



Progression and Symptoms of PAD

Albert D. Sam II, MD MMM FACS



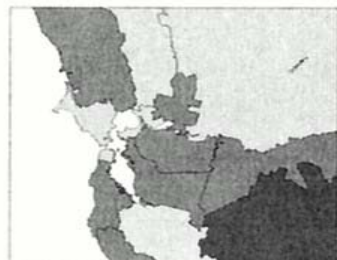
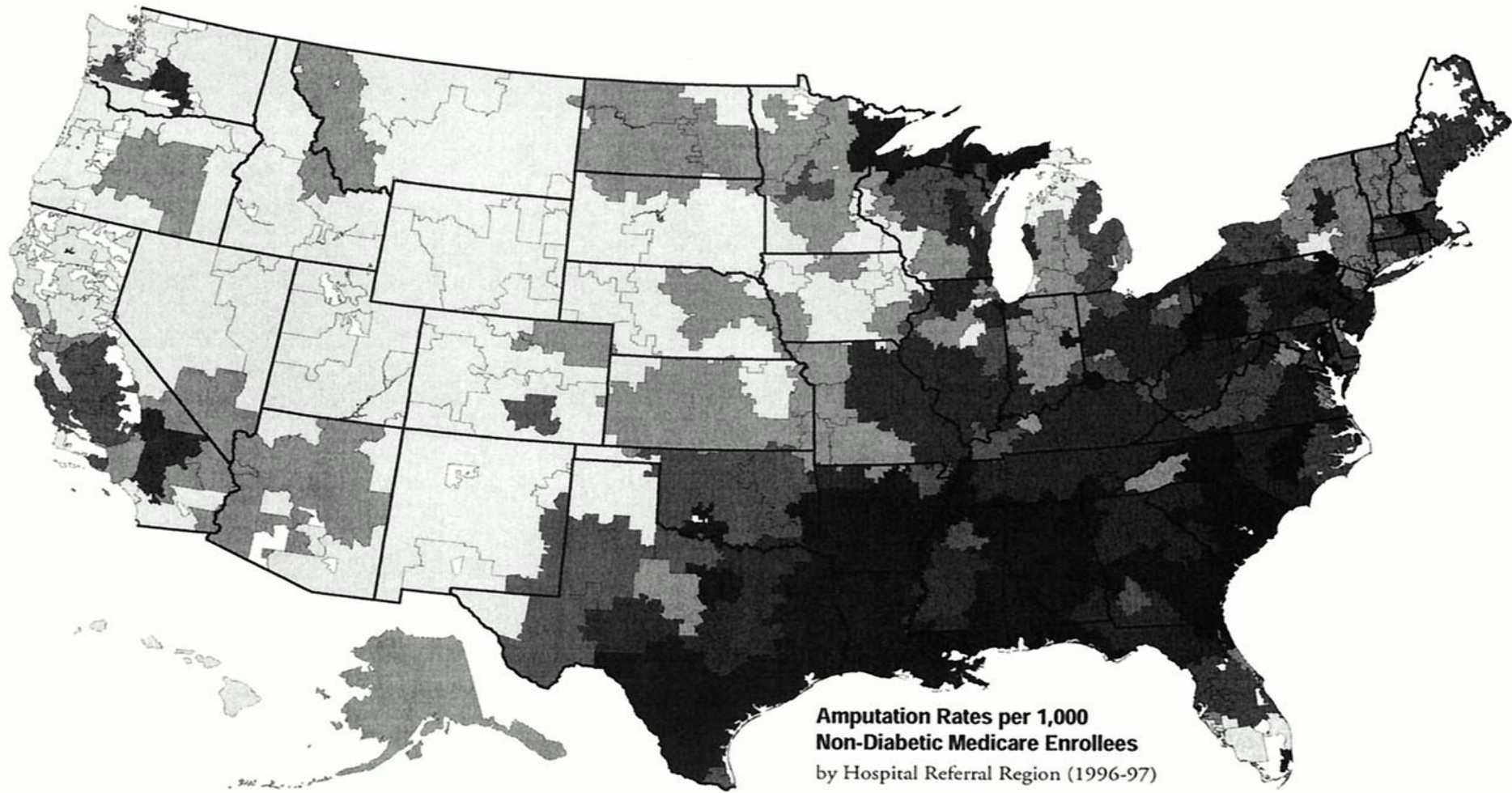
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Progression and Symptoms of PAD

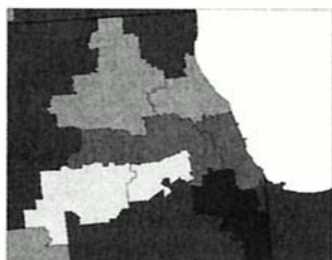


Progression and Symptoms of PAD





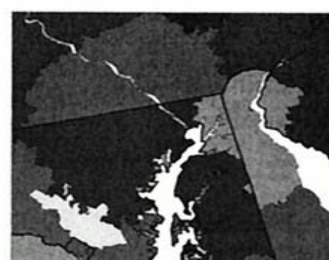
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- PAD is often asymptomatic and therefore, is not always easy to detect
- Critical Limb Ischemia, a result of untreated PAD, accounts for the majority of all non-traumatic amputations in the US
- We are on the front lines every day and can make a difference in the detection of PAD

