Peripheral Arterial Disease in Primary Care:
8 *Reasons Why You Should Care?*

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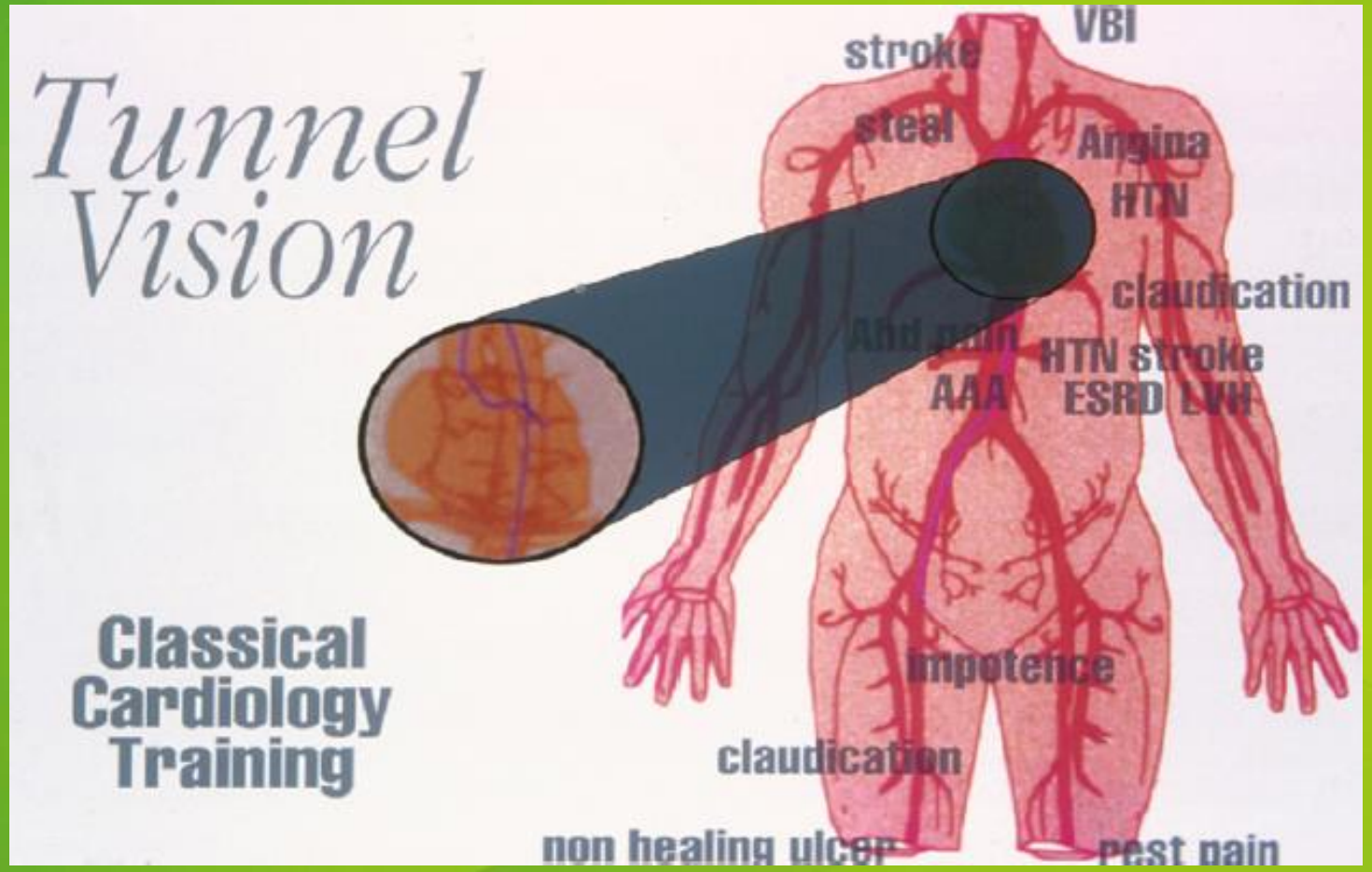
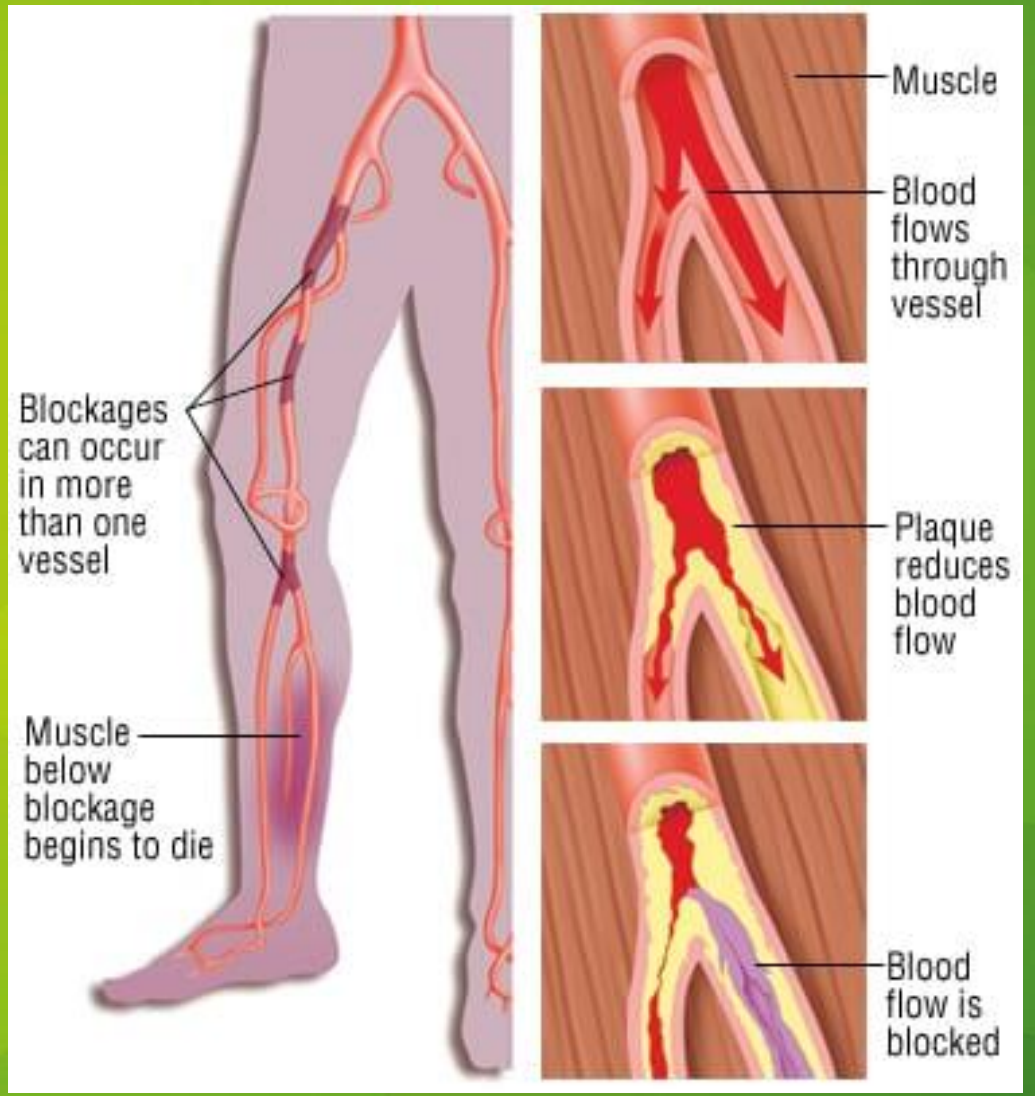
Atherosclerosis is a Systemic Disease





8 Reasons why you should care about PAD?

1. PAD is common in primary care
2. PAD = high CV risk
3. PAD is progressive
4. PAD can be silent but is not benign
5. PAD is under-recognized, under-diagnosed & under-treated
6. PAD treatment can save life & limb
7. PAD can be readily diagnosed in primary care
8. Primary care can play key role in PAD management

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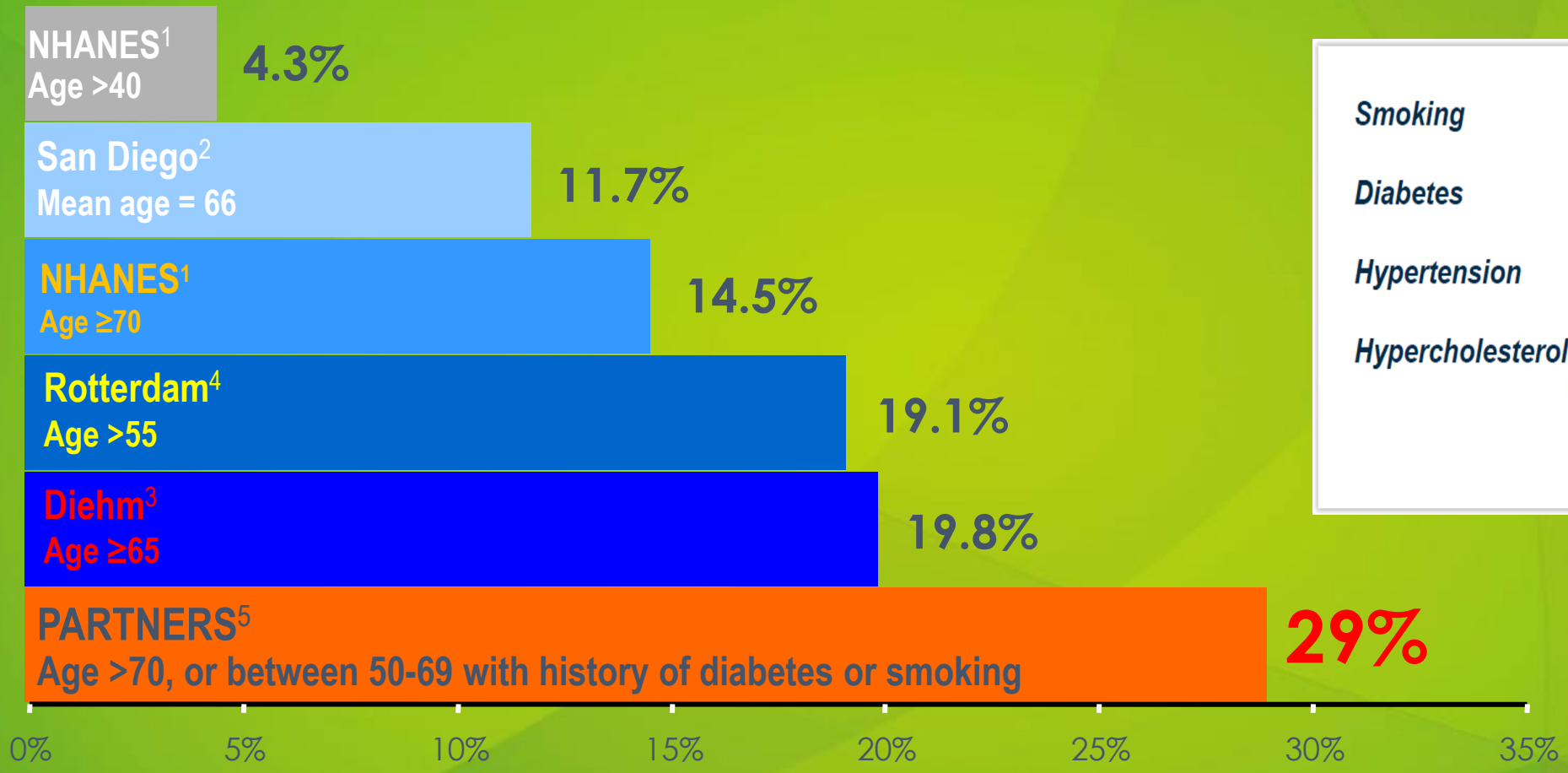
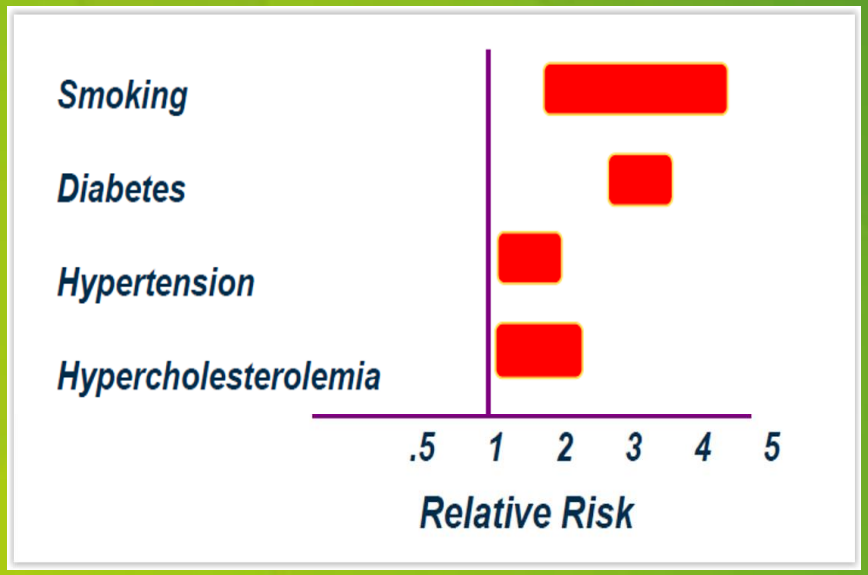
1. PAD is Common in Primary Care Setting





NHANES = National Health and Nutrition Examination Survey. PARTNERS = PAD Awareness, Risk, and Treatment New Resources for Survival program.

