Disparities in Cardiovascular Care

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Objectives

- Increase awareness about the influence of social factors on the incidence, treatment, and outcomes of CVD and PAD
- Discuss the diabetes epidemic in Native Americans-the most common cause of PAD
- Summarize the current state of knowledge about these factors
- Suggest future directions to attenuate or eliminate these adverse influences in order to decrease the burden of CVD and PAD in ethnic minority patients

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What is health?

"Health is a state of complete physical, social and mental well-being, and not merely the absence of disease or infirmity."

World Health Organization 1948

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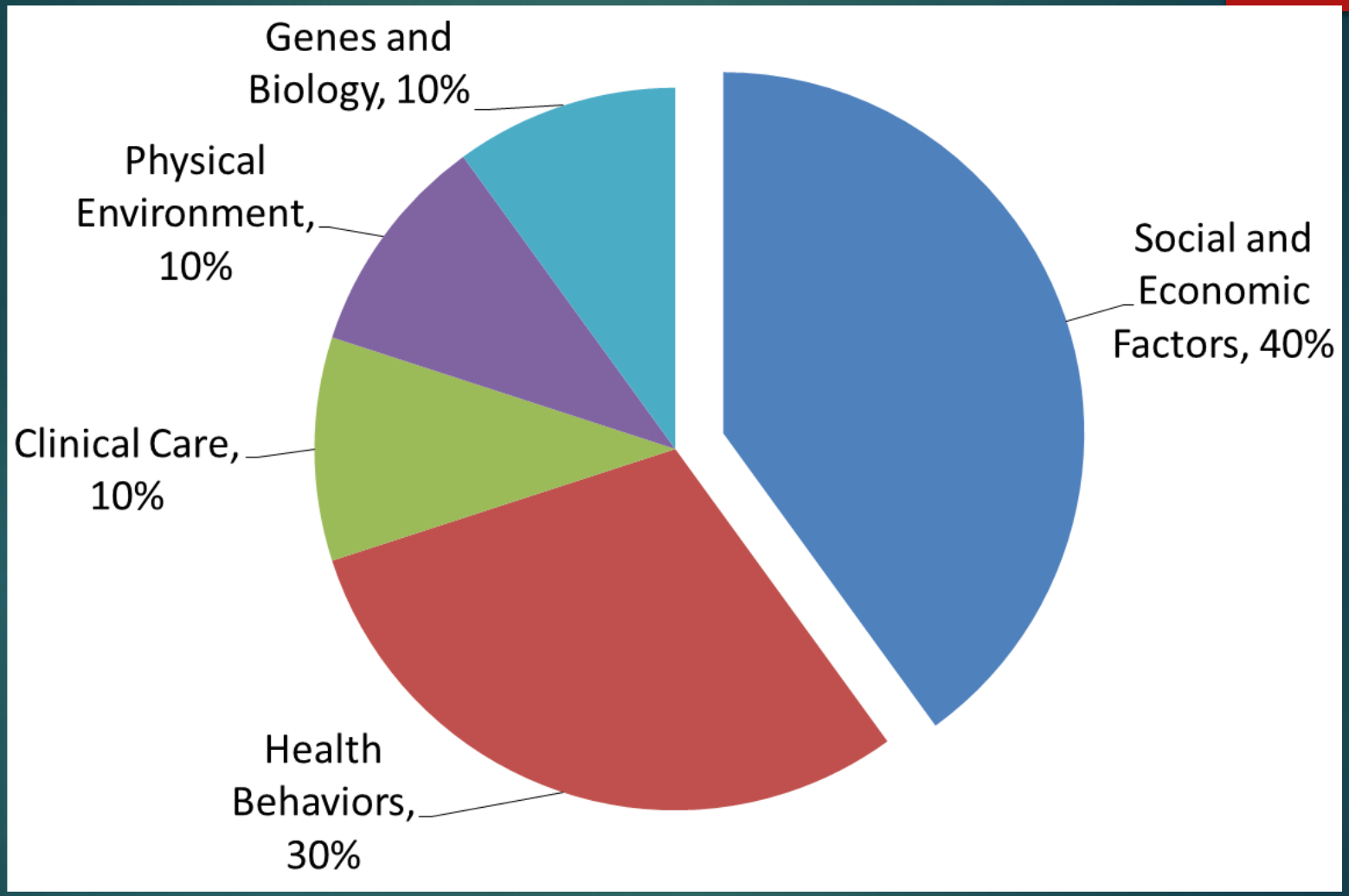
Factors that determine health



Tarlov AR. Public policy frameworks for improving population health. *Ann N Y Acad Sci* 1999; 896: 281-93.

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Necessary conditions for health

- Peace
- Shelter
- Education
- Food
- Income
- Stable eco-system
- Sustainable resources
- Social justice and equity

World Health Organization. Ottawa charter for health promotion. International Conference on Health Promotion: The Move Towards a New Public Health, November 17-21, 1986 Ottawa, Ontario, Canada, 1986. Accessed July 12, 2002 at <http://www.who.int/hpr/archive/docs/ottawa.html>.

Social Determinants of Health

Economic Stability	Neighborhood and Physical Environment	Education	Food	Community and Social Context	Health Care System
Employment	Housing	Literacy	Hunger	Social Integration	Health Coverage
Income	Transportation	Language	Access to Healthy Options	Support Systems	Provider Availability
Expenses	Safety	Early Childhood Education		Community Engagement	Provide Linguistic and Cultural Competency
Debt	Parks	Vocational Training		Discrimination	
Medical Bills	Playgrounds	Higher Education		Stress	Quality of Care
Support	Walkability				
	Zip Code/ Geography				

HEALTH OUTCOMES
Mortality, Morbidity, Life Expectancy, Health Care Expenditures, Health Status, Functional Limitations

Reproduced from Artiga S, Hinton E. Beyond Health Care: The Role of Social Determinants in Promoting Health and Health Equity. Kaiser Family Foundation. May 10 2018. Available at: https://www.kff.org/disparities-policy/issue-brief/beyond-health-care-the-role-of-social-determinants-in-promoting-health-and-health-equity/. Accessed May 11, 2020.

Health Equity

Attainment of the highest level of health possible for all people. Achieving health equity requires valuing everyone and avoiding inequalities, historical and contemporary injustices, and the elimination of health disparities and health care disparities

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Everyone needs:

- **Social and environmental safety in the places we live, learn, work, worship and play *(housing conditions, crime rates, school climate, social norms and attitudes, etc.)***

  and

- **Culturally-competent and appropriate services when the need arises *(access to health care, mental health care, financial assistance, etc.)***

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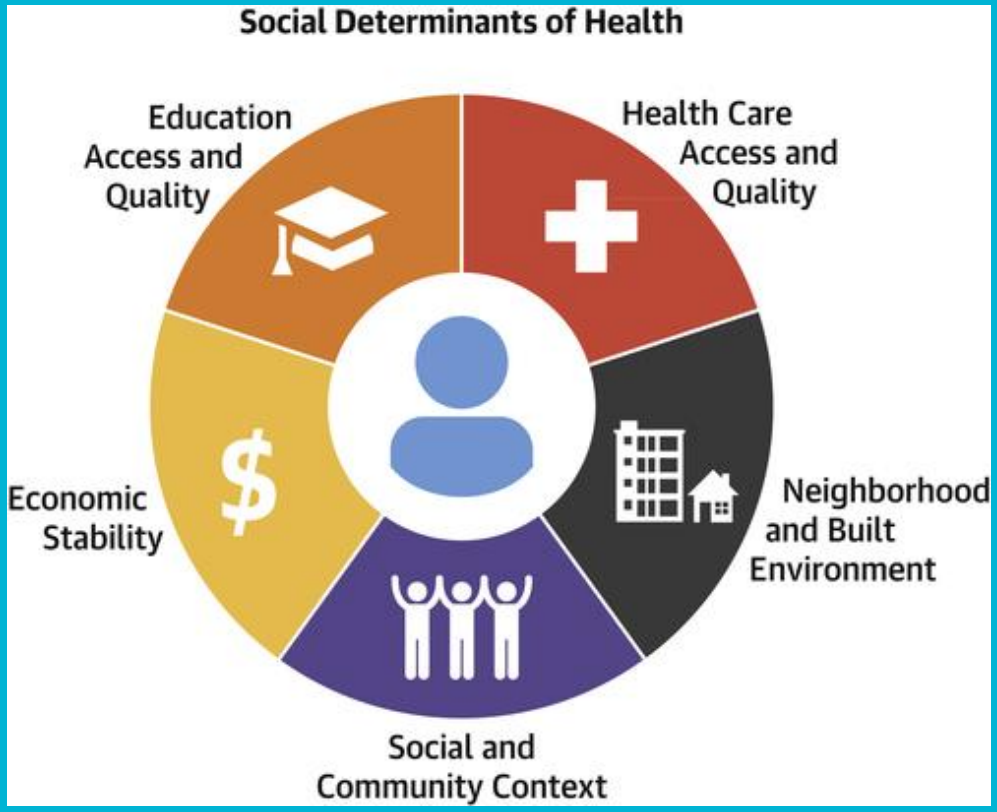
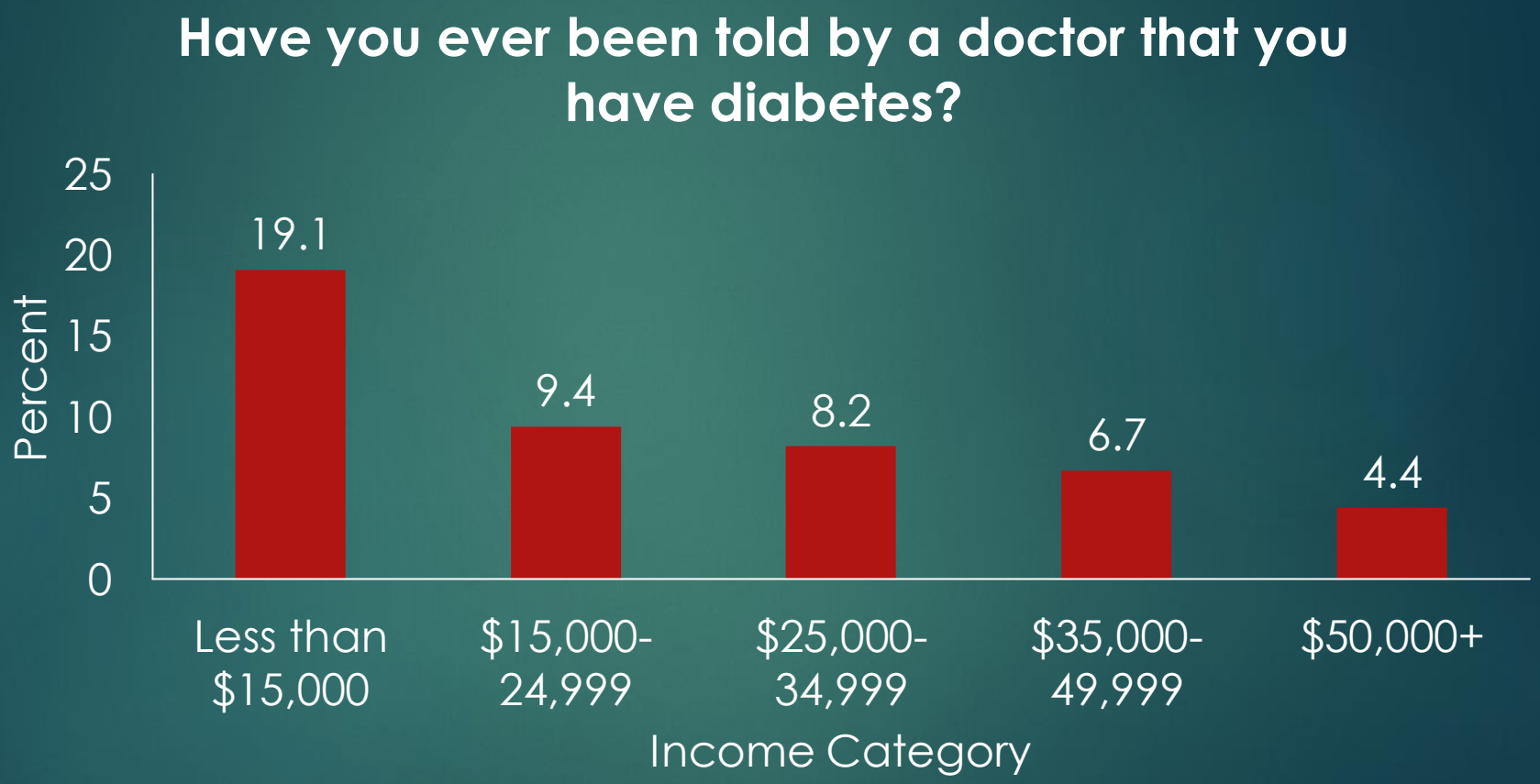


Dipti Itchhaporia et al. *J Am Coll Cardiol* 2021; 77:2613-2616.

2021 American College of Cardiology Foundation

JACC JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY

Health Inequity: Diabetes by Income Level, South Dakota 2010



Source: CDC Behavioral Risk Factor Surveillance System
Percentages are weighted to population characteristics.

The cost of health inequities

- From 2003 to 2006, the combined costs of health inequities and premature death in the US totaled $1.24 trillion
- Elimination of health disparities among racial/ethnic minorities would have reduced these costs, including direct medical care, by $ 229.4 billion

American Public Health Association; Achieving Heath Equity in the US; Nov 2018: www.apha.org

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Structural inequities

- **Structures or systems of society — such as finance, housing, transportation, education, social opportunities, etc. — that are structured in such a way that they benefit one population unfairly (whether intended or not).**

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Who's affected by structural inequities in South Dakota?