Peripheral Artery Disease (PAD)

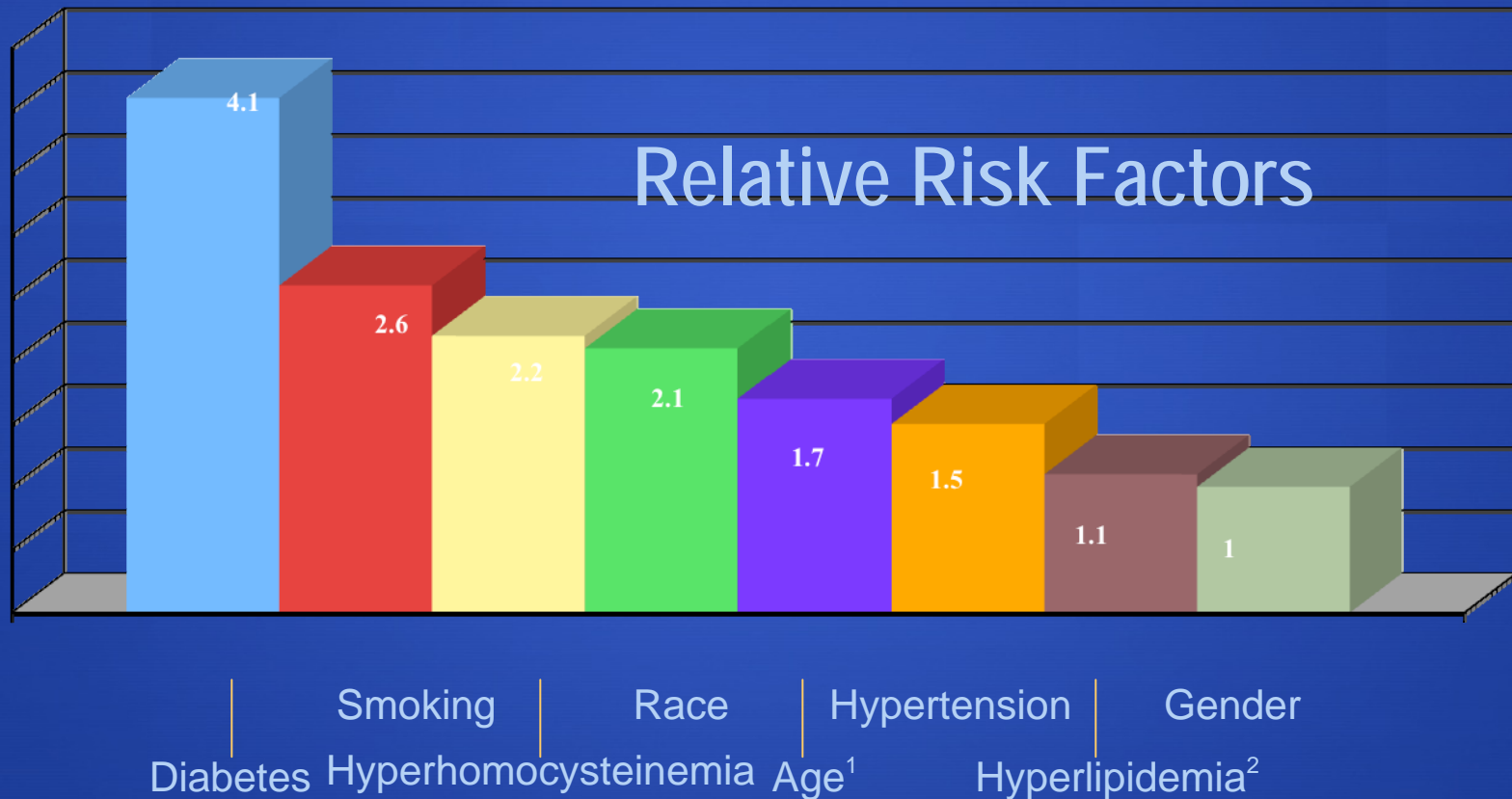
- PAD affects 12-20% of Americans age 65 and older.¹
- 12 million with PAD in the U.S. alone²
- 4x greater risk in those with diabetes over the age of 50.³
- Prevalence: 5% at age 50
10% by age 65
25% 80 and over

1. Becker, GJ, et al. The Importance of Increasing Public and Physician Awareness of Peripheral Arterial Disease. J Vasc Interv Radiol 2002; 13[1];7-11.

2. "Peripheral Arterial Disease in People with Diabetes", American Diabetes Association Consensus Statement, Diabetes Care, Volume 26, Number 12, December 2003, 3333-3341.

3. "Diagnosis of PAD is Important for People with Diabetes", American Diabetes Association Consensus Statement, Diabetes Care, November 21, 2003, www.diabetes.org.