1. Selvin E, Erlinger TP. NHANES. *Circulation.* 2004;110:738-743; 2. Criqui MH et al. *Circulation.* 1985;71:510-515; 3. Meijer WT et al. *Arterioscler Thromb Vasc Biol*. 1998;18:185-192; 4. Diehm C et al. *Atherosclerosis.* 2004;172:95-105; 5. Hirsch AT et al. *JAMA.* 2001;286:1317-1324.

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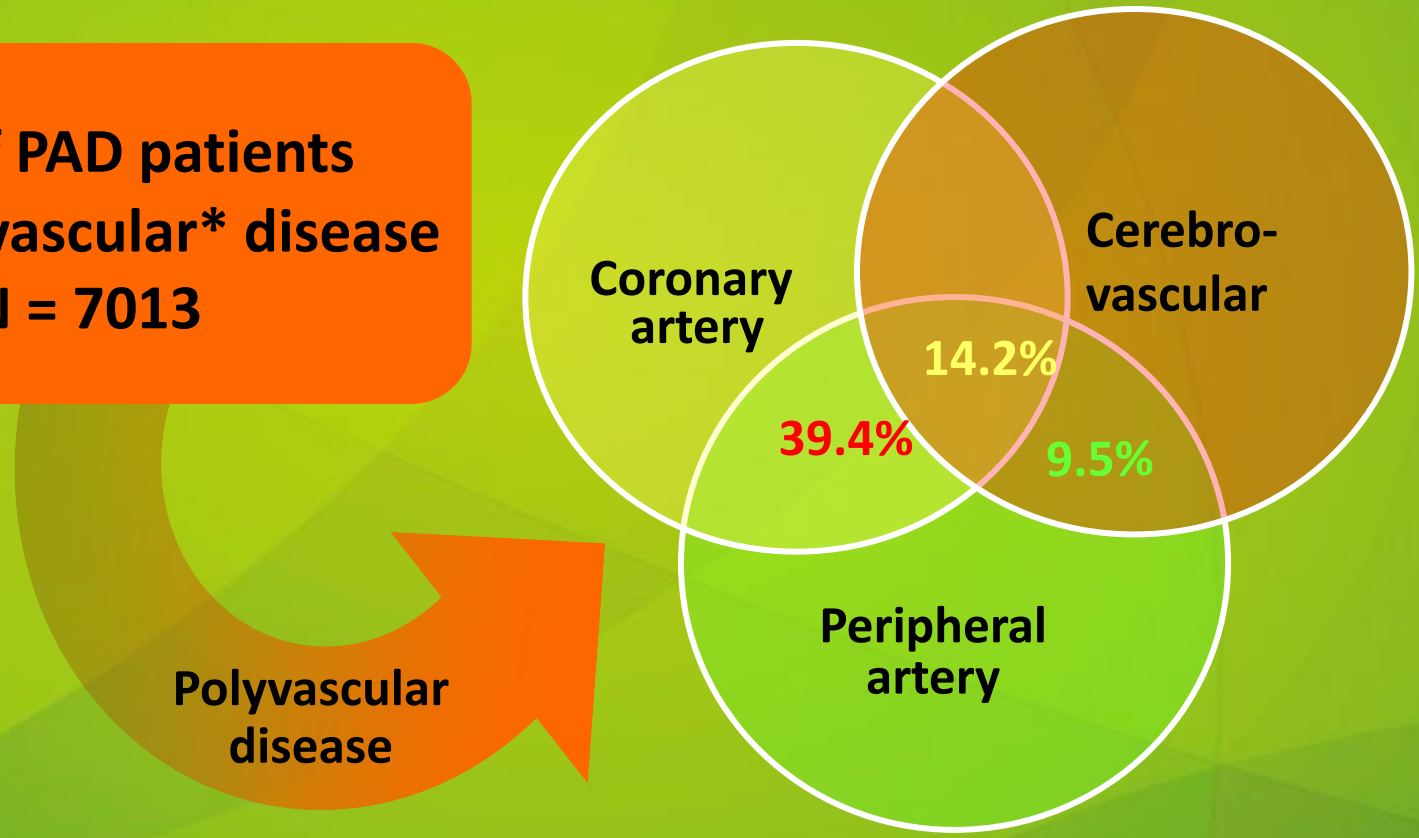
Poly-vascular Disease is Common

REACH – International Registry

>63,000 patients from 43 countries (Incl. Hong Kong)

63% of PAD patients had poly-vascular* disease N = 7013

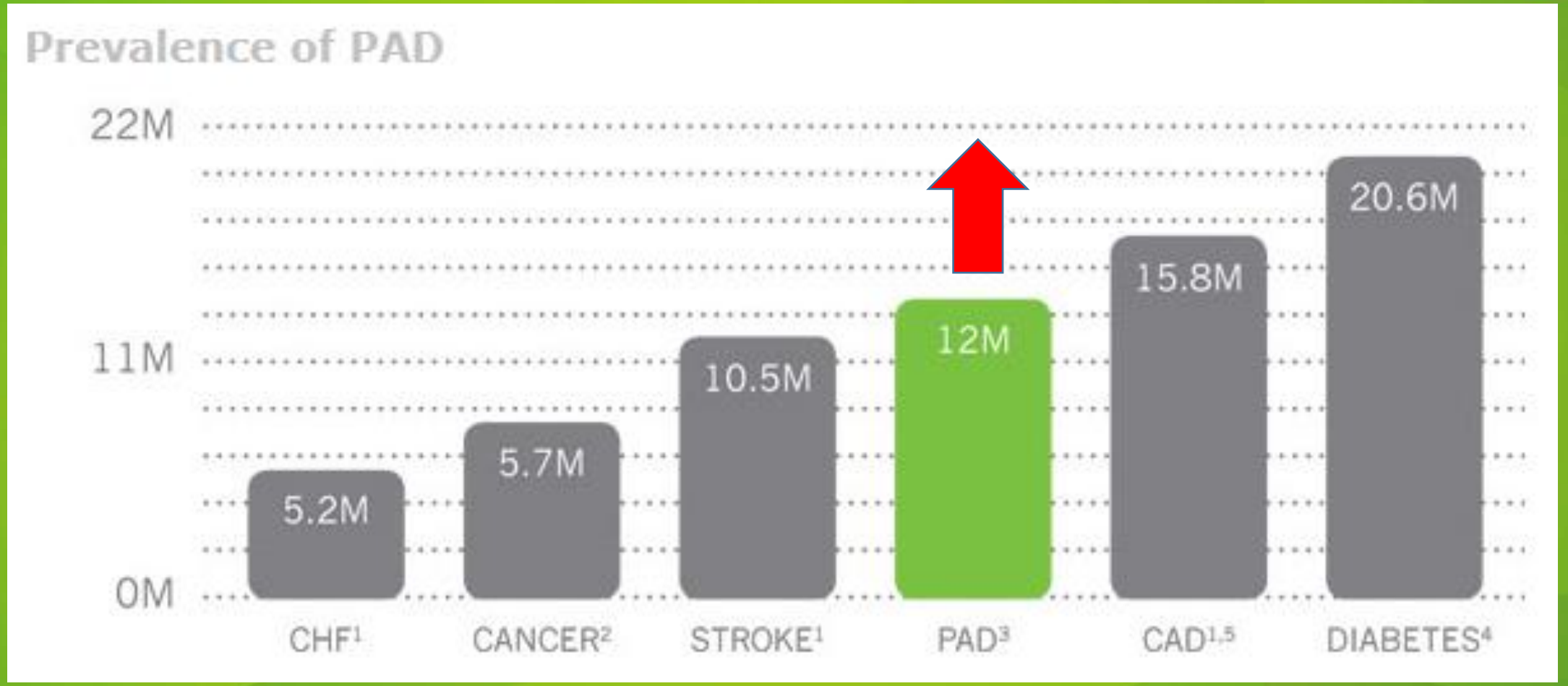


*PAD patients with polyvascular disease had concomitant symptomatic cerebrovascular disease and/or CVD.

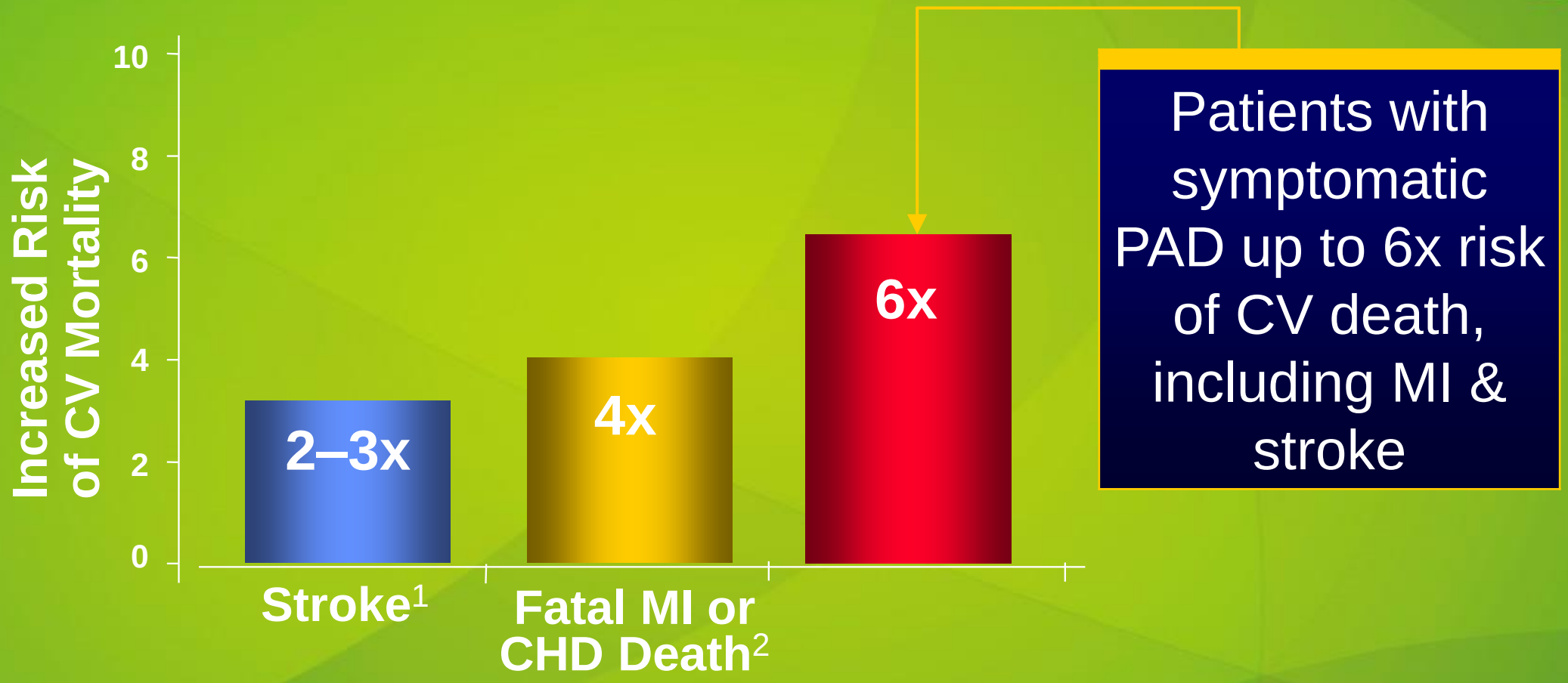
REACH = REduction of Atherothrombosis for Continued Health.

Bhatt DL et al. American College of Cardiology Scientific Session. March 8, 2005.

