2017 MID-ATLANTIC
CONFERENCE

7th ANNUAL CURRENT CONCEPTS IN
VASCULAR THERAPIES

2017

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April 21, 2017

Caring for the Infected Diabetic Foot is a Team Sport

SENTARA™

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James Callahan, DPM
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Leigh Atrium
Providence Road
First Colonial Road
Greenbrier Healthplex
Obici

Norfolk
Virginia Beach
Virginia Beach
Chesapeake
Suffolk

How can we avoid this scenario

How can we avoid this scenario

How can we prevent amputation

Team effort

The Reality of Diabetes

- Diabetes affects **26 million people** in the United States
- 8% of the population
- 16 million have been diagnosed
- 8.5 million are undiagnosed
- 3 million African Americans (11.4%)
- 2 million (8.2%) Hispanics, with **25%** of Hispanics 45-74 years of age have diabetes.
- Healthcare costs of treating diabetes: $100 billion/year
- There are currently **85,000 leg amputations / year**

The Reality of Diabetes

- More than 40% of people with diabetes mellitus are unaware of their disease
- About 15% of annual global health care budgets are spent on diabetes mellitus
- Diabetes mellitus is the seventh leading cause of death in the United States
- Diabetes mellitus is the leading cause of :
  - renal failure
  - lower extremity amputations
  - new cases of blindness in adult Americans

The Diabetic Foot

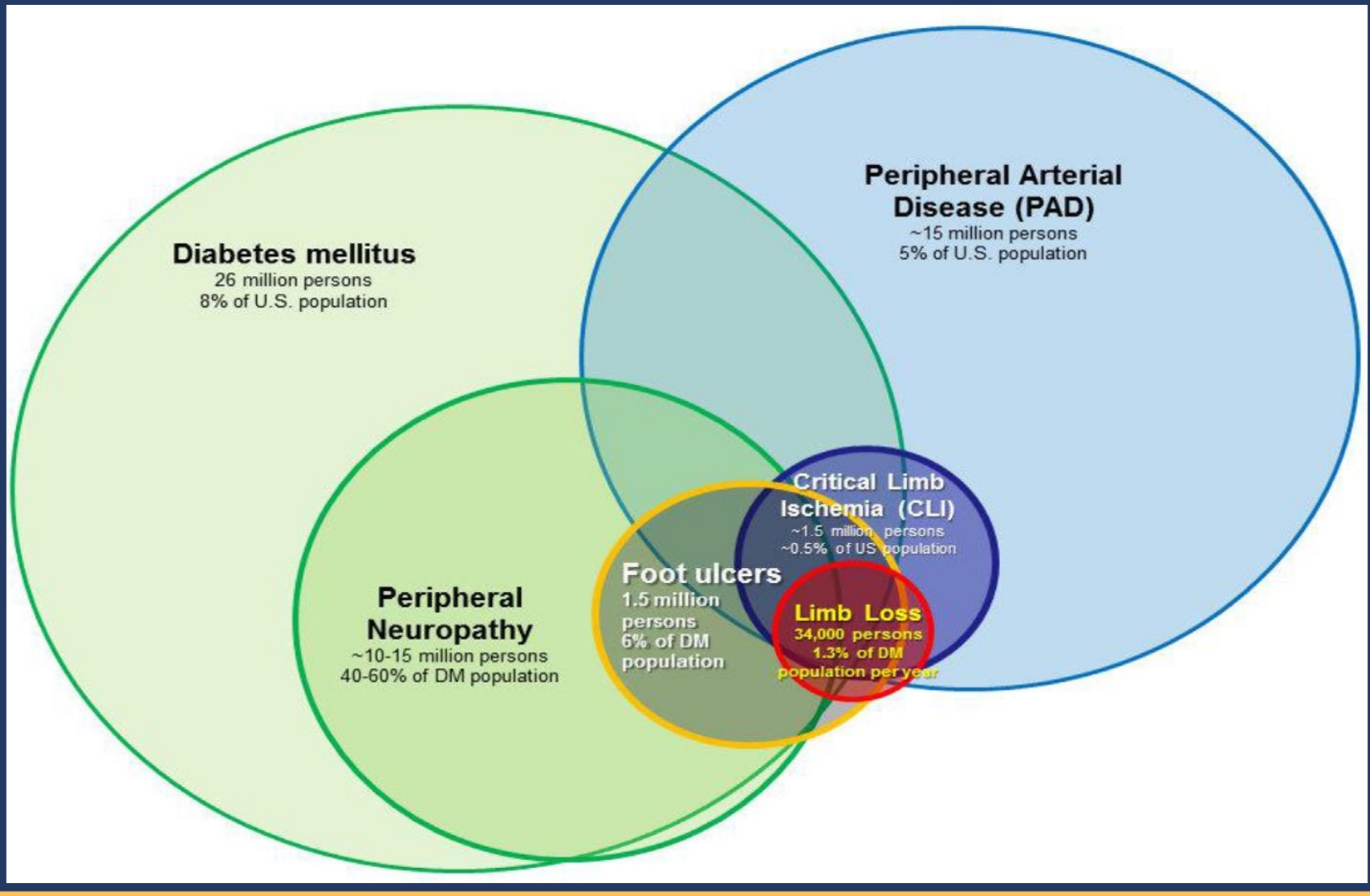
- 25% of foot ulcers progress to a leg amputation.
- 20% of those with a minor amputation will go on to a major amputation in 6 months.
- DM patients have a 40% higher risk of death after amputation compared to non-diabetics, with 50% mortality within 3 years.
- By the time the amputation is done total cost including hospitalization, wound care, loss of productivity is $100,000.
- If DM patient loses a leg, most lose other leg within 3 years, most are deceased within 5 years.