Peripheral Artery Disease



1. Calculated relative risk increase at 5-year intervals
2. Rel. Risk is 1.1 per 10mg/dL increase in total cholesterol

From: Newman et al. Circulation 1993;
Hiatt et al, Circulation 1995; Graham, JAMA 1997

The Problems

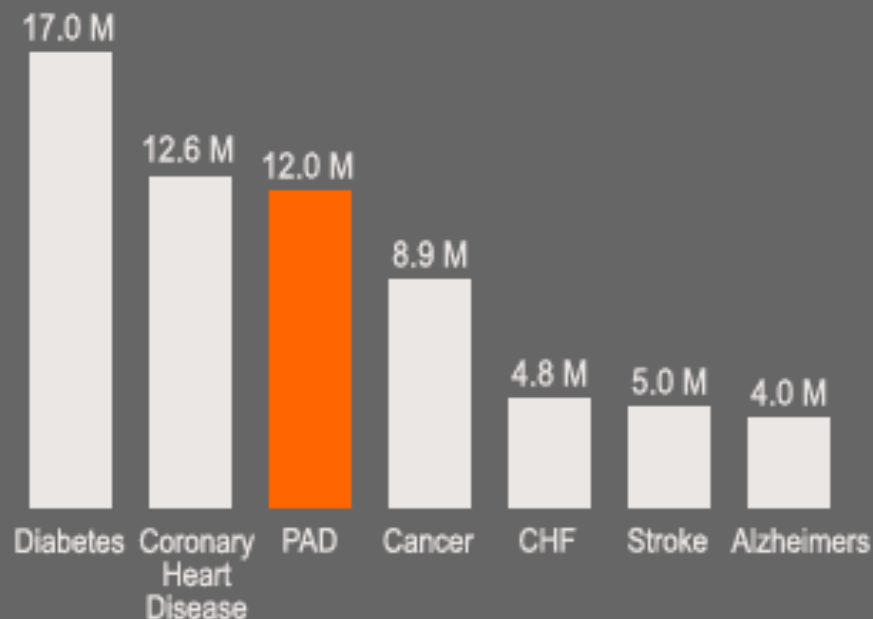
- Approximately 60% of patients with CLI suffer from co-morbid conditions

The Problems

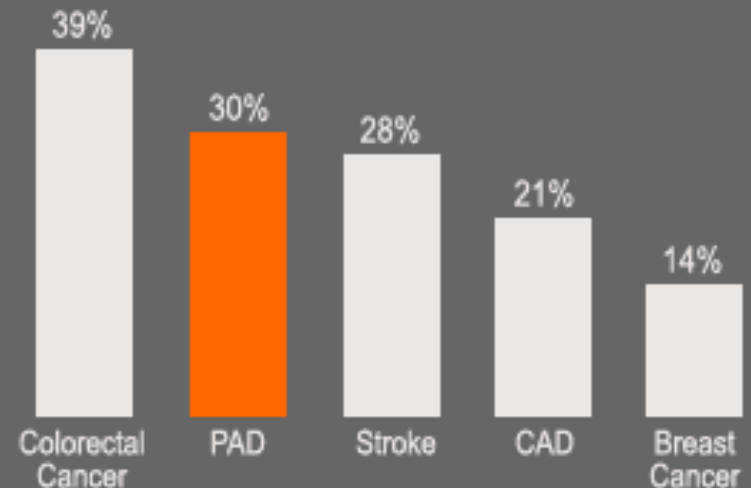
- Approximately 60% of patients with CLI suffer from co-morbid conditions
 - Diabetes
 - End-Stage Renal Disease
 - Coronary Artery Disease and
 - Cerebrovascular Disease
 - Among Others...

PAD: More Prevalent and More Deadly Than Many Leading Diseases

Disease Prevalence (Millions)



Five-Year Mortality Rate



Source: American Cancer Society, American Heart Association, Alzheimers Disease Education / Referral Center, American Diabetes Association, SAGE Group

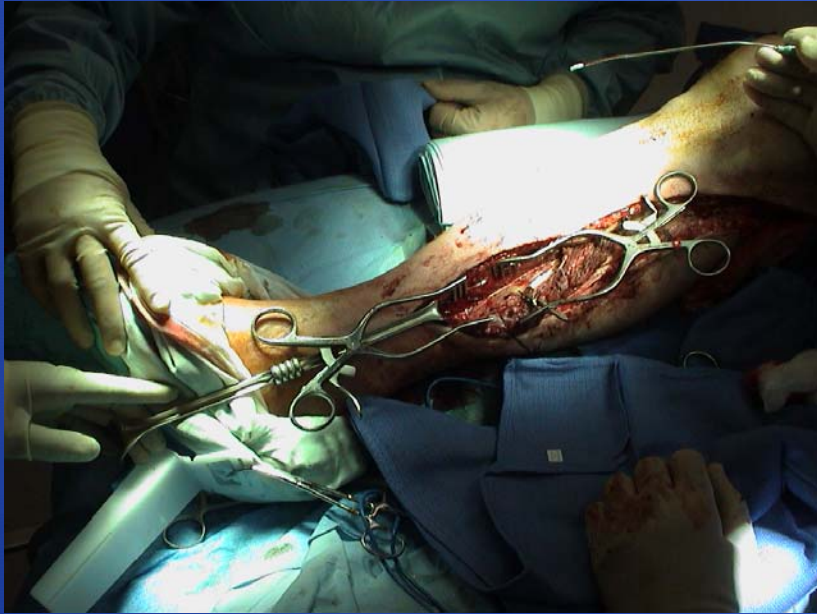
The Problems

- **Complex Referral Patterns Make It Difficult to Diagnose and Revascularize Patients with CLI**
 - Family Physicians/Internal Medicine
 - Podiatrists
 - Nephrologists
 - Wound Care
 - Endocrinologists
 - Home Care