- **American Indians**
- **African Americans**
- **Persons with mental health challenges**
- **Immigrants**
- **Refugees**
- **Asian-Pacific Islanders**
- **Hispanics/Latinos**
- **Persons with disabilities**

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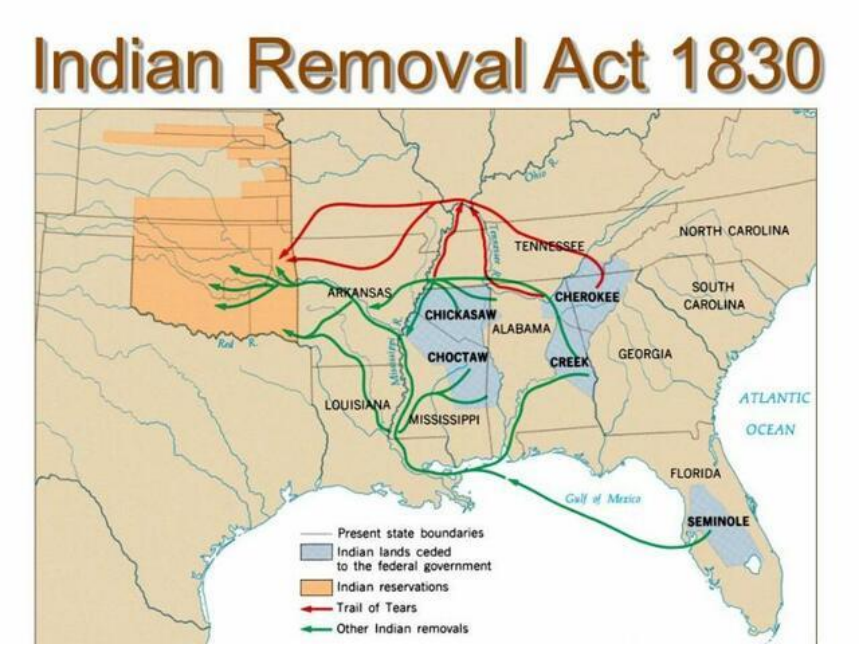
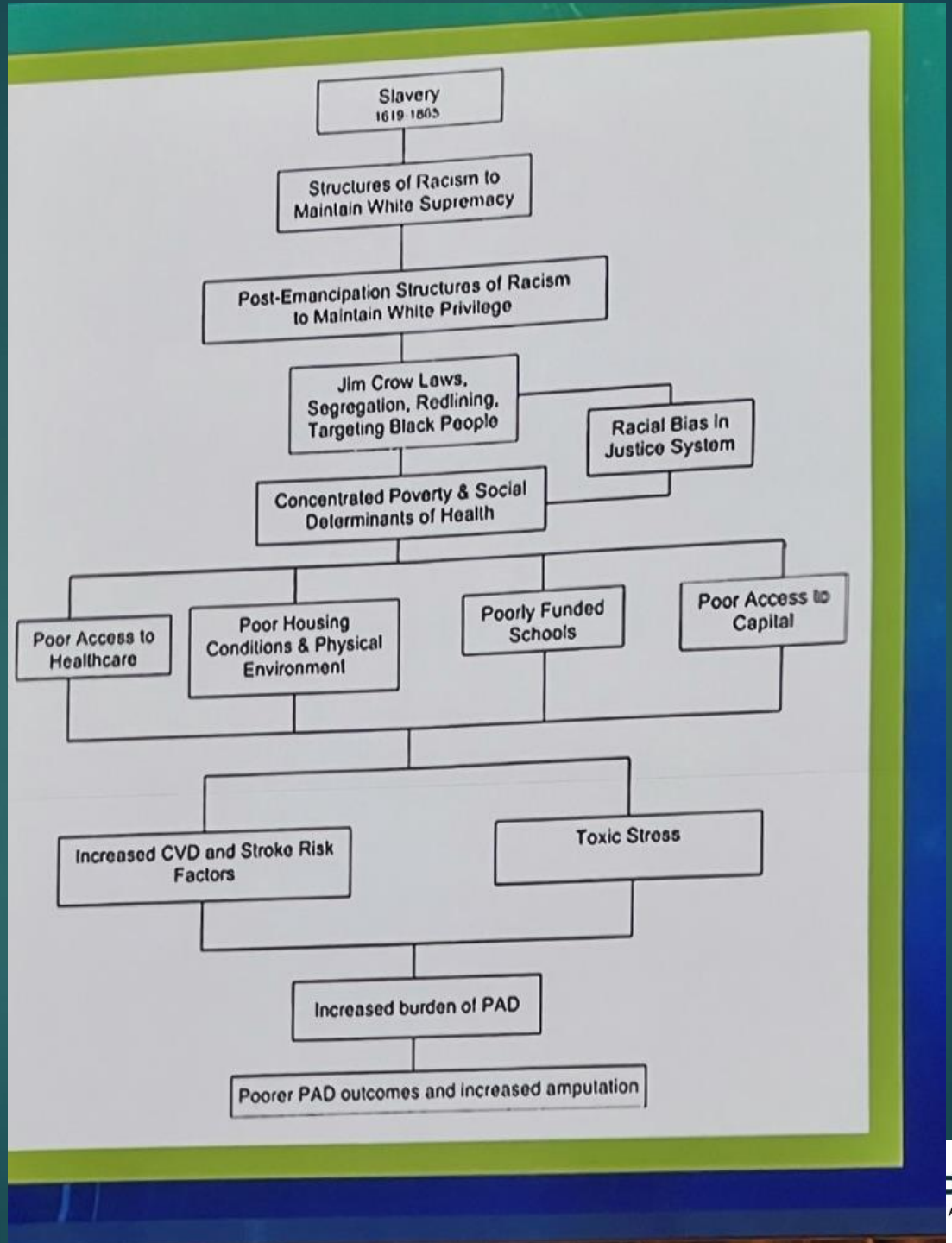
Inequity has a long, complicated history

- Race has been used as a tool for oppression and violence in the US since our beginning
  - Indian Removal Act of 1830
    - Extreme example of indigenous oppression
  - Jim Crow Laws in the 19th century
    - Occurred after the end of slavery
    - Enforced and encouraged racial segregation
    - Denied Black people basic American rights- voting, obtaining an education, owning property, getting married





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Why is inequity self perpetuating?

- Systematic or Structural elements of society that benefit one population unfairly.
  - Finance
  - Housing
  - Transportation
  - Education
  - Social Opportunities
  - ETC…

From Minnesota Department of Health Office of Health Statistics, Advancing Health Equity in Minnesota, 2014

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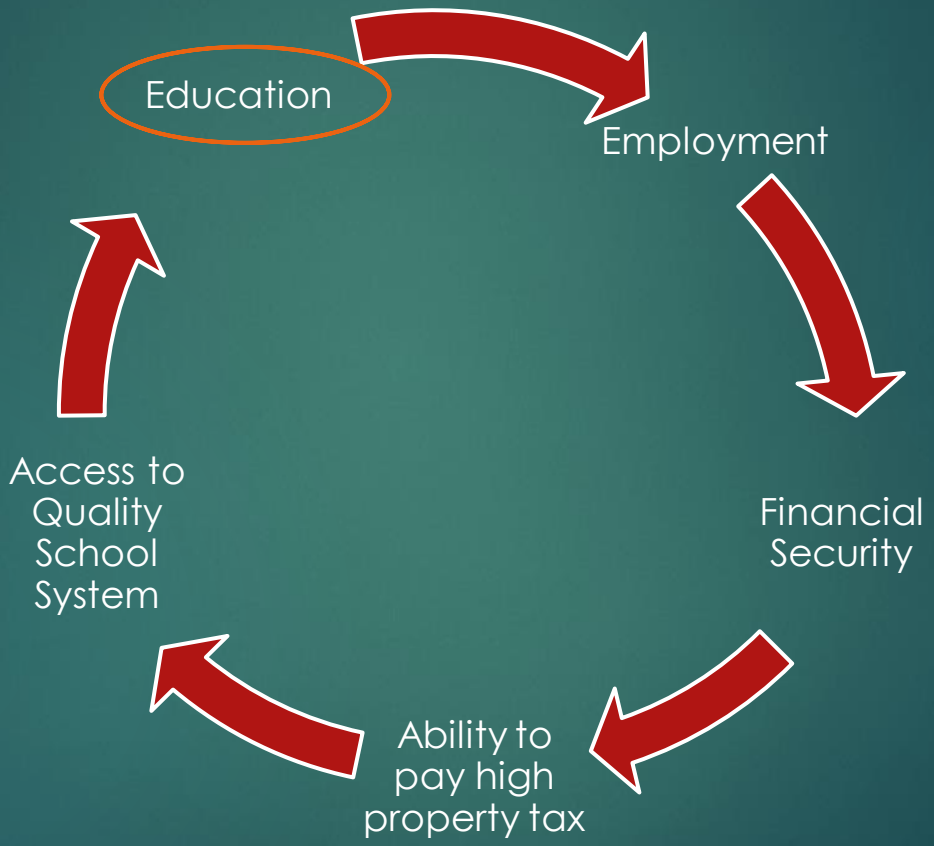
Structural Inequity



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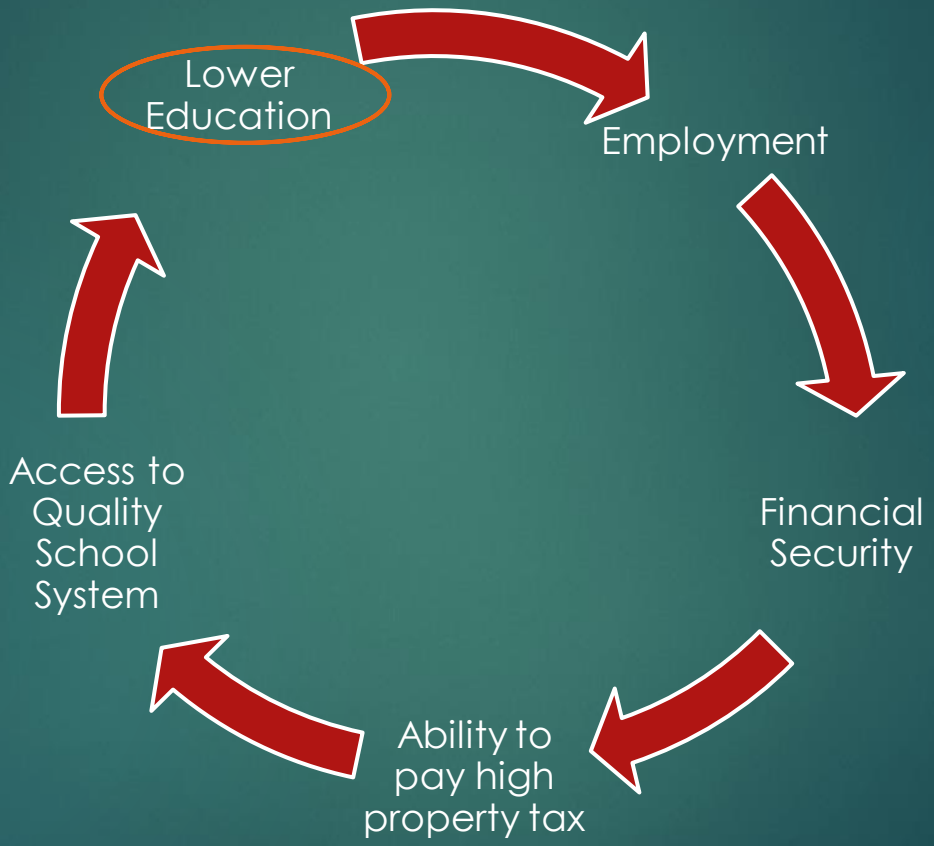
Structural Inequity



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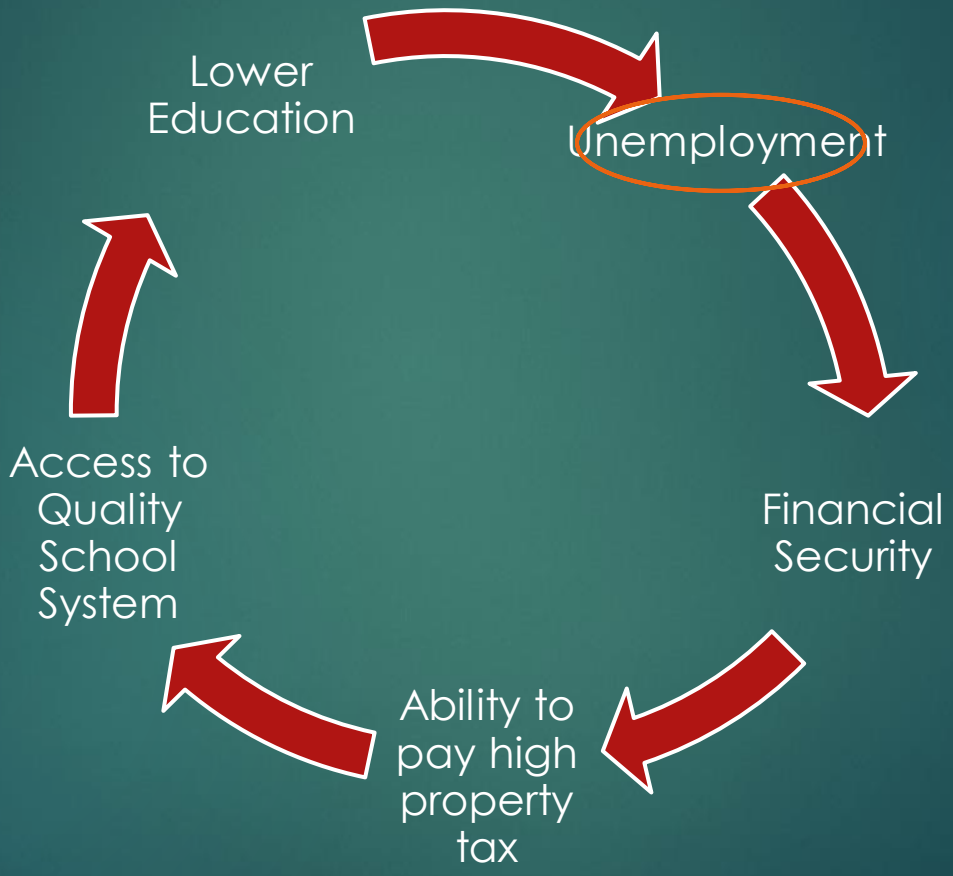
Structural Inequity