Scope of Problem



2. PAD = High CV Risk



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

1 in 5 patients with PAD will experience CV death, MI, stroke, or hospitalization within 1 year

REACH Registry

PAD 21.1% 1 in ~5

CAD 15.2% 1 in ~6

CVD 14.5% 1 in ~7

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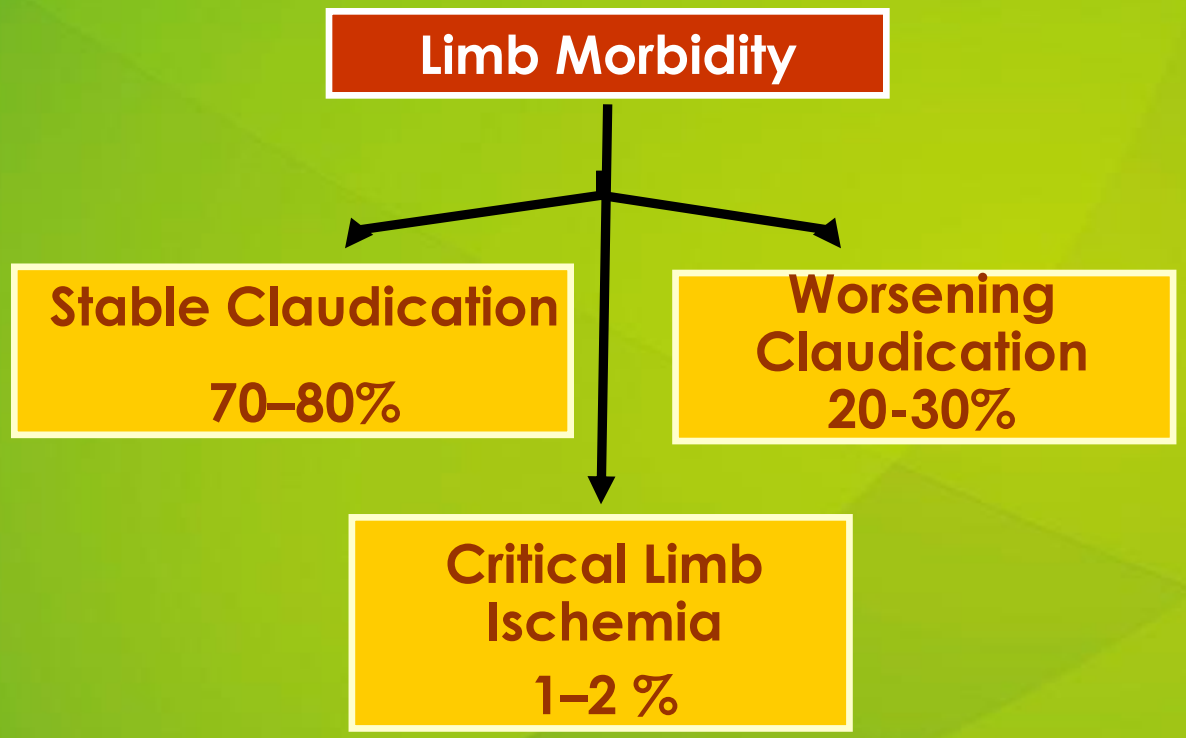
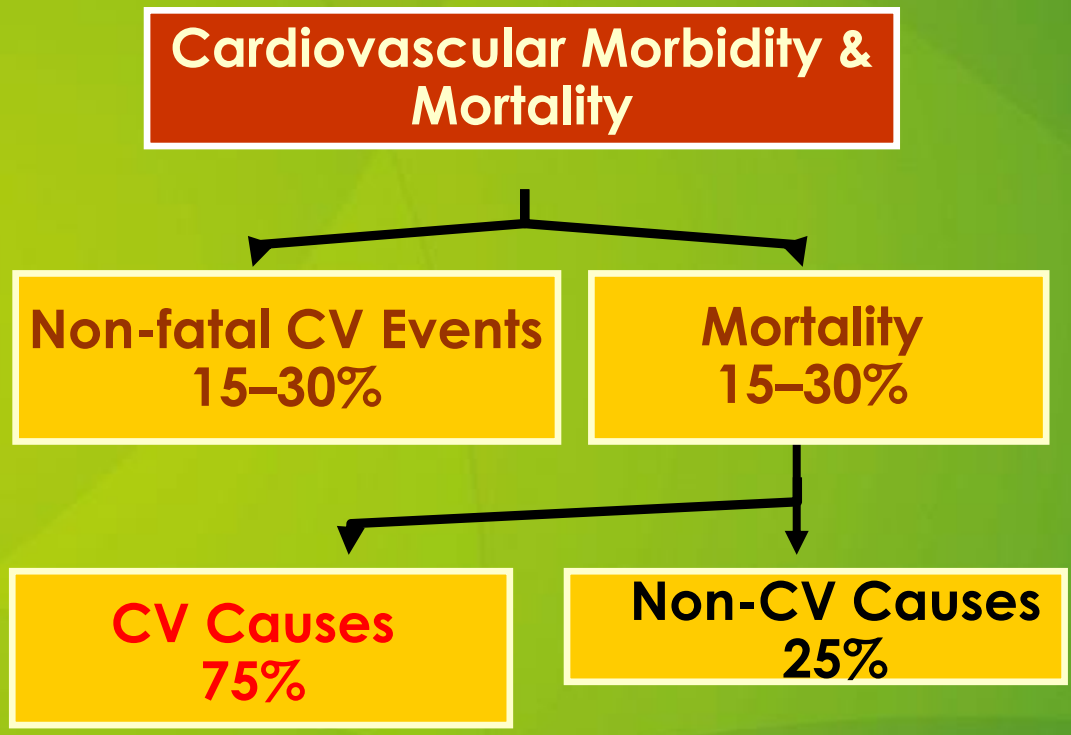
Steg PG *et al*, on behalf of the REACH Registry Investigators. *JAMA* 2007;297(11):1197-1206.

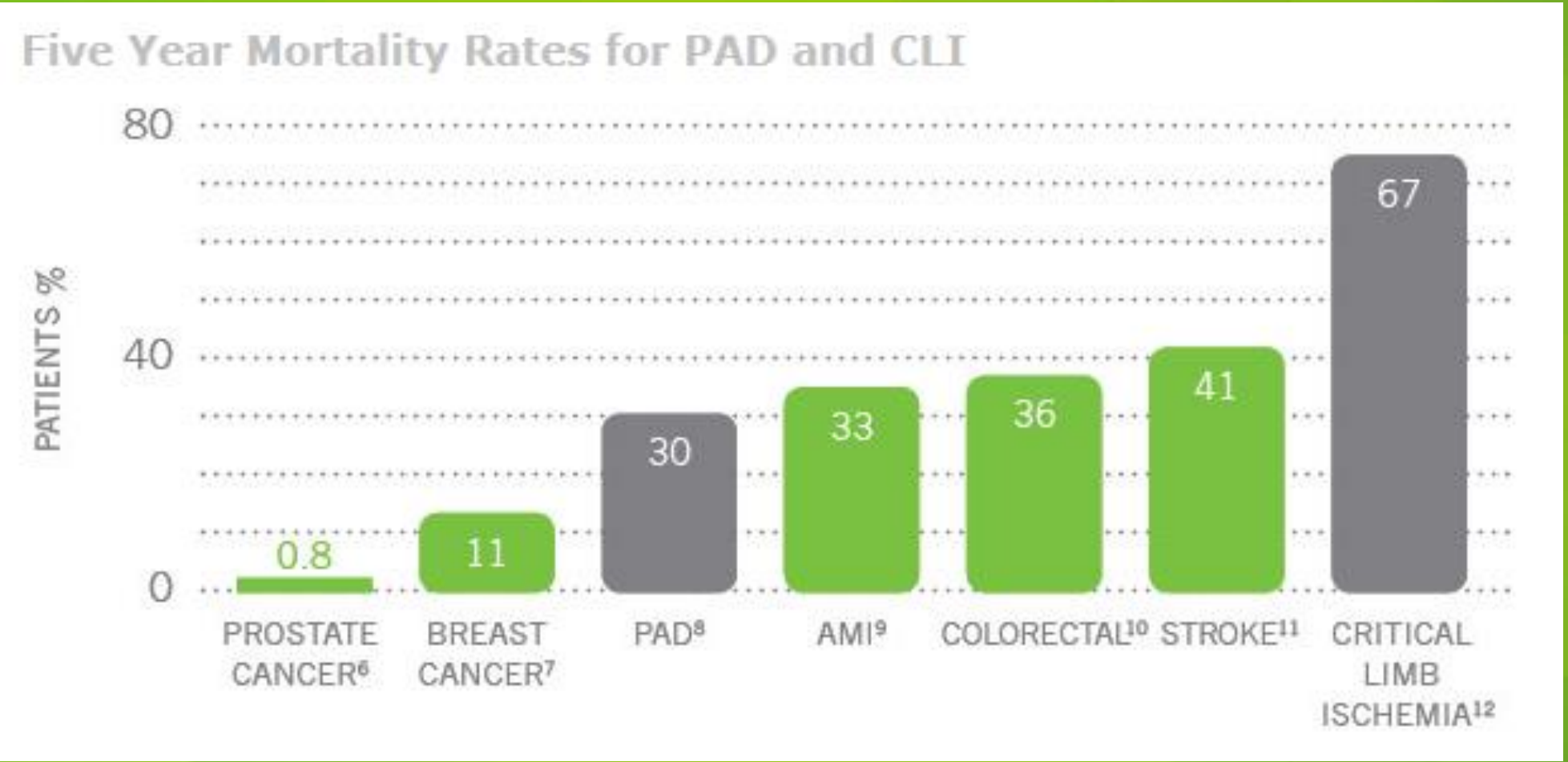
3. PAD is progressive

Natural History of PAD: 5-Year Outcomes





Relative 5-Year Mortality Rates



* American Cancer Society. *Cancer Facts and Figures.* 1997.

** Kempczinski, RF, Bernhard VM. IN: Rutherford RB, ed. Vascular Surgery. Philadelphia, PA: WB Saunders; 1989: chap 53.

Critical Limb Ischemia (CLI)

Most Severe PAD (1% - 3%)

Ischemic rest pain

Non-healing Ulcer

Sepsis

Gangrene

Amputation

Death

<50% alive with both limbs in 1 year

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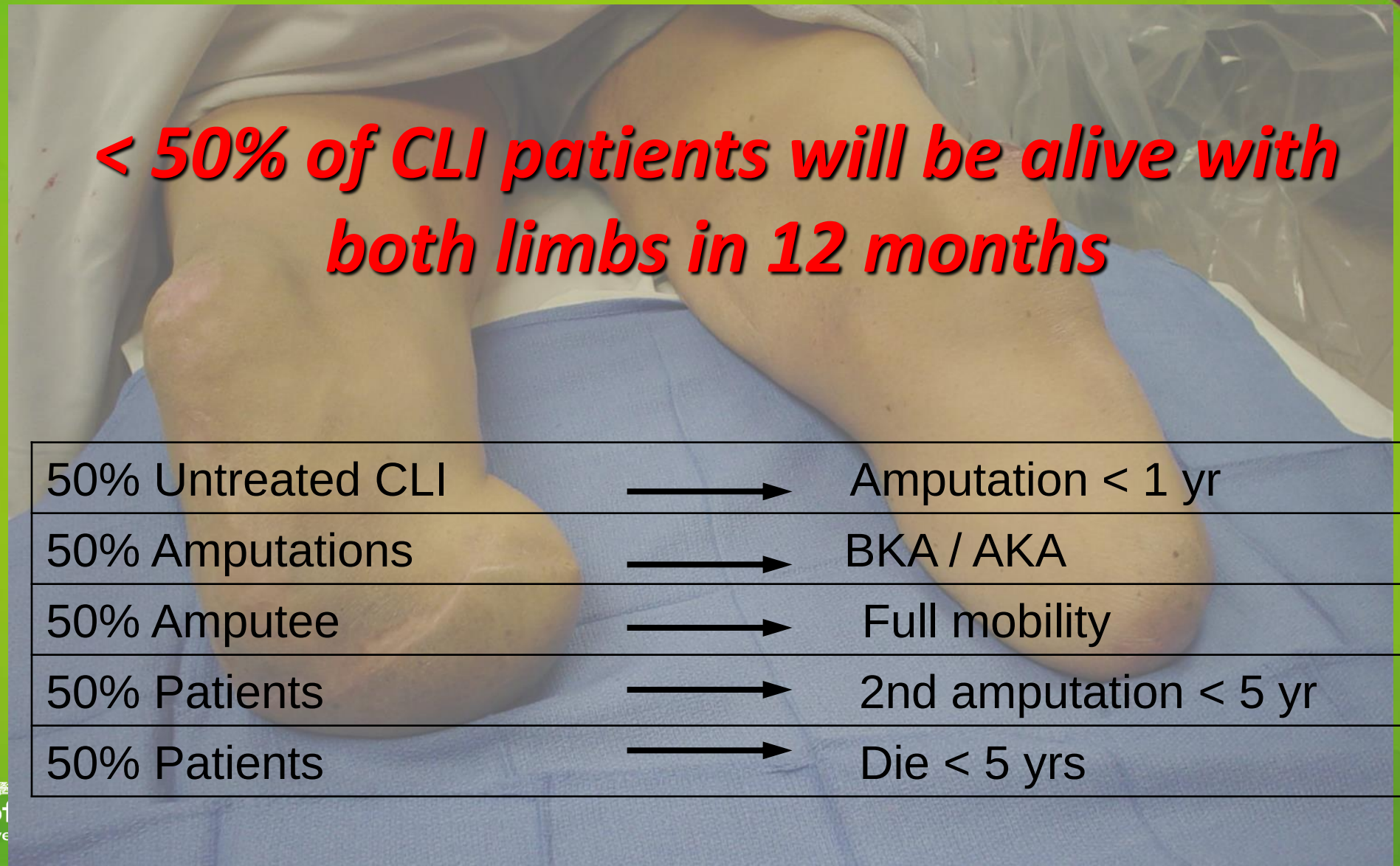
Tragic “Rule of 50” of CLI