- Diabetic foot disease costs **$16,000,000,000 /year**

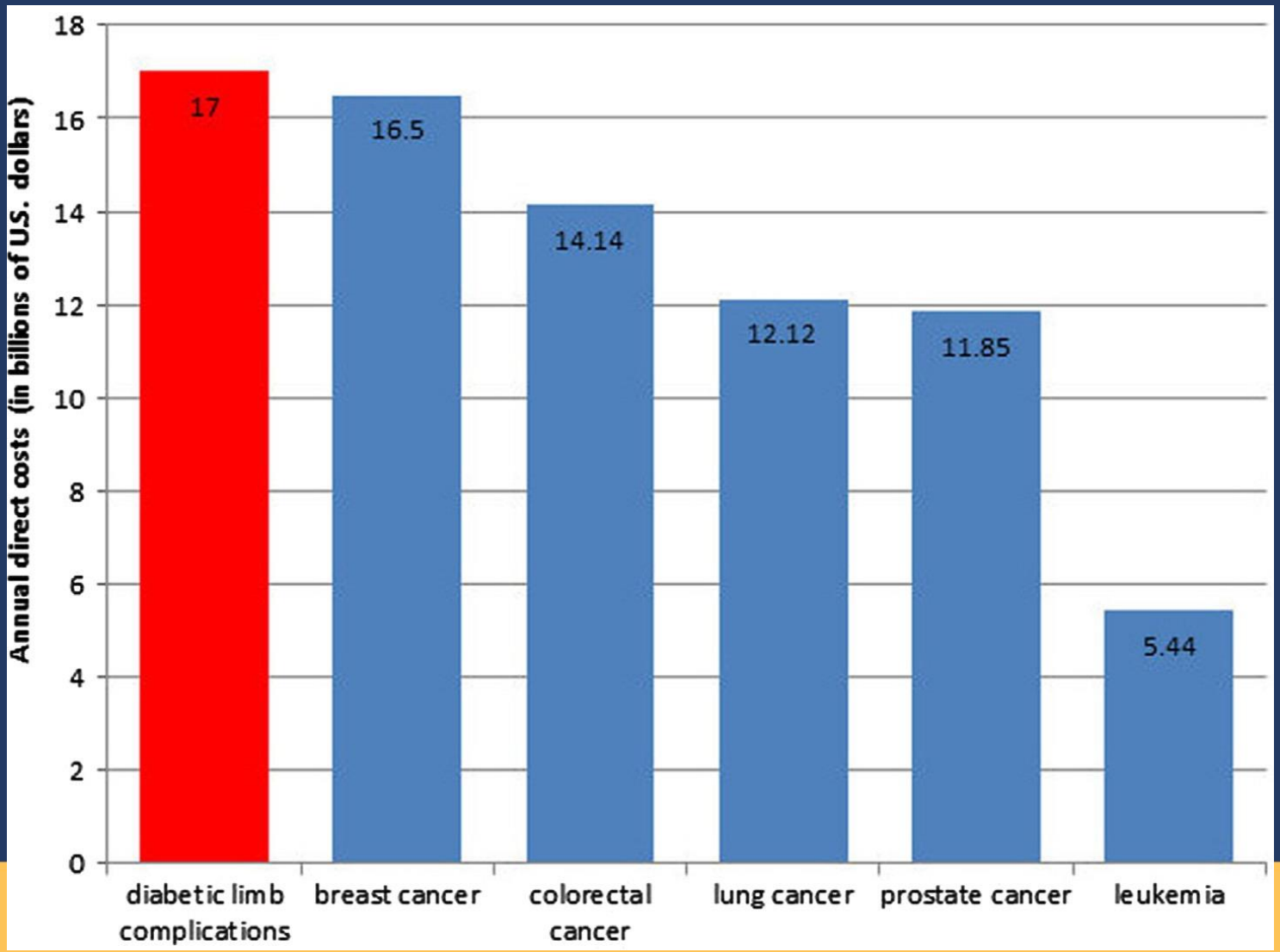
The Diabetic Foot

- Diabetic foot ulcers are often preventable BUT treatment is frequently suboptimal
- Diabetic foot ulcers are the most costly complication of diabetes mellitus
- The average lower limb amputation and rehabilitation costs $45,000 per limb

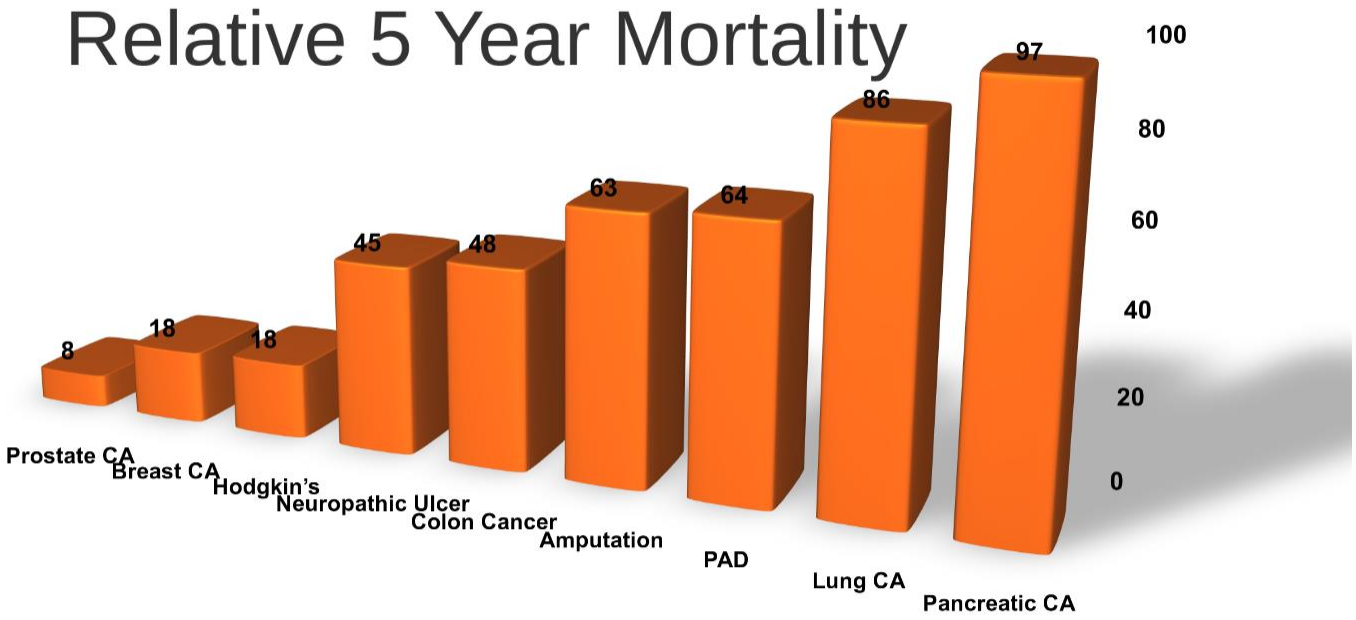
- **Diabetic foot ulcers precede 85% of lower limb amputations ➔ PREVENTION**