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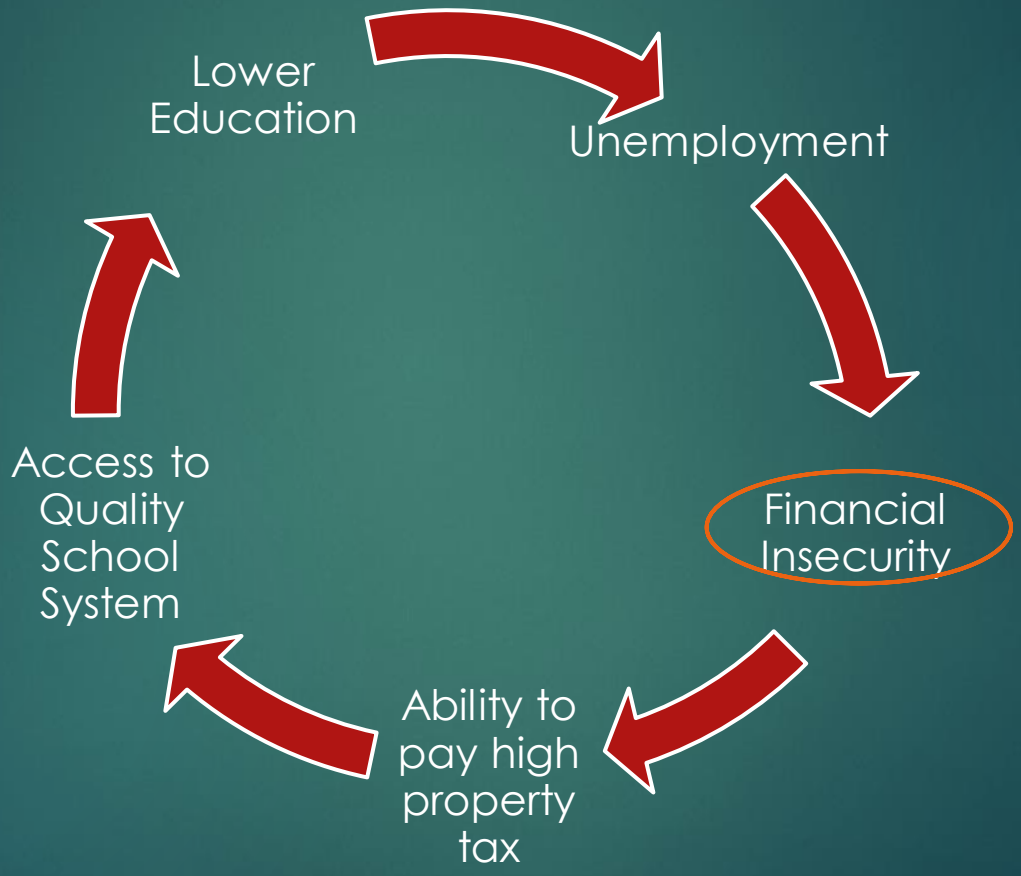
Structural Inequity



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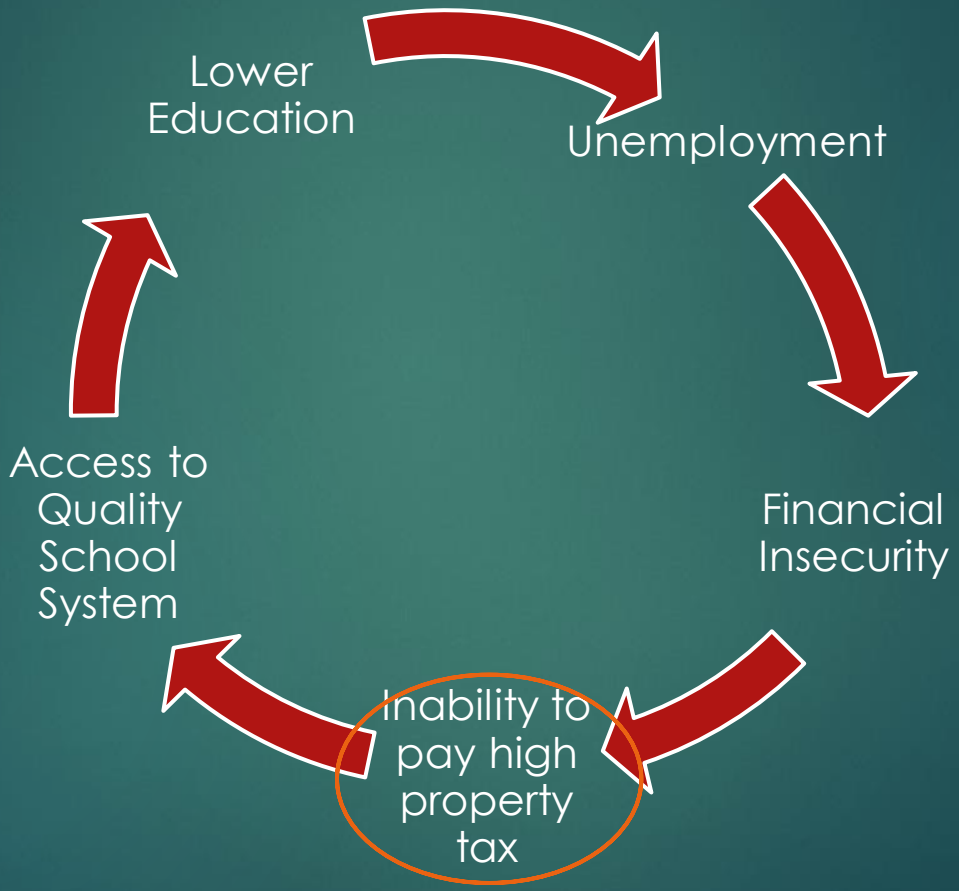
Structural Inequity



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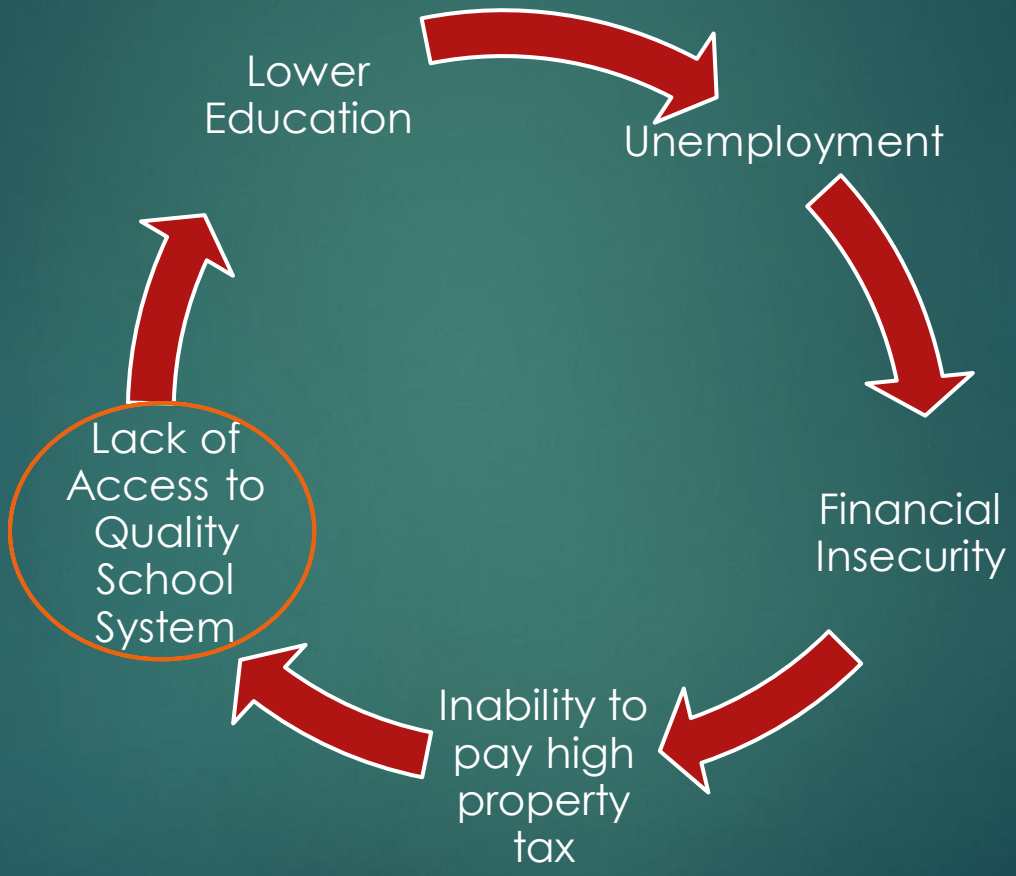
Structural Inequity



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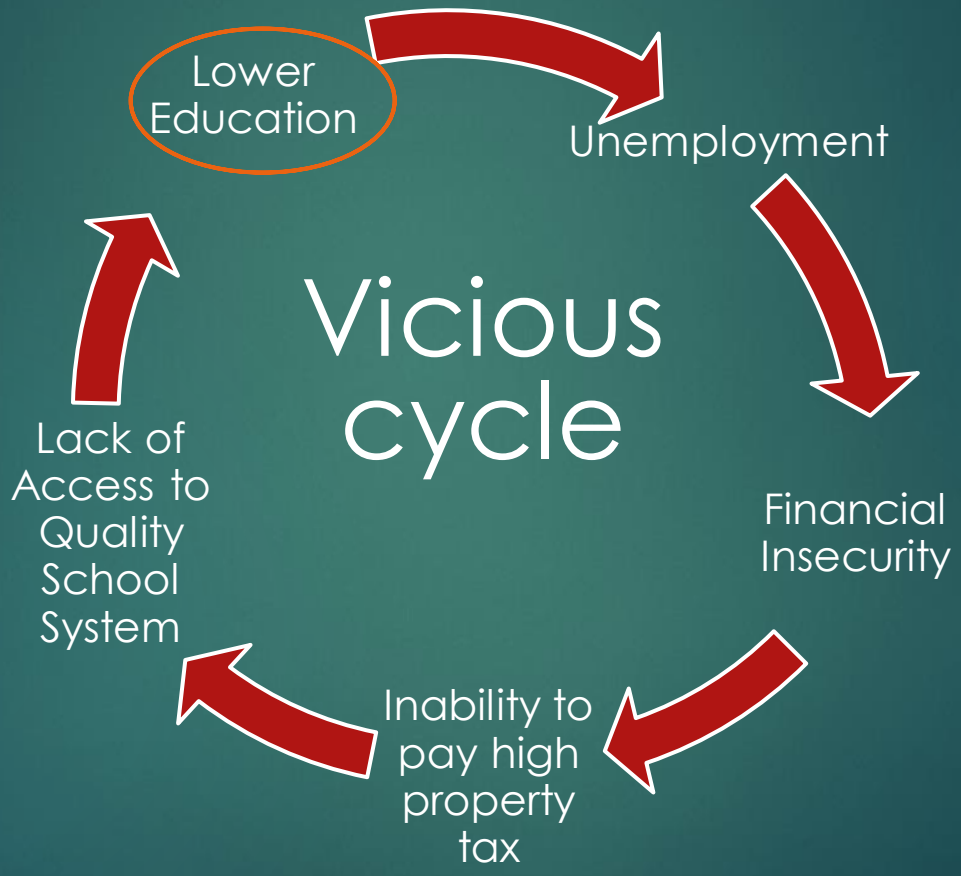
Structural Inequity



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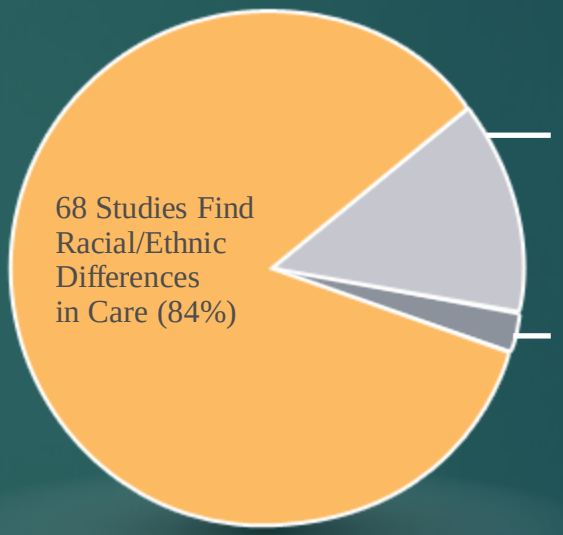
What's the Evidence?