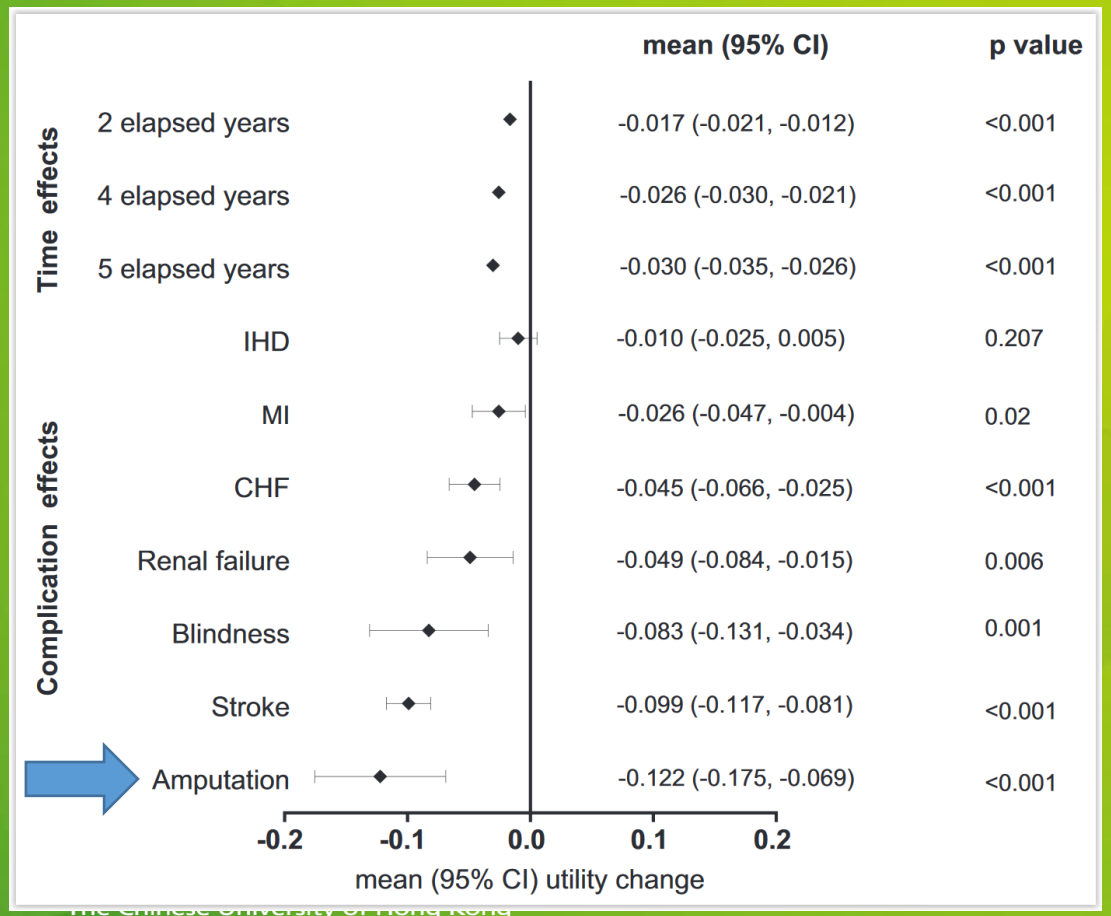


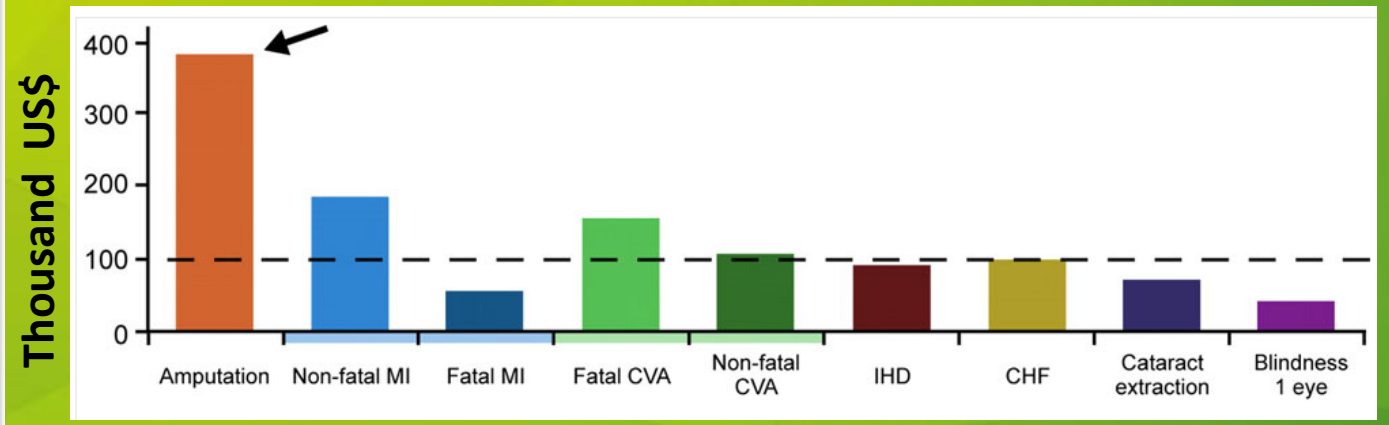
< 50% of CLI patients will be alive with both limbs in 12 months

50% Untreated CLI	→	Amputation < 1 yr
50% Amputations	→	BKA / AKA
50% Amputee	→	Full mobility
50% Patients	→	2nd amputation < 5 yr
50% Patients	→	Die < 5 yrs

Amputation is Costly & Irreversible

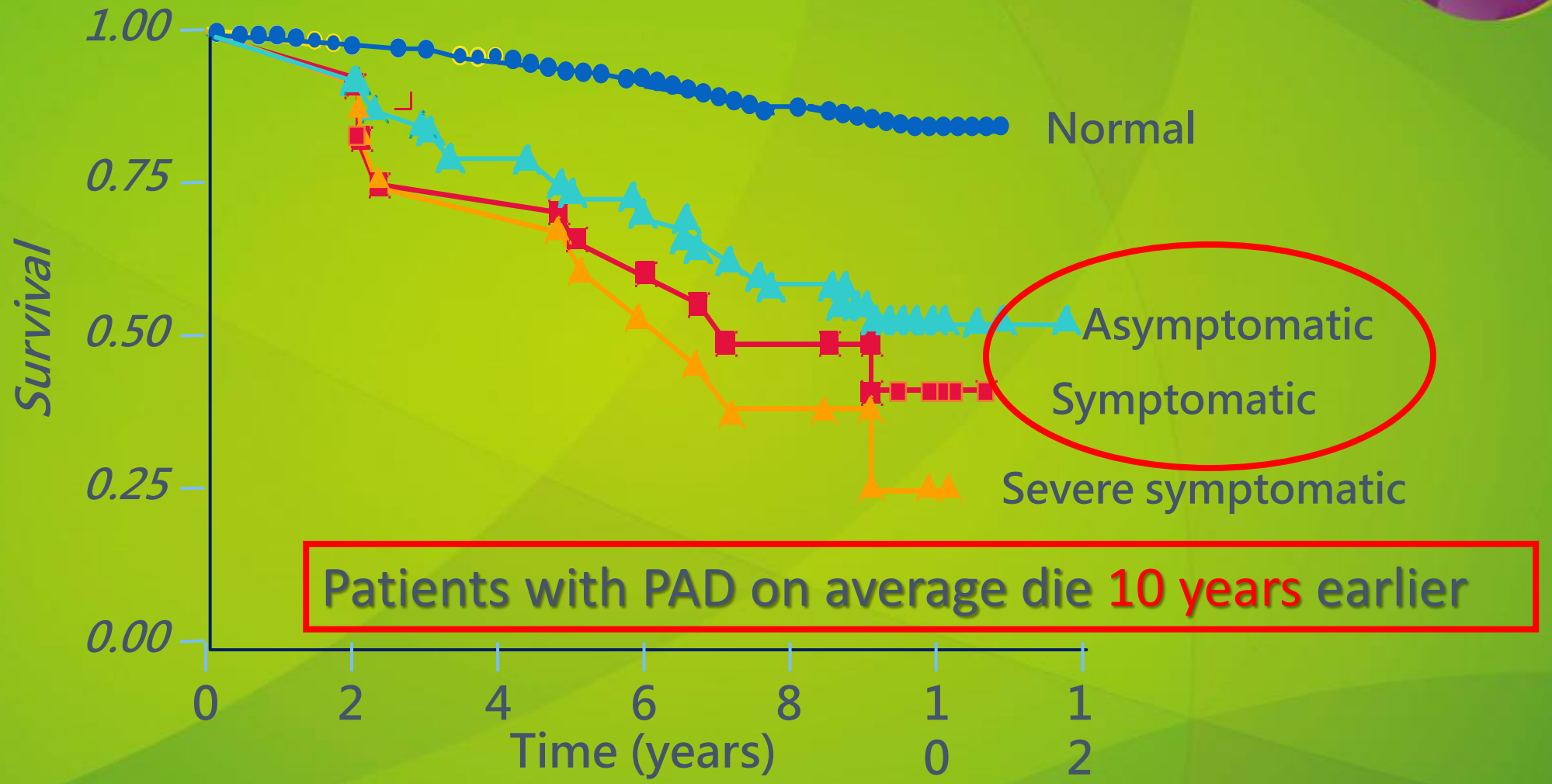
Worst Quality of Life Associated with Complications of Diabetes





Clarke P, et al. Diabet Med. 2003;20(6).
Hayes A. Value in Health. 2016

4. PAD Can be Silent but is not Benign



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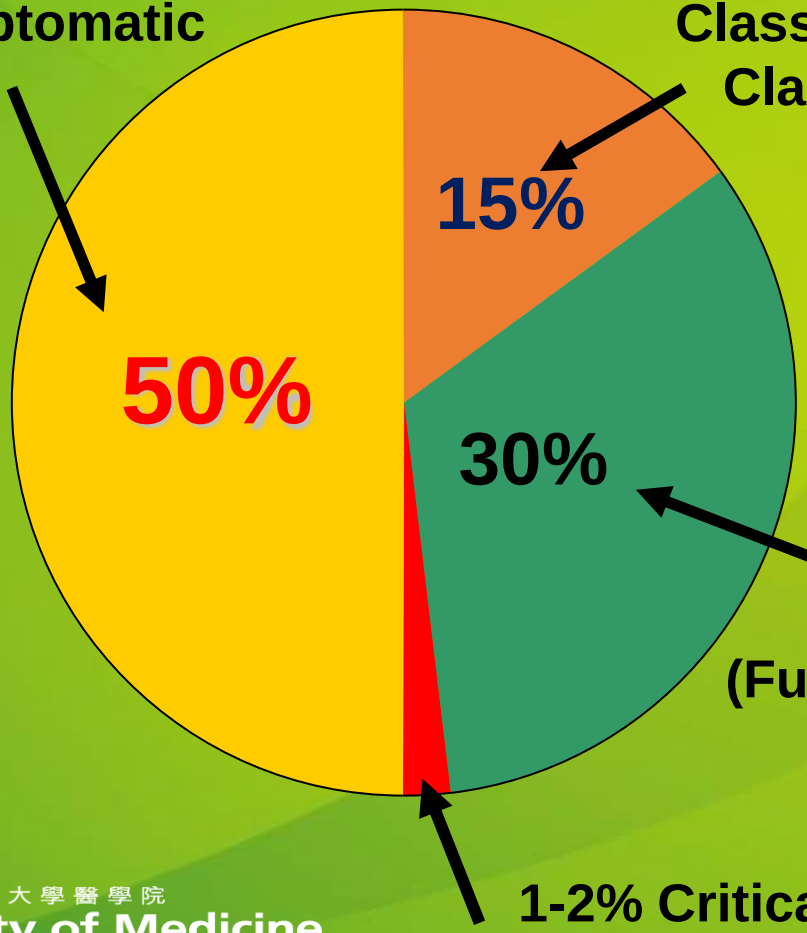
*Kaplan-Meier survival curves based on mortality from all causes.
†Large-vessel PAD.

Adapted from Criqui MH et al. *N Engl J Med.* 1992;326:381-386.

Classical Claudication is Uncommon

Relying on history of claudication alone can miss 90% of PAD

Claudication alone does not define presence or absence of PAD



Most common symptom of PAD

- Cramping, aching, fatigue, weakness or pain
- Feet, **calf**, thigh, buttock (depend on level of disease)
- Occurs with activity
- Quickly relieve with rest

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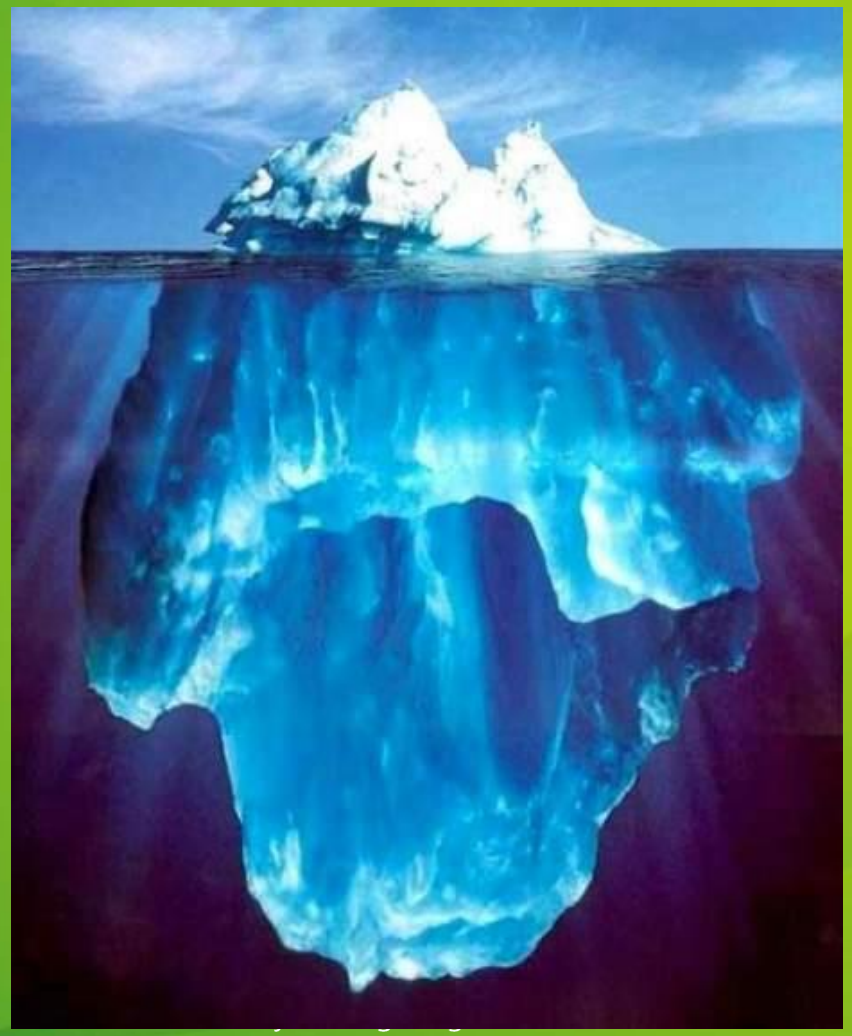
Hirsch et al. JAMA. 2001; 286: 1317-1324