The Problems

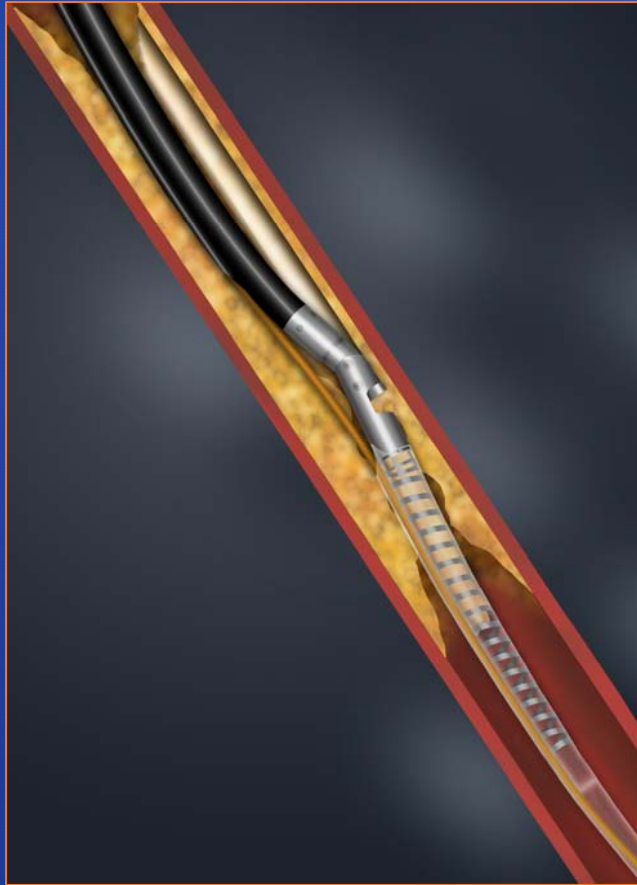
- **Complex, Shifting Operating MD Dynamics**
 - **Vascular Surgeons**
 - **Interventional Radiologists**
 - **Interventional Cardiologists**
 - **All compete for Patient Referrals**
 - **Specialties promote procedures within area of expertise and differentiation without definitive clinical data**

The Problems



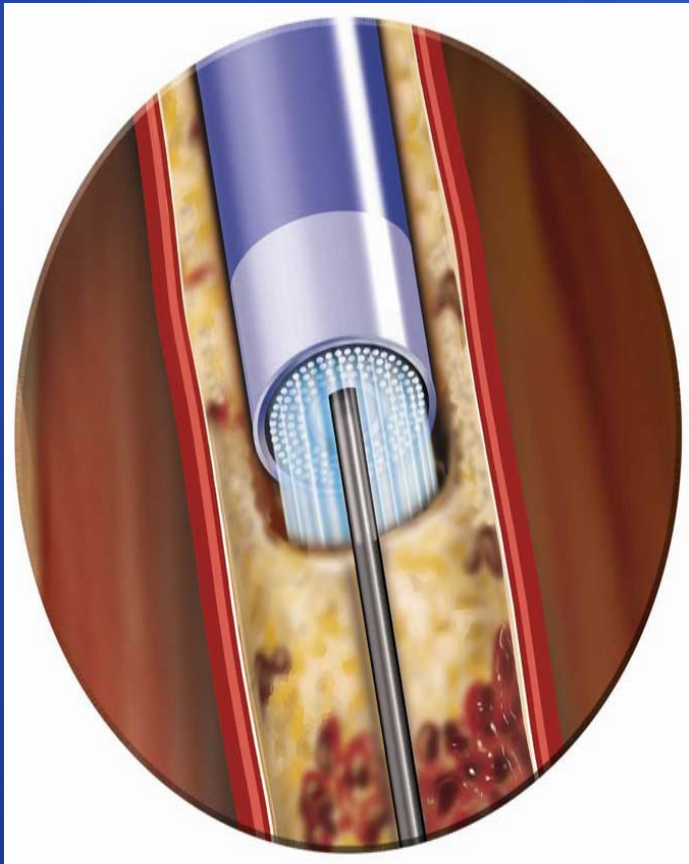
- No Definitive "Best Therapy"
 - Surgery has a high procedural durability AND higher morbidity/mortality with high initial cost and prolonged recovery times

The Problems



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The Problems



- No Definitive "Best Therapy"
 - Surgery has a high procedural durability AND higher morbidity/mortality with high initial cost and prolonged recovery times
 - Endovascular techniques have lower procedural durability AND lower morbidity/mortality BUT are repeatable with resultant higher incremental costs and short recovery times
 - Procedural success has been low in long, total occlusions and in lesions/occlusions below the knee (CLI)



Critical Limb Ischemia

- The most severe manifestation of PAD resulting in rest pain, ulcers and gangrene
- Nearly 2 million people in the US and Europe suffer from CLI
- CLI results in nearly 200,000 amputations every year



CLI is a Marker for Death

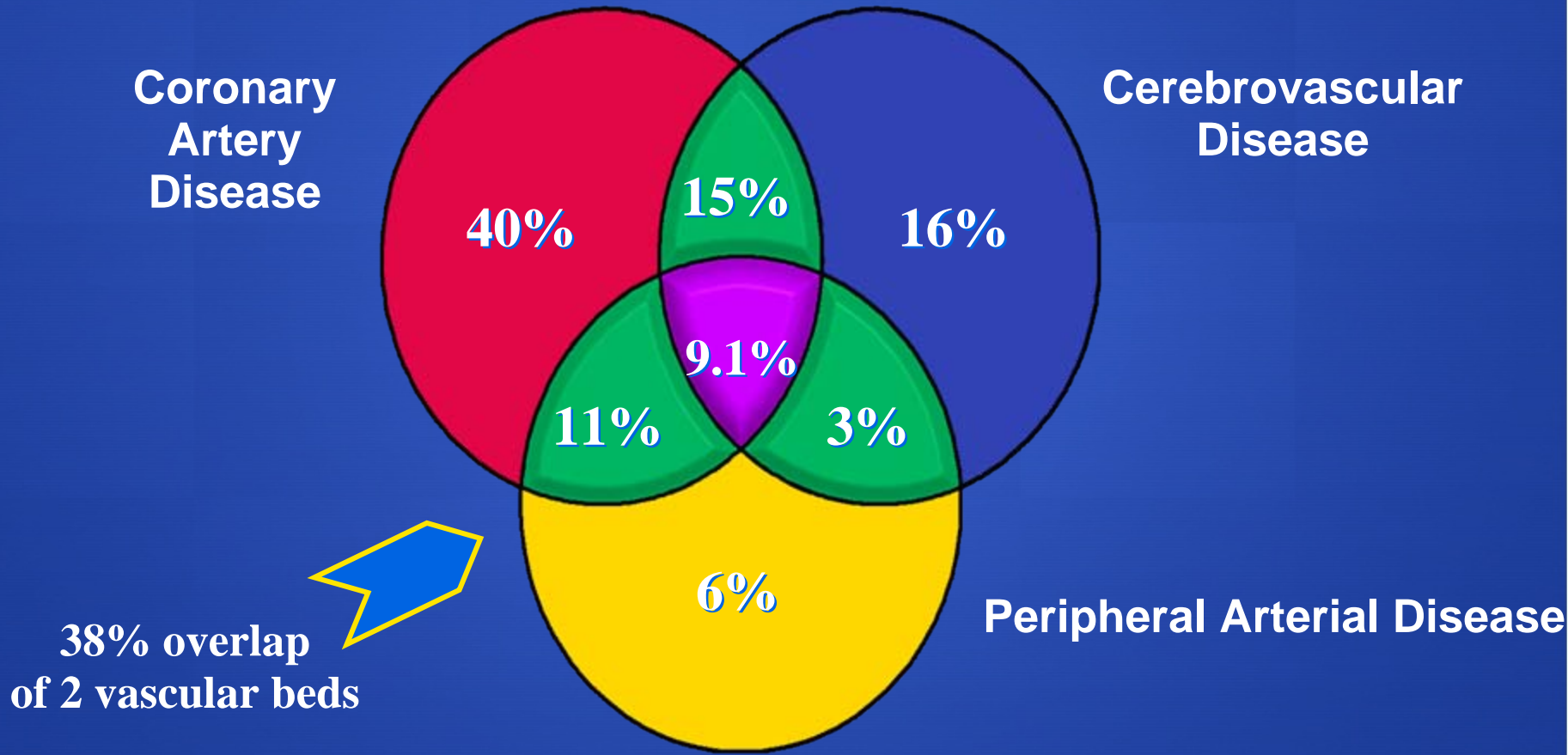
- Within 3 months of presentation:
- 1-year mortality: 21.0%
- 2-year mortality: 31.6%



CLI is a Marker for Death

- **Within 3 months of presentation:**
 - death in 9%
 - MI in 1%
 - stroke in 1%
 - amputation in 12%
 - persistent CLI in 18%
- **1-year mortality: 21.0%**
- **2-year mortality: 31.6%**

Overlap of Atherosclerotic Diseases



Symptoms of PAD

- Claudication: Dull cramping or pain in muscles of hips, thighs or calf muscles when walking, climbing stairs, or exercise which is relieved with cessation of activity
- Fatigue in legs which may require patient to stop and rest while walking
- Leg “tiredness” or “tightness” not limited to a particular muscle group when ambulating

Symptoms of PAD

- Worsening neuropathic symptoms of the feet – particularly in diabetics
- Rest pain or night pain that occurs when legs elevated in bed, relieved when placed in dependent position. Typically in the distal foot and toes
- Impotence may be a sign of iliac disease

Why Treat Claudicants?