- Disparities persist across many clinical settings and conditions
- Even after adjusting for:
  - Age
  - Health insurance
  - Socioeconomic status
  - Severity of conditions

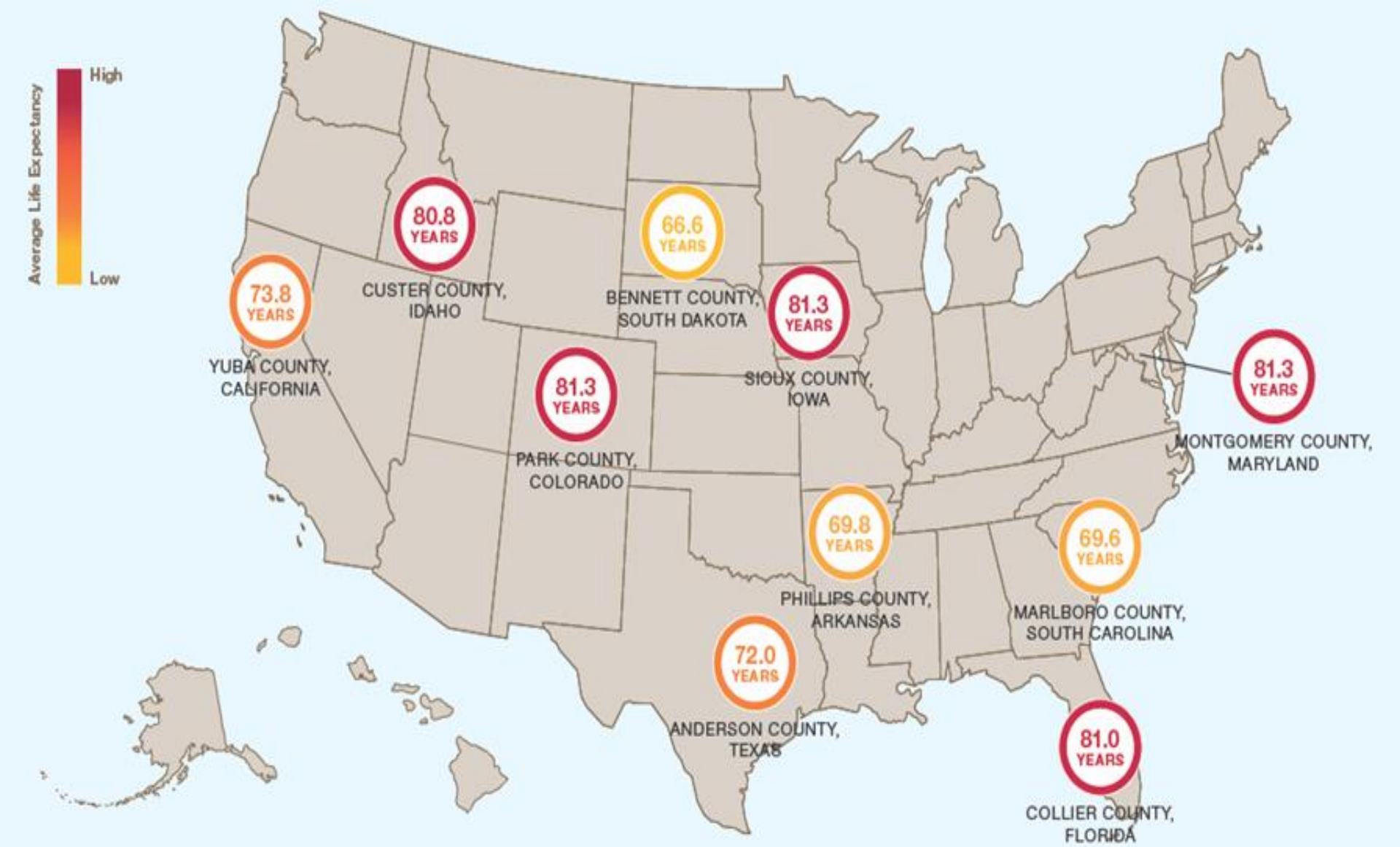
Figure 1
Evidence of Racial/Ethnic Differences in Cardiac Care, 1984–2001



Total = 81 Studies

Source: Kaiser Family Foundation/American College of Cardiology Foundation, Racial/Ethnic Differences in Cardiac Care: The Weight of the Evidence, 2002

Differences in How Long and How Well We Live



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South Dakota has the biggest gap in life expectancy in the US

States	Highest Life Expectancy	Lowest Life Expectancy	Difference in Life Expectancy
Alabama	76.8	71.7	5.1
Alaska	76.9*	76.9*	N/A
Arizona	80.9	73.9	7.0
Arkansas	78.0	69.8	8.2
California	80.8	73.8	7.0
Colorado	81.3	74.8	6.5
Connecticut	79.2	76.8	2.4
Delaware	76.5	75.8	0.7
District of Columbia	72.0	72.0	N/A
Florida	81.0	70.2	10.8
Georgia	78.9	72.2	6.7
Hawaii	80.5	77.3	3.2
Idaho	80.8	74.9	5.9
Illinois	79.6	74.3	5.3
Indiana	79.1	73.5	5.6
Iowa	81.3	76.1	5.2
Kansas	80.3	73.2	7.1
Kentucky	77.4	72.0	5.4
Louisiana	76.7	71.6	5.1
Maine	78.8	75.6	3.2
Maryland	81.3	68.6	12.7
Massachusetts	79.5	76.5	3.0
Michigan	80.2	73.4	6.8
Minnesota	81.1	76.2	4.9
Mississippi	76.1	70.1	6.0
Missouri	79.3	70.8	8.5

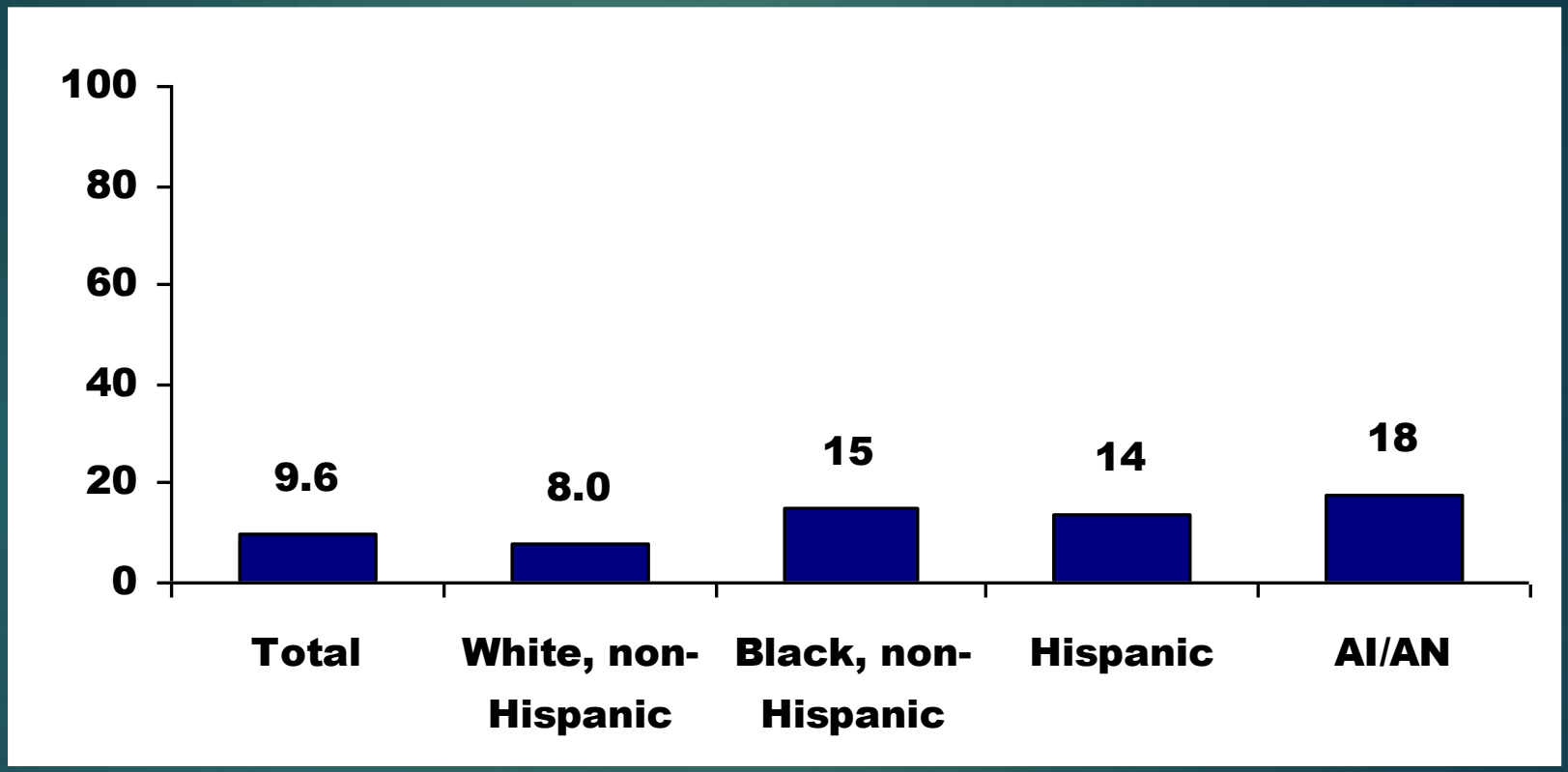
States	Highest Life Expectancy	Lowest Life Expectancy	Difference in Life Expectancy
Montana	79.3	72.8	6.5
Nebraska	80.1	76.4	3.7
Nevada	79.8	74.5	5.3
New Hampshire	78.7	76.2	2.5
New Jersey	79.9	74.7	5.2
New Mexico	79.6	74.2	5.4
New York	79.5	75.0	4.5
North Carolina	78.6	71.2	7.4
North Dakota	80.0	76.3	3.7
Ohio	79.7	73.4	6.3
Oklahoma	77.9	72.0	5.9
Oregon	80.9	75.5	5.4
Pennsylvania	79.4	72.3	7.1
Rhode Island	79.5	77.5	2.0
South Carolina	78.9	69.6	9.3
South Dakota	80.3	66.6	13.7
Tennessee	78.8	72.4	6.4
Texas	80.2	72.0	8.2
Utah	80.8	76.3	4.5
Vermont	79.0	76.9	2.1
Virginia	80.9	69.6	11.3
Washington	80.3	74.9	5.4
West Virginia	77.2	70.4	6.8
Wisconsin	80.1	75.7	4.4
Wyoming	78.2	73.9	4.3

*Due to multiple changes in county/census divisions, life expectancy for Alaska was estimated as a single figure, assigned to all counties in the state.

Source: Murray CJ, Kulkarni SC, Michaud C, et al. "Eight Americas: Investigating Mortality Disparities Across Races, Counties, and Race-Counties in the United States." Public Library of Science, 3(9): e260, 2006.

Chart 3-9. American Indians/Alaska Natives are more likely to have diabetes than other groups.

Percentage of people age 20 years or older with diabetes, 2005



AI/AN = American Indian/Alaska Native.

Source: National Institutes of Health, National Diabetes Information Clearinghouse. *Total Preva*
Among People Aged 20 Years or Older, United States, 2005.

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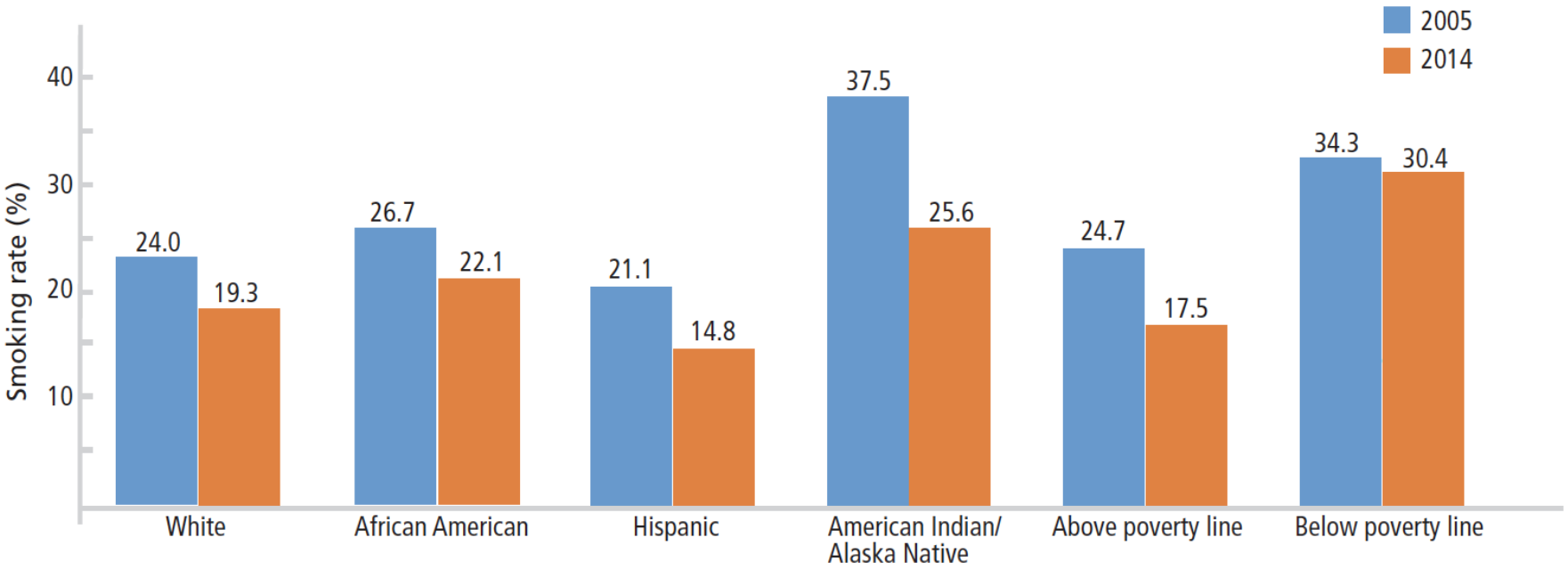

Figure 2. Percentage of adults who are active smokers, 2005 and 2014.

Data from National Health Interview Surgery, Jamal et al, reference 16.

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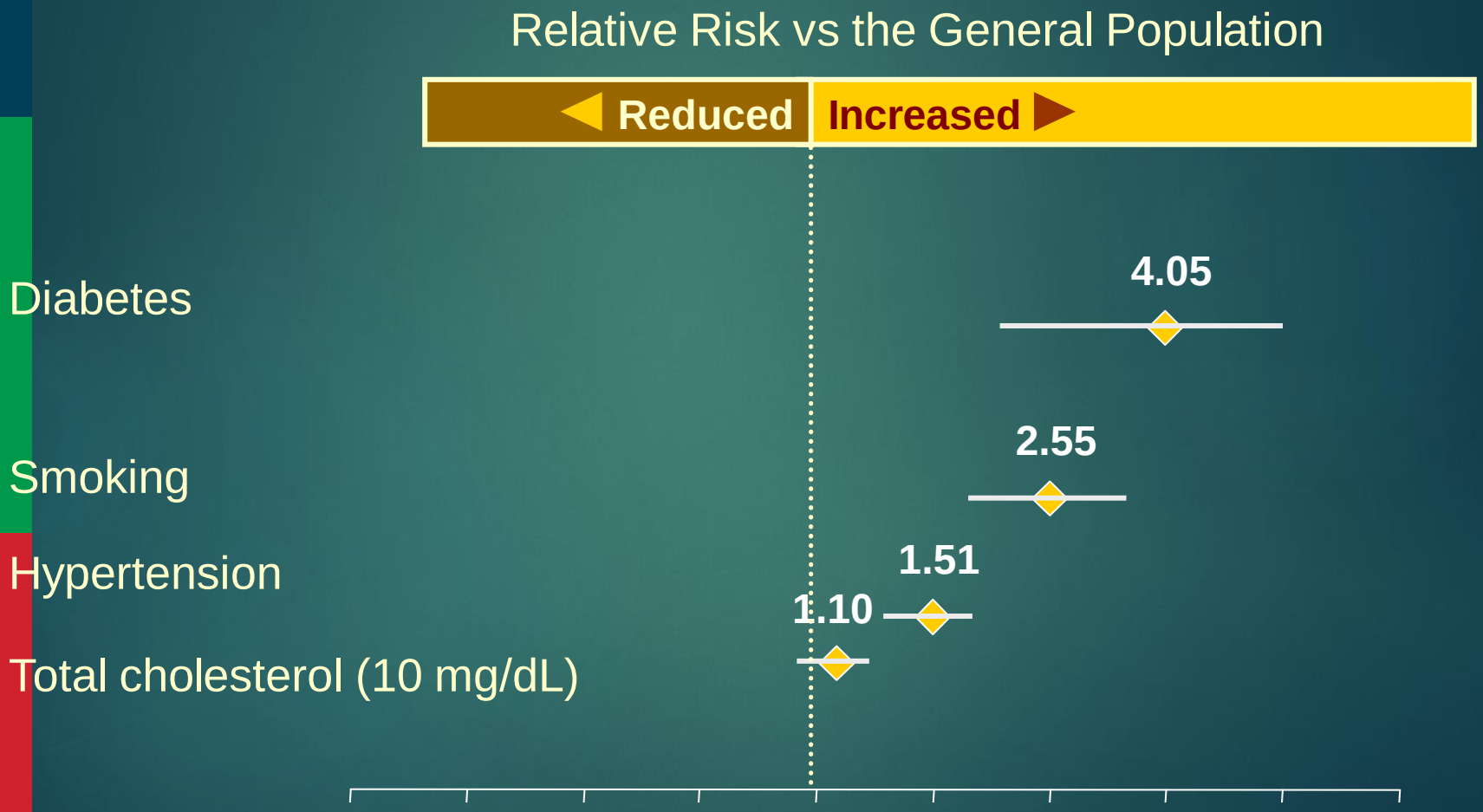
Independent Risk Factors for PAD*



* PAD diagnosis based on ABI <0.90.

Newman AB, et al. *Circulation.* 1993;88:837-845

Diabetes in American Indians

Native Americans have the highest prevalence of DM of any ethnic minority at 18.1% of all adults

Native Americans suffer more diabetes related complications that any other subgroup

- -PAD
- -Neuropathy (loss of protective sensation)
- -End stage renal disease requiring dialysis
- -Diabetic foot ulcers
- -Lower Extremity Amputation (31.0 per 1000 people)
- -Premature mortality (4 times the mortality rate due to DM compared to US general population)

CDC National Diabetes Statistic Report-2018

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Diabetes in American Indians-Why??

Predisposing Genetics

-Highest prevalence of Type 2 DM single nucleotide polymorphisms (SNPs) of any group studies

-DNER, Variations in MTHFR, mutations in ABCA1 (cholesterol transporter)

Lifestyle Behaviors

-Tobacco use, obesity, physical inactivity, alcohol and drug use, sugar-sweetened beverage consumption, HTN, obesity, processed food heavy diet

Socioeconomic Status

-80% of American Indians have a high school degree; 14.7% have ANY college degree

-Unemployment rate approaches 50%

-Among the highest poverty rates in the US

CDC National Diabetes Statistic Report-2018

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Diabetes in American Indians-Why??

Access to Healthcare

- -IHS delivered healthcare to 2.6 million people in 37 states
- -In 2018, the HIS budget was DECREASED to $4.7 billion, which means each person is allocated $1,807
- -In 2022, IHS discretionary funding was increased by 36%, to $8.5 billion, which is $3269/person

Provider Bias

- -Both direct racism and unconscious racial bias

Patient Attitudes toward Western Medicine

- -Limited focus on spiritual and holistic facets of health
- -Limited acknowledgment of traditional American Indian healers and methods (mental, physical, spiritual, and emotional balance)

CDC National Diabetes Statistic Report-2018

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Diabetes in American Indians-Why??

This is a very complicated process. The approach to making a difference in diabetes in the Native American population will need to address every one of these problems

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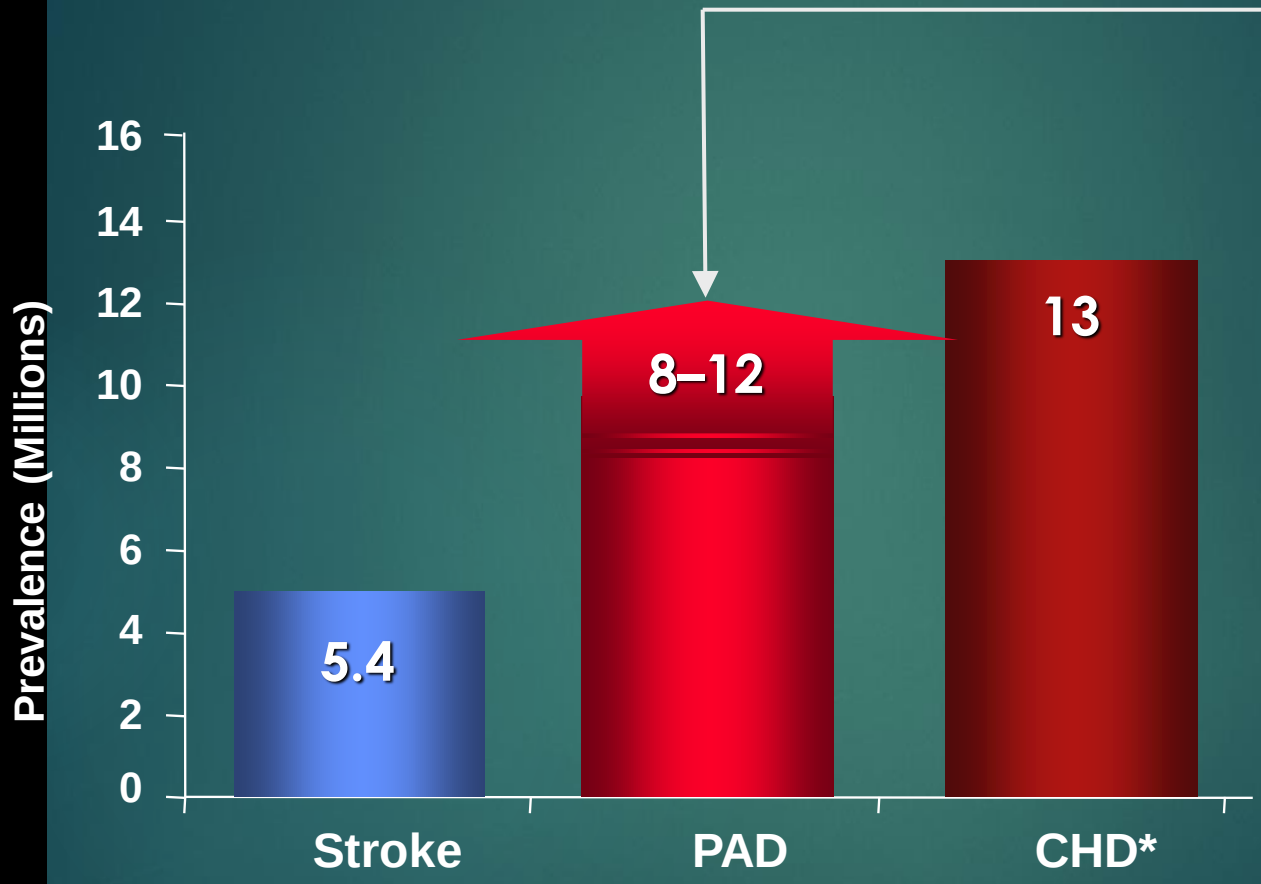
Prevalence of PAD in the US



PAD currently affects 8–12 million Americans.

By 2050, the prevalence is expected to reach 19 million.

CHD = coronary heart disease. PAD = peripheral arterial disease.

* Includes myocardial infarction and angina pectoris.

American Heart Association. *Heart Disease and Stroke Statistics—2005 Update*. 20

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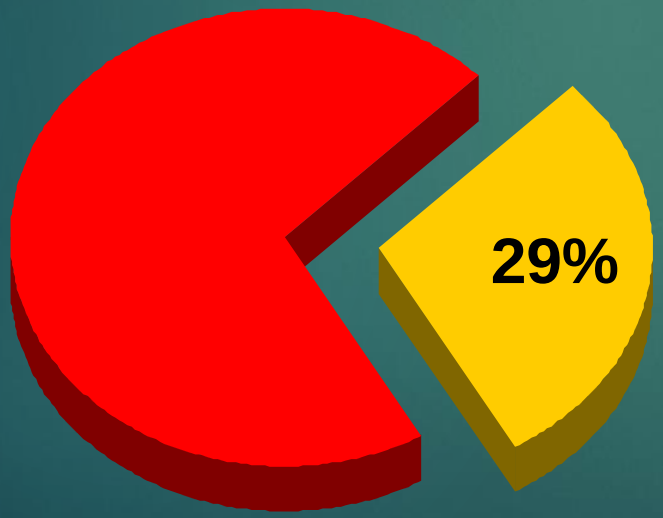
Prevalence of PAD in At-Risk Patients

- The PARTNERS* program evaluated 6,979 patients in physicians' offices.
- Patient criteria:
  - ≥70 years, or
  - 50–69 years with a history of smoking and/or diabetes



29% of patients were diagnosed with PAD

* PARTNERS=PAD Awareness, Risk, and Treatment: New Resources for Survival. Hirsch AT, et al. *JAMA.* 2001;286:1317-1324.

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Typical vs Atypical Symptoms in Patients With Symptomatic PAD

Typical Symptoms[1]

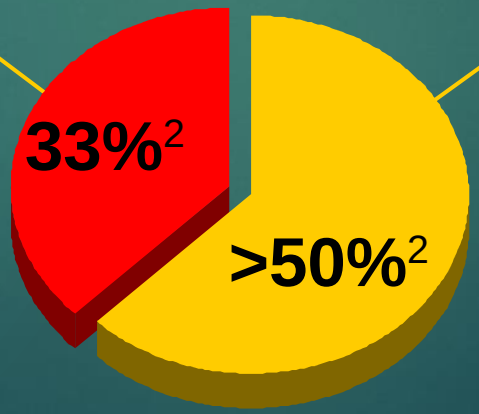
Intermittent claudication

- Exertional calf pain that
  - causes the patient to stop walking
  - resolves within 10 minutes of rest

Other nonspecific leg symptoms that may be indicative of PAD

Atypical Symptoms[1]

- Exertional leg pain that
  - may involve areas other than the calves
  - may not stop the patient from walking
  - may not resolve within 10 minutes of rest