Diabetes mellitus
26 million persons
8% of U.S. population
Peripheral Arterial Disease (PAD)
~15 million persons
5% of U.S. population
Peripheral Neuropathy
~10-15 million persons
40-60% of DM population
Critical Limb Ischemia (CLI)
~1.5 million persons
~0.5% of US population
Foot ulcers
1.5 million persons
6% of DM population
Limb Loss
34,000 persons
1.3% of DM population per year

Diabetic Foot = Cancer



Diabetic Foot/PAD vs Cancer



Armstrong, et al, Int Wound J, 2007
Aulivola, et al, Arch Surg, 2004
American Cancer Society, 2000
National Cancer Institute (http://seer.cancer.gov), 2007
Moulik, et al, Diabetes Care, 2003
Faglia, et al, Circulation, 2006
Office Natl. Statistics, UK, 2006
Singh, Armstrong, Lipsky, JAMA, 2006

Diabetic with Callus = Breast Lump

Diabetic Pathway to Amputation

Diabetes

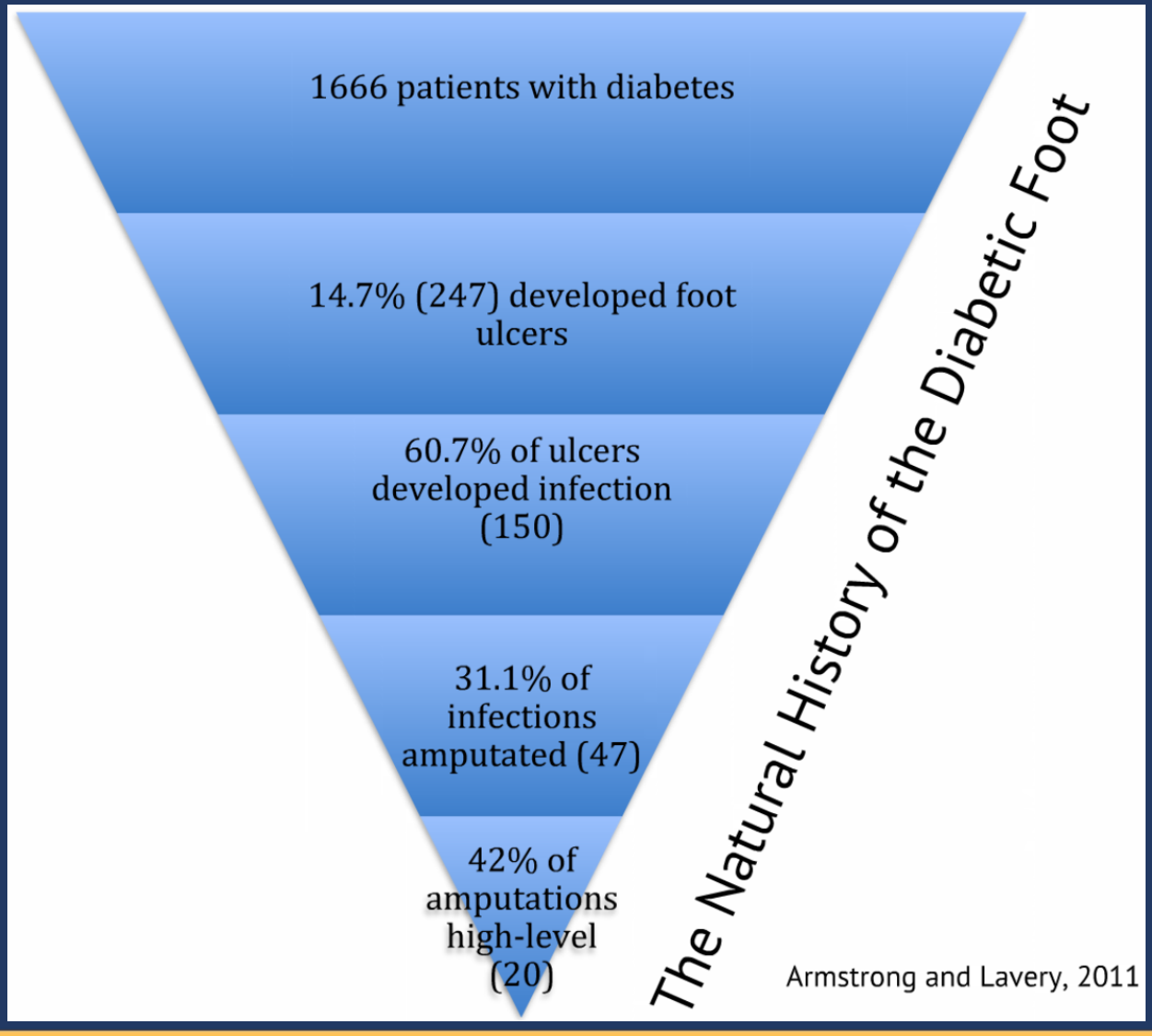
Neuropathy

Ulceration

Infection

Ischemia

Amputation


1666 patients with diabetes
14.7% (247) developed foot ulcers
60.7% of ulcers developed infection (150)
31.1% of infections amputated (47)
42% of amputations high-level (20)
The Natural History of the Diabetic Foot
Armstrong and Lavery, 2011