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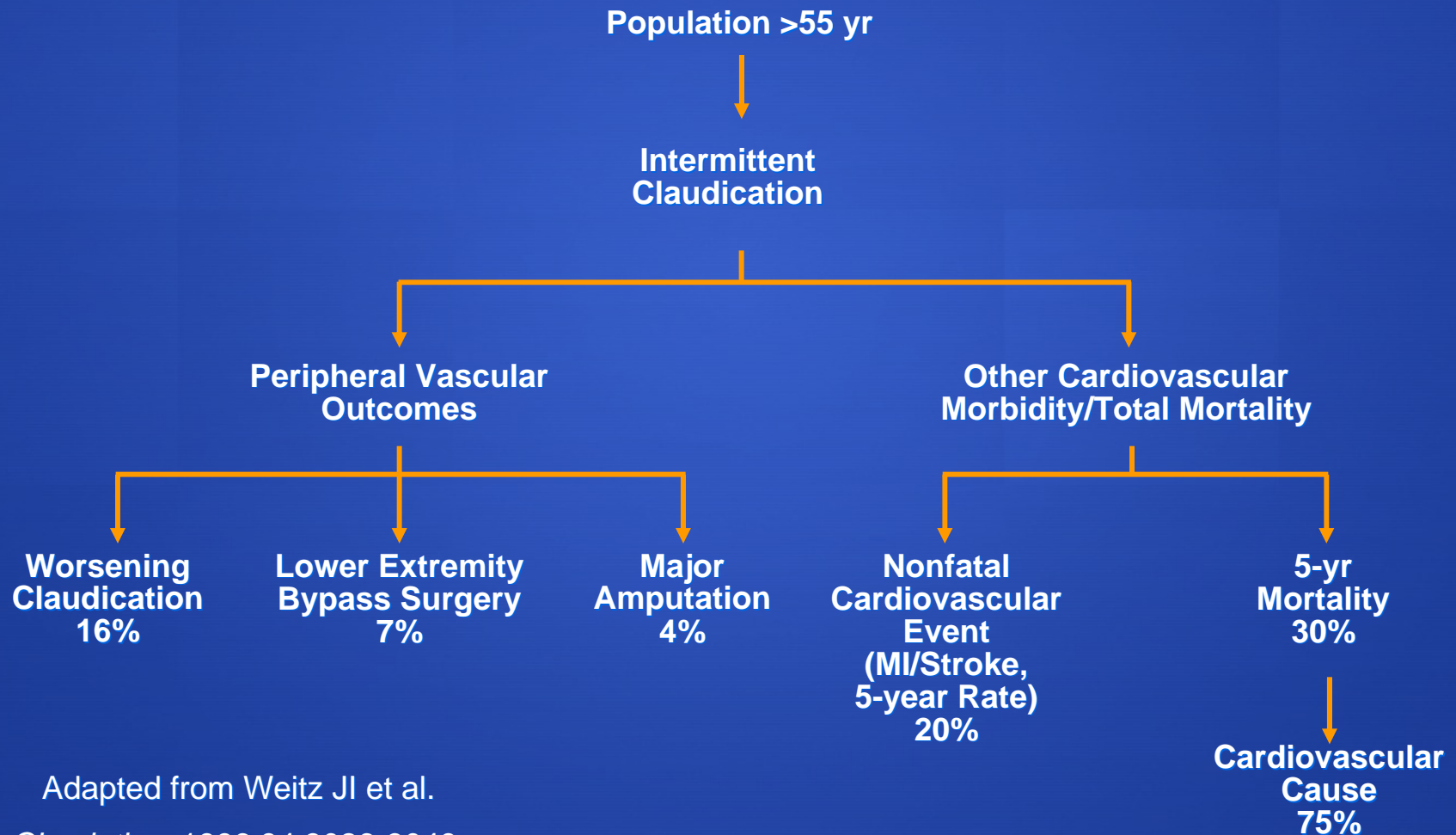
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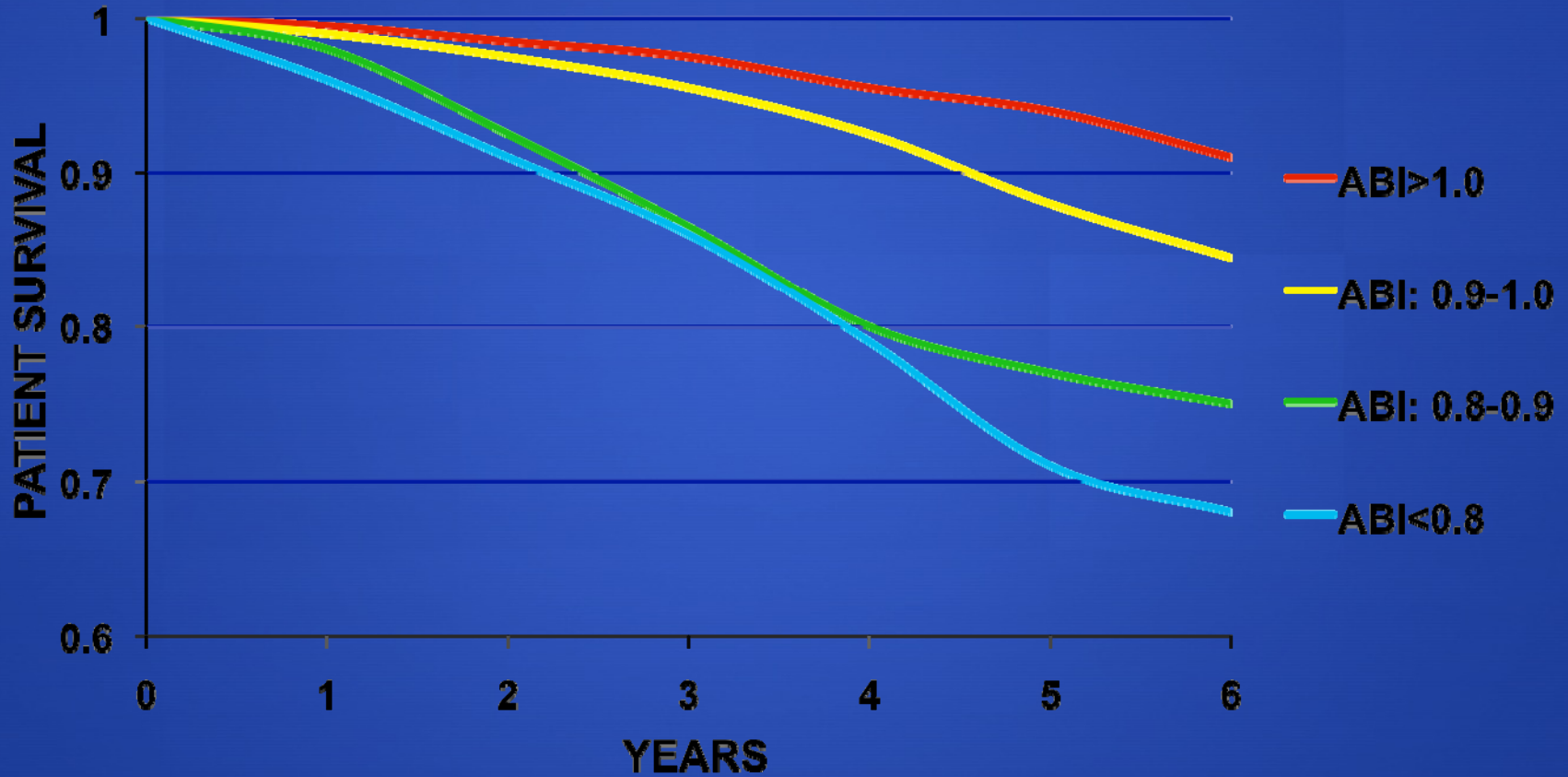
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- Low risk options exist today
- Lesions are easier to treat in earlier stages
- Patients can exercise and improve overall health
- The prognosis for untreated intermittent claudication is not good

Prognosis in Patients with Intermittent Claudication



Adapted from Weitz JI et al.
Circulation. 1996;94:3026-3049.

Patient Survival by Ankle-Brachial Index in Cardiovascular Health Study



Lifestyle Changes and Symptoms

- Questions to ask patients with possible lower extremity disease:
 - What is your typical activity level?
 - Do you experience any discomfort in the calf, thigh, buttock or hip area that occurs with walking, climbing stairs?
 - Describe the symptom, onset, duration and resolution?
 - Do you experience rest pain, leg pain when in bed?
 - Have you had any sores or skin ulcerations that won't heal?
 - Any changes in the color, temperature or appearance of your skin?
 - Any problems with impotence?

Visual Cues to PAD and Arterial Insufficiency

- Cool, dry, atrophic skin on legs
- Thickened or deformed nails
- Hair loss or uneven distribution on legs
- Muscle weakness or atrophy
- Ulcers or wounds on lower extremities
- Gangrene

PAD Diagnostic Tests

- Non-invasive tests¹
 - ABI (Ankle/Brachial Index)
 - Exercise Test
 - Segmental Pressures
 - Segmental Volume Plethysmography
 - Duplex Ultrasonography
 - MRA (Magnetic Resonance Arteriography)
- Invasive tests¹
 - Peripheral Angiography (DSA/CTA/MRA)

The Ankle-Brachial Index

$$\text{ABI} = \frac{\text{Lower extremity systolic pressure}}{\text{Brachial artery systolic pressure}}$$

Normal	0.95-1.2
PAD	<0.90
Rest pain/ulceration	<0.40

- The Ankle-Brachial Index is 95% sensitive and 99% specific for PAD
- Both ankle and brachial systolic pressures are obtained using a hand-held Doppler instrument



ADA Consensus Panel

- **Recommends ABI Screening for:**
 - **Patients over the age of 50 years who have diabetes**
 - **Patients with diabetes younger than 50 years of age who have other PAD risk factors (ie. Smoking, hypertension, hyperlipidemia, diabetes more than 10 years)**
- **ABI should be repeated in 5 years if normal**
- **If ABI is abnormal, then patient should be referred**

ACC/AHA Guidelines for the Management of PAD

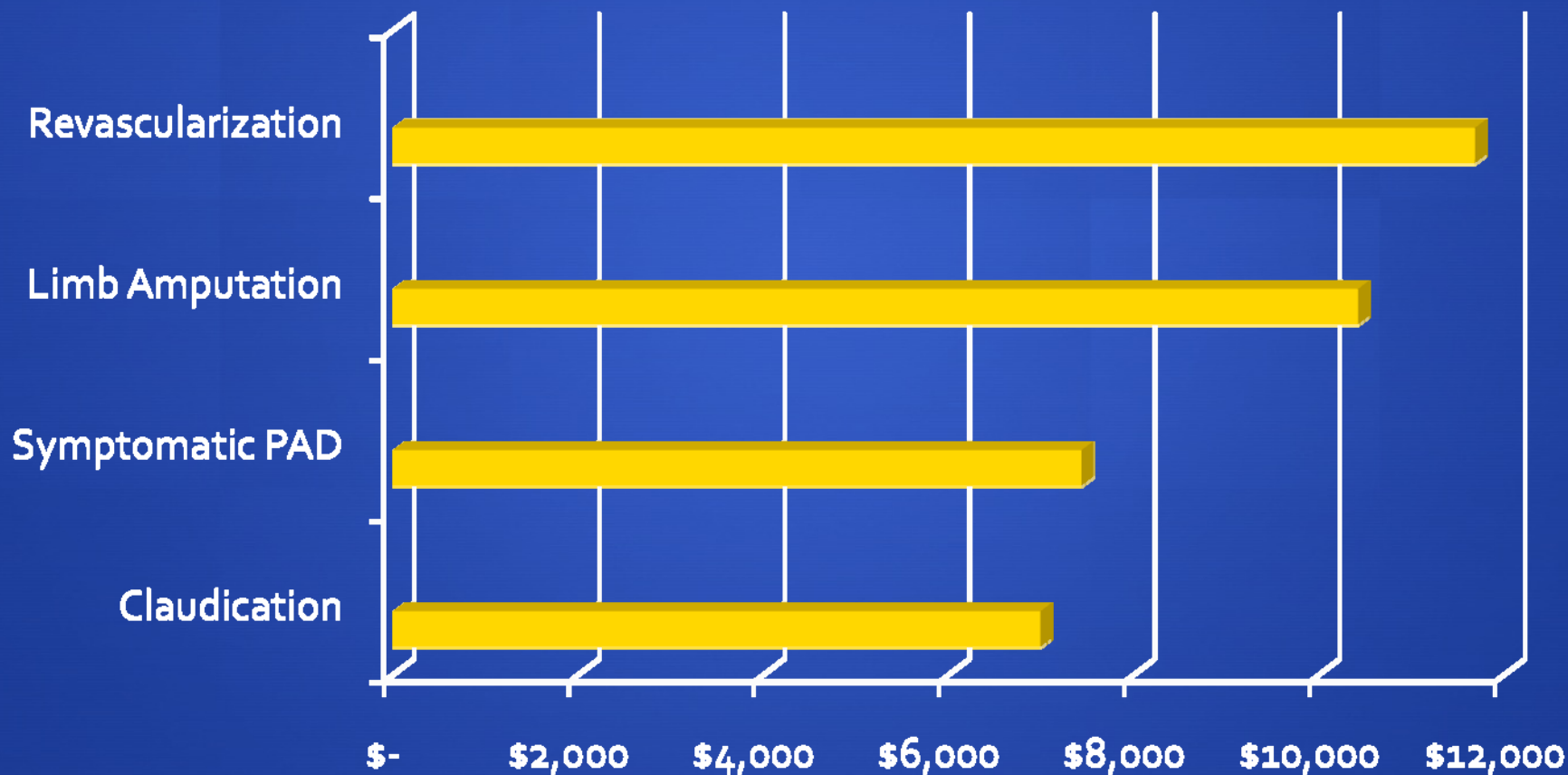
- The high prevalence of atherosclerotic risk factors place these patients at a “markedly” increased risk of atherosclerotic ischemic events, including MI and stroke
- All patients with lower extremity PAD should achieve risk reduction and specific treatment targets comparable to those of individuals with established coronary artery disease.

Progression and Symptoms of PAD

“PAD shares the same risk factors as cardiovascular conditions like stroke and heart attack but does not always have the dramatic onset....even if it does, it’s not treated as seriously.”

Elizabeth Mahoney, Sc.D.,
Saint Luke’s Hospital, Kansas City, MO
REACH Investigator

Average Cumulative 2-year Hospitalization Costs per (U.S.) Patient



Progression and Symptoms of PAD

“No one should assume that the first admission for a PAD procedure is a permanent resolution or ‘fix’ of the underlying condition.”

Alan T. Hirsch, M.D.,
University of Minnesota
REACH Investigator

PAD Treatment Options

- Medical
 - Risk Factor Modification*
 - Exercise Therapy*
 - Drug Therapy*
- Endovascular Therapy
 - Peripheral Transluminal Angioplasty*
 - Peripheral Stenting*
 - Athrectomy
 - Thrombolytic Therapy (adjunctive)
- Surgery
 - Bypass Grafts*
 - Amputation*
 - Endarterectomy*

*Rosenfield K, Isner JM, Chap. 97 Textbook of Cardiovascular Medicine 1998

How Can We Make a Difference?

- PAD Screening for Early Detection
 - Examine patient medical, surgical, family history
 - Question the patient about lifestyle changes and symptoms onset, characteristics, etc.
 - Visual screening
 - Non-invasive testing
 - Early referral to a vascular specialist

How Can We Make a Difference?