1. McDermott MM et al. *JAMA*. 2001;286:1599-1606.
2. Hiatt WR. *N Engl J Med.* 2001;344:1608-1621.

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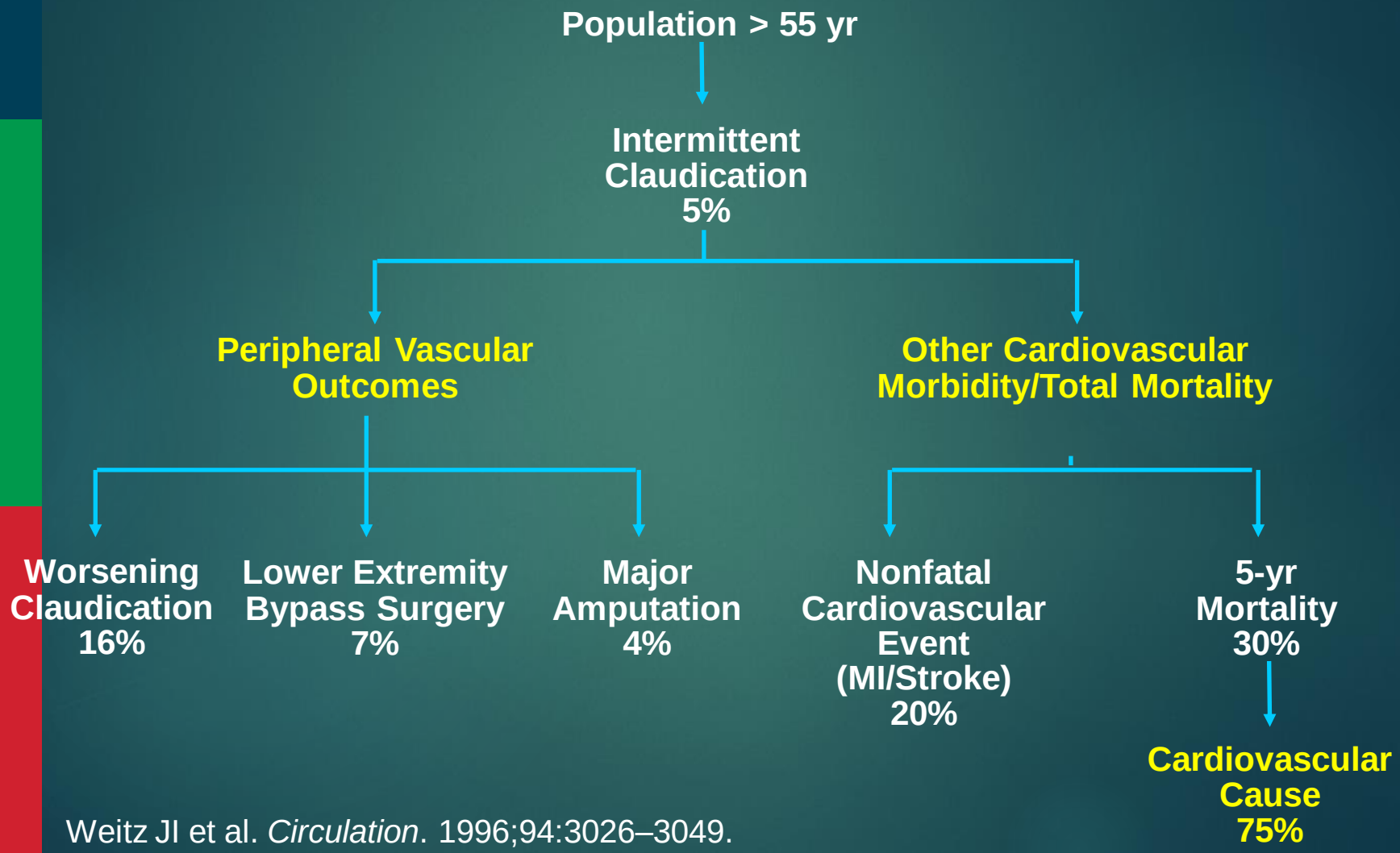
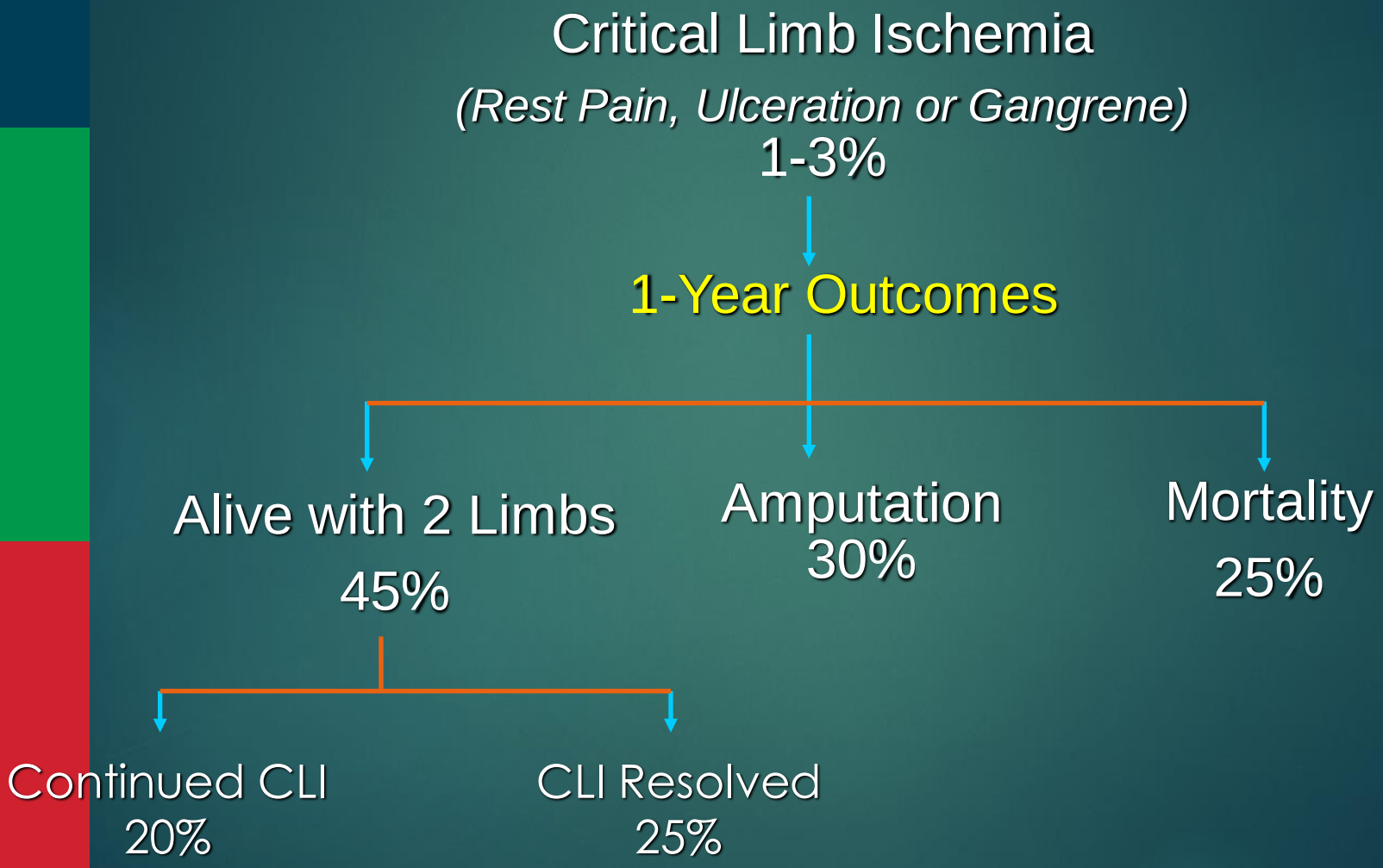
Natural History
Intermittent Claudication



Weitz JI et al. *Circulation*. 1996;94:3026–3049.

Natural History of Critical Limb Ischemia



Hirsh et al. *JACC*. 2006;47:1239-1312.

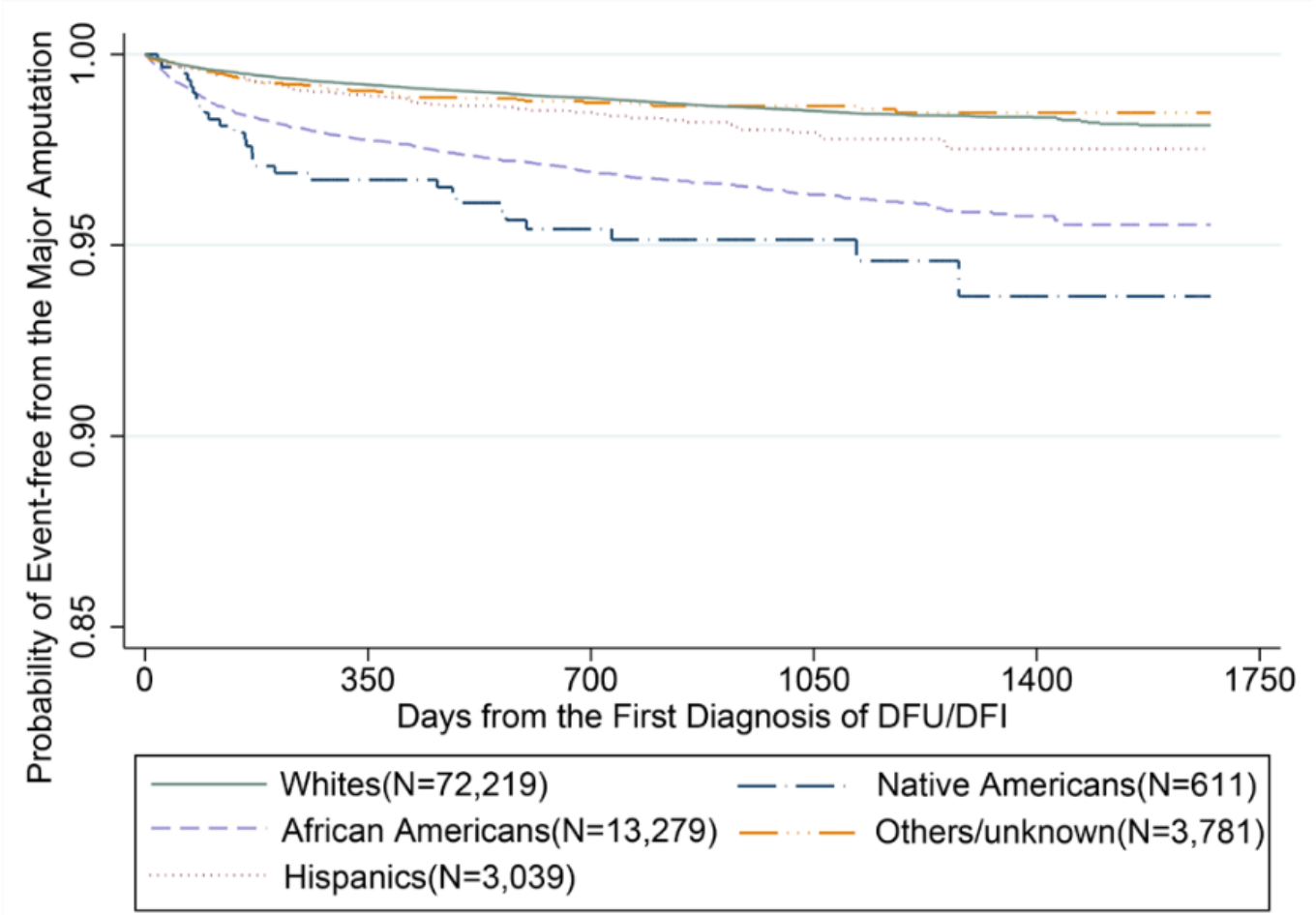
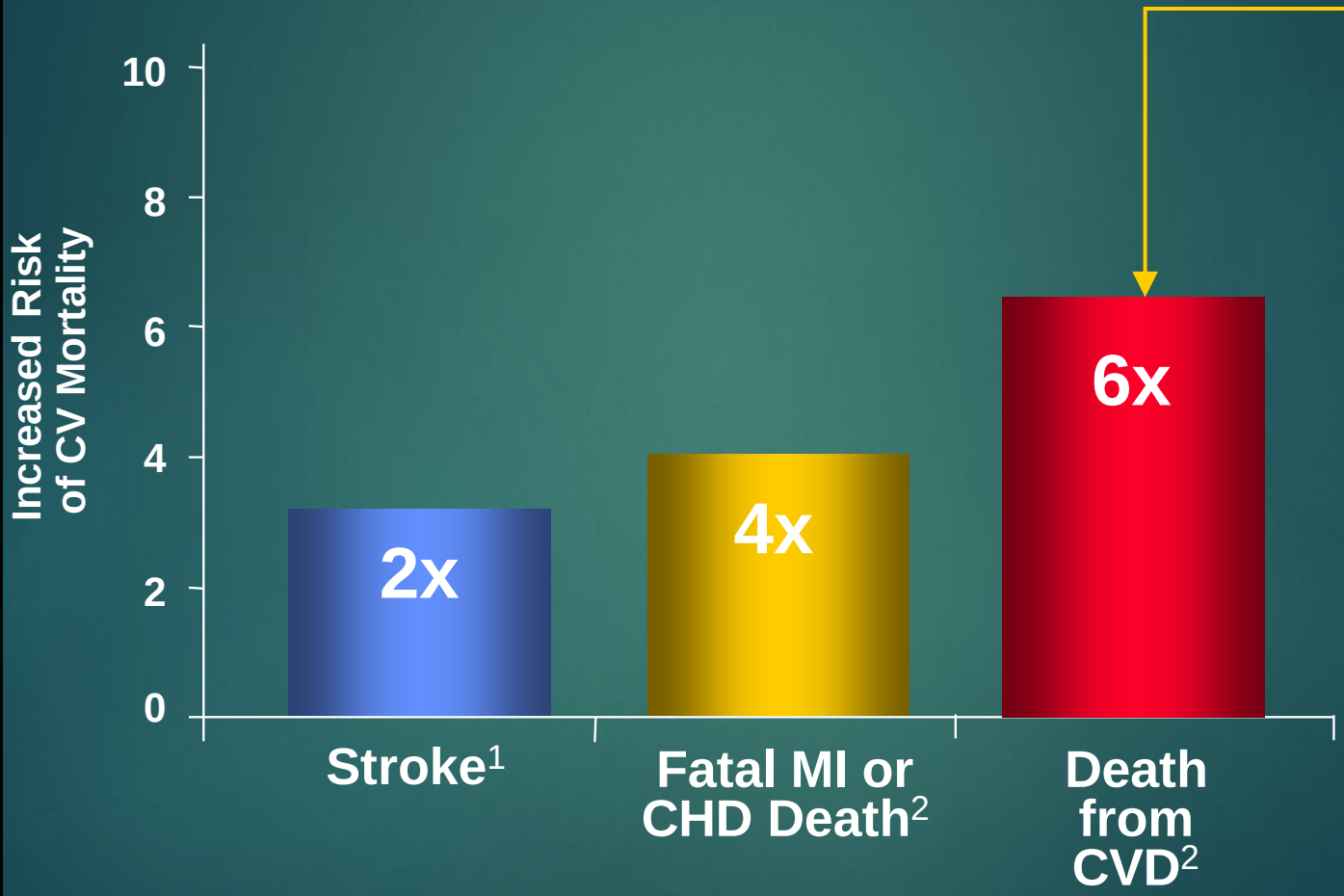


Figure 2 Kaplan-Meier survival curve for major amputation (online supplementary table 1). ICD-9-CM codes. DFI, diabetic foot infection; DFU, diabetic foot ulcer; ICD-CM, International classification of diseases, 9th revision, clinical modification.