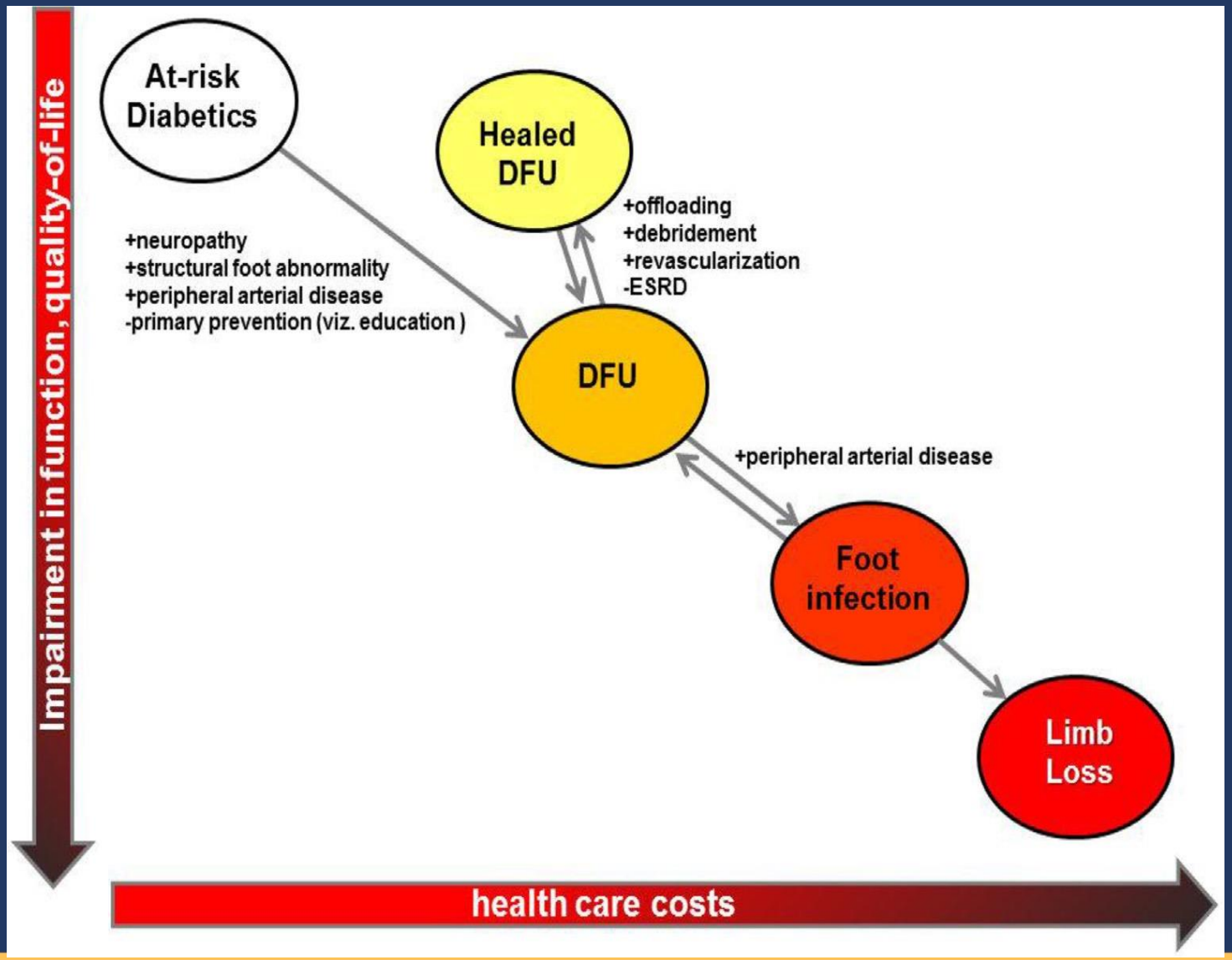
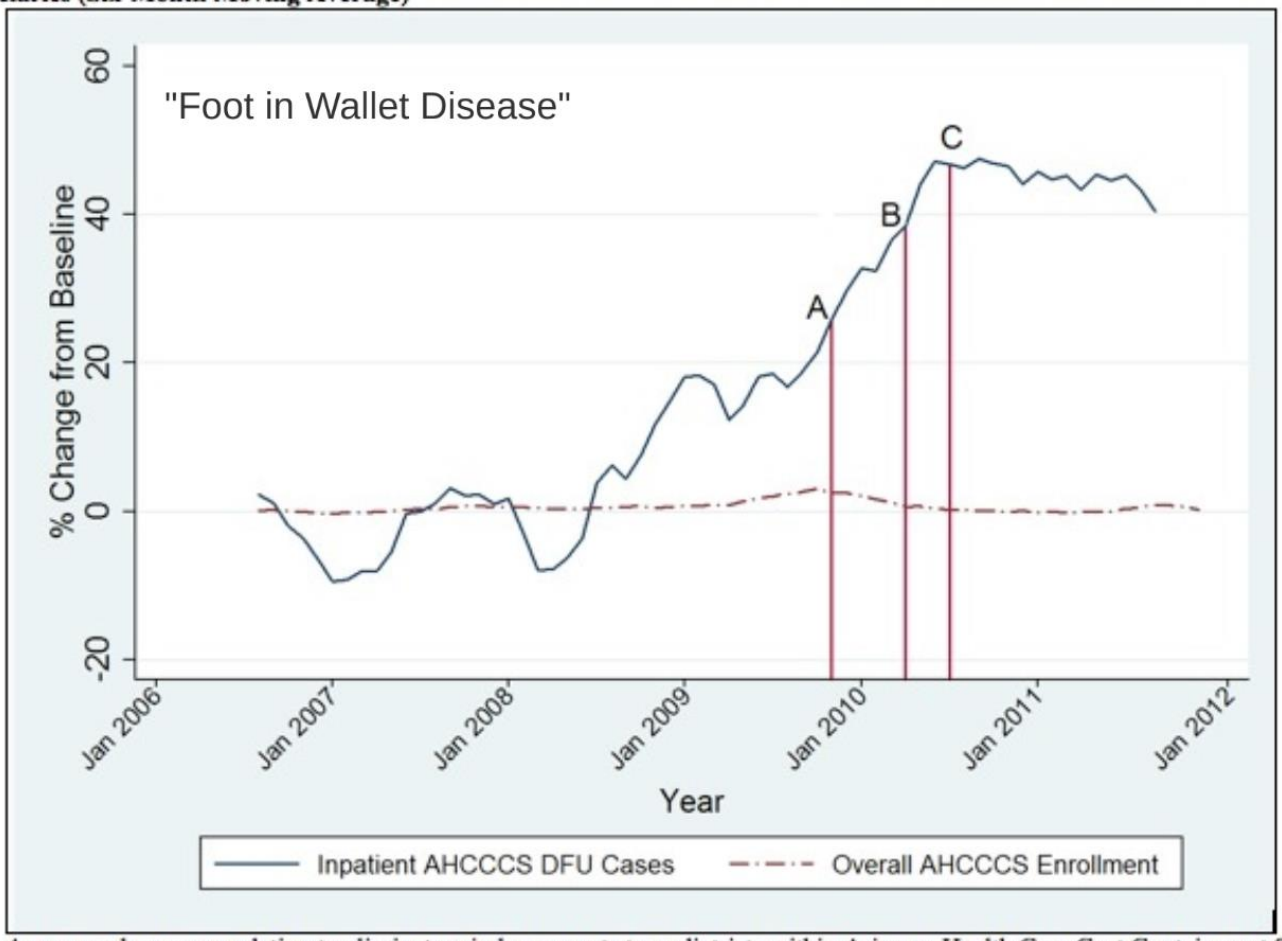

Impairment in function, quality-of-life
At-risk Diabetics
+neuropathy
+structural foot abnormality
+peripheral arterial disease
-primary prevention (viz. education)
Healed DFU
+offloading
+debridement
+revascularization
-ESRD
DFU
+peripheral arterial disease
Foot infection
Limb Loss
health care costs

Figure 1. Diabetic Foot Infection Hospitalizations Among Arizona Health Care Cost Containment System (AHCCCS, Arizona Medicaid) Beneficiaries (Six-Month Moving Average)



Timepoint A: Announced recommendation to eliminate reimbursements to podiatrists within Arizona Health Care Cost Containment System, AHCCCS (i.e., Arizona Medicaid); Arizona 49th Legislature SB1003 and HB2003 [OCTOBER 2009]

Timepoint B: Arizona 49th Legislature SB 1003 and HB 2003 legislation signed [MARCH 2010]

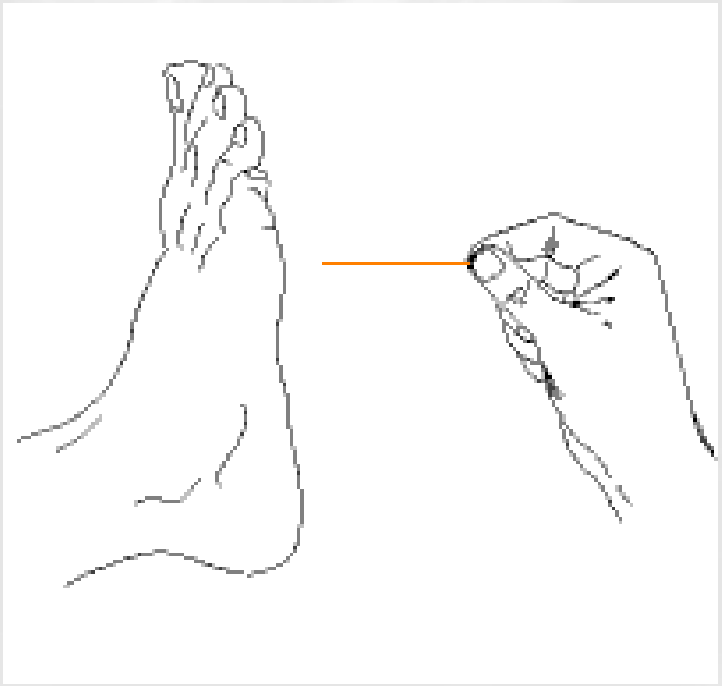
Timepoint C: Official date of podiatric service coverage elimination [JUNE 2010]

Diabetic Peripheral Neuropathy

- Increased plantar pressure resulting from neuropathy is the cause of most diabetic foot ulcers
- Diabetic neuropathy has 3 components: sensory, autonomic, and motor neuropathy
- Loss of protective sensation can be measured with a 10-g monofilament (the Semmes Weinstein monofilament test)
- Autonomic neuropathy causes dryness of the skin, and motor neuropathy results in a toe deformities, loss of reflexes, and intrinsic muscle atrophy of the foot
- Diabetic sensorimotor polyneuropathy will develop in 45% of patients within 10 years of the onset of diabetes mellitus

Early Foot Screening

Diabetic Foot Exam for Neuropathy



Callus formation

↓

Subcutaneous bleeding

↓

Ulcer formation

↓

Deeper infection
± osteomyelitis

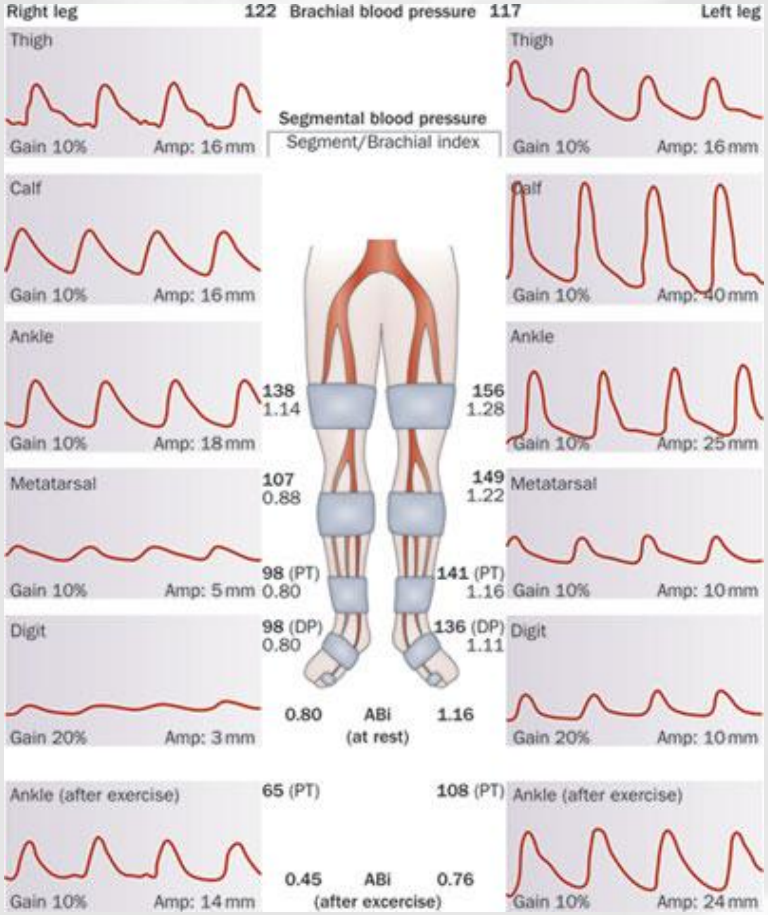
Proper Offloading of Ulcers

Peripheral Arterial Disease

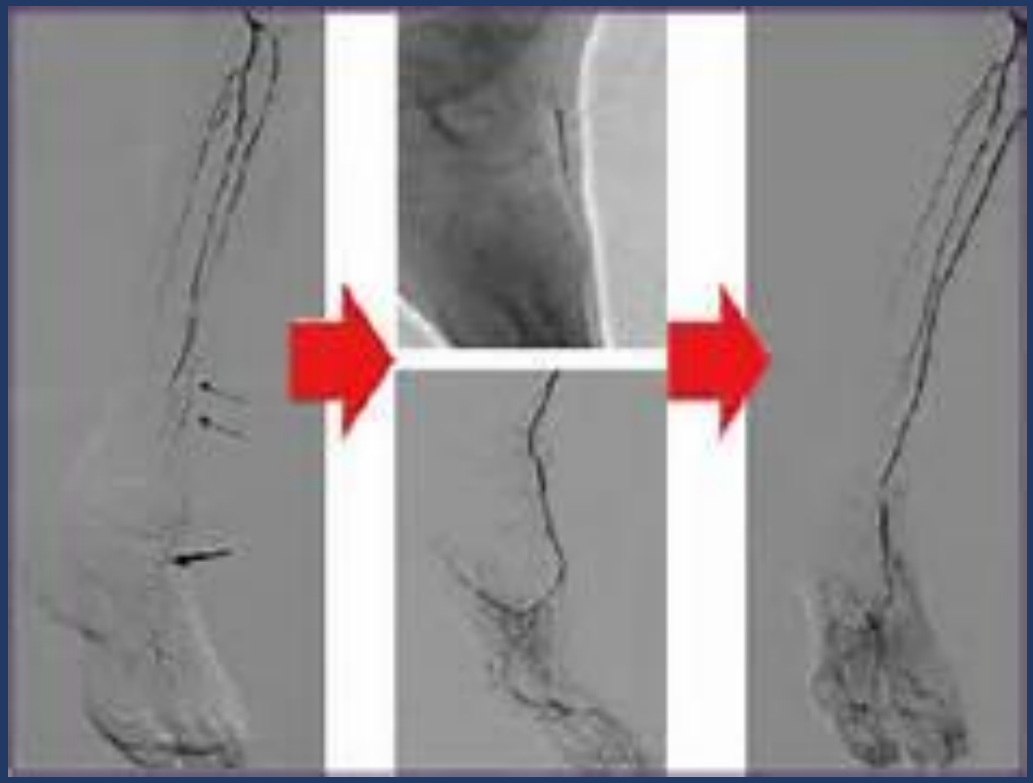
- Assessment of the vascular status requires a thorough history and physical examination; however, definitive diagnoses require an Arterial studies
- A palpable pulse in the foot does not always equate normal perfusion, especially in diabetics
- Segmental continuous wave Doppler examination, ankle-brachial index, and toe-brachial pressure index are regarded as the criterion standard for the evaluation of limb perfusion in persons with diabetes mellitus
- Ischemic disease increases the risk for limb loss.
- If vascular (ischemic) signs and symptoms are present, referral to vascular surgeon for proper testing and revascularization

Early Foot Screening

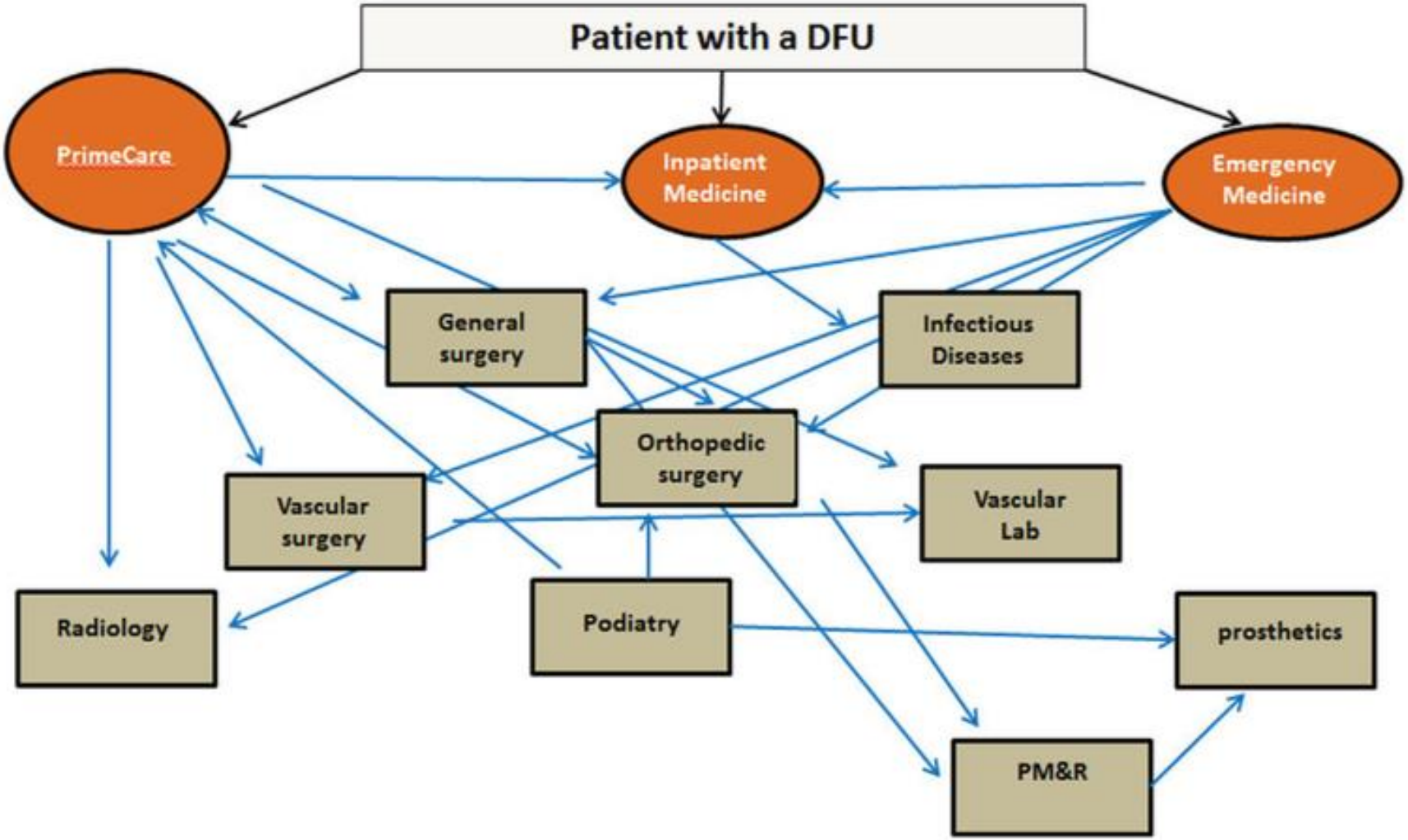
Diabetic Foot Exam for PVD

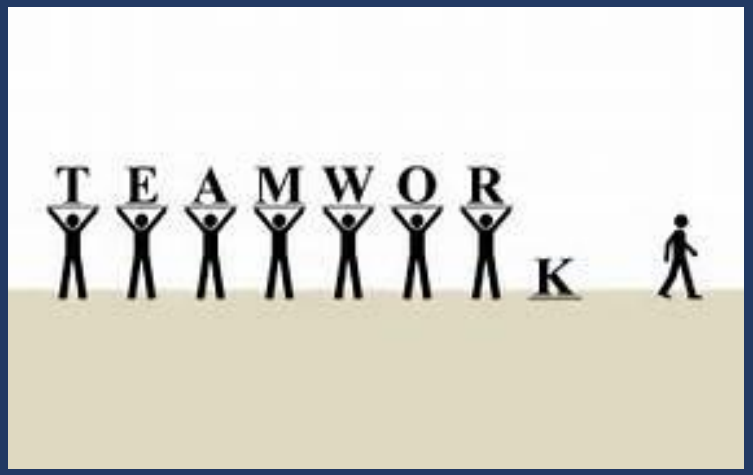


Vascular surgery



TOE and FLOW


Patient with a DFU
PrimeCare
Inpatient Medicine
Emergency Medicine
General surgery
Infectious Diseases
Orthopedic surgery
Vascular surgery
Vascular Lab
Radiology
Podiatry
prosthetics
PM&R