5. PAD is under-recognized, under-diagnosed & under-treated



Awareness Low

"PAD is uncommon & not serious"

Atypical or Asymptomatic

"I don't have claudication"

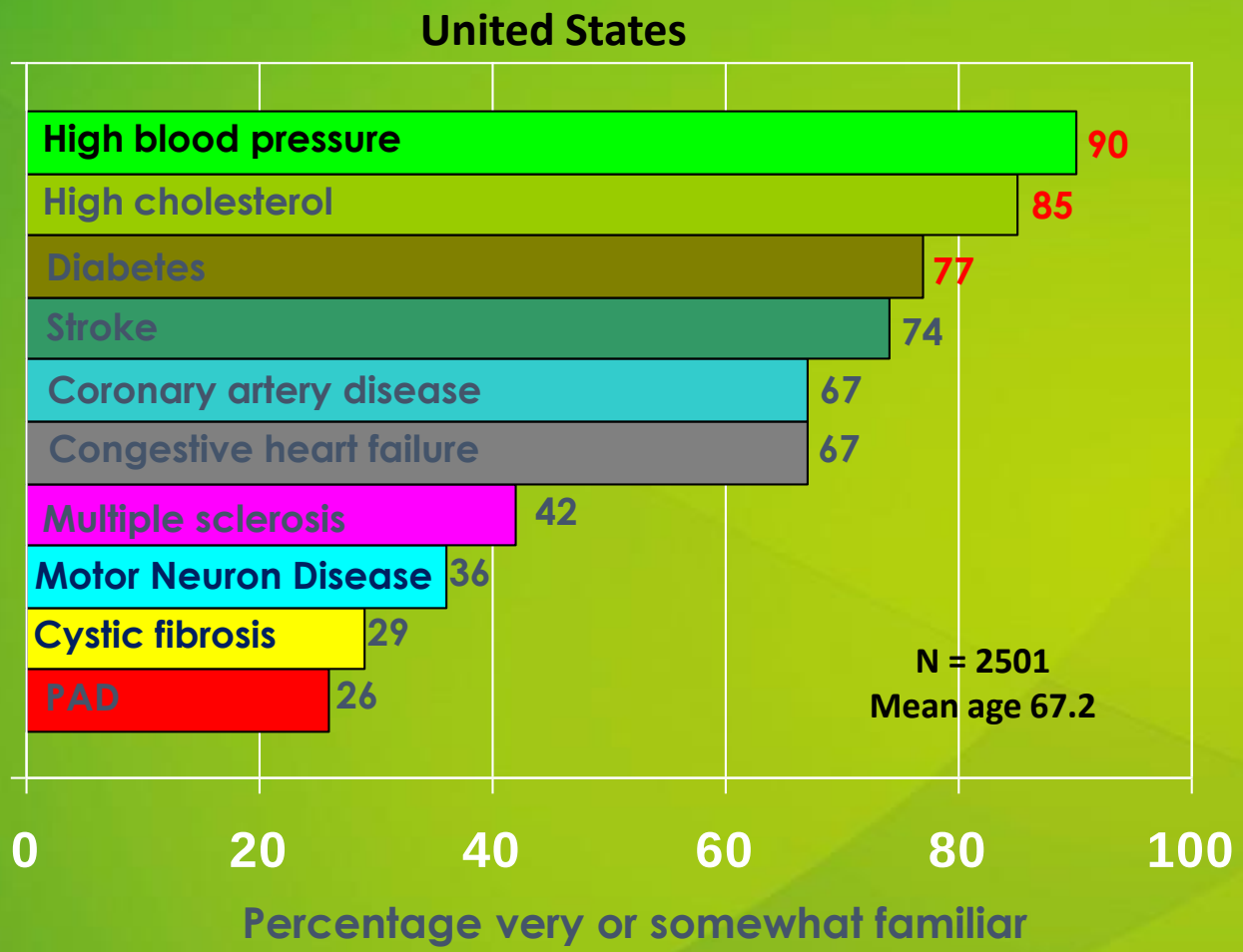
Acceptable to walk in pain

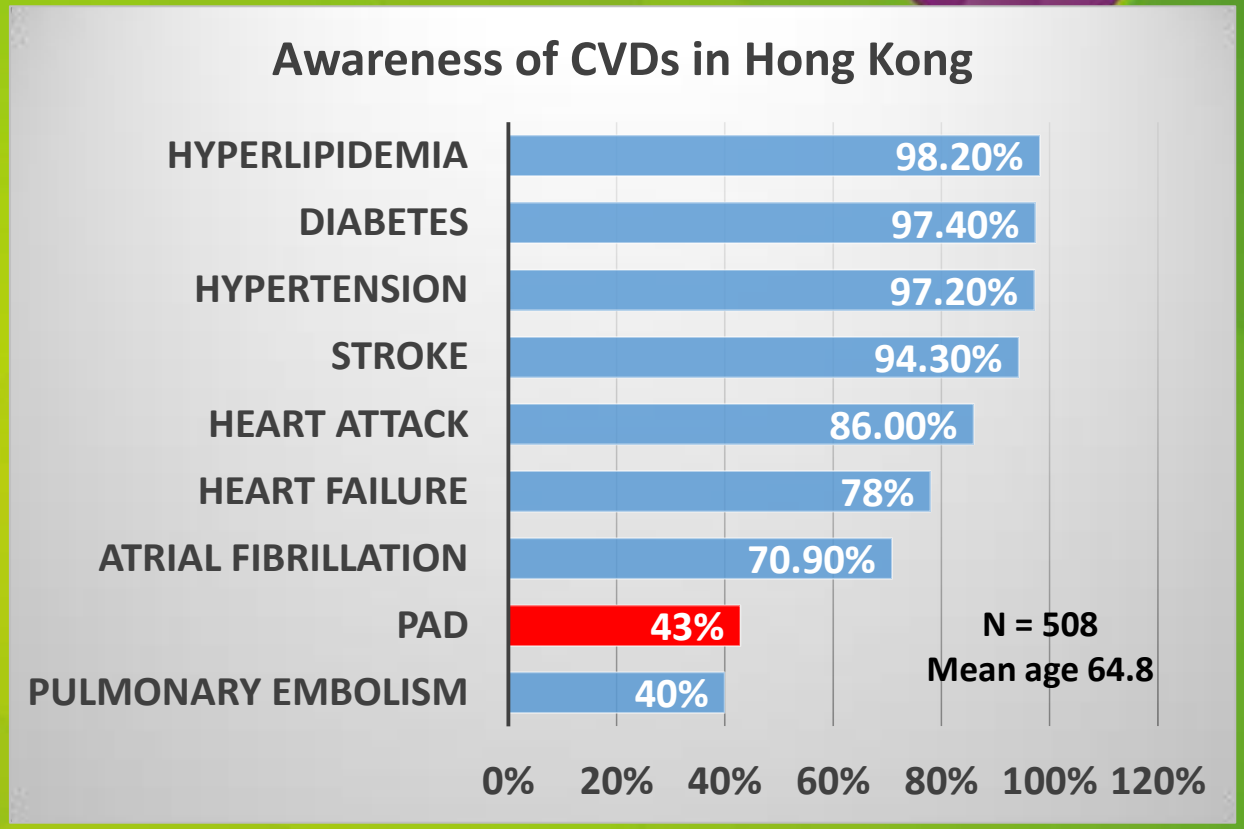
"It is just old age or my arthritis"

"Nothing can be done"

ABI underutilized as diagnostic tool

Poor Public Awareness of PAD





Gaps in Public Knowledge of Peripheral Arterial Disease: The First National PAD Public Awareness Survey. Circulation 2007;116

Yan BP, unpublished data

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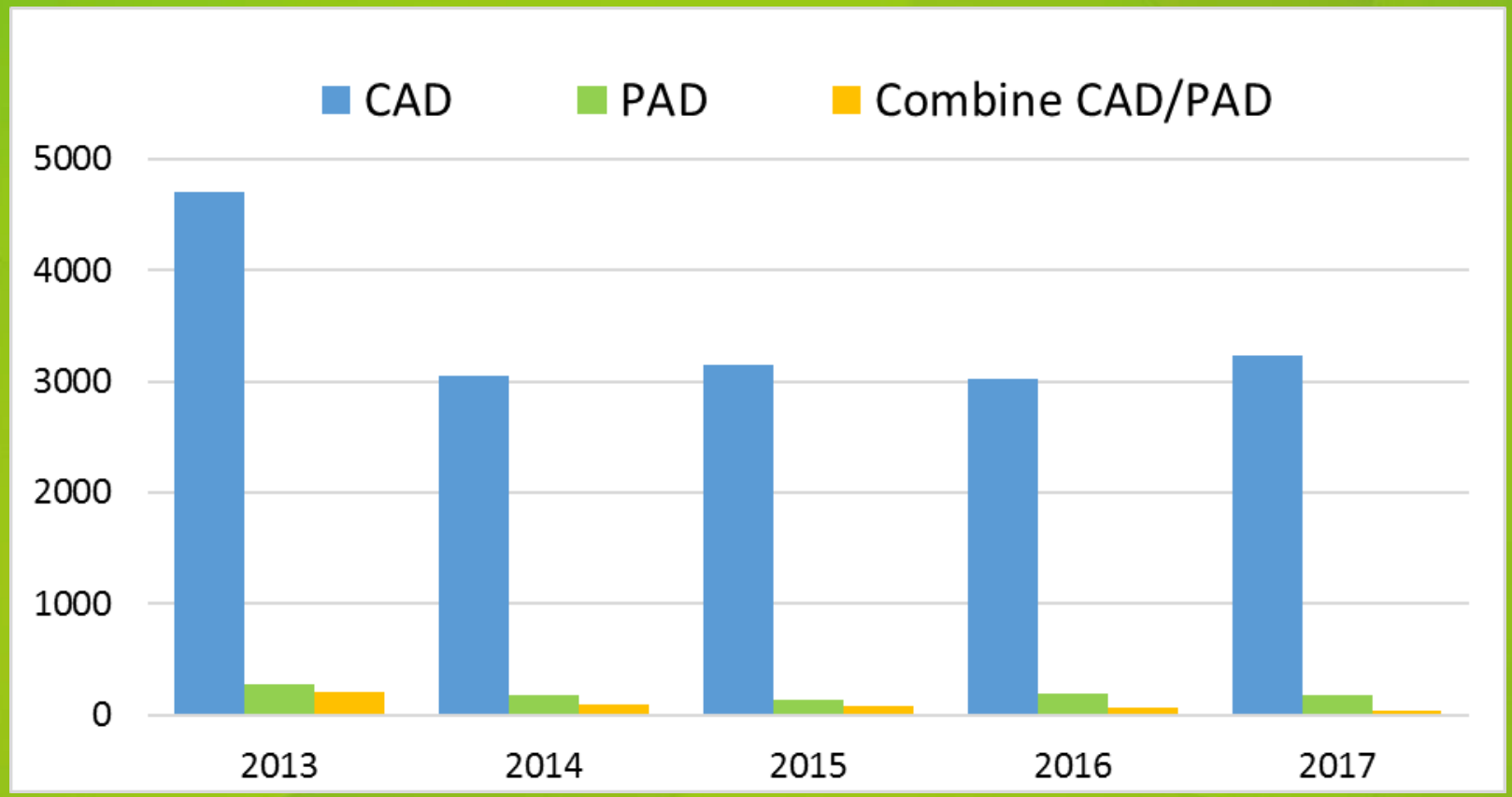
18,639 patients diagnosed/discharged with CAD and/or PAD between 2013 & 2017 in NTEC



	N	N	N	N	N
CAD	4709	3049	3151	3029	3236
PAD	272	181	138	199	181
Combine CAD/PAD	208	96	82	72	36

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Just Old Age vs. Active Ageing

- **“Its my arthritis”**
  - Spinal degeneration is common in elderly
  - Patients may have both problems
  - Many PAD patients treated with analgesia (even spinal surgery) with little improvement!