Cardiovascular Events with PAD



Patients with symptomatic PAD face up to 6x greater risk of death from CVD, including MI and stroke

1. Kannel WB. *J Cardiovasc Risk*. 1994;1:333-339.
2. Criqui MH et al. *N Engl J Med*. 1992;326:381-386.

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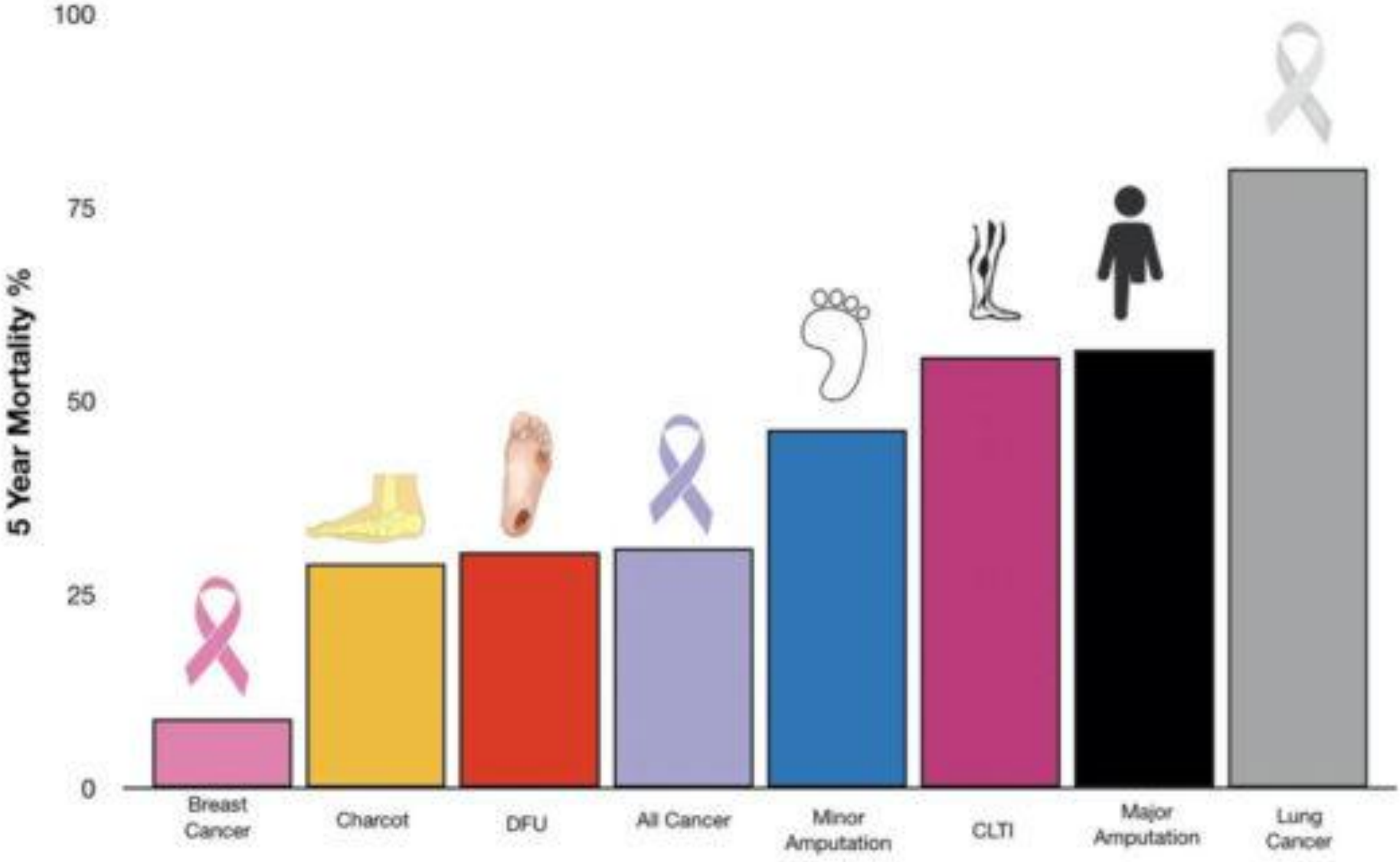
100
75
50
25
0
5 Year Mortality %
Breast Cancer
Charcot
DFU
All Cancer
Minor Amputation
CLTI
Major Amputation
Lung Cancer

Why do amputations occur?

- Usually caused by a skin injury.
- The injury becomes infected.
- Infection spreads.
- Gangrene may set in.
- Amputation stops the infection from spreading to the rest of the body, which often has a fatal outcome.

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Treatment of PAD

Therapies Based Upon Symptoms

Intermittent Claudication

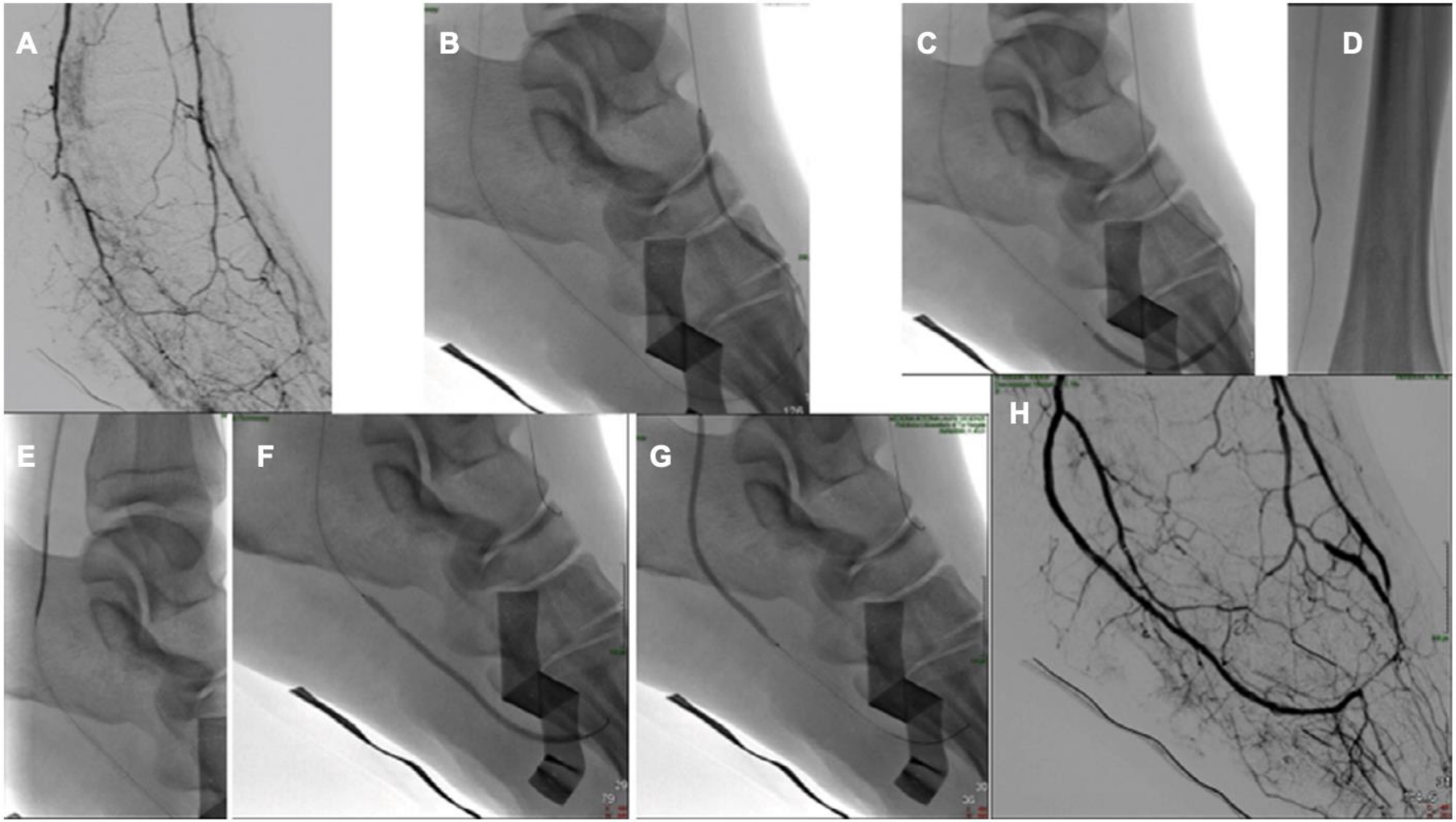
- Exercise Therapy
- Medications
  - ASA
  - Plavix
  - Rivaroxaban
  - Statins
- Revascularization
  - *Limiting symptoms*

Goal to provide relief of symptoms

Critical limb ischemia

- Wound care
- Antibiotics
- Revascularization
  - Endovascular
  - Surgery

Goal to promote limb survival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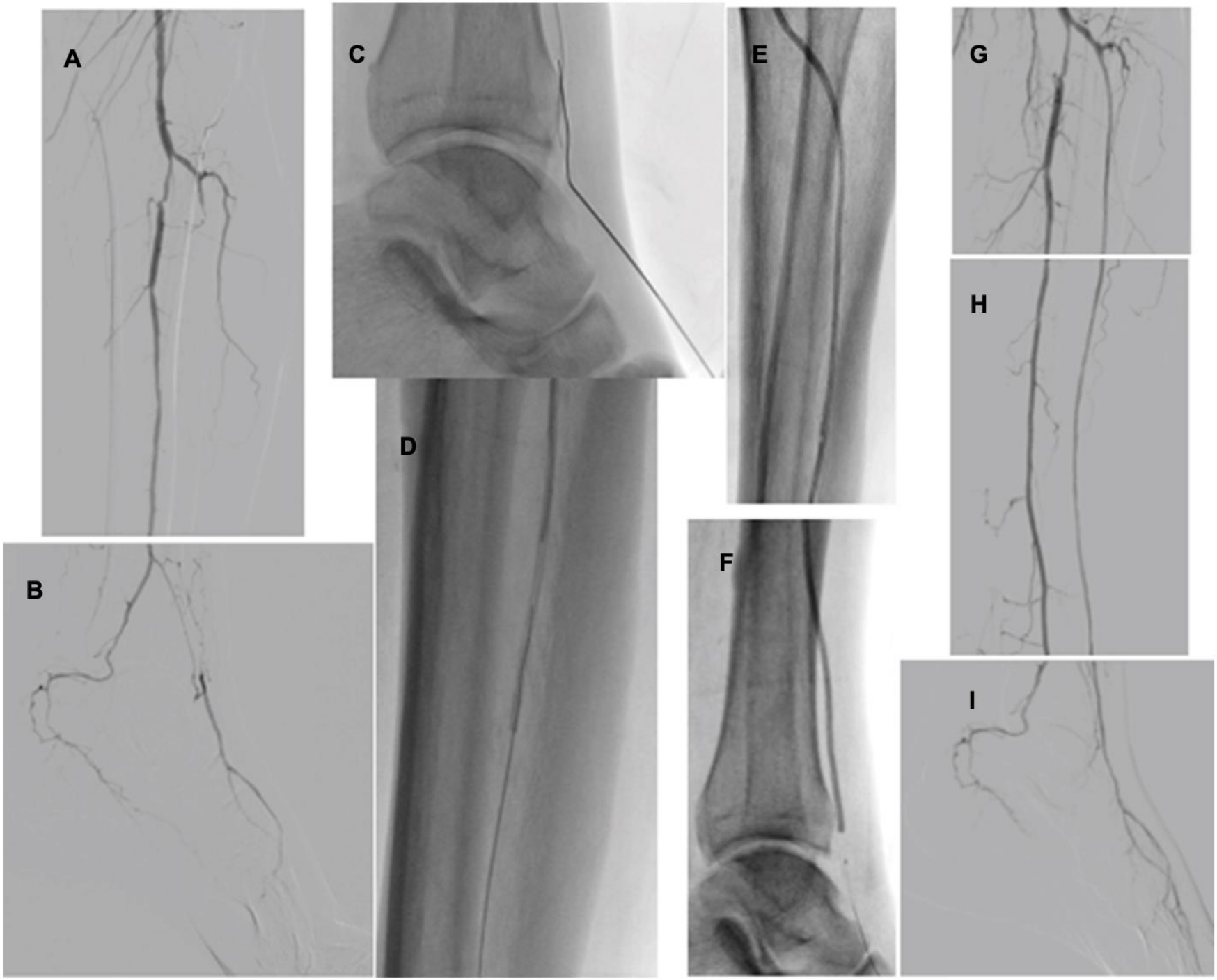
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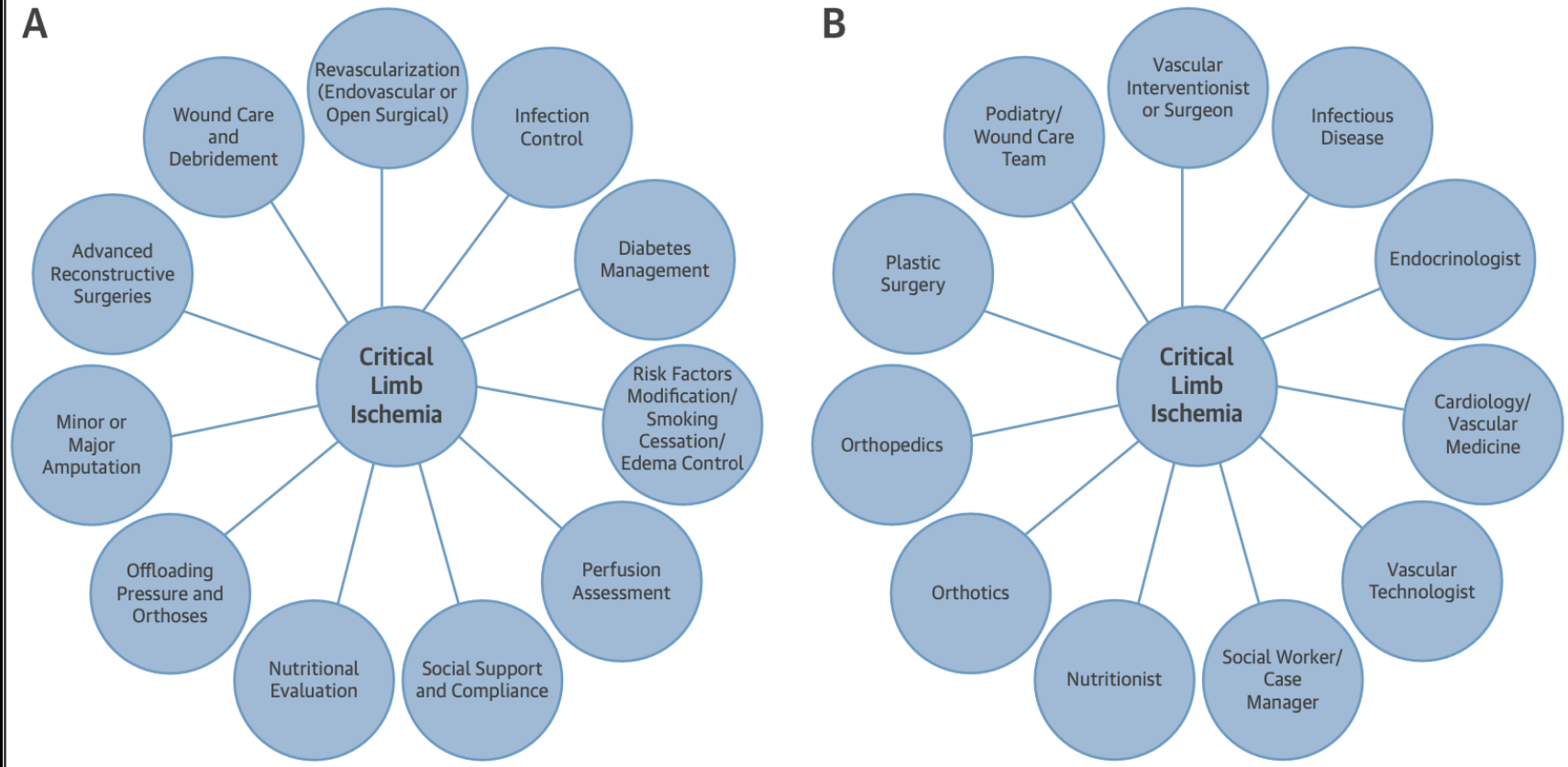
Limb Ischemia Management

FIGURE 1 **Potential Components and Required Specialists for the Diagnosis and Treatment of Critical Limb Ischemia**



(A) Potential components of critical limb ischemia diagnosis, management, and follow-up, and **(B)** the multidisciplinary team of experts that may be required to address these factors.

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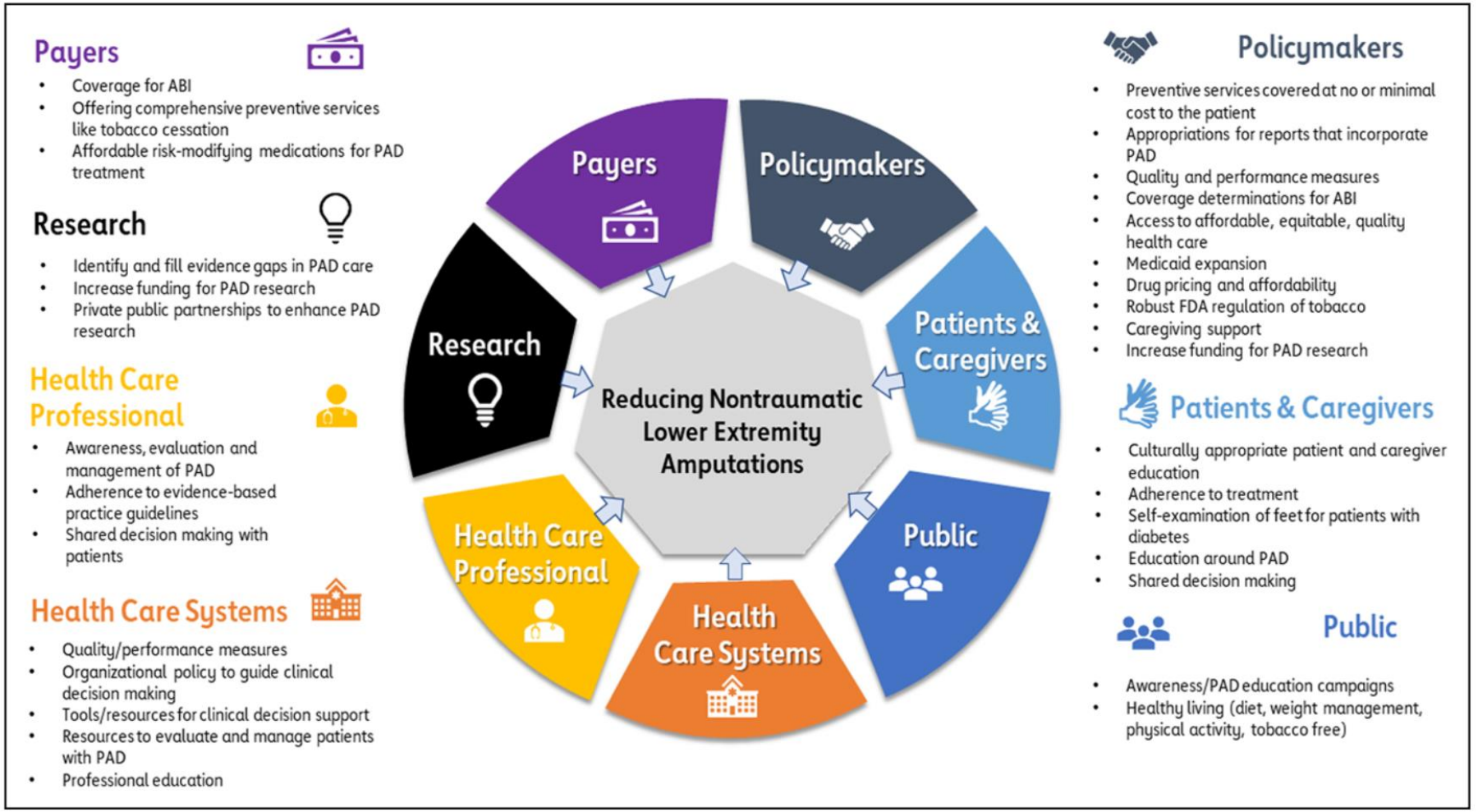

Figure 3. Key roles of each stakeholder for improving peripheral artery disease (PAD) diagnosis and management .
ABI indicates ankle-brachial index; and FDA, US Food and Drug Administration.

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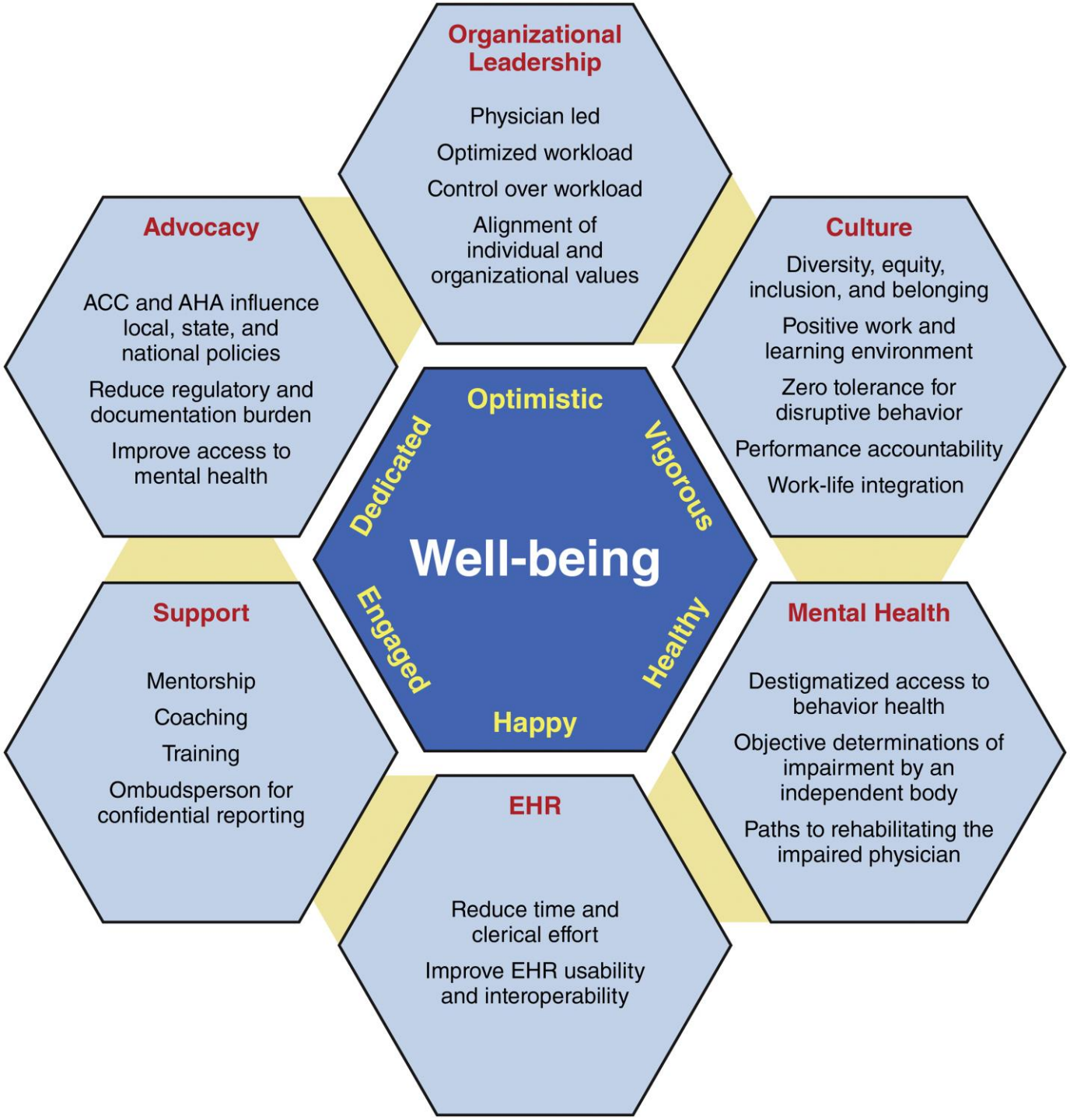
Organizational Leadership
Physician led
Optimized workload
Control over workload
Alignment of individual and organizational values
Advocacy
ACC and AHA influence local, state, and national policies
Reduce regulatory and documentation burden
Improve access to mental health
Culture
Diversity, equity, inclusion, and belonging
Positive work and learning environment
Zero tolerance for disruptive behavior
Performance accountability
Work-life integration
Optimistic
Dedicated
Vigorous
Well-being
Engaged
Healthy
Happy
Support
Mentorship
Coaching
Training
Ombudsperson for confidential reporting
Mental Health
Destigmatized access to behavior health
Objective determinations of impairment by an independent body
Paths to rehabilitating the impaired physician
EHR
Reduce time and clerical effort
Improve EHR usability and interoperability

What can we do?

- **First Step: Short Term**
  - We need to treat these patient earlier in their disease process
    - Early detection of PAD
    - All diabetics, smokers, and people with 2 or more risk factors should have a screening ABI yearly
    - ABI >1.3 or <0.9 should be referred to a Vascular Specialist
    - A patient should never have an amputation without evaluation for treatable arterial or venous disease
  - Patient education
    - Diabetes management
    - Foot care
    - Exercise

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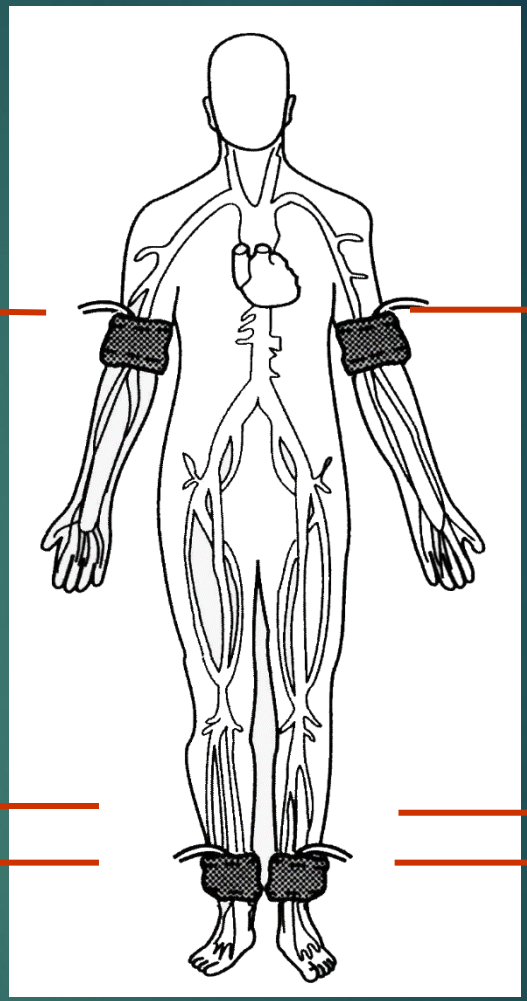
How to Perform and Calculate the ABI

Right Arm Pressure:

Left Arm Pressure:



Pressure:
PT
DP

Pressure:
PT
DP

≥1.0-<1.3— Normal
0.81-0.90 — Mild Obstruction
0.41-0.80 — Moderate Obstruction
≤0.40 — Severe Obstruction
>1.3 — Calcified vessels

Right ABI

$$\frac{\text{Higher Right Ankle Pressure}}{\text{Higher Arm Pressure}} = \frac{\text{mm Hg}}{\text{mm Hg}}$$

Left ABI

$$\frac{\text{Higher Left Ankle Pressure}}{\text{Higher Arm Pressure}} = \frac{\text{mm Hg}}{\text{mm Hg}}$$

What can we do?

- **Second Step: Intermediate Term**
  - Improve access to contemporary diabetes management
  - Improve access to state of the art Podiatry with biannual foot exams
  - Partner with IHS to develop screening programs
  - Incorporate Traditional Healers and methods into the PAD treatment algorithm

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What can we do?

- **Third Step: Long Term**
  - Improve IHS funding
  - Address maladaptive lifestyle behaviors and develop programs to offer better food choice, exercise, smoking cessation, etc
  - Address socioeconomic inequlities that are obvious and pervasive in American Indians

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"Of all the forms of inequality, injustice in healthcare is the most shocking and inhumane "

Rev. Dr. Martin Luther King

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