A TEAM APPROACH

DIABETIC LIMB SALVAGE

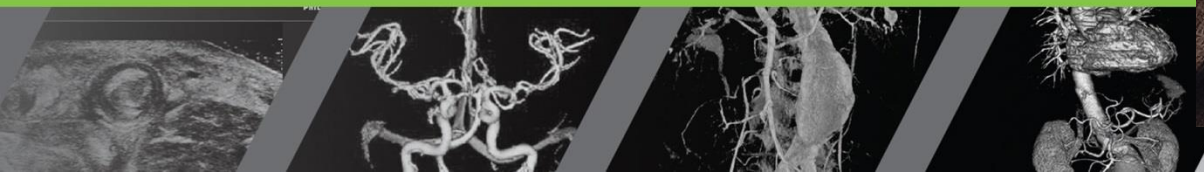
MEDSTAR GEORGETOWN UNIVERSITY HOSPITAL

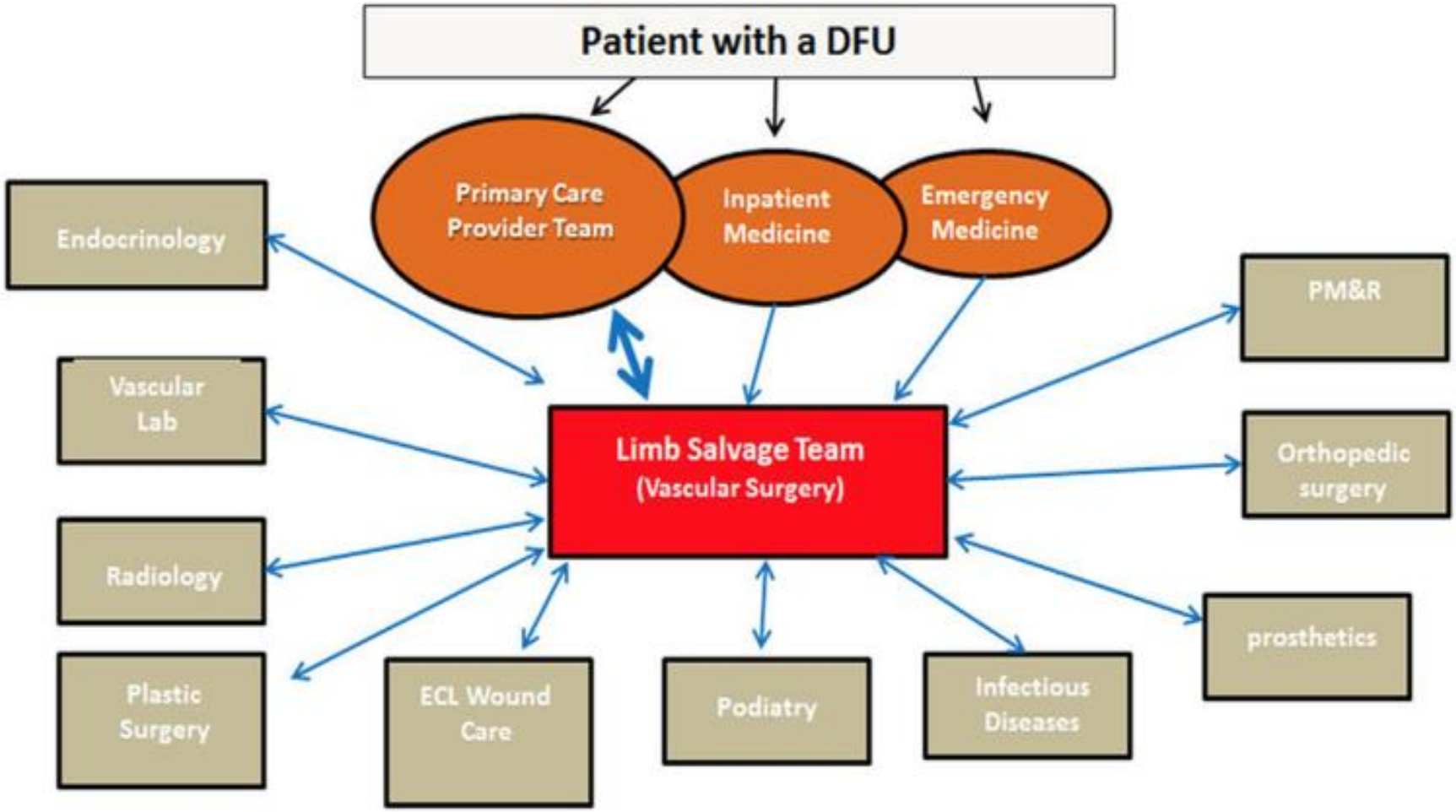
What we know

- Patients with diabetes mellitus have an increased risk of developing diabetic foot ulcers and are at risk for delayed healing
- Peripheral neuropathy and vascular disease are major factors.
- Comprehensive evaluation of the patient should be performed in concert with local wound care and vascular consultation.
- The keys of local wound care and treatment include pressure redistribution (off-loading), surgical debridement of the callus and ulcer, and the treatment of local infection.
- Keep the wound moist but the skin dry.
- Antibiotics and infectious disease consultation.

What we do

- Early detection and prevention
- Optimize vascular supply
- Plantar pressure redistribution and shoe gear modification
- Medical and surgical intervention for soft tissue and bone infections
- Consider bioengineered skin substitutes




Patient with a DFU
Primary Care Provider Team
Inpatient Medicine
Emergency Medicine
Endocrinology
Vascular Lab
Radiology
Plastic Surgery
ECL Wound Care
Podiatry
Infectious Diseases
prosthetics
Orthopedic surgery
PM&R
Limb Salvage Team
(Vascular Surgery)

Management of the Diabetic Foot

- Strive for multidisciplinary team approach
- Primary care physicians, hospitalists, endocrinology, infectious disease, radiology, podiatric surgery, orthopedics, plastic surgery, vascular surgery, nursing, diabetes educators, dieticians, physical therapy, orthotists, case management, social service, hyperbaric medicine.
- Outcomes of treatment should be monitored and communicated to the limb salvage team
- Make the patient and their family a part of the team

Thank You

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