- **“I don’t need to walk very far”**
  - Taxi everywhere
  - Escalators everywhere

Claudication is Debilitating

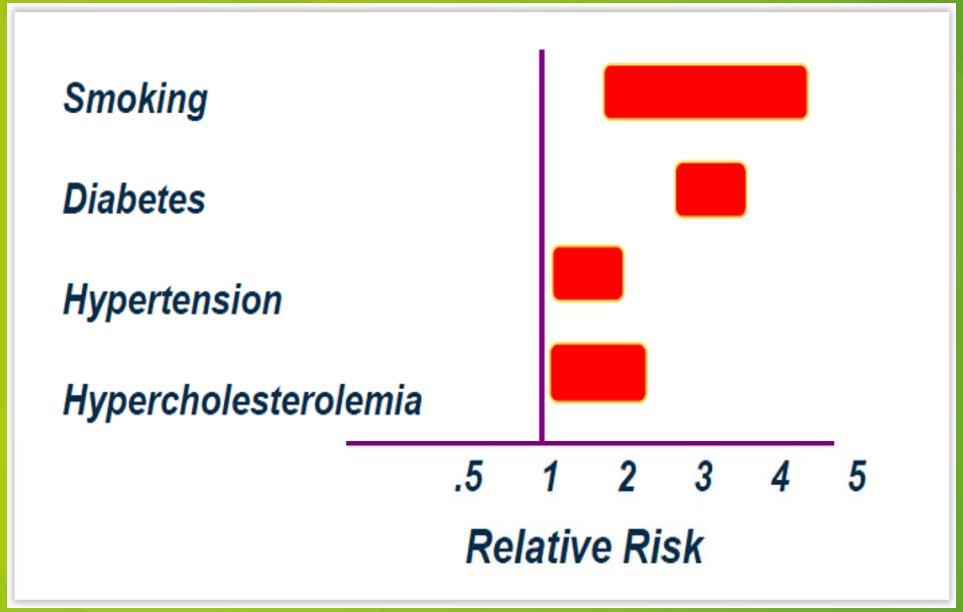
- Lower physical activity levels ~50% of age-matched control
  - Poorer walking endurance
  - Slower walking speed
  - Poorer balance
  - Increased rates of decline
  - Gradual decline if untreated

- Even asymptomatic PAD patients have significantly impaired physical function
- Reduced QoL similar to mod-severe heart failure

Am J Cardiol 2001; 87 (suppl): 14D-18D

6. PAD treatment can save life & limb

- Importance of early detection of PAD
  - Initiate CV risk reduction treatment
    - Only 20% to 30% PAD patients are receiving treatment
  - Early referral for revascularization
    - Lifestyle limiting claudication
    - Limb salvage for critical limb ischemia

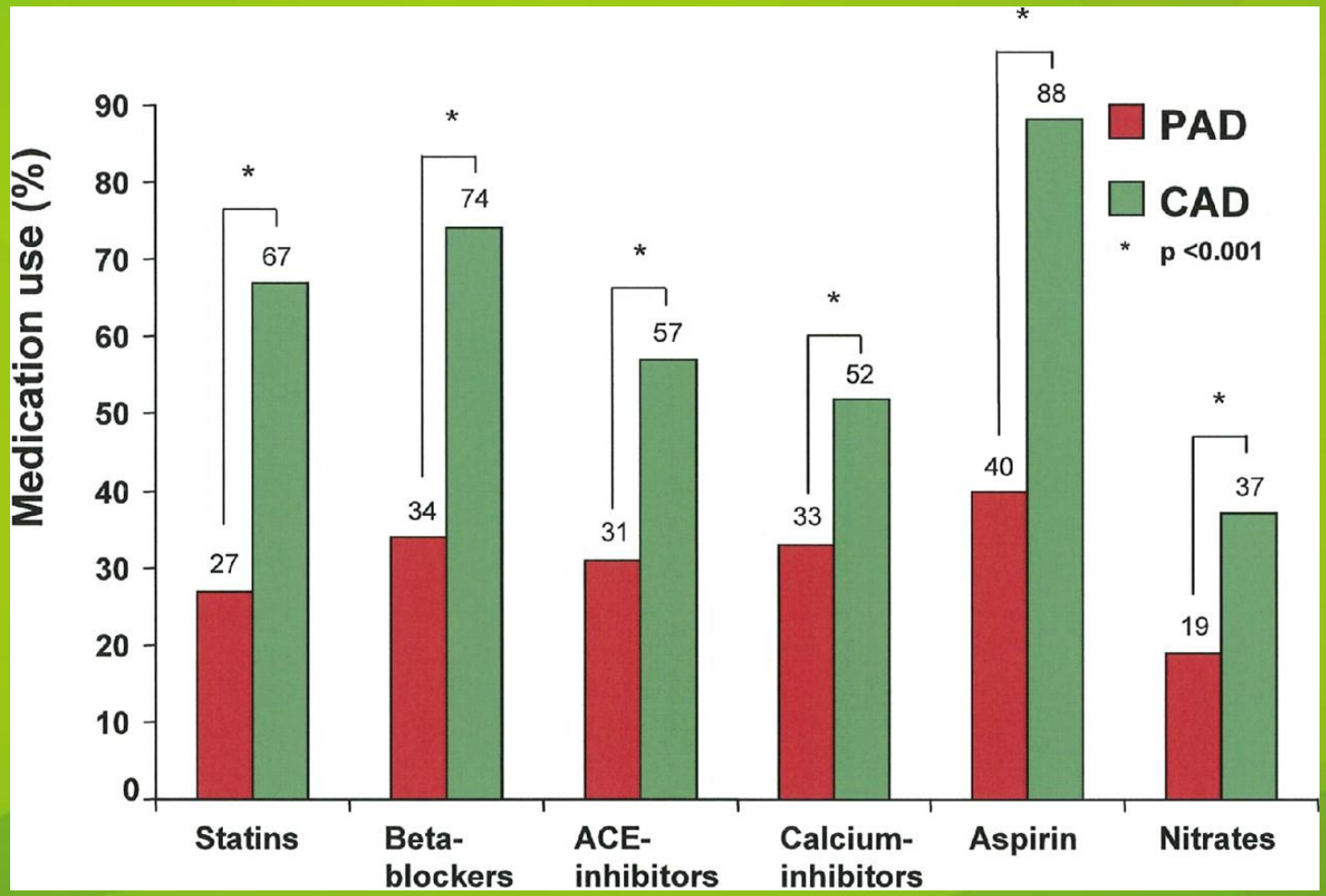


CV Risk Reduction (ESC 2017)

Recommendations	Class	Level
Smoking cessation is recommended in all patients with PADs.	I	B
Healthy diet and physical activity are recommended for all patients with PADs.	I	C
Statins are recommended in all patients with PADs.	I	A
In patients with PADs, it is recommended to reduce LDL-C to <1.8 mmol/L (70 mg/dL) or decrease it by ≥50% if baseline values are 1.8-3.5 mmol/L (70-135 mg/dL).	I	C
In diabetic patients with PADs, strict glycaemic control is recommended.	I	C
Antiplatelet therapy is recommended in patients with symptomatic PADs.	I	C
In patients with PADs and hypertension, it is recommended to control blood pressure at <140/90 mmHg.	I	A
ACEIs or ARBs should be considered as first line therapy in patients with PADs and hypertension.	IIa	B

Under-treatment of PAD vs. CAD

2,730 propensity matched patients



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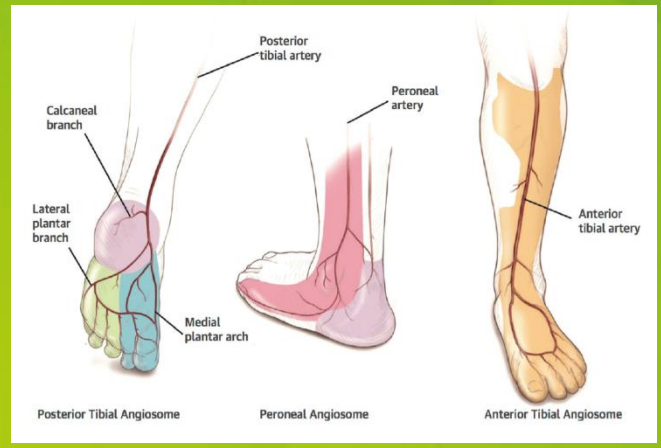
Welten, G. M.J.M. et al. J Am Coll Cardiol 2008;51:1588-1596

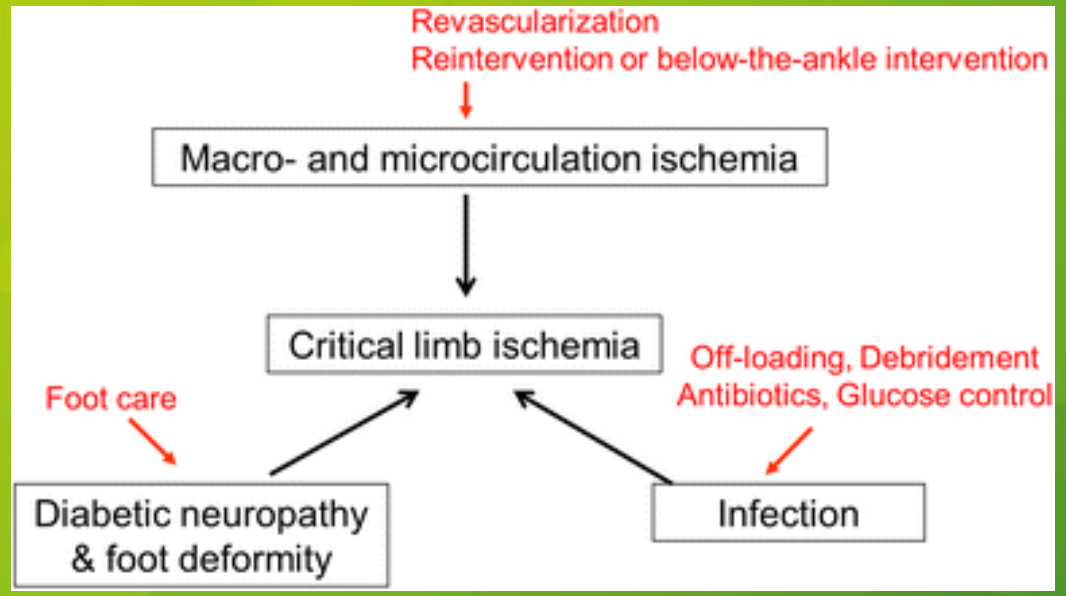
Claudication Symptom Relief

- Cilostazol
  - Modest efficacy & safety
- Exercise therapy
  - Supervised walking to maximum walking distance
  - Min 30-45min ≥3/week ≥3 months
- Revascularization
  - Failure with exercise & drug therapy
  - Lifestyle-limiting symptoms and function
  - Less invasive endovascular preferred over surgery

Limb Salvage for Critical Limb Ischemia

- Class 1 indication for revascularization (ACC/ESC/TASC 2)
  - Improve blood flow & tissue oxygenation
- Endovascular preferred over bypass surgery
- Up to 90% freedom from amputation
- Small % no-option cases only not treated early enough!





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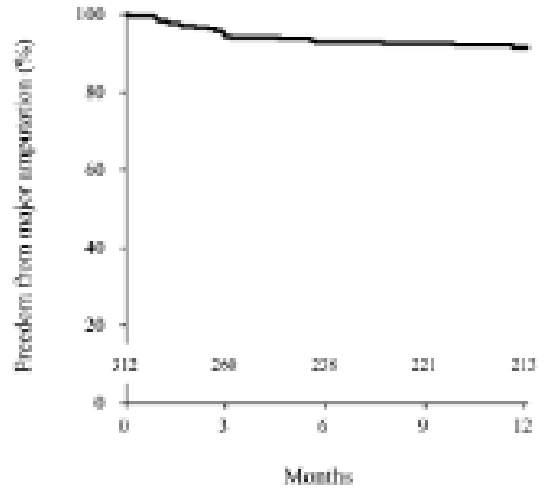
Kawarada O, Yan BP, et al . Cardiovasc Interv Ther. 2018

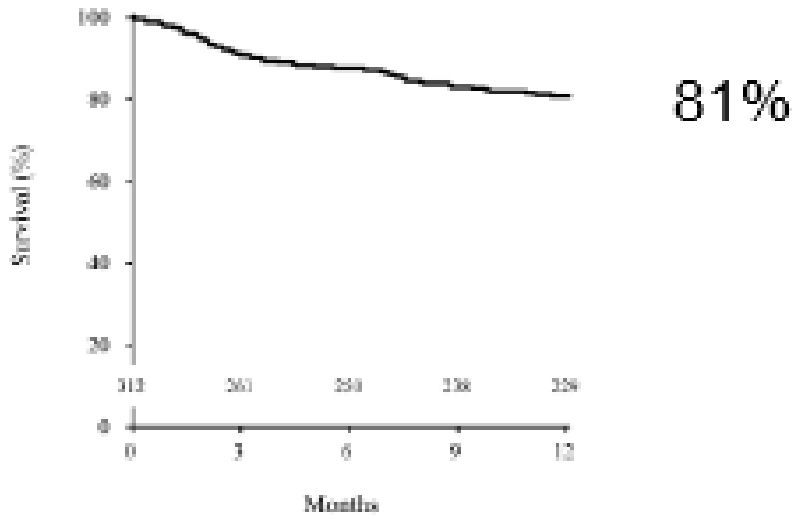
Endovascular Treatment for Infrainguinal Vessels in Patients With Critical Limb Ischemia

OLIVE Registry, a Prospective, Multicenter Study in Japan With 12-Month Follow-up

- ***Relief pain*** ***
- Improve wound healing
- Prevent major amputation
- Limit amputation level
- Improve physical function & QoL
- Prolong survival
- Reduce hospitalizations & costs



Freedom from major amputation



Survival rate

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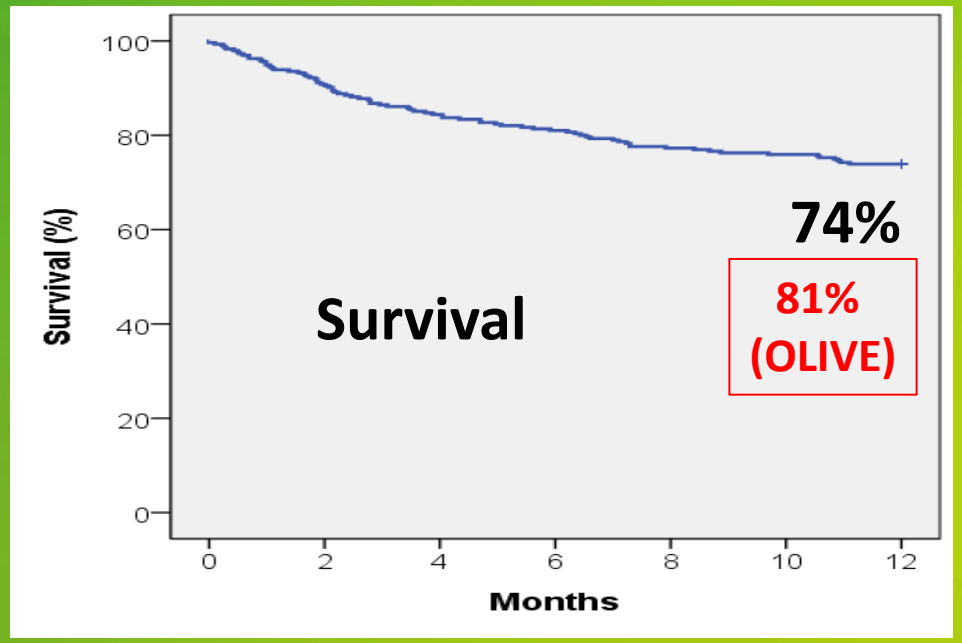
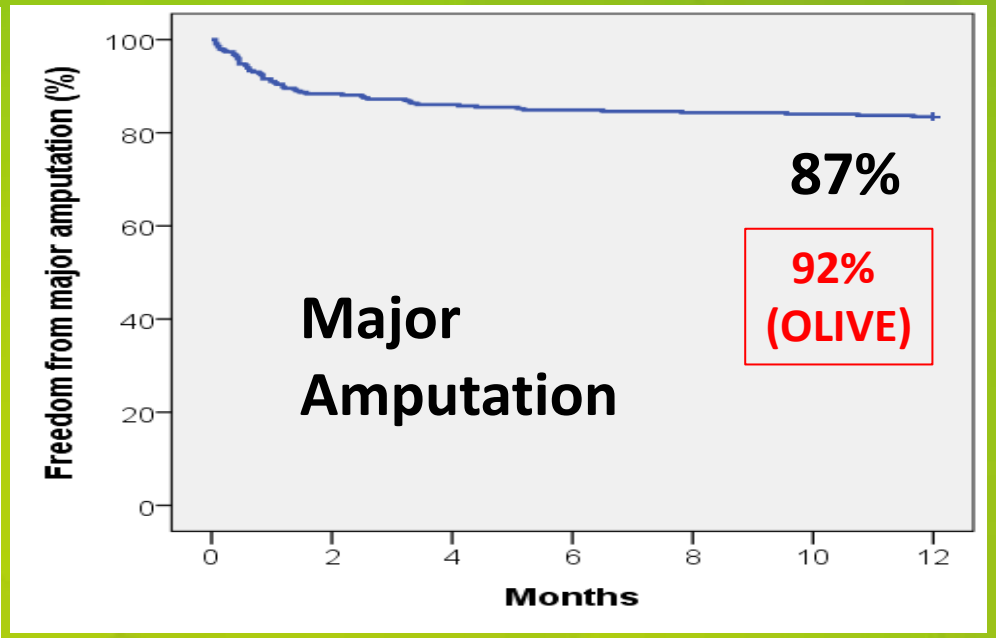
Circ Cardiovasc Interv. 2013 Feb;6(1):68-76

My CLI Endovascular Experience
2009 – 2016

Patients / Limbs	N = 333/ 389
Mean age ≥80 years	74.2±11.9 35.4%
Male	52.0%
Diabetes	64.0%
Hypertension	83.2%
Hyperlipidemia	40.2%
Smoker / ex-smoker	48.6%
Coronary artery disease	28.5%
Stroke/TIA	25.8%
ESRF / Dialysis	20.4% / 19.5%
Anemia	65.2%
Albumin <30g/L	21.9%
CRP >30mg/L	47.5%
Rutherford Class 4 / 5/ 6	21.9% / 69.4% / 8.7%

12 Month Clinical Outcomes

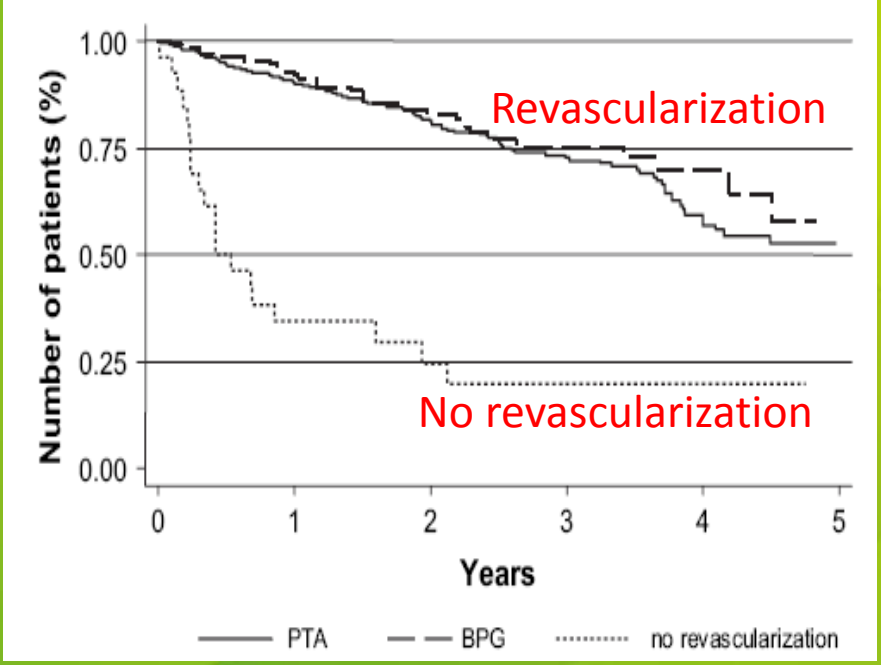




Revascularization Reduces 5 Year Amputation & Mortality in DM with CLI

- >30x risk of major amputation if no revascularization
- <5% of patients ***not*** suitable for revascularization

Survival



Major Amputation

Patients treatment	Above-the-ankle amputation		Total
	At 30 days	Follow-up	
Angioplasty (N = 420)	6 (1.4%)	16 (3.8%)	22 (5.2%)
Bypass graft (N = 117)	3 (2.6%)	14 (12%)	17 (14.5%)
No revascularization (N = 27)	14 (51.9%)	2 (7.4%)	16 (59.3%)

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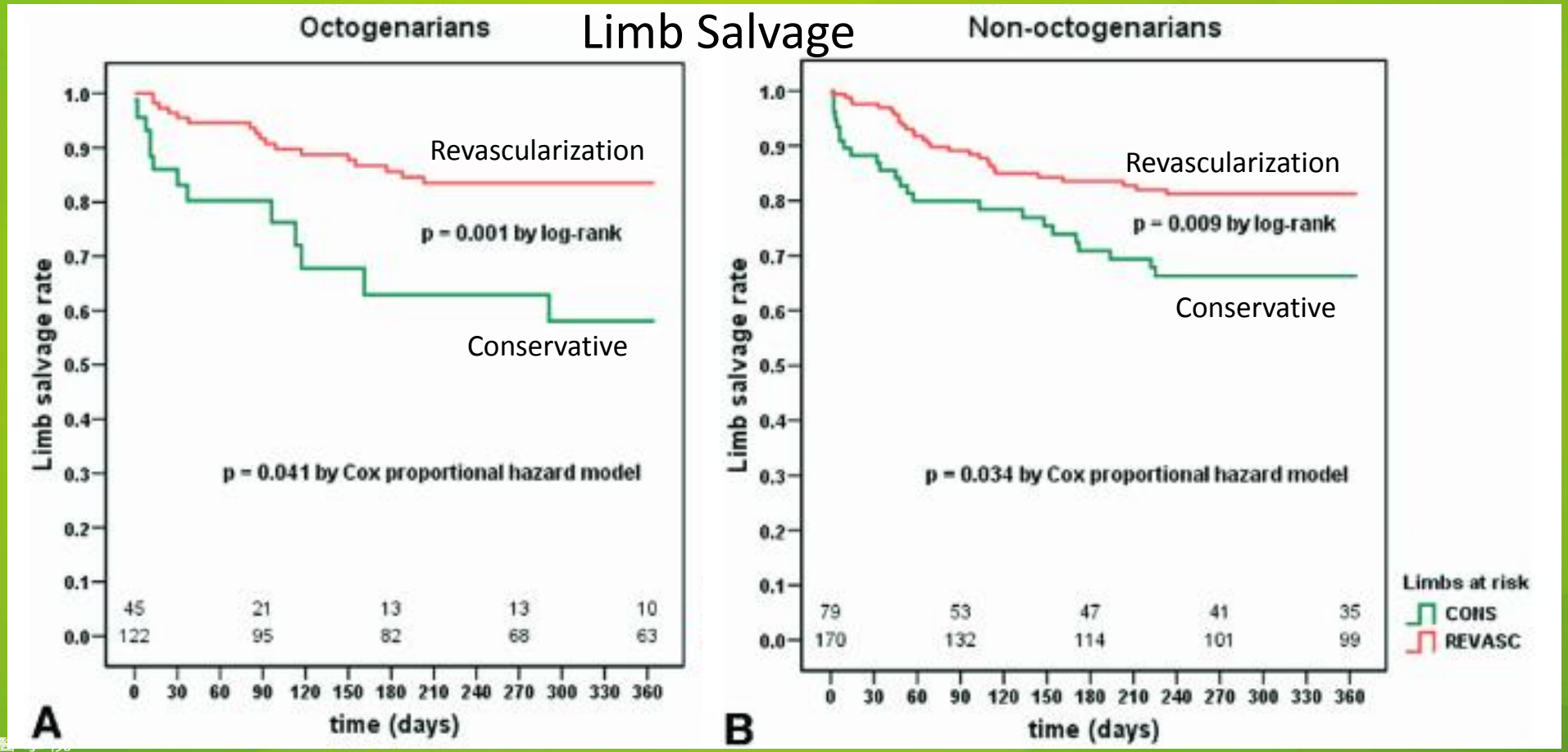
Faglia E et al. Eur J Vasc Endovasc Surg 2006 (32)

Revascularization for chronic critical lower limb ischemia in octogenarians is worthwhile

Oldest CLI patient I have treated was 103!!!!



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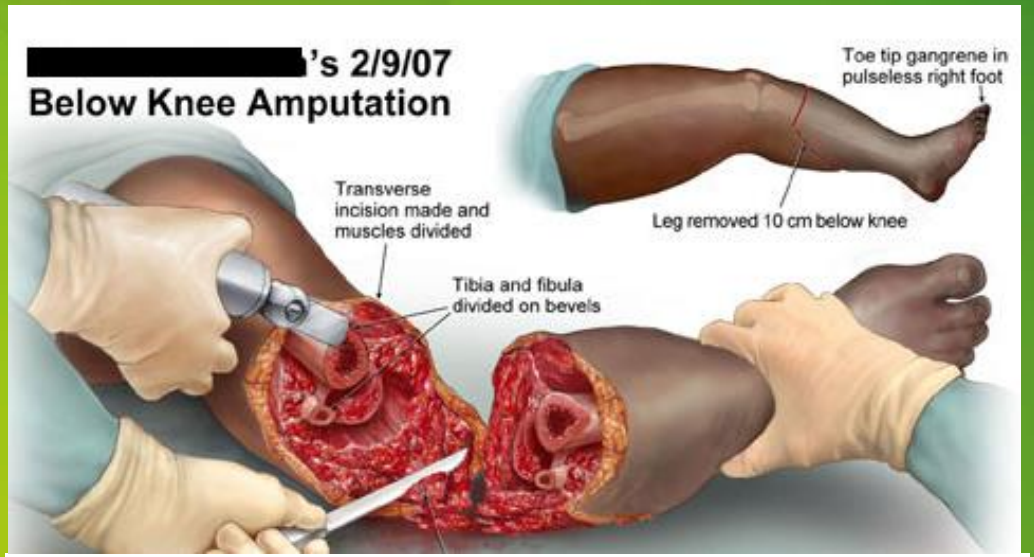
Brosi P et al. J Vasc Surg 2007:46

Uphill Battle in HK

- Amputation remains 1º treatment for most CLI patients in HK
  - 4.8 in 100,000 per year
    (~400 per year)
- Without prior vascular assessment or attempt at revascularization
- Revascularization often too late for limb salvage



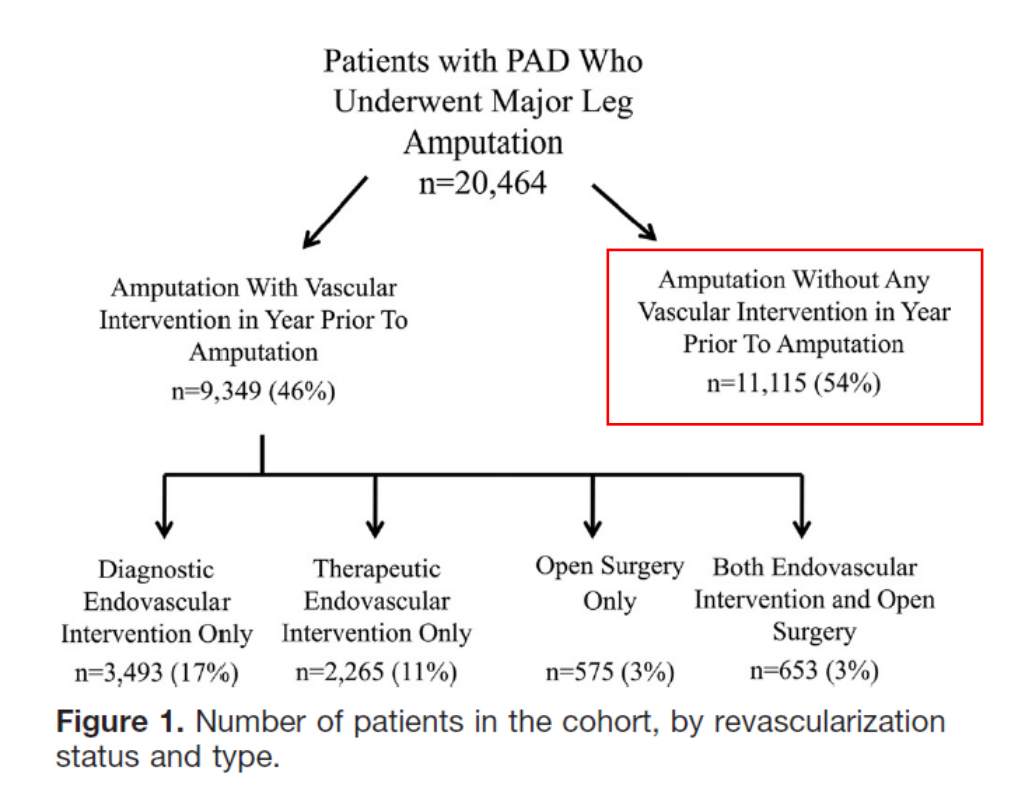


Figure 1. Number of patients in the cohort, by revascularization status and type.

Goodney PP, et al. Circ Cardiovasc Qual Outcomes. 2012;5:94-102

Patient Barriers in HK

- Poor awareness
  - Major amputation can be avoided in 80-90% of cases if treated early
  - Told “Nothing can be done & amputation is inevitable for survival”
- Diabetes alone does not cause amputation in “diabetic foot” (it increases risk of PAD)
- Late presentation
  - Fear of amputation begets amputation
- Cost of revascularization (mostly funded by HA)

Doctor Barriers in HK

- Poor awareness
  - Major amputation can be avoided in 80-90% of cases if treated early
- Lost window of opportunity (Binary Response)
  - “It is not infected. No need for amputation now. Keep it clean”
  - “It is infected, we must amputate NOW or you will die”
- Patients deemed too high risk for revascularization
  - Elderly & co-morbidities
- Don’t know who to refer & refer too late
- Inadequate revascularization
  - Failure to achieve straight-line-flow to foot

7. PAD can be Readily Diagnosed in Primary Care

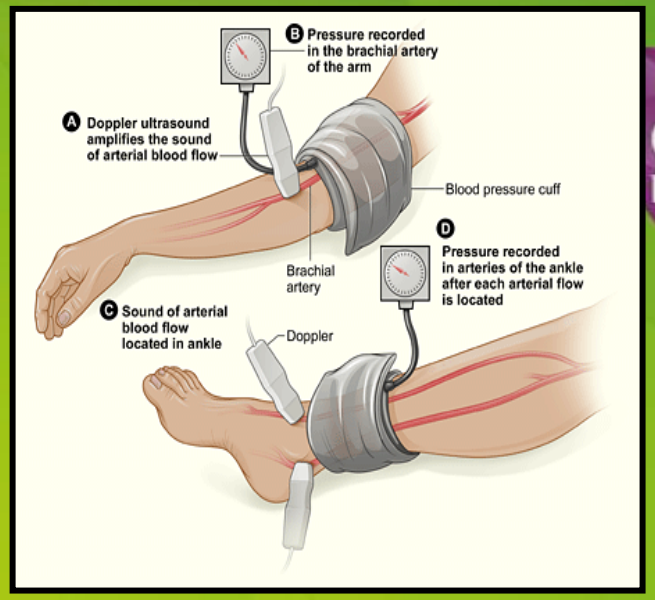
Target your efforts

Identify Persons at High Risk	
Age	>70 years
Lifestyle	Smokers • >50 years
Comorbidities	Diabetes • >50 years • Other risk factors Cardiovascular disease Chronic kidney disease
Symptoms	Leg pain with exertion Leg pain at rest Walking impairment Nonhealing wounds

- Clinical history & vascular review
  - Vascular history
  - Limb symptoms on exertion
  - CV risk factors
  - CVD
- Physical examination
  - Week or absent pulses
  - Signs of limb ischemia
- Labs
  - Lipid profile, HbA1c
- Ankle brachial Index (ABI)

Ankle Brachial Index (ABI)

- 1st line non-invasive test (Class 1 ESC)
- Confirms diagnosis
  - 95% sensitive & 100% specific
- Lower ABI
  - Higher CV risk
  - More severe PAD
  - Worse prognosis
- Beware false negative in elderly, diabetic, CKD (uncompressible arteries)



ABI Calculation

Left ABI:

Higher left ankle pressure ÷ Higher arm pressure = ____

Right ABI:

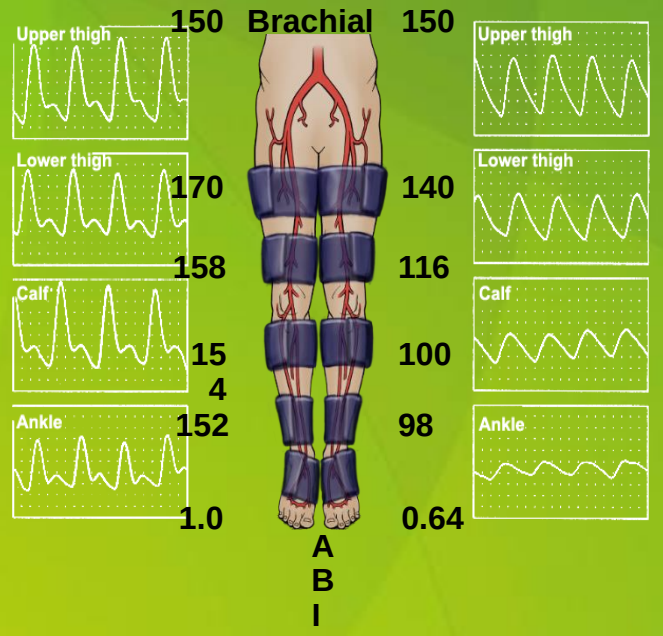
Higher right ankle pressure ÷ Higher arm pressure = ____

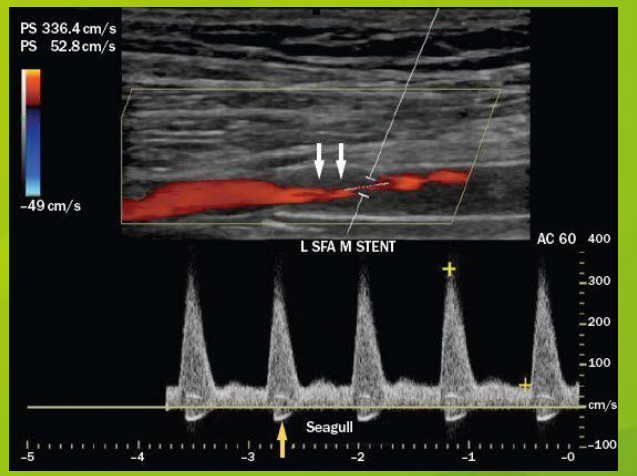
ABI	Interpretation (Arterial Status)
>1.30	Noncompressible
1.00-1.29	Normal
0.91-0.99	Borderline (equivocal)
0.41-0.90	Mild to Moderate P.A.D.
0.00-0.40	Severe P.A.D.

P.A.D. is defined as an ABI of ≤0.90

Other Non-Invasive Testing

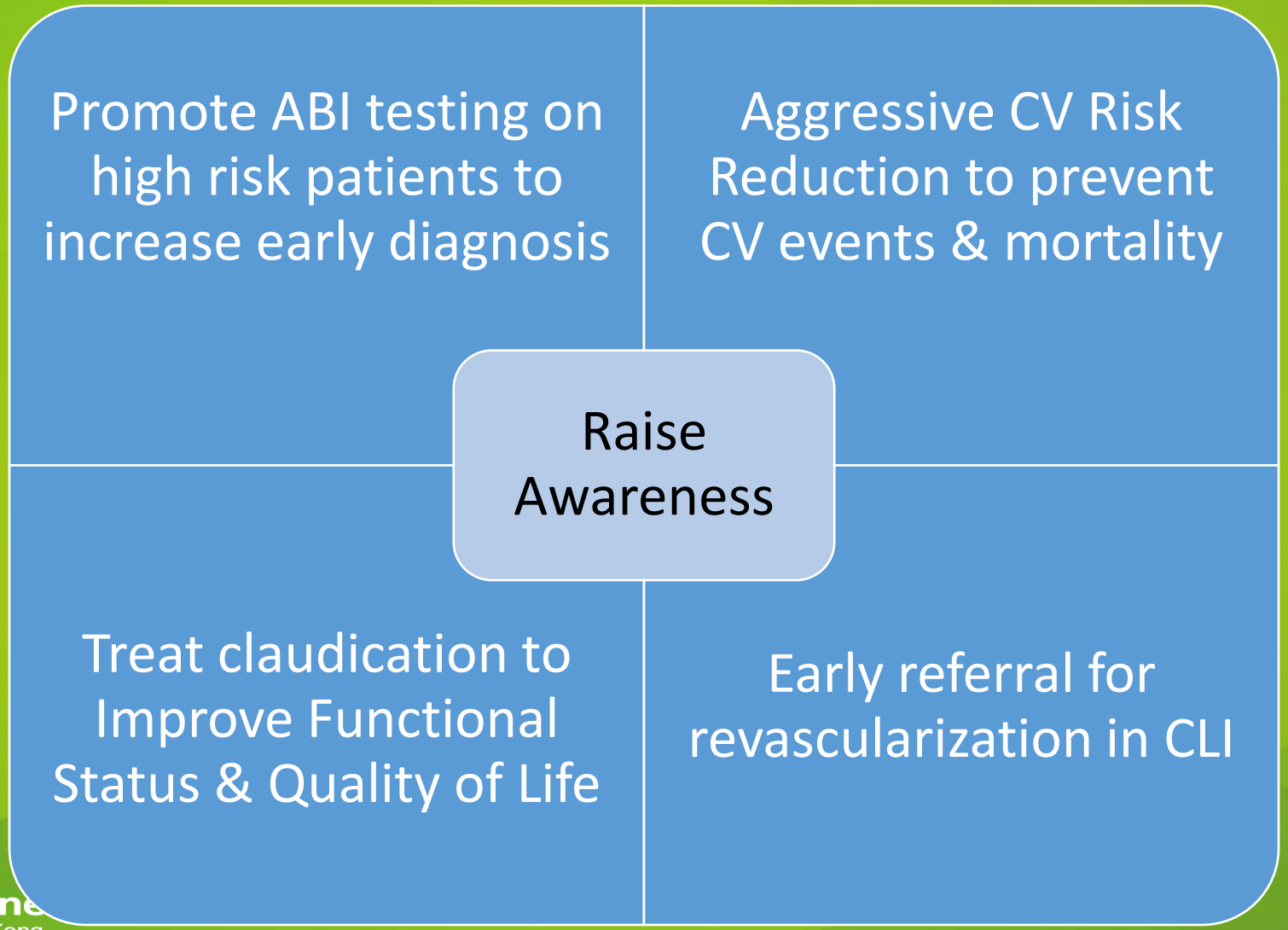
- Supportive tests to determine anatomy, physiology or functional status
  - Exercise ABI
  - Segmental pressure measurements
  - Pulse volume recording
  - Transcutaenous oxygen tension or pressure
  - Vascular imaging
    - Duplex ultrasound
    - Angiography (CTA, MRA)





8. Primary care can play key role in PAD management

Call-to-Action



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Summary (1)

- PAD is a leading cause of CV death, amputations & disability
- PAD is common
- Patients with PAD have similar risk of CV death as patients with CAD or CVD
- CV risk is elevated even in those without symptoms
- CV risk is related to severity of PAD
  - CLI have an annual mortality rate of 25%

Summary (2)

- ABI testing is simple & non-invasive
- Aggressive CV risk factor modification is essential
- Treatment of IC should include exercise therapy, drug therapy & selective use of revascularization
- Major amputation can be prevented in most CLI cases with early revascularization
- Endovascular therapy has become the preferred primary method for revascularization in CLI

Thank You