
Dormandy J, Rutherford R; TASC Working Group, TransAtlantic Inter-Society Consensus (TASC). Management of peripheral arterial disease (PA*Vasc Surg.* 2000;31(1 pt 2):S1–S2D). *J* 88.

10-Year Survival Rates for Patients with PAD



Criqui M et al. Mortality over a period of 10 years in patients with peripheral arterial disease. *N Engl J Med.* 1992;326:381–386.

Mortality and PAD



1. Meijer WT, et al. Arterioscler Thromb Vasc Biol. 1998;18:185-192. 2. Criqui MH, et al. Circulation. 1985;71:510-515.

NCVH
New Cardiovascular Horizons

PAD ANNUAL ECONOMIC BURDEN*

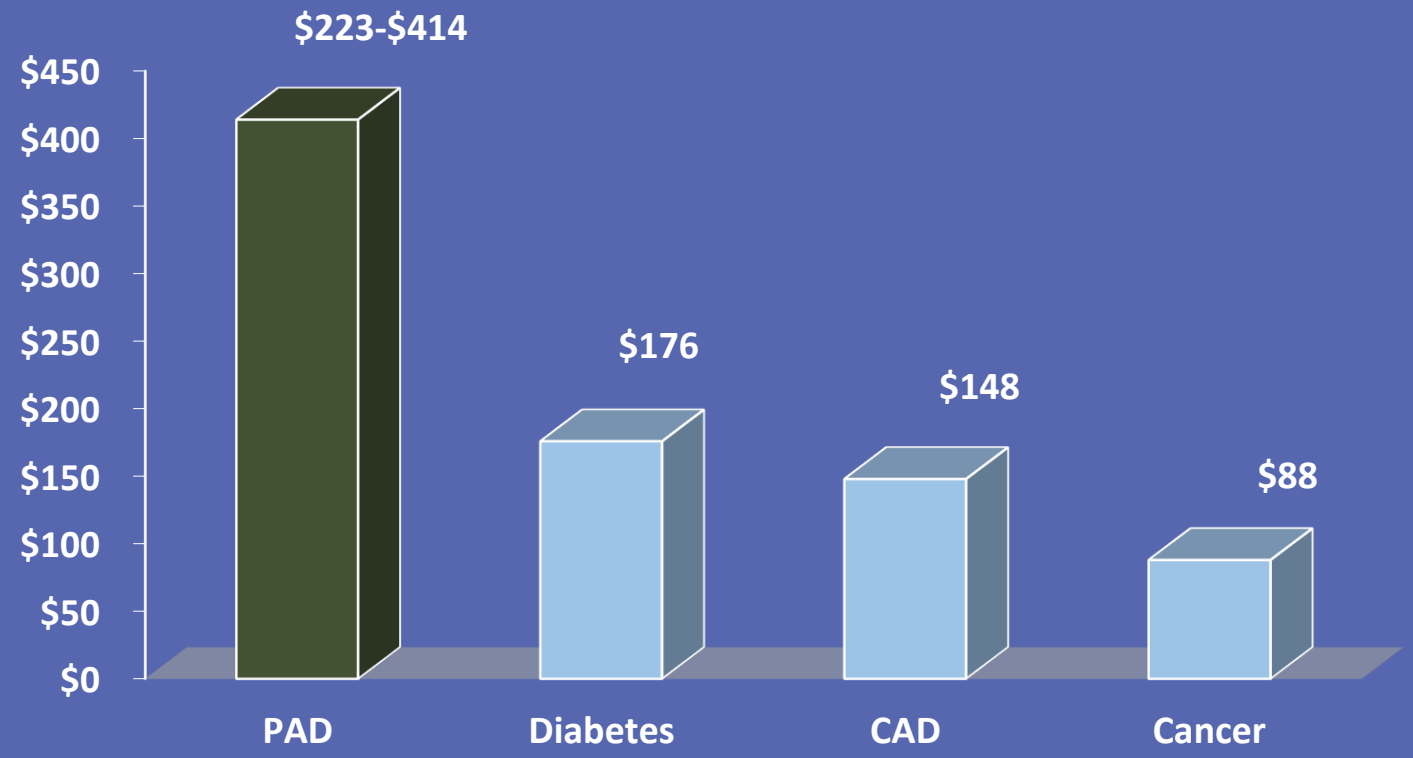
$223†-$414‡ BILLION

†U.S. REACH population inpatient costs + outpatient medication = $11,280 X 19.8 Mil PAD in 2015

‡Margolis managed care population all-cause hospitalizations + medications + other = $20,895 x 19.8 Mil PAD. Per pt. costs in 2015 $.

Source: Mahoney EM. Circ Cardiovasc Qual Outcomes 2008;1:38-45, Margolis J. J Manag Care Pharm 2005; 11(9): 727-24 and Yost ML. Real cost of PAD 2011 THE SAGE GROUP.

2015 ANNUAL ECONOMIC BURDEN*
(Billions $)



*Direct costs in the United States: PAD & CAD costs inflated to 2015 $. Direct cost of diabetes is 2012 and cancer 2014.

Source: Yost ML. Real cost of PAD 2011 THE SAGE GROUP, Mahoney EM. Circ Cardiovasc Qual Outcomes 2008;1:38-45, American Cancer Society website and ADA Diabetes Care 2013;36(4):1033-46.

Why Fear PAD ?

- Similar characteristics of any **CANCER**
  - Progressive.
  - Asymptomatic.
  - When identified – usually too late.
  - Significant morbidity/mortality.
  - Extremely prevalent and numbers are only on the rise:
    - Aging population.
    - Increasing diabetic population (> 30-50% of population by 2050)

IF YOU HAVE A CANCER YOU NEED TO SCREEN PATIENTS AND IDENTIFY THOSE AT RISK – Pap smear, CXR, and mammography.

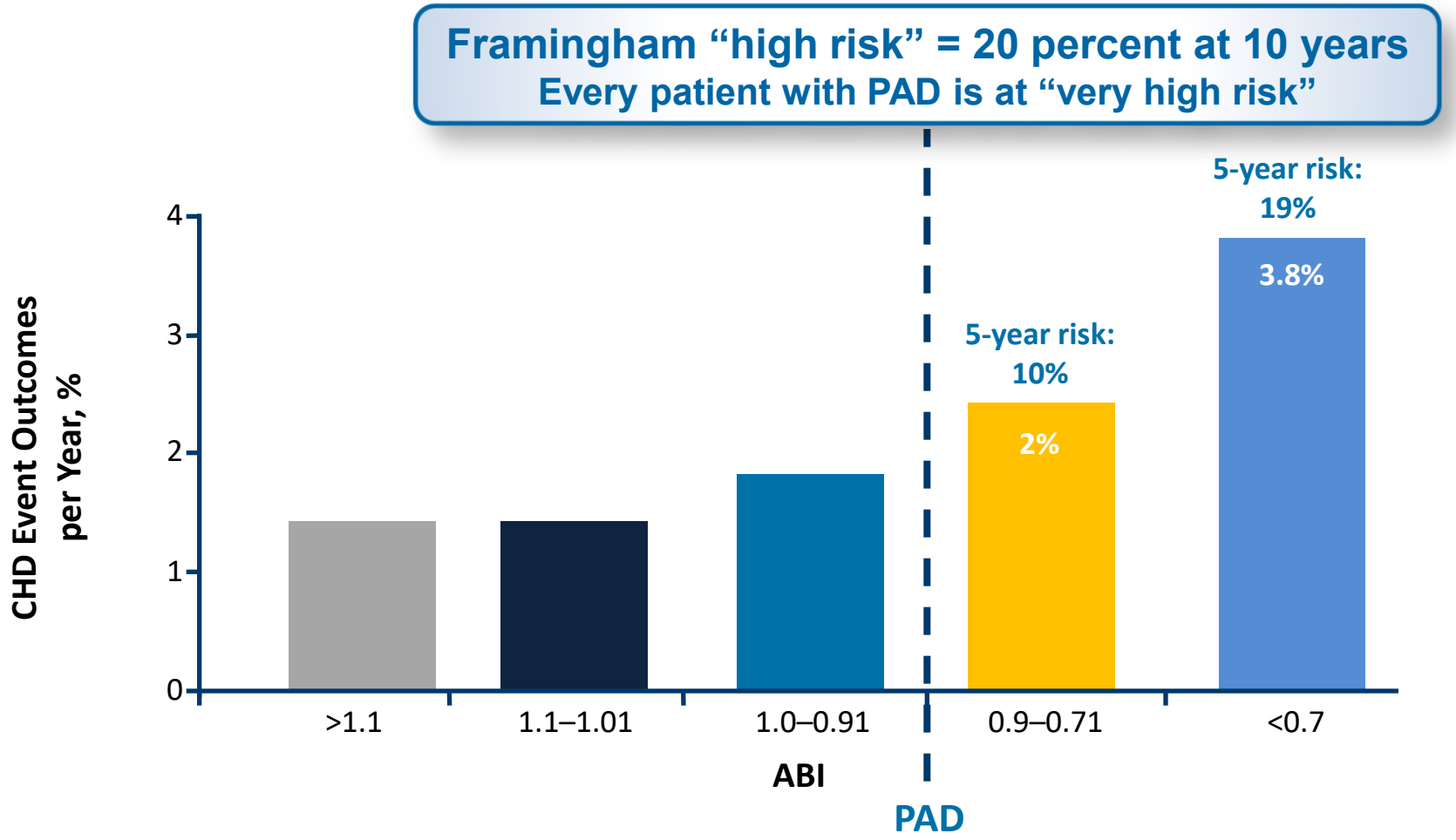
Why Fear PAD ?

We know PAD patients exist – ALL the prevalence data supports such a claim.

PAD is currently our new number one cardiovascular challenge SO why are we behind ?

"THE PATIENT NEEDS TO BE EXTRAPOLATED – THIS CAN BE ACHIEVED BY PATIENT-SPECIFIC POPULATION SCREENING AND PROMOTING AWARENESS TO PHYSICIANS, HEALTHCARE ADMINISTRATORS, AND COMMUNITY"

Cardiovascular Risk Increases with Decreases in ABI



Fatal or nonfatal MI.
CHD=coronary heart disease (chronic heart failure).
Leng G et al. Use of ankle brachial pressure index to predict cardiovascular events and death: a cohort study. *Brit Med J.* 1996;313:1440–1444.

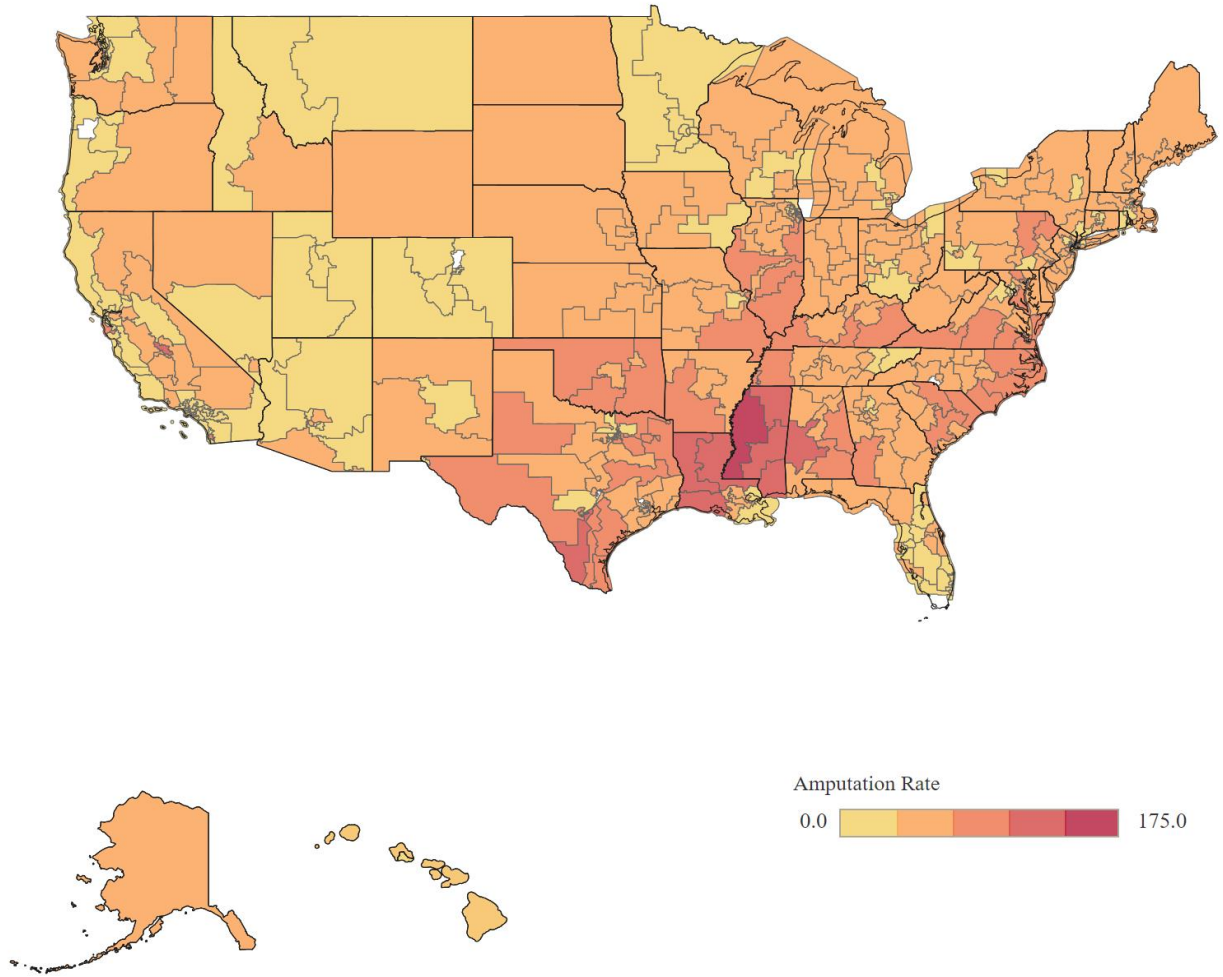
PAD: Health Equity, Diversity, and Inclusion (HEDI) Nightmare

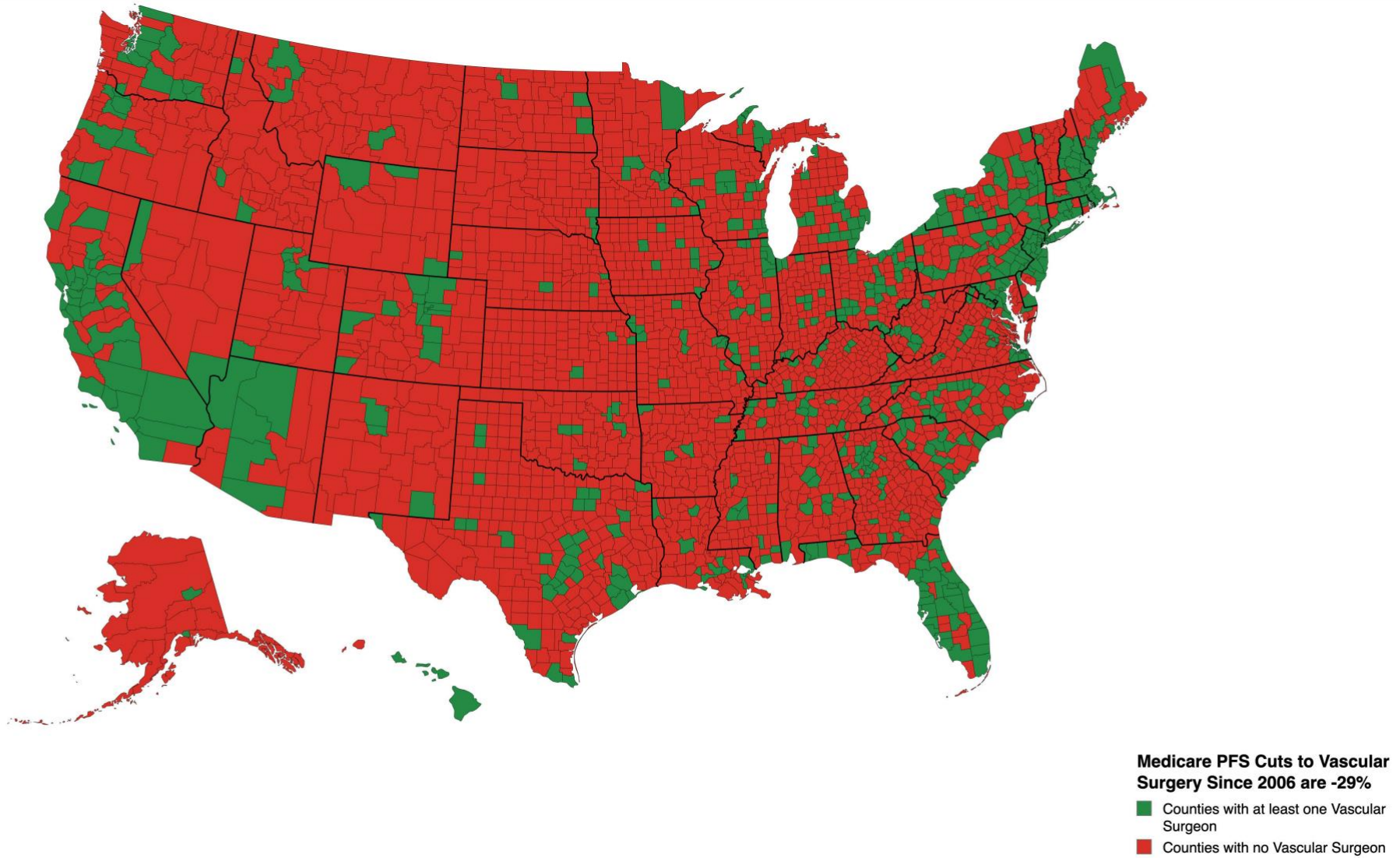
- Racial Disparities.
- Sex Disparities.
- Rural vs Urban Disparities – Access to care issue(s).
- "Territorial-ism" – 4 different practice disciplines managing the patient.
- Lack of diversity in clinical trails
- Lack of "Shared Decision Making" tools.

Provider Workforce Shortages within the Vascular and Endovascular Space

Interventional Cardiologists, Interventional Radiologists, and Vascular Surgeons.

The Amputation Heat Map for the United States



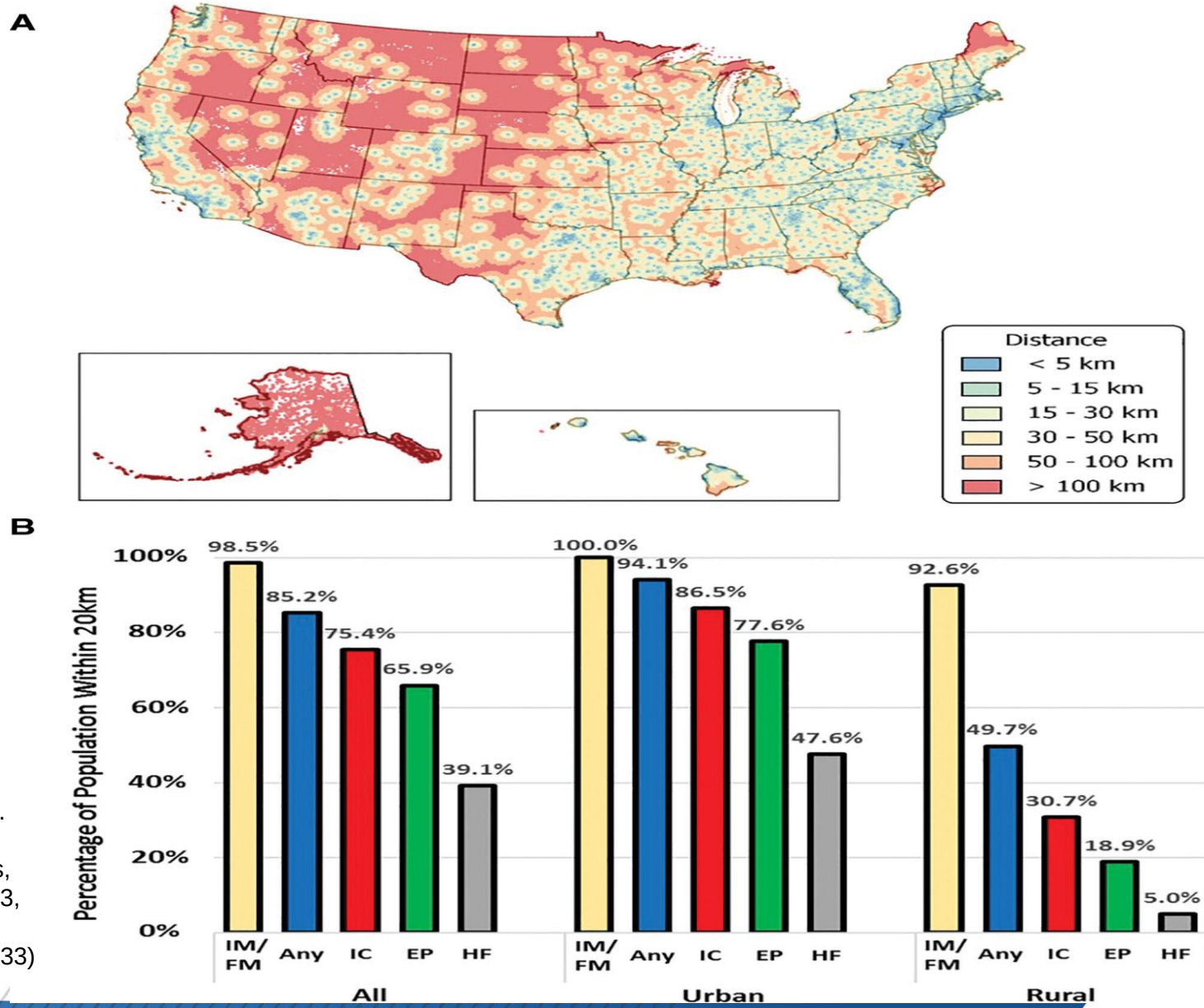

Medicare PFS Cuts to Vascular Surgery Since 2006 are -29%
Counties with at least one Vascular Surgeon
Counties with no Vascular Surgeon

From the Society for Vascular Surgery

Characterizing the geographic distribution of vascular surgeons in the United States

Vamsi K. Potluri, MD,[a] Josh L. Bilello, MD,[a] Shaunak G. Patel, MD,[b] Silpa Yarra, MD, MPH,[a] Mellick T. Sykes, MD, FACS,[a] *and* Michael B. Silva Jr, MD, FACS,[a] *Galveston, TX; and New York, NY*

Results: In 2018, the U.S. population was 309.8 million, and there were 3145 counties. Of the 3145 counties, 533 (17%) had had a practicing vascular surgeon. The combined population of these counties was 213.8 million people (69% of the U.S. population). Stratified by age, the vascular surgeons in these 533 counties could treat 37.3 million people aged >50 years and 17.4 million people aged >65 years. However, 2612 counties (83%), with a total population of 96 million people (31% of the U.S. population), had had no practicing vascular surgeon. When stratified by age, 78.1 million people in the uncovered counties were aged >50 years and 35 million were aged >65 years. Of the 2612 uncovered counties, 48% were urban and 24% were rural.



Issam Motairek. Circulation: Cardiovascular Quality and Outcomes. Mapping Geographic Proximity to Cardiologists Across the United States, Volume: 16, Issue: 10, Pages: e010133, DOI: (10.1161/CIRCOUTCOMES.123.010133)

Interventional radiologists are few and far between in the U.S.

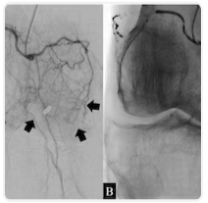
Will Morton
Nov 2, 2023

Interventional radiologists are disproportionately distributed in the U.S, with higher densities practicing near urban areas, according to a study published October 30 in the *Journal of Vascular and Interventional Radiology*.

"Almost 31.2% of the United States population does not have access to an interventional radiologist, however, many patients would prefer minimally invasive care," wrote first author Yusuf Ahmad, a student at Lake Erie College of Osteopathic Medicine in Erie, PA, and colleagues.

Latest in Interventional

New procedure shows promise reducing knee osteoarthritis pain
DECEMBER 20, 2023



Thrombectomy use increasing to treat VTE
DECEMBER 5, 2023

PAD Awareness – 59% among total sample

Black Americans, who are at greatest risk, are least aware of PAD

Black Americans are significantly less aware of PAD:

45% Black
53% Hispanic
66% White

} Aware of PAD

Which of the following conditions have you heard of? (select all that apply)

n=1,543 Total, 468 Black, 793 White, 62 Hispanic, 86 Other

AMERICAN COLLEGE of CARDIOLOGY

AMPUTATION LOTTERY

Amputation lottery substantially depends on who you are and where you live

Amputations varies by Race, Socioeconomic status, hospital volume, operator skill set, and geographic location.

AMPUTATION PATIENT OUTCOMES

Discharge status: Only 11%-24% go home routinely,

Majority (73%) go to another institution (skilled nursing facility, rehabilitation)

In-hospital mortality: 3.4%

Ambulation: 60%-80% cannot walk

Mortality (2-year): 30%-50% (frequently MI)

Contralateral amputation: 36%-50%

Allie DE. *Eurointervention.* 2005;1(1):60-69,. Belmont PJ. *J Am Coll Surg.* 2011;213:370-378, Dillingham TR. Arch Phys Med Rehabil. 2005;86:480-486, AHRQ. Healthcare Cost and Utilization Project. HCUP Query Outcomes 84.14-84.17, Dillingham TR. PMR. 2011;3(4):336-344, Dormandy JA. J Vasc Surg. 2000;31(Suppl):S1-S296. Jackson. Slide presentation at Vascular Annual Meeting, 2011, Jencks SF. N Engl J Med. 2009;360:1418-1428, Norgren L. J Vasc Surg. 2007;45(suppl):S1-S67, Yeager RA. Rutherford. Vascular Surgery. 2005:2474-2481, Subramaniam B. Anesth Analg. 2005;100:1241-1247, Gardner SJ. Endovascular Today 2011;10(8):38-44 and Yost. Endovascular Today, 2014.

AMPUTATION: MORE PATIENT OUTCOMES

Lengthy healing process

At 100 days, 45% BKA and 24% AKA not healed

Quality of life reduced

Severe physical impairment in ambulation, body care, movement, and mobility

Chronic pain 95%

Phantom limb pain: 79%-80%
Residual limb pain: 68%-74%
Back pain: 52%-62%

Source: Nehler MR. J Vasc Surg. 2003;38(1):7-14, Peters EJG. Diabetes Care. 2001;24(10):1799-1804, Ephraim PL. Arch Phys Med Rehabil. 2005;86:1910-1919, Ehde DM. Arch Phys Med Rehabil. 2000;81:1039-1044

2024 ACC/AHA/AACVPR/APMA/ABC/SCAI/SVM/SVN/SVS/SIR/VESS Guideline for the Management of Lower Extremity Peripheral Artery Disease

A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines

Developed in Collaboration With and Endorsed by the American Association of Cardiovascular and Pulmonary Rehabilitation, American Podiatric Medical Association, Association of Black Cardiologists, Society for Cardiovascular Angiography and Interventions, Society for Vascular Medicine, Society for Vascular Nursing, Society for Vascular Surgery, Society of Interventional Radiology, and Vascular & Endovascular Surgery Society

Top 10 Take Home Messages

1. Peripheral artery disease (PAD) is a common cardiovascular disease associated with increased risk of amputation, myocardial infarction, stroke, and death, as well as impaired quality of life, walking performance, and functional status.
2. This guideline defines 4 clinical subsets of PAD:
   - Asymptomatic PAD (may have functional impairment)
   - Chronic symptomatic PAD (including claudication),
   - Chronic limb-threatening ischemia, and
   - Acute limb ischemia.
3. Detection of PAD in most patients is accomplished through the history, examination, and the resting ankle-brachial index.
4. Health disparities in PAD are associated with poor limb and cardiovascular outcomes and must be addressed at the individual patient and population levels, with interventions coordinated between multiple stakeholders across the cardiovascular community and public health infrastructure.
5. Effective medical therapies for patients with PAD should be prescribed to prevent major adverse cardiovascular events and major adverse limb events for patients with PAD, including antiplatelet (generally single antiplatelet) and antithrombotic therapy, lipid-lowering (ie, high-intensity statin) and antihypertensive therapy, management of diabetes, and smoking cessation. Rivaroxaban (2.5 mg twice daily) combined with low-dose aspirin (81 mg daily) is effective to prevent major adverse cardiovascular events and major adverse limb events in patients with PAD who are not at increased risk of bleeding.
6. Structured exercise is a core component of care for patients with PAD. It includes supervised exercise therapy and community-based (including structured home-based) programs.

Top 10 Take Home Messages

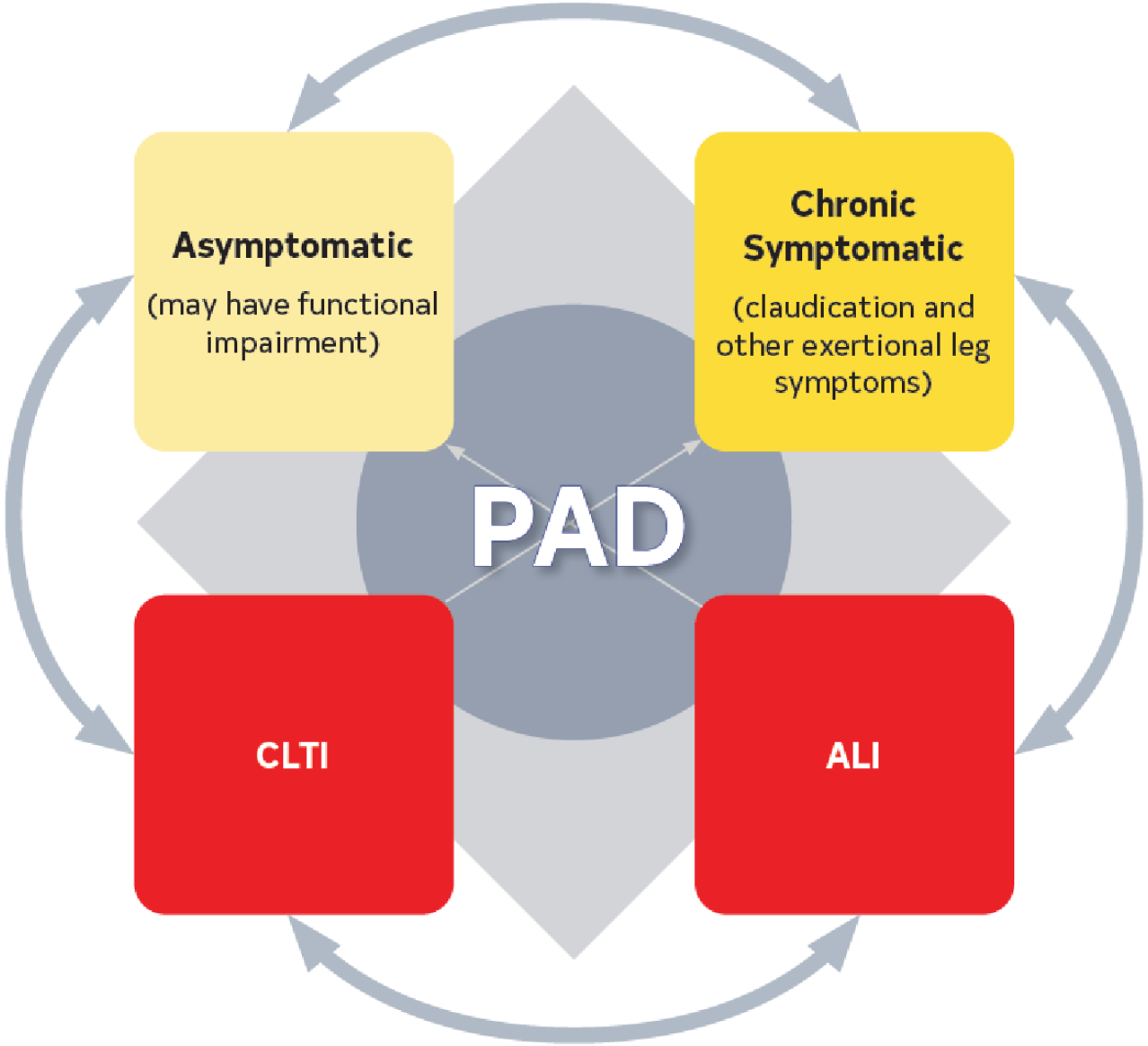
7. Revascularization (endovascular, surgical, or hybrid) should be used to prevent limb loss in those with chronic limb-threatening ischemia and can be used to improve quality of life and functional status in patients with claudication not responsive to medical therapy and structured exercise.

8. Care for patients with PAD, and especially those with chronic limb-threatening ischemia, is optimized when delivered by a multispecialty care team.

9. Foot care is crucial for patients with PAD across all clinical subsets and ranges from preventive care and patient education to advanced care in the setting of chronic limb-threatening ischemia. Podiatrists and other specialists with expertise in foot care, wound-healing therapies, and foot surgery are important members of the multispecialty care team.

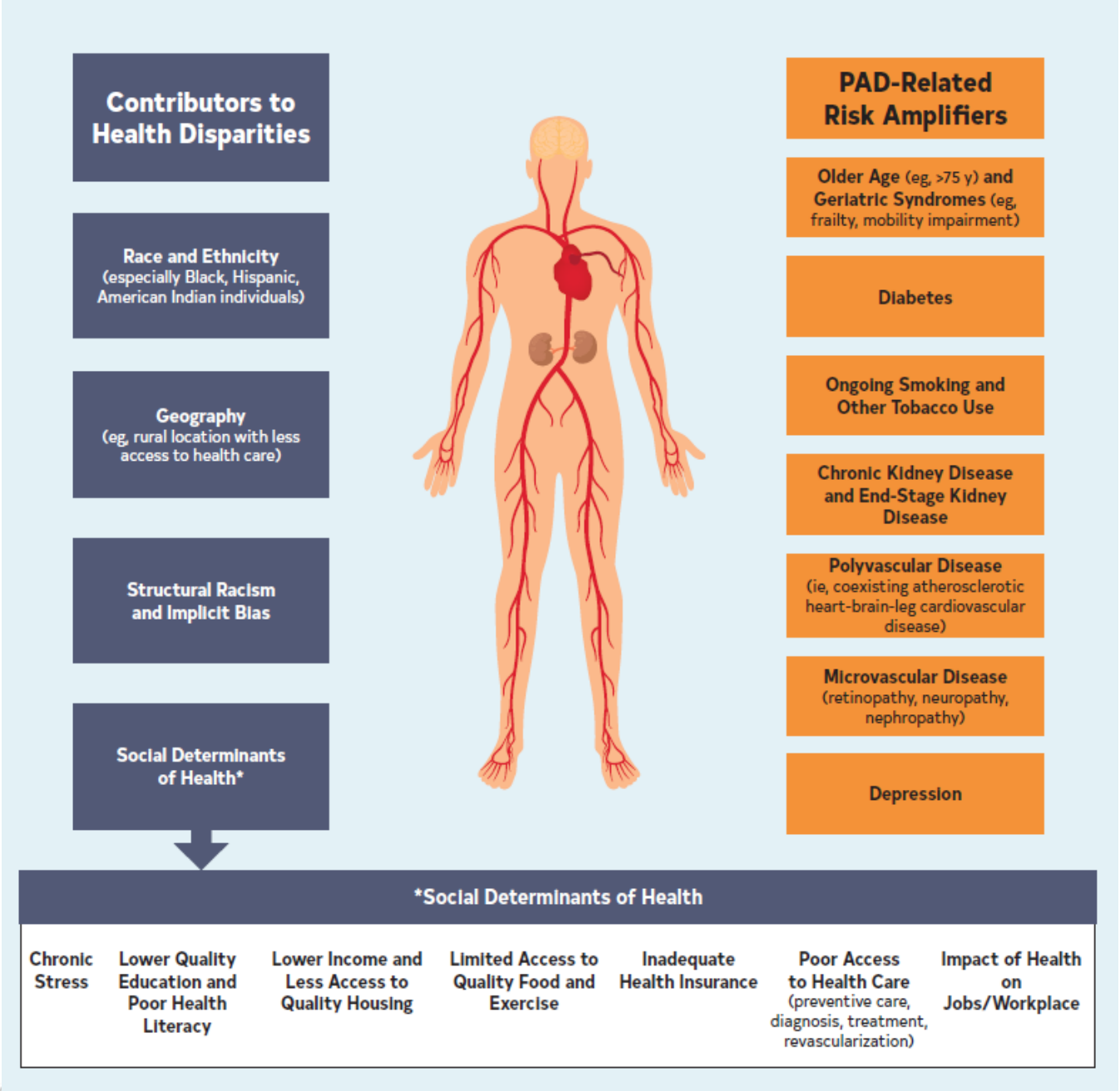
10. The PAD National Action Plan outlines 6 strategic goals to improve awareness, detection, and treatment of PAD nationwide. Implementation of this action plan is recognized as a top advocacy priority by the writing committee.

Figure 1. Clinical Subsets of PAD.



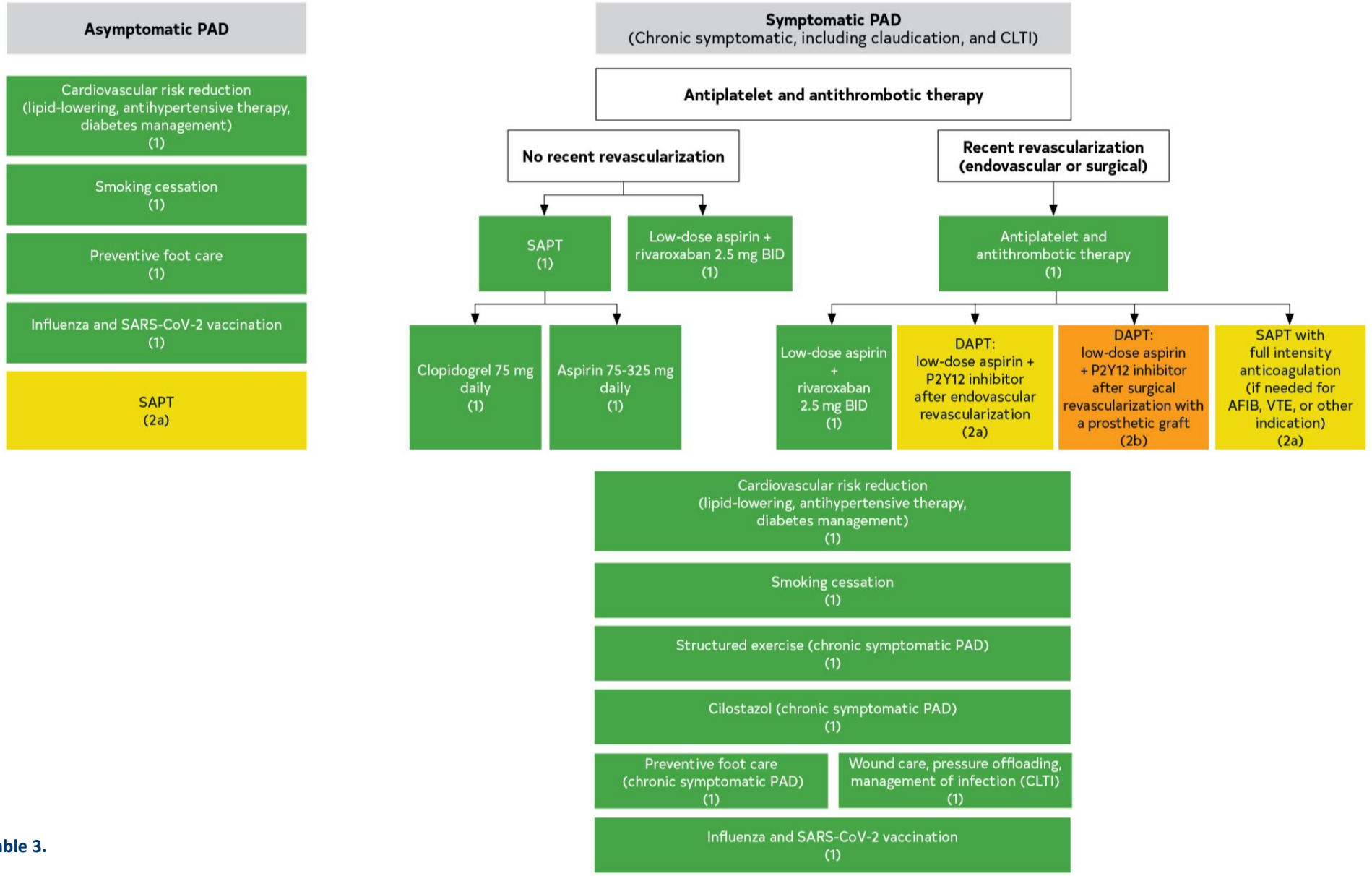
ALI indicates acute limb ischemia; CLTI, chronic limb-threatening ischemia; and PAD, peripheral artery disease.

Figure 3. Health Disparities and PAD-Related Risk Amplifiers Increase Risk of MACE and MALE.



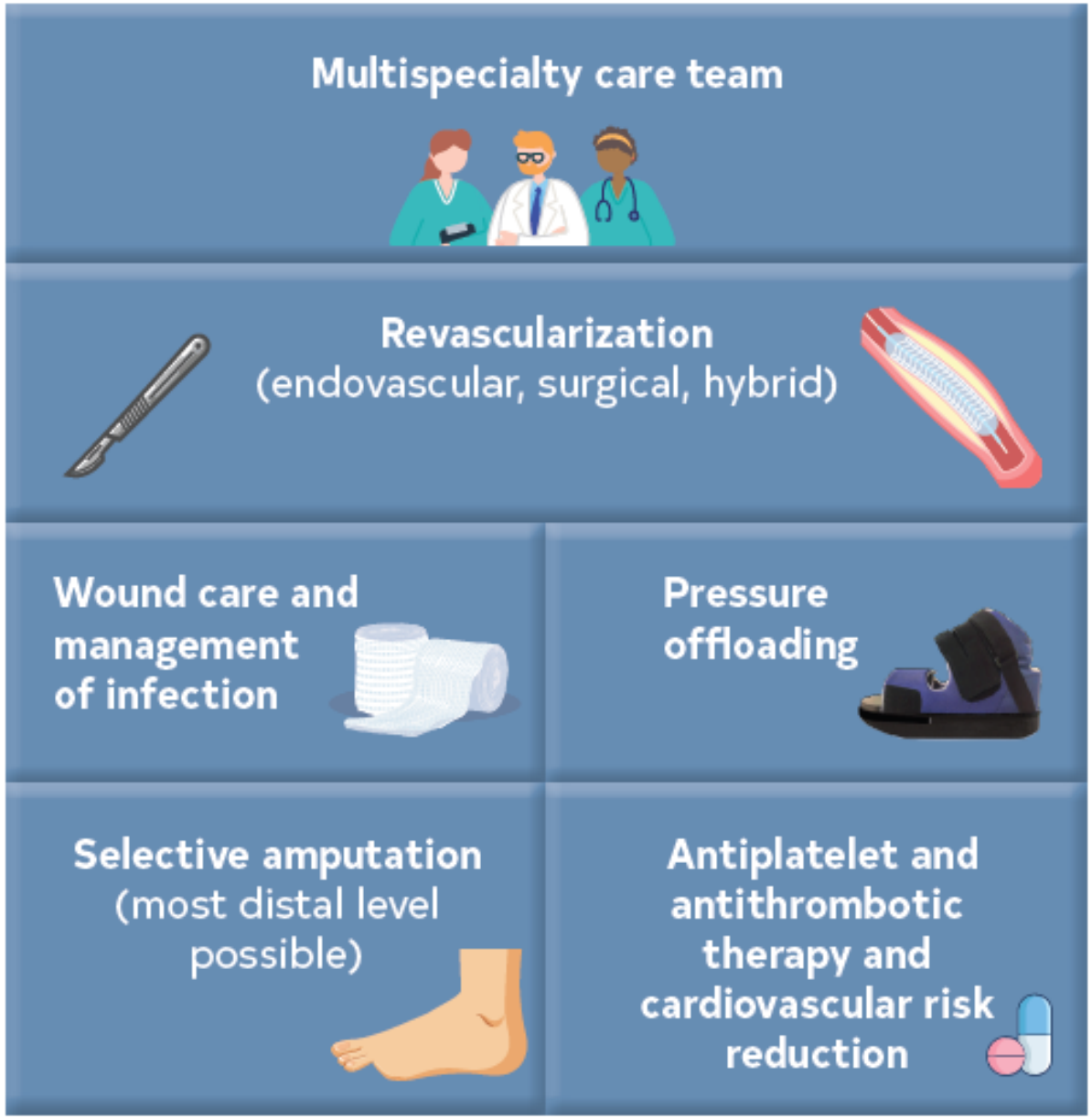
MACE indicates major adverse cardiovascular events; MALE, major adverse limb events; and PAD, peripheral artery disease.

Figure 4. Medical Therapy and Foot Care for PAD.



Colors correspond to Table 3.

Figure 6. Components of Care for CLTI.



CLTI indicates chronic limb-threatening ischemia.

Health Equity

Lifestyle, Function, Smoking Cessation, Foot care, Influenza & COVID vaccination
(exercise, diet, cilostazol)

Rx for Diabetes

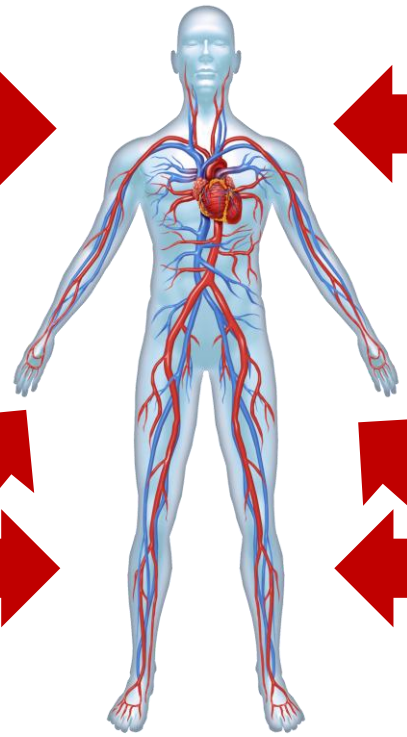
2016 Glycemic targets → **GLP1 agonists, SGLT inhibitors for MACE / HF / CKD**
--
Glycemic targets for microvascular disease

Blood Pressure

2016 Antihypertensive Therapy for MACE / HF risk reduction → **2016 Goal <130 / <80 mmHg w/ ACEi**

Antithrombotics

2016 Aspirin or Clopidogrel for MACE Reduction → **Anti-platelet Therapy for MACE Reduction**
--
Low dose aspirin and rivaroxaban 2.5 mg twice daily to reduce MACE and MALE



Comprehensive team approach & revascularization for CLTI

Lipid Lowering

2016 Statin Therapy → **High-intensity Statin therapy**
--
If LDL-C ≥ 70 mg/dL on maximally tolerated statin reasonable to add PCSK9i (Class 2a)

Risk of MACE and MALE

Risk Amplifiers

- **Polyvascular Disease**
- **Age**
- **Diabetes Mellitus**
- **Smoking**
- **CKD**
- **Prior Revascularization**

Function & Quality of Life

Risk of Major Adverse Limb Events

No PAD	Functional Impairment (called asymptomatic PAD in GL)	Post Revascularization / Chronic PAD	Chronic limb-threatening ischemia	Acute limb ischemia

AMERICAN COLLEGE of CARDIOLOGY

“What are the Disparities and Inequities Surrounding Diagnosis, Management, Treatment, and Patient Outcomes in PAD?”

Health Disparity

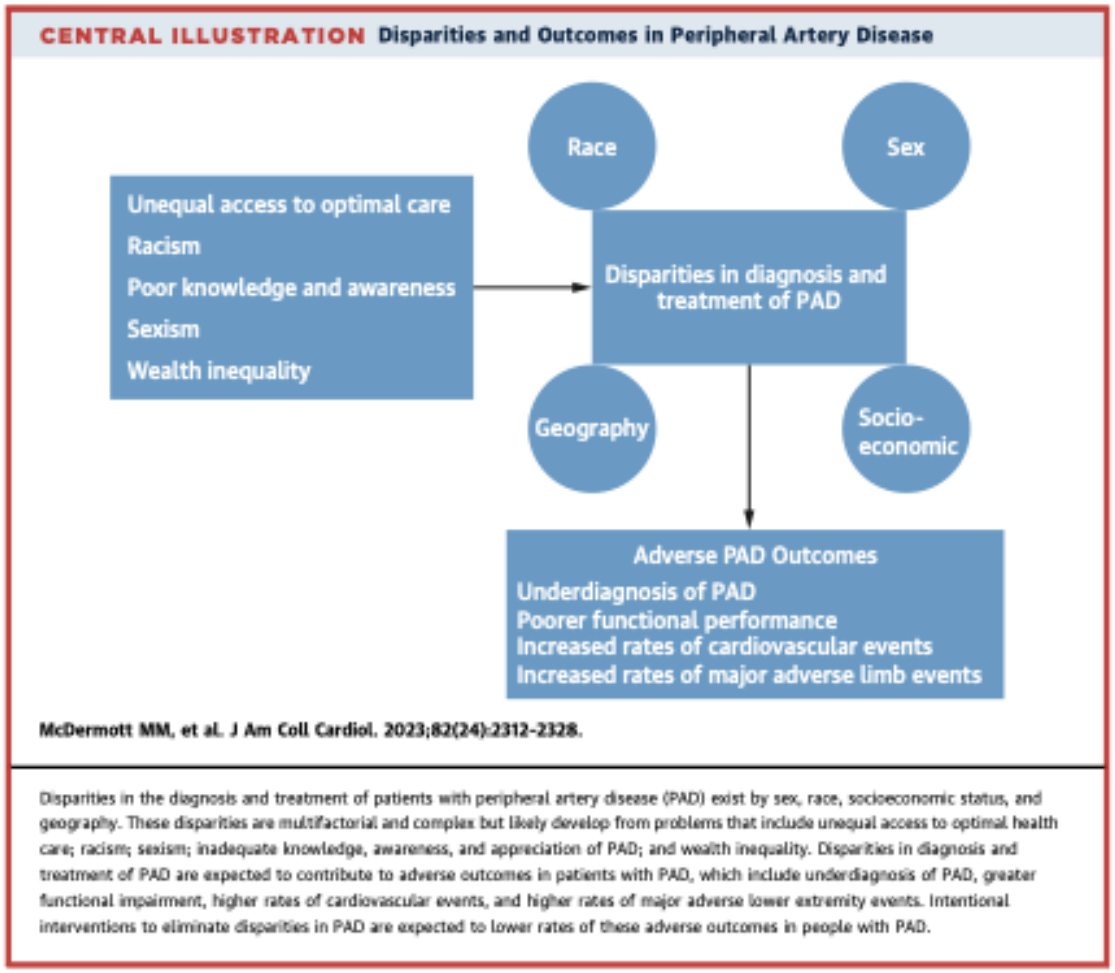
Health disparities are preventable differences in the burden of disease, injury, violence, or opportunities to achieve optimal health that are experienced by socially disadvantaged populations.

Health Inequities

The systematic, avoidable and unfair differences in health outcomes that can be observed between populations, between social groups within the same population or as a gradient across a population ranked by social position.

McCartney G, Popham F, McMaster R, Cumbers A. Defining health and health inequalities. *Public Health.* 2019;172:22-30; Crear-Perry J, Correa-de-Araujo R, Lewis Johnson T, McLemore MR, Neilson E, Wallace M. Social and structural determinants of health inequities in maternal health. *Journal of women's health.* 2021;30(2):230-235; Healthypeople.gov ; CDC. Community Health and Program Services (CHAPS): Health Disparities Among Racial/Ethnic Populations. Atlanta: U.S. Department of Health and Human Services; 2008

Disparities and Outcomes in PAD



Disparities develop from problems that include unequal access to optimal health care; racism; sexism; inadequate knowledge, awareness, and appreciation of PAD; and wealth inequality.

Disparities are documented by: race, sex, geography, and socioeconomic status

McDermott MM, Ho KJ, Alabi O, et al. Disparities in Diagnosis, Treatment, and Outcomes of Peripheral Artery Disease: JACC Scientific Statement. *Journal of the American College of Cardiology*. 2023;82(24):2312-2328.

Disparities in Treatment for PAD

TABLE 1 Disparities in Guideline-Recommended Treatments for PAD

Treatment	Efficacy Evidence	Disparity Evidence by Sex, Race, or SES	Potential for Disparities Not Yet Documented
Cholesterol-lowering therapy	• Significantly reduces cardiovascular event rates compared with placebo[21,25] • Lower LDL cholesterol is associated with lower cardiovascular event rates[21,25]	• Women were less likely than men to be prescribed cholesterol-lowering therapy and more likely to decline cholesterol-lowering therapy[55-58] • People who are Black were less likely to be prescribed statins and antiplatelet drugs than people who are not Black[78,79]	• Increased costs of newer and more potent cholesterol lowering therapies may reduce their accessibility to specific populations
Smoking cessation	• People who smoke have higher rates of adverse outcomes	• People who were Black and of lower SES have higher rates of cigarette smoking[113,114]	• Poorer SES and poor access to care may reduce assistance with smoking cessation
Diabetes mellitus	• Certain drug therapies, such as SGLT2 inhibitors and GLP1 agonists, have prevented adverse outcomes in patients with cardiovascular disease, such as PAD		• Poor access to healthy foods, such as grocery stores with fruits and vegetables may contribute to PAD-related disparities in people who are Black or who have lower SES
Antiplatelet and antithrombotic treatment	• Antiplatelet therapy such as clopidogrel and rivaroxaban 2.5 mg twice daily plus 81 mg aspirin each reduce cardiovascular event rates in PAD	• People with PAD who are Black were less likely to receive antiplatelet therapy compared with White patients	• Lack of access to health care may result in lower rates of optimal antiplatelet therapy for people with PAD
Supervised walking exercise	• Improved treadmill walking performance compared with control; improves 6-minute walk distance by approximately 25-35 m[25]	• Efficacy is similar between men and women and between people who are Black and not Black[64] • Women were less likely than men to participate in CMS-covered supervised exercise[82] • Black patients were less likely to participate in CMS-covered supervised exercise[66] • People with PAD who were Black and those of lower SES were more likely to report that the $11 copay per exercise session was a barrier to participation[82]	• Lack of availability of supervised exercise facilities in urban and rural areas
Home-based walking exercise	• Improves 6-minute walk distance by approximately 45-55 m compared with control[64,107]	• Efficacy is similar between men and women and between people who are Black and those who are not Black[65,66]	• Structured home-based walking exercise is not widely available in the United States, and evidence regarding disparities in access is not available

CMS = Centers for Medicare and Medicaid Services; GLP-1 = glucagon-like peptide-1; LDL = low-density lipoprotein; PAD = peripheral artery disease; SES = socioeconomic status; SGLT2 = sodium-glucose cotransporter-2.

Women (particularly Black women) are less likely to receive RX for cholesterol-lowering therapy

Black patients are less likely to receive antiplatelet therapy compared to White patients.

Black patients and women are less likely to participate in CMS-covered supervised exercise therapy (SET)

Persistent variability by race, sex and geographic region for surgical intervention

McDermott MM, Ho KJ, Alabi O, et al. Disparities in Diagnosis, Treatment, and Outcomes of Peripheral Artery Disease: JACC Scientific Statement. *Journal of the American College of Cardiology.* 2023;82(24):2312-2328.

Disparities in Amputation Rates

TABLE 3 Disparities in Amputation Rates in the United States

Group	Summary of Evidence
Sex	• In some studies, male sex has been associated with higher amputation rates
Race	• Black race has been consistently associated with higher amputation rates compared with White race among people with PAD • People with PAD who are Hispanic or Native American have higher rates of amputation compared with people who are White
Socioeconomic status	• Amputation rates are significantly higher in people with lower income compared with people with higher income
Geography	• Geographic differences in amputation rates are well documented, with high amputation rates occurring in the southeastern region of the United States

PAD = peripheral artery disease.

Black and Native Americans, and Hispanics have ↑ amputation rates compared with people who are White.

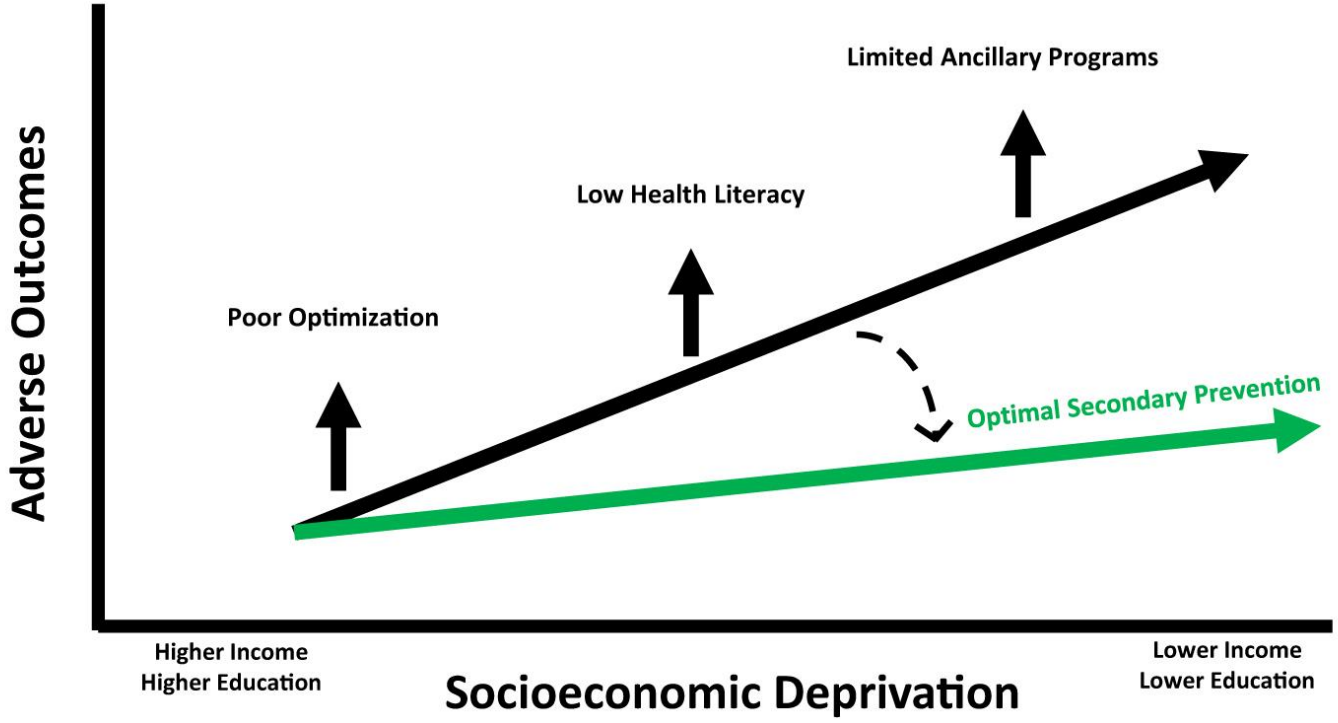
Amputation rates are ↑ in people with ↓  than people with ↑ 

Geographic distance is highly correlated with amputation rates.

McDermott MM, Ho KJ, Alabi O, et al. Disparities in Diagnosis, Treatment, and Outcomes of Peripheral Artery Disease: JACC Scientific Statement. *Journal of the American College of Cardiology.* 2023;82(24):2312-2328.

Social Deprivation and PAD

Secondary Prevention of PAD:
Relationship Between Adverse Outcomes and Socioeconomic Deprivation



Populations of low socioeconomic status appear to be at increased risk for the development of peripheral artery disease

Increased prevalence of cardiovascular risk factors (eg, cigarette smoking) and decreased access to care.

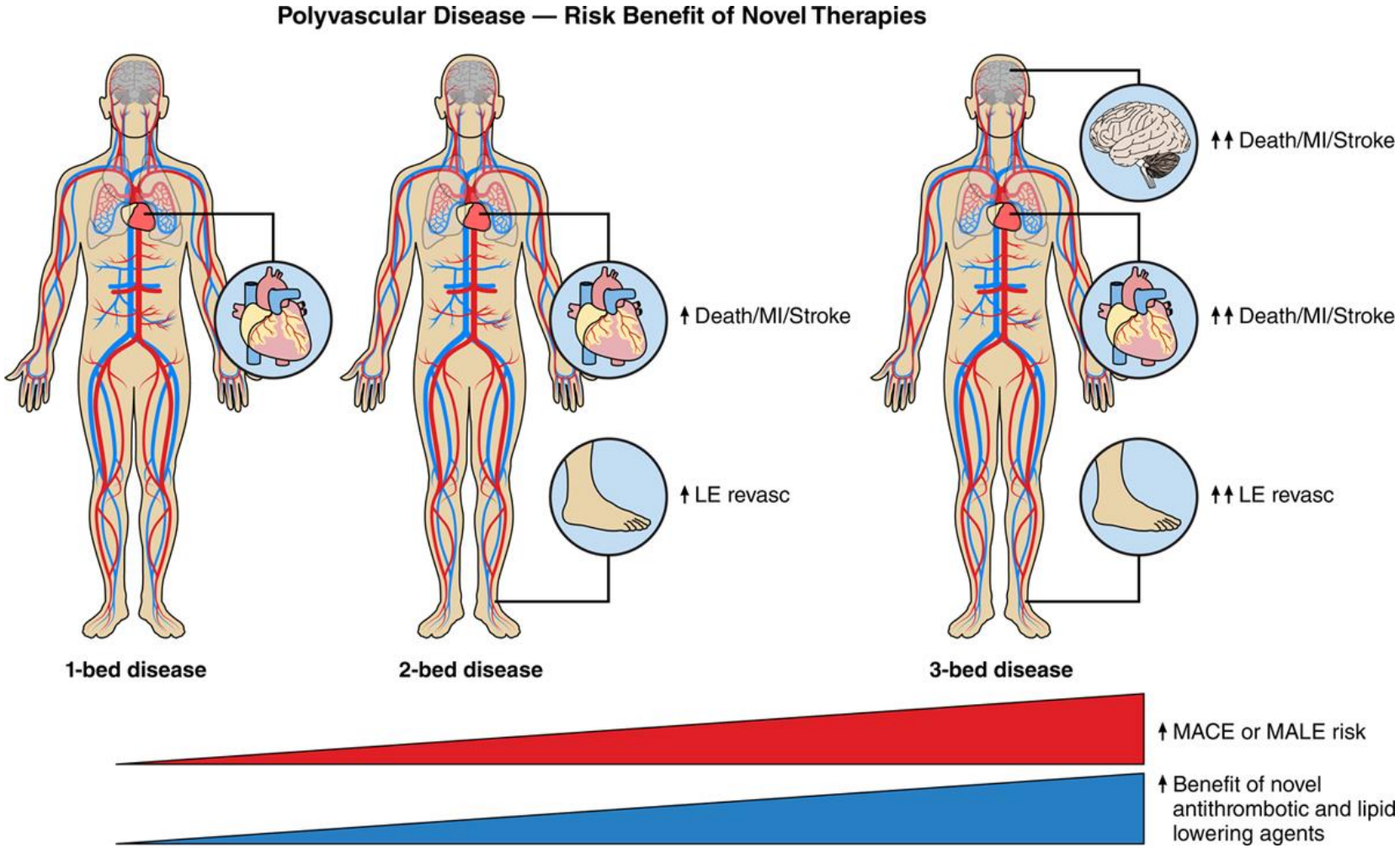
Nash D, McClure G, Mastracci TM, Anand SS. Social deprivation and peripheral artery disease. *Canadian Journal of Cardiology.* 2022;38(5):612-622.

Overcoming Disparities and Inequities

- Racial disparities are present in PAD and under-researched
- Noted “barriers” are complex and larger than a clinical solution alone
- Intentional recruitment (over sampling) of minoritized populations
- Inclusion of racial demographics (and between group differences) in data reporting
- Leverage implementation science to identify and address both clinical and patient related barriers to care
- Move *outside* of the clinic for solutions (explore other fields)

Allison MA, Armstrong DG, Goodney PP, Hamburg NM, Kirksey L, Lancaster KJ, et al. Health Disparities in Peripheral Artery Disease: A Scientific Statement From the American Heart Association. Circulation. 2023.

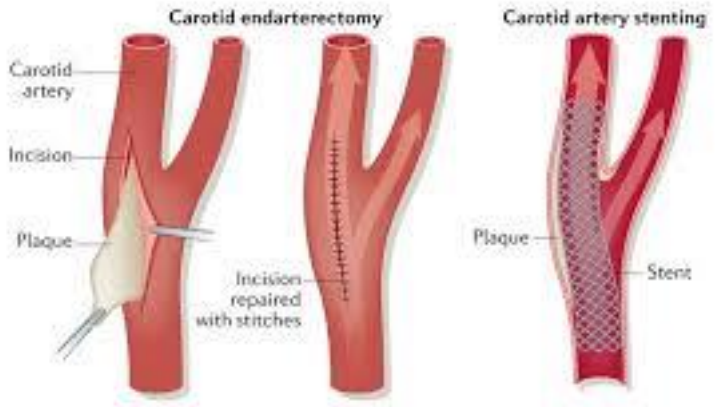
The Implications of (Poly)Vascular Disease



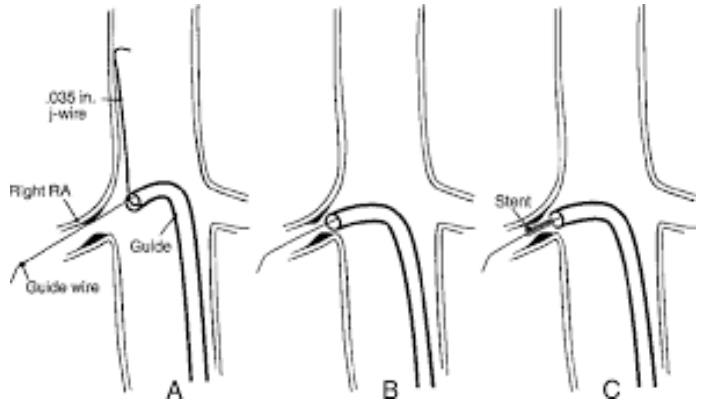
Gutierrez JA et al. Circulation: Cardiovascular Interventions 2019.

Landscape of PAD Therapies

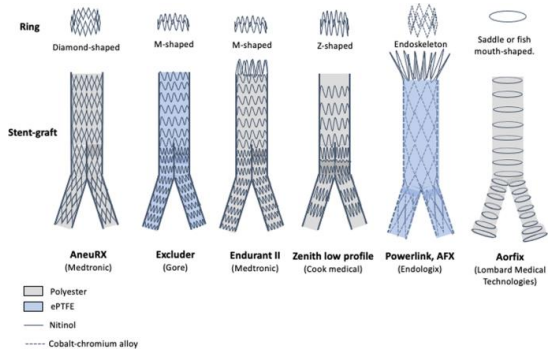
Carotid Revascularization



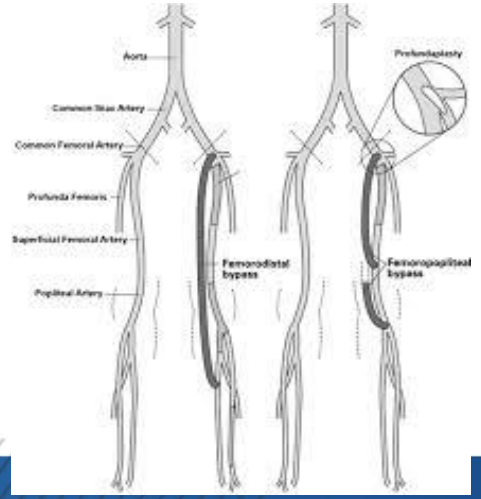
Renal Artery Stenting



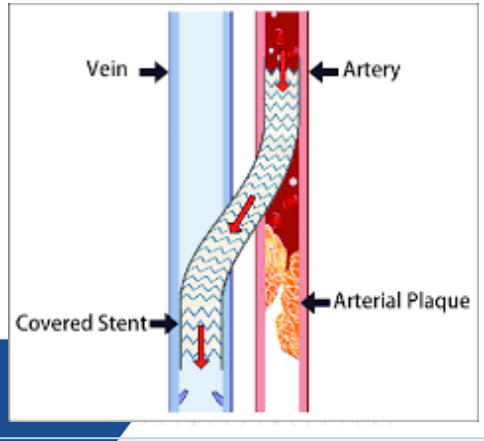
EVAR



LE Bypass Surgery



Deep Vein Arterialization



Disparities in Outcomes Post-LE Bypass

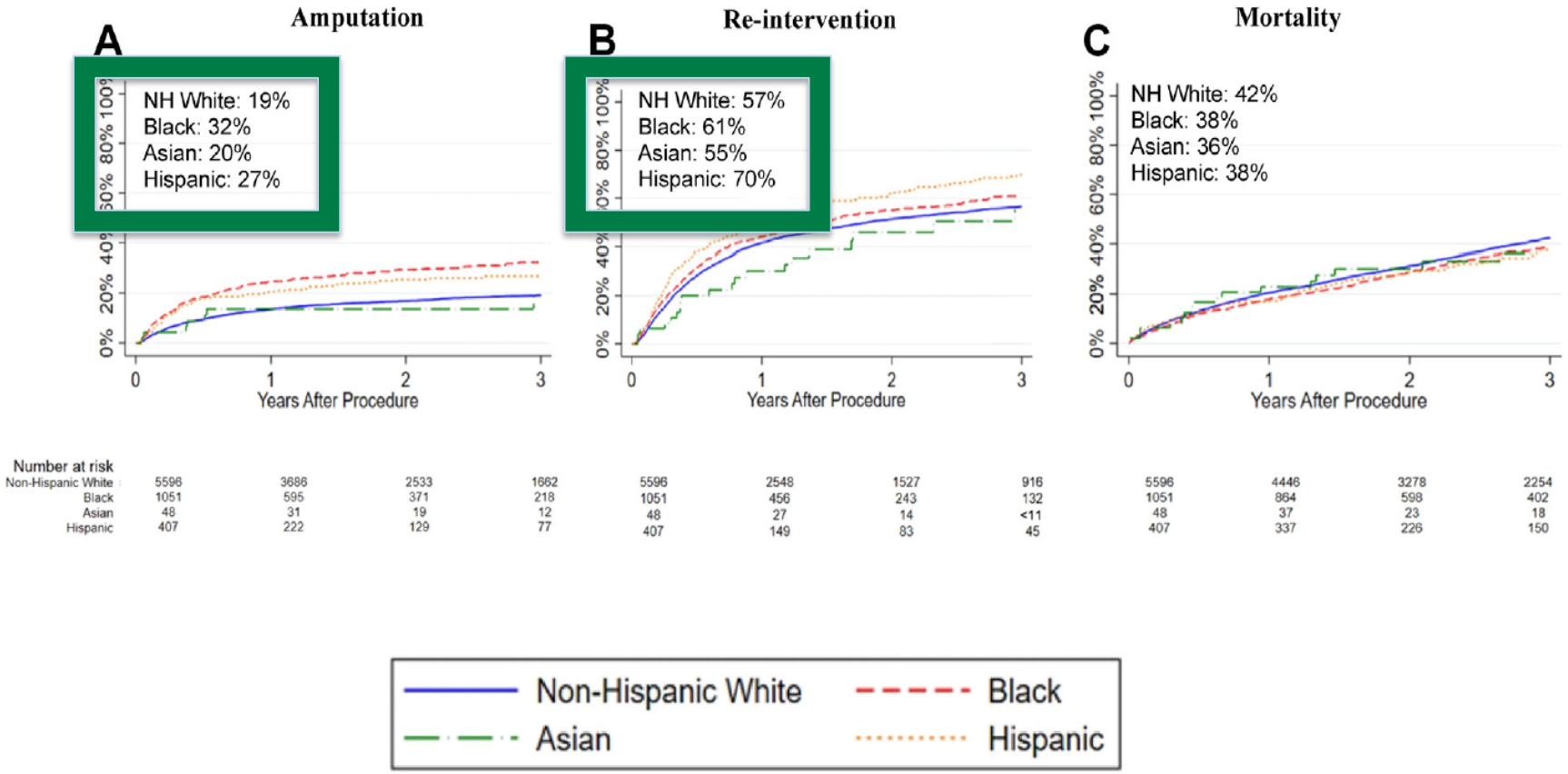


Fig. Kaplan-Meier estimates for 3-year amputation **(A)**, reintervention **(B)**, and mortality **(C)** after open infrainguinal bypass stratified by race/ethnicity. All standard errors are <10%.

Hazard Ratio of MALE higher for Black patients (HR, 1.3; 95% CI, 1.2-1.4) and Hispanic patients (HR, 1.5; 95% CI, 1.3-1.7)

Regional Variation in Health Disparities

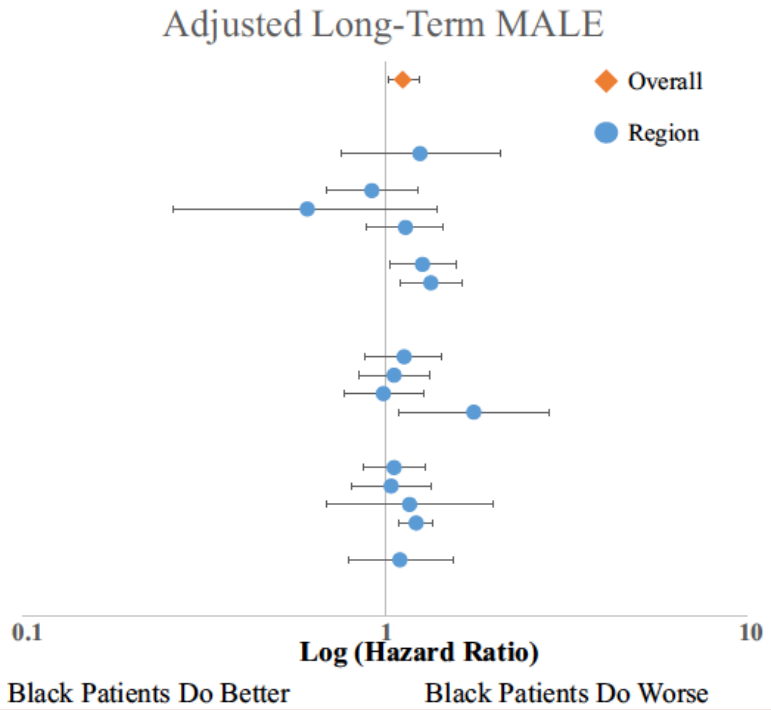


Fig 5. Forest plot of the hazard ratios (HRs) for the adjusted long-term major adverse limb event (*MALE*) risk for black patients compared with white patients by region. The *top line* is the overall cohort; each subsequent line represents an individual region. No significant difference across regions.

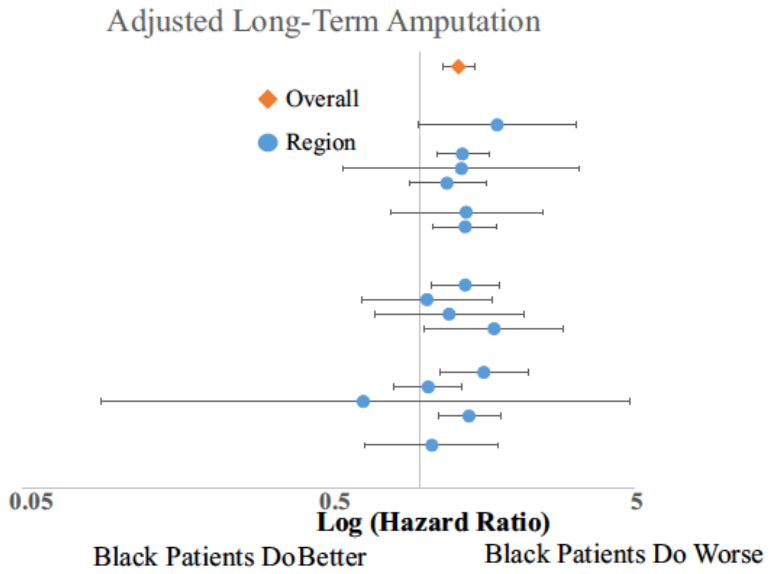


Fig 6. Forest plot of the hazard ratios (HRs) for the adjusted long-term amputation risk for black patients compared with white patients by region. The *top line* is the overall cohort; each subsequent line represents an individual region. No significant difference across regions.

O'Donnell et al. JVS 2017.

Heterogeneity in Practice

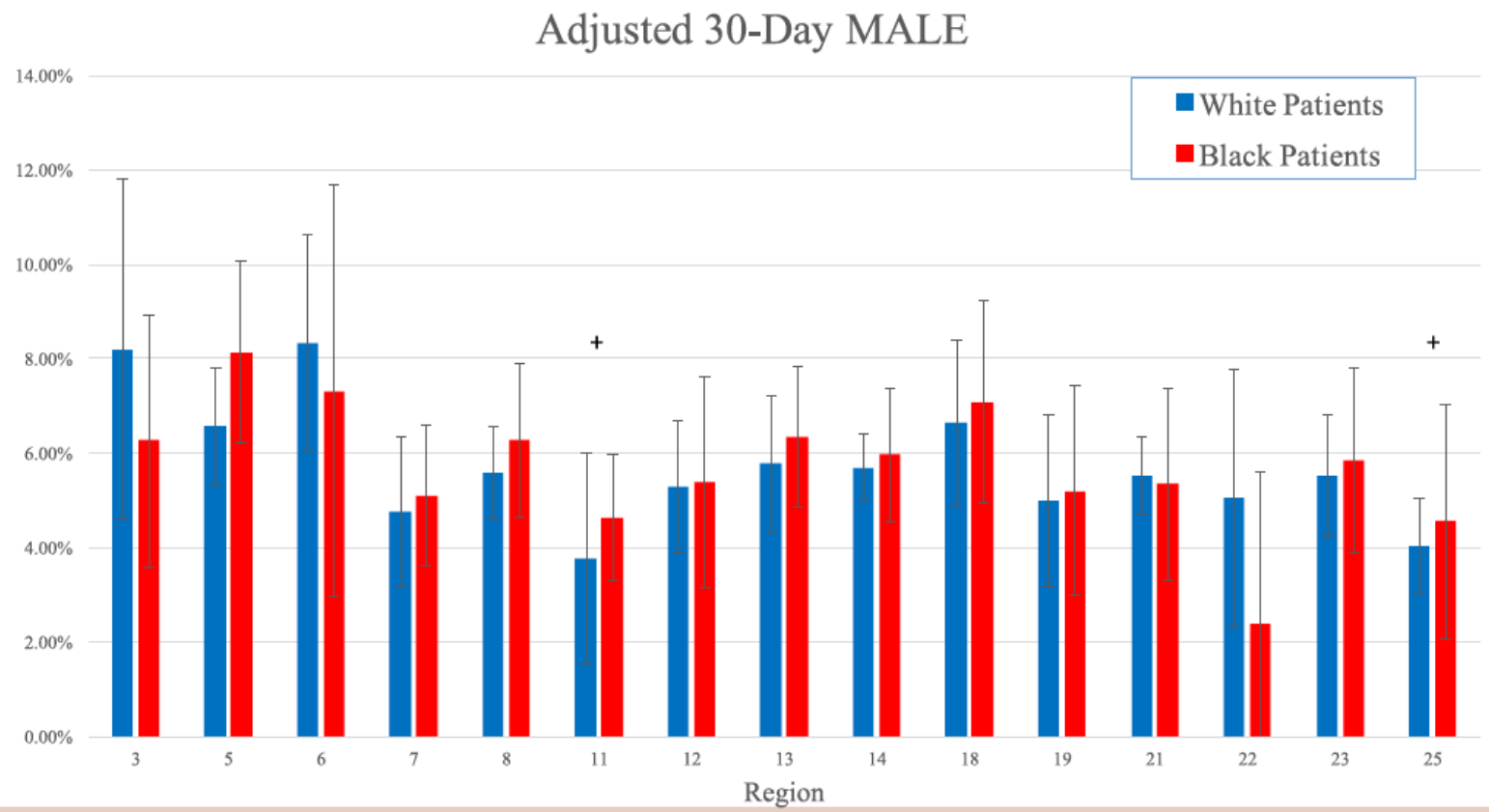


Fig 2. Adjusted 30-day rates of major adverse limb event (*MALE*) by region in black and white patients. $^{*}P < .05$ for black patients compared with white patients. $^{+}P < .05$ for white patients in that region compared with white patients in other regions. $^{x}P < .05$ for black patients in that region compared with black patients in other regions.

O'Donnell et al. JVS 2017.

Differences in Comorbidities Explain Black–White Disparities in Outcomes After Femoropopliteal Endovascular Intervention

Anna K. Krawisz, MD; Sahana Natesan, BS; Rishi K. Wadhera, MD; Siyan Chen, MSc; Yang Song, MSc; Robert W. Yeh, MD; Michael R. Jaff, DO; Jay Giri, MD; Howard Julien, MD; Eric A. Secemsky, MD

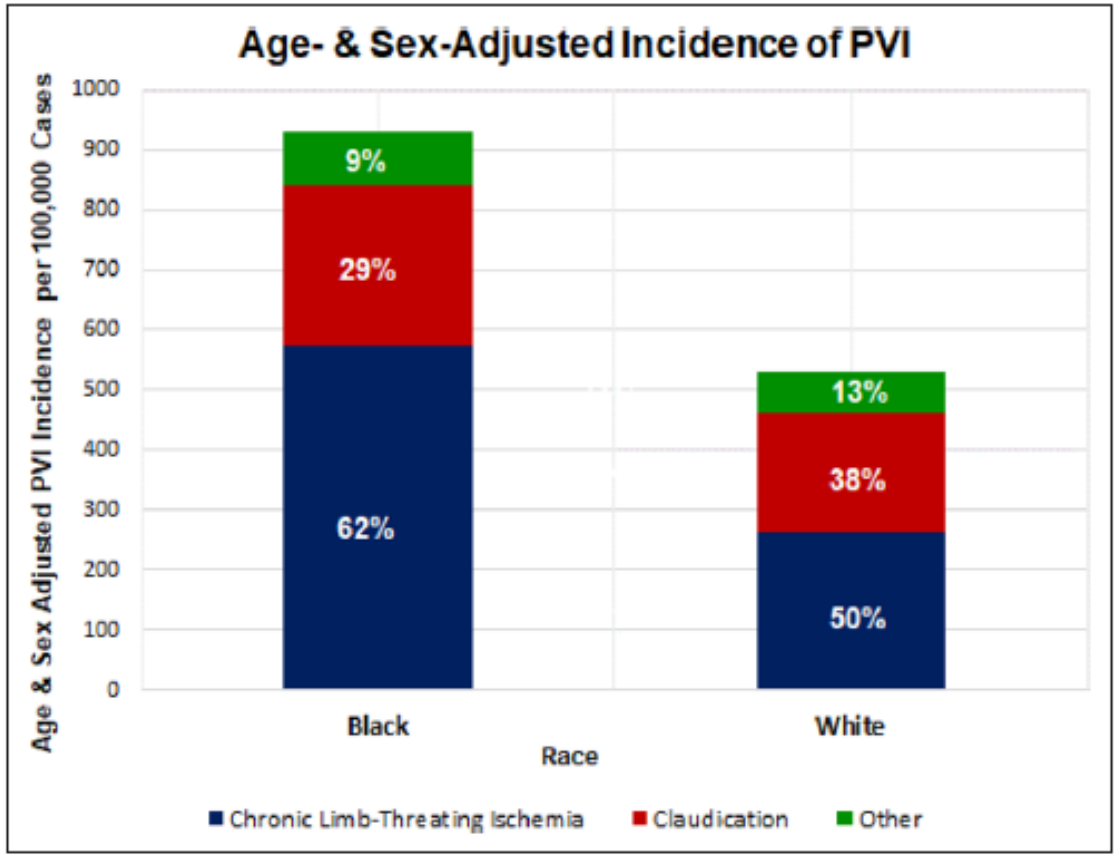


Figure 1. Age- and sex-adjusted population-level incidence of PVI in Black and White Medicare beneficiaries from 2016 to 2018. Black adults have a higher incidence of peripheral endovascular intervention (PVI) than White adults from 2016 to 2018. Black beneficiaries underwent 928 PVIs per 100 000 Black beneficiaries compared with 530 PVIs per 100 000 White beneficiaries over the 3-year study period (risk ratio, 1.75 for Black vs White [95% CI, 1.73–1.77]; $P<0.01$).

Should Location Matter?

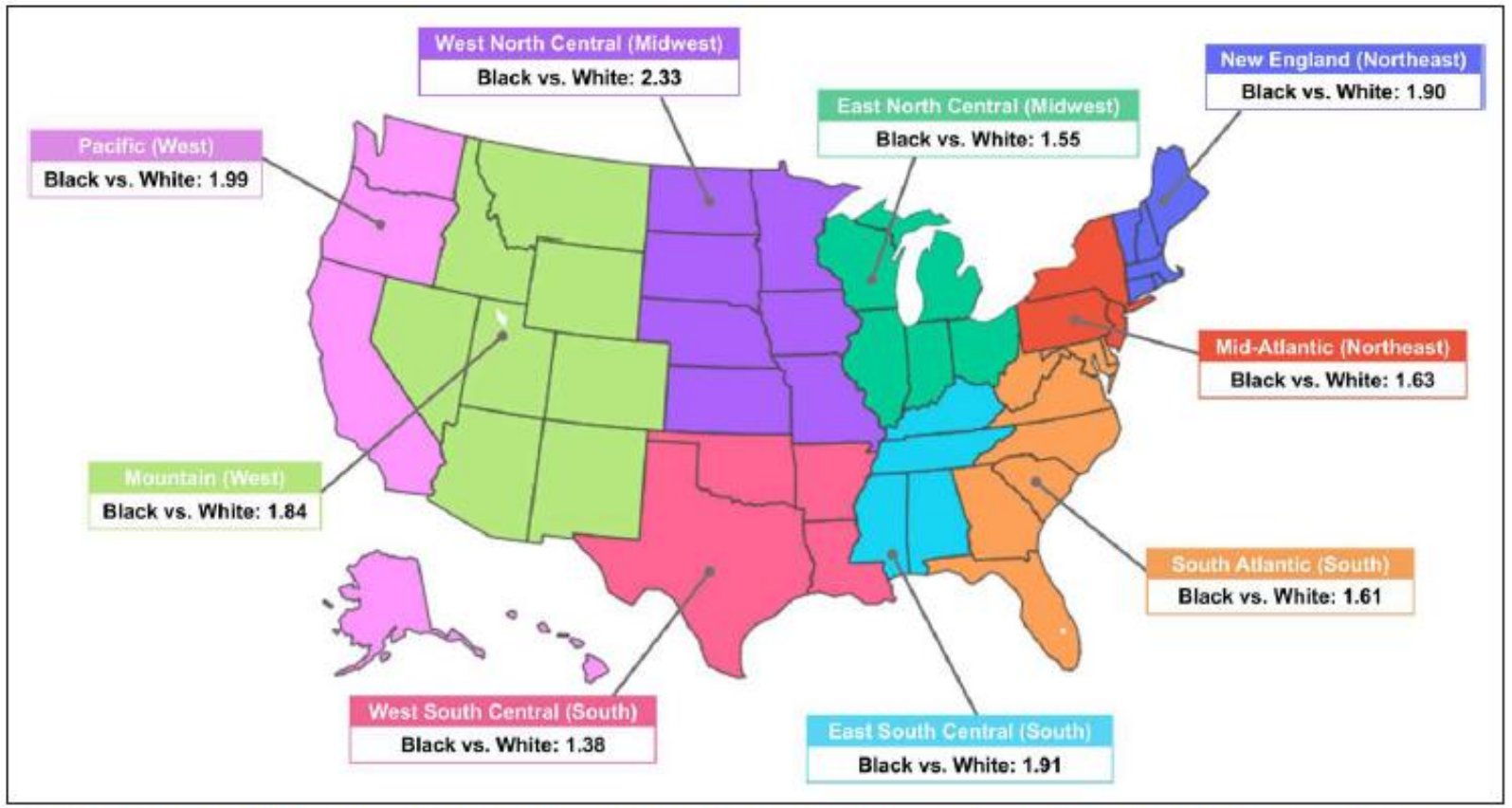


Figure 2. Relative risk of undergoing PVI in Black and White Medicare beneficiaries from 2016 to 2018 divided by census regions of the United States.

Black adults are more likely to undergo peripheral endovascular intervention (PVI) in all regions of the United States. There is a statistically significant difference in PVI incidence between Black and White adults in every census region (Table 1).

Krawisz AK et al. Circulation 2022.

AMERICAN COLLEGE of CARDIOLOGY

Differential Outcomes Post-PVI

Table 3. Incidence of the Composite Outcome of Death and Major Amputation Stratified by Race and Indication for PVI

Race	Age- and sex-adjusted outcome incidence	CLTI	Claudication	Other
Black, %	25.03 (24.45–25.61)	33.71 (32.89–34.53)	8.56 (7.86–9.27)	21.30 (19.49–23.10)
White, %	18.62 (18.39–18.85)	27.62 (27.23–28.01)	7.08 (6.82–7.33)	17.94 (17.29–18.59)

CLTI indicates chronic limb-threatening ischemia; and PVI, peripheral endovascular intervention.

How are we doing with GDMT?

Table 2. Rates of Prescriptions of Key Cardiovascular Medications by Race

	All race groups (n=104 699), %	Black (n=16 998), %	White (n=87 701), %	*P* value
ACE inhibitor/ARB	44.83	40.85	45.61	<0.001
ACE Inhibitor	29.74	26.20	30.42	<0.001
ARB	15.66	15.30	15.73	0.158
ARNI	0.30	0.22	0.32	0.038
Anticoagulant	15.77	11.15	16.66	<0.001
VKA	8.54	5.95	9.04	<0.001
DOAC	6.94	4.92	7.33	<0.001
Other	1.54	0.96	1.65	<0.001
Antiplatelet	47.52	44.51	48.10	<0.001
β-Blocker	52.94	50.02	53.50	<0.001
Cholesterol				
Bile acid binding	0.71	0.49	0.75	<0.001
Fibrates	4.22	1.41	4.76	<0.001
Statins	59.22	55.32	59.97	<0.00
PCSK9 inhibitors	0.40	0.14	0.34	0.005
Other	3.41	2.62	3.56	<0.001
Diabetes				
Biguanides	15.70	13.38	16.14	<0.001
DPP-4	5.53	5.99	5.43	0.003
GLP-1 agonists	1.09	0.82	1.14	<0.001
Insulin	18.51	22.17	17.80	<0.001
Meglitinides	0.61	0.62	0.60	0.823
SGLT2 inhibitor	0.97	0.71	1.02	<0.001
Sulfonylureas	11.92	10.97	12.11	<0.001
Thiazolidinediones	1.58	1.52	1.60	0.447
Other	0.16	0.18	0.16	0.593
Diuretics				
Carbonic	0.02	0.04	0.02	0.047
Loop diuretics	24.86	22.11	25.40	<0.001
Thiazides	16.60	18.81	16.17	<0.001
Potassium sparing	6.25	5.61	6.37	<0.001
MRA	0.14	0.08	0.15	0.016
Nitrates	8.16	9.67	7.86	<0.001
PDE3 inhibitor	6.68	6.55	6.71	0.438

ACE indicates angiotensin-converting enzyme; ARB, angiotensin receptor blocker; ARNI, angiotensin receptor-neprilysin inhibitor; DOAC, direct oral anticoagulants; DPP-4, dipeptidyl peptidase-4; GLP-1, glucagon-like peptide-1; MRA, mineralocorticoid receptor antagonists; PCSK9, proprotein convertase subtilisin/kexin type 9; PDE3, phosphodiesterase-3; SGLT2, sodium-glucose co-transporter-2; and VKA, vitamin K antagonist.

Krawisz AK et al. Circulation 2022.

AMERICAN COLLEGE of CARDIOLOGY

Racial and ethnic disparities in coronary, vascular, structural, and congenital heart disease

Cindy L. Grines MD, MSCAI[1] | Andrew J. Klein MD, FSCAI[2] | Holly Bauser-Heaton MD, PhD, FSCAI[3] | Mohamad Alkhouli MD, FSCAI[4] | Neelima Katukuri MD, FSCAI[5] | Varun Aggarwal MD, FSCAI[6] | S. Elissa Altin MD, FSCAI[7] | Wayne B. Batchelor MD, FSCAI[8] | James C. Blankenship MD, MSCAI[9] | Foluso Fakorede MD[10] | Beau Hawkins MD, FSCAI[11] | Gabriel A. Hernandez MD[12] | Nkechinyere Ijioma MBBS[13] | Britton Keeshan MD, MPH[14] | Jun Li MD, FSCAI[1] R. Allen Ligon MD[16] | Andres Pineda MD, FSCAI[17] | Yader Sandoval MD, FSCAI[4] | Michael N. Young MD[18]

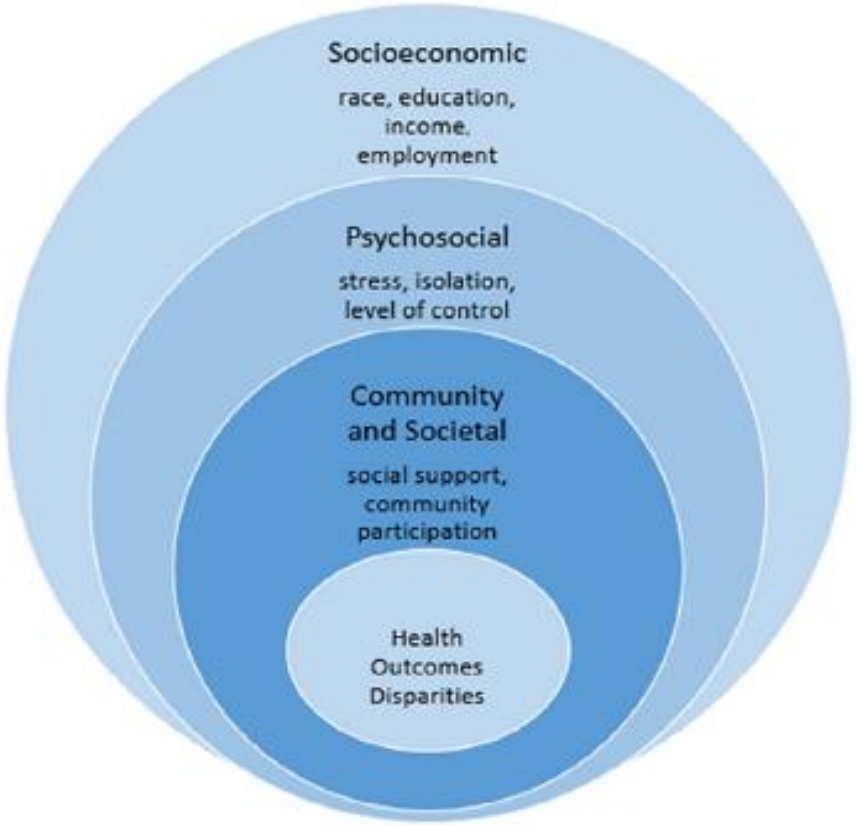


FIGURE 3 The wide breadth of the impact and origin of health care disparities

LEVELS OF CHANGE

National
Societal
Regional/State
Health System
Community
Provider

TABLE 3 Proposed multilevel strategy and tactics to address health care disparities in PAD/CLTI

Level	Proposed opportunities to address health care disparities
National	• Create policies to recruit and increase underrepresented and disadvantaged students in sciences • Mandate tax incentives for pharmaceutical companies to discount medications in low socioeconomic areas • Establish congressional awareness of healthcare disparities • Develop a congressional task force to address healthcare disparities • Create national research programs specifically addressing health disparities • Expand grants, scholarship, and loan forgiveness/repayment programs to serve vulnerable populations • Increase general public awareness of disparities in healthcare via national public health campaigns, celebrity messaging, and society coalition building • Mandate public reporting of hospital amputation rates • Determine and share publicly all social risk factors of health, cultural, and community competence in practice and disparities of care via by use of AHRQ NHDR-NHQR reports • Mandate EMR companies offer freely QA/QI tools to promote standardized care and documentation for CLTI • Mandate all medical school curricula include health disparity education
Professional society	• Promote a diverse CV healthcare workforce throughout all appointments and committees • Engage providers who understand and meet individual patient needs as leaders for improving racial and socioeconomic disparities • Utilize "prime time" slots during annual conferences to highlight disparities in multidisciplinary presentations • Produce clinical documents that acknowledge that minorities have been underrepresented in CV trials • Define standards of care, evidenced-based guidelines, quality of wound-care, optimal medical therapy, affordable and appropriate revascularization in all at-risk populations for national use • Develop Cath lab proficiency tools and online training to identify institutional gaps in PAD-CLTI care • Define the CLTI care team to aid hospitals and ensure they each have one • Create a PAD awareness campaign among all providers and promote patient-centered PAD educational programs for all populations • Educate patients and providers on the basics of PAD, available treatment options, and how/when to seek a second opinion and how it progresses to CLTI if preventative steps are not initiated • Establish partnerships with industry to target vulnerable populations with CLTI • Develop a PAD educational culturally sensitive population specific media platforms that can be used by members in their own community (available in a multitude of languages) • Develop bylaws to ensure BOT members include those from diverse backgrounds • Establish programs that reach out to other key societies involved in CLTI care including wound care, PCPs, diabetologists, nephrologists, and so forth.
Regional/state	• Determine and share current state of care/provider at the state and county level by local and state governments (are there enough providers to provide care?) • Improve access to quality care in areas lacking specialties or resources • Develop regional expertise in CLTI to build MDT teams • State incentives (e.g., loan forgiveness programs) to prompt providers to work in rural and underserved areas • Designate referral centers and centers of excellence in CLTI to permit centralization of advanced care and incentives to refer to such centers from smaller centers (tax benefits) • Focus on recruitment and retention of minorities into interventional cardiology with a focus on PAD and providing care to rural/underserved areas • Address social determinants of health into algorithm and sustainable community-based strategies that demonstrate effectiveness
Healthcare system	• Mandate a multidisciplinary CLTI care team with support for a CLTI limb salvage program • Support and incentivize physicians and non-physicians (including diabetes educators, nurses, wound care, pharmacist, and community navigators) to adequately address the relationship between patient demographics, risk factors, lifestyle, medications, and patients' education • Identify and screen all at-risk patients by developing EMR tools • Review and disseminate all QA/QI initiatives and outcomes with respect to race
Community	• Fund community and faith-based health driven initiatives within the marginalized communities. • Develop PAD/CLTI screening events • Establish partnerships between local respected leaders of underserved and vulnerable populations and health care providers dedicated to CLTI care
Provider	• Recognize disparities exist in all healthcare systems and practices • Attend professional development courses/lectures on healthcare disparities and those designed toward team building that enhance the CLTI team development • Examine our practices for disparities in care, including local amputation rates by race and sex • Develop partnerships with local community leaders to raise PAD/CLTI awareness, especially leaders of vulnerable populations • Volunteer your time for healthcare screenings specifically for vulnerable populations • Commit to making a difference to eliminate these disparities, one interaction at a time

Abbreviations: CLTI, chronic limb-threatening ischemia; PAD, peripheral artery disease.

Grines CL et al. Catheter Cardiovasc Interv 2021

PAD Awareness Month

American Heart Association.

Peripheral Artery Disease Symptom Checker

What is PAD? Peripheral artery disease (PAD) usually occurs when peripheral arteries that carry blood from the heart to other parts of the body narrow due to a buildup of fatty plaque deposits.

Why is it important? PAD increases your risk for serious health problems such as heart attack and stroke. PAD can also lead to leg or foot amputation.

Risk Factors for PAD:

- ☐ Do you have a family history of PAD?
- ☐ Do you have diabetes?
- ☐ Do you have chronic kidney disease?
- ☐ Do you have high blood pressure?
- ☐ Do you have high cholesterol?
- ☐ Do you smoke or have you in the past?

Check symptoms that apply to you, noting the frequency.
Then bring this tracker to your next appointment to review with your doctor.

Weakness, heaviness, pain, cramping, numbness or tingling in the leg/calf muscles, especially during walking and other activities	○ Never	○ Occasionally	○ Often	○ Always
Leg pain that disturbs sleep	○ Never	○ Occasionally	○ Often	○ Always
Sores or wounds on toes, feet or legs that heal slowly or not at all	○ Never	○ Occasionally	○ Often	○ Always
Toes or feet look pale, discolored, darkened, black or bluish	○ Never	○ Occasionally	○ Often	○ Always

Have you experienced a decrease in walking distance?
○ Yes ○ No

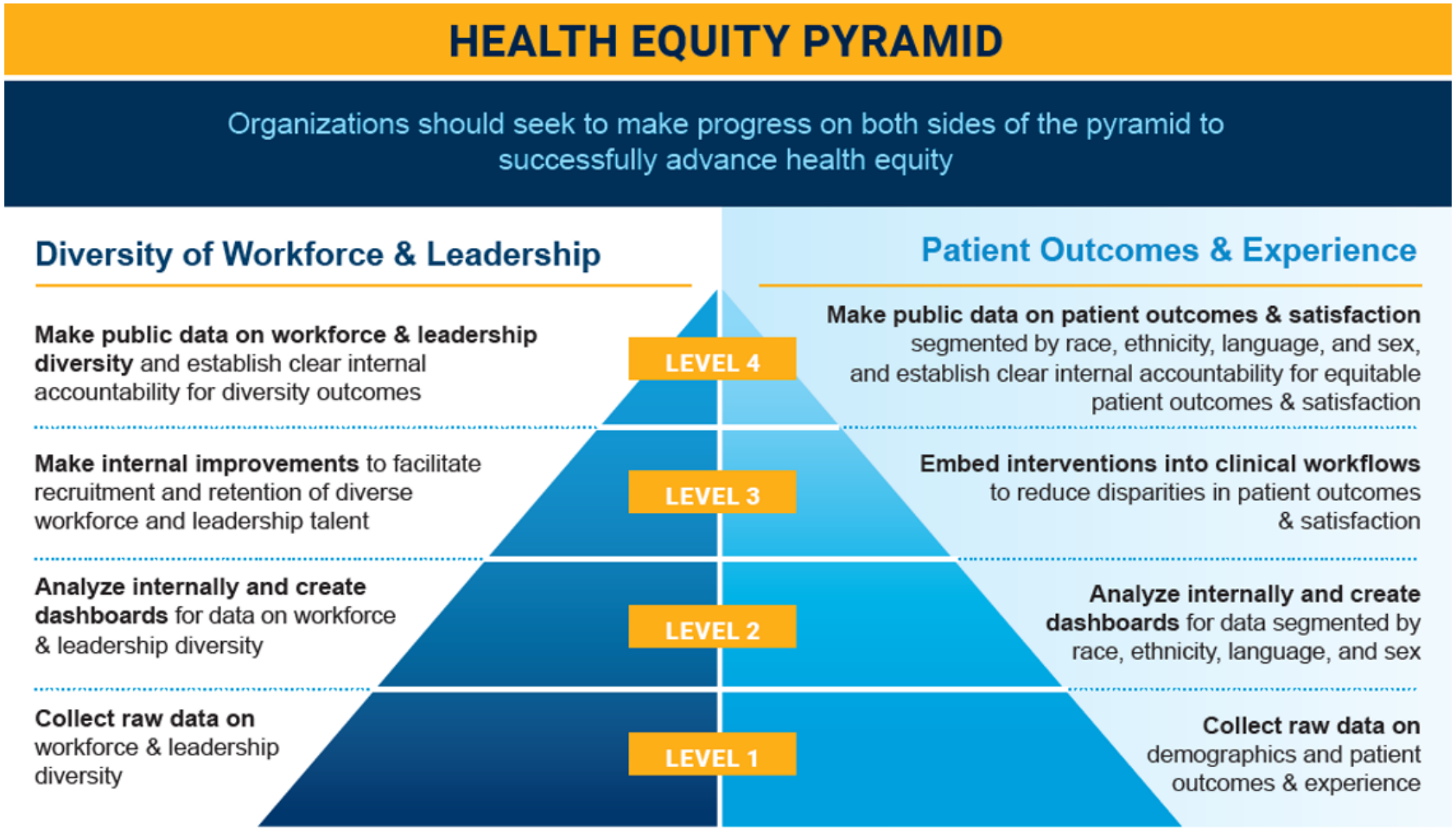
Have you noticed poor nail growth and decreased hair growth on the toes and legs over time?
○ Yes ○ No

Does one leg or foot regularly feel colder than the other?
○ Yes ○ No

It's important to note these symptoms to get an accurate diagnosis and to talk to your health care professional about managing them. You also may have to see a vascular specialist.

For more information about peripheral artery disease, go to heart.org/PAD.

Roadmap for CEOs



Takeaways for Impacting Change

- Be cognizant of the inherent differences in how patients may be diagnosed and treated based on ethnicity
- Align on a common goal -> the patient
- Improve enrollment of diverse populations in pivotal clinical trials
- Advocate to local, state, and national governance to address systemic health disparities through funding

Q&A

VISION

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

AMERICAN COLLEGE of CARDIOLOGY

Thank You

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

ACC CardioSmart PAD Resources

https://www.cardiosmart.org/topics/peripheral-artery-disease

Upcoming Webinar

“Understanding the Role of Community Engagement in CV Care”

Nov 2024; 7pm

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