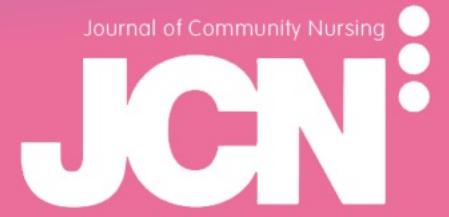


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# IMPACT OF DIABETES: THE DIABETIC FOOT

**WEDNESDAY  
3 NOVEMBER  
7.30 - 8.30**

FACEBOOK LIVE



**ANDREW SHARPE**  
ADVANCED PODIATRIST,  
SALFORD CARE ORGANISATION



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# DIABETIC FOOT: THE IMPACT OF DIABETES

ANDREW SHARPE, ADVANCED PODIATRIST,  
SALFORD CARE ORGANISATION

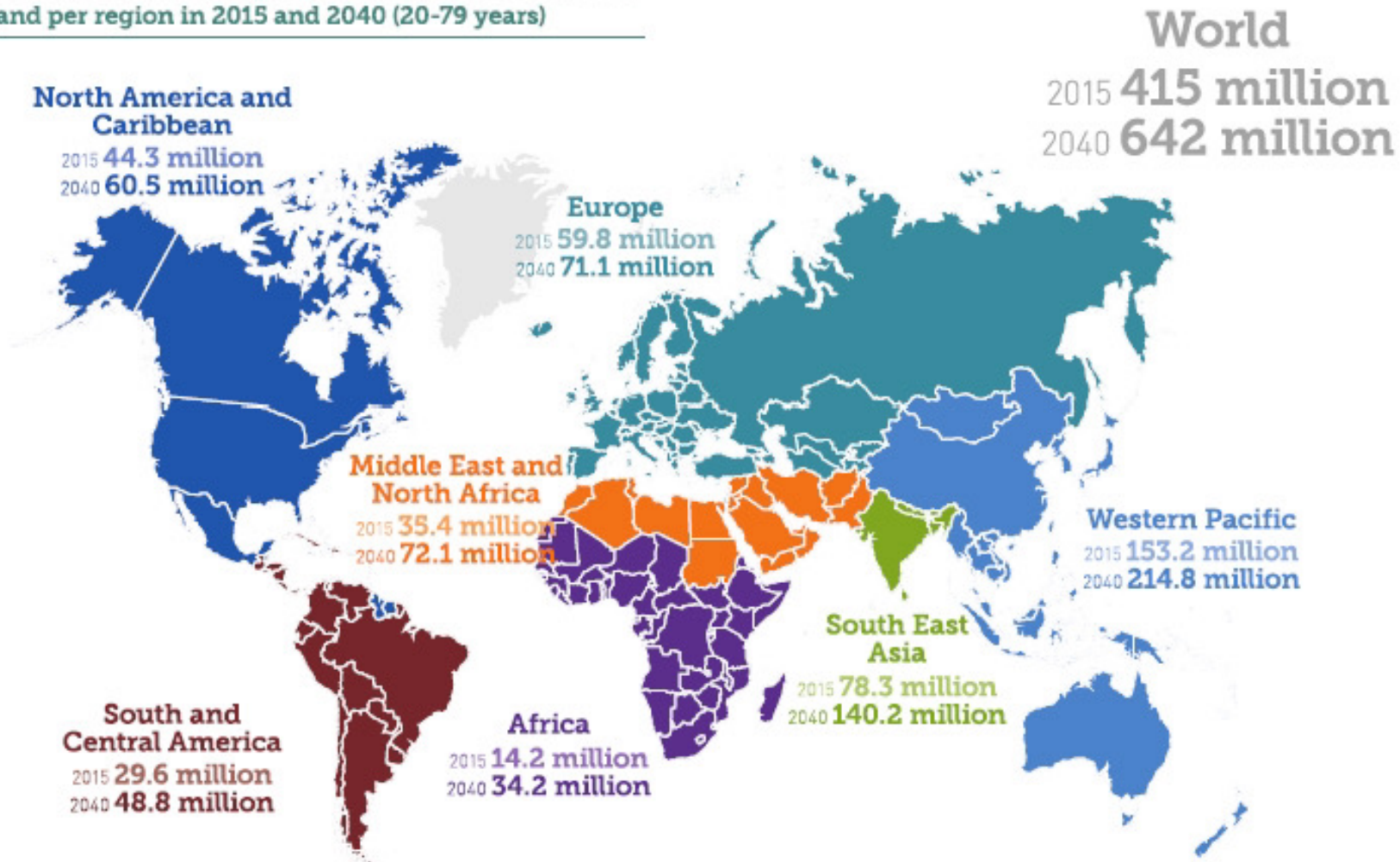
# OVERVIEW

- Diabetes in context
- Yo! **VIP**
  - Vascular (peripheral arterial disease [PAD])
  - Infection (soft tissue and bone)
  - Pressure (and neuropathy)
- How diabetes affects **wound healing**
- **Infection**/prevention of infection
  - Cutimed<sup>®</sup> Sorbact<sup>®</sup> patient case studies
- Role of the **multidisciplinary footcare service**
  - NICE (diabetic foot problems: prevention and management, 2019) and referral pathway, early referral, what to look out for/signposting and who to refer to...



# GLOBAL PREVALENCE

Estimated number of people with diabetes worldwide and per region in 2015 and 2040 (20-79 years)



# DIABETIC FOOT ULCER — FINANCIAL IMPACT

- NHS England spent **£972m–£1.13 billion** on foot ulceration and amputation:
  - **0.72–0.83%** of its **entire budget**
  - **£2.66–3.09 million/day**
  - 66% (2/3) of expenditure in primary, community and outpatient settings (Kerr et al, 2019)
    - Delay in referral leading to increase in cost?
    - Only 22% were referred to specialist diabetic foot clinics
    - 5% were referred to podiatry



£2.66–  
£3.09  
million/day!

# IMPACT ON PATIENTS AND SOCIAL CARE

## Patient cost

- **8,500 amputations** (minor or major) per year in UK (2013–2016)
  - **176 amputations/week**
    - Increased from 135 amputations/ week
  - 23 amputations/day (Diabetes UK, 2018)

## Social

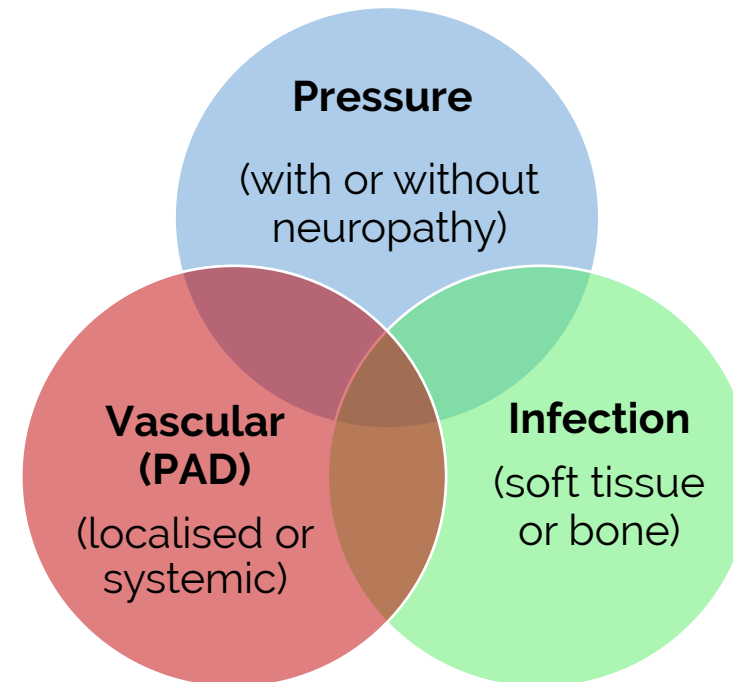
- Social care cost for DFU and amputation estimated at **£13.9 billion**
  - 14 times more expensive than health care (Bowen et al, 2018)



# BACKGROUND TO DIABETIC FOOT ULCER

- Diabetes leading cause of foot ulceration and amputation
- Eight elements that recognise risk of ulceration and amputation  
(National Institute for Health and Care Excellence [NICE], 2019)

- Neuropathy, callus, deformity, Charcot arthropathy
- Limb ischaemia, gangrene
- Ulceration, infection and/or inflammation, gangrene



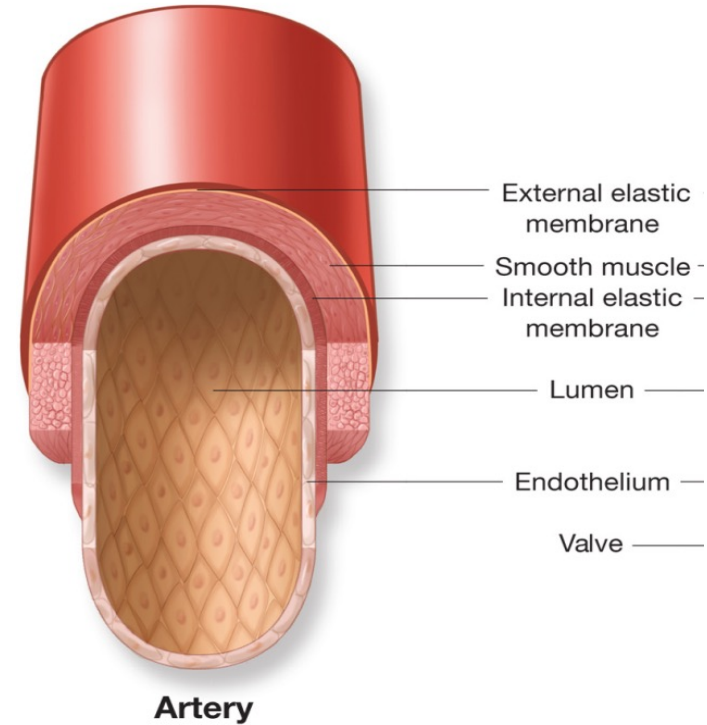
# VASCULAR



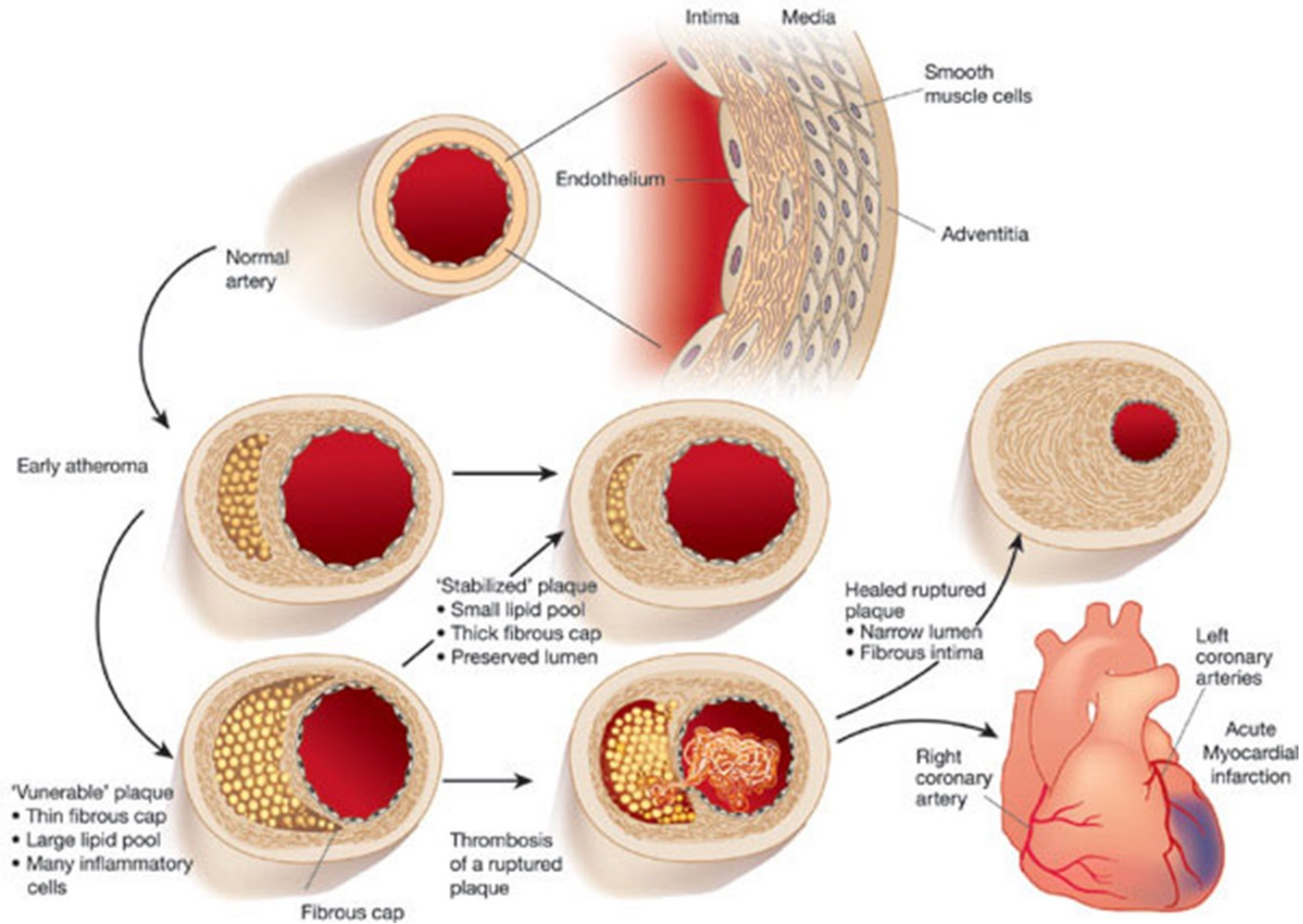
# ARTERIAL ANATOMY

## Arteries consist of:

- Tunica adventita
- Tunica media
- Tunica intima



# PERIPHERAL ARTERIAL DISEASE



# VASCULAR ASSESSMENT: PODIATRY

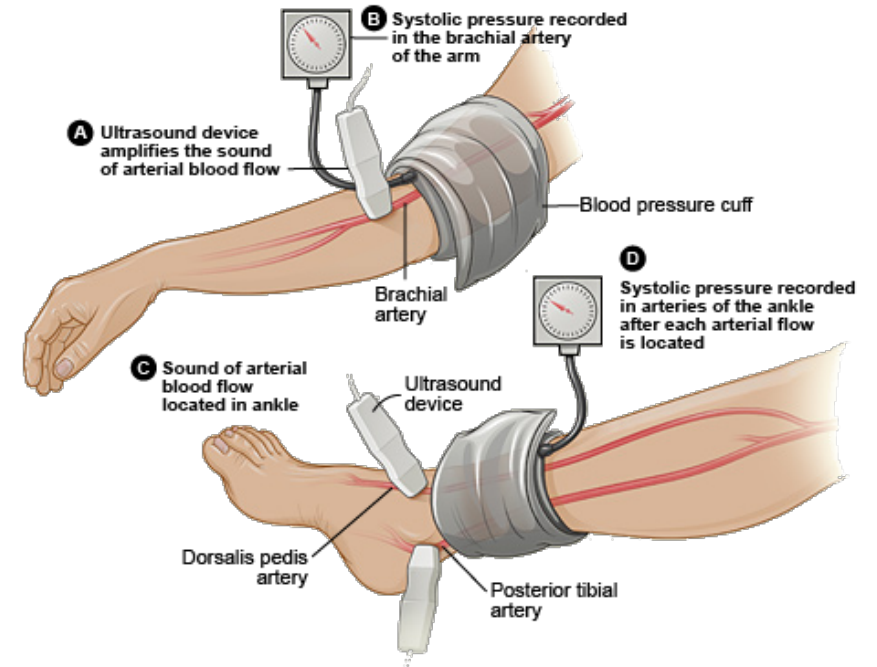
## Three Ps — pulses, pressure, phases

- Absent **pulse** may indicate arterial disease
  - **Podiatry — lower limb speciality**, beyond the foot pulses
- **Pressure**
  - Reduced **ankle brachial pressure index (ABPI)** figures
  - +/- reduced toe pressure figure



# VASCULAR ASSESSMENT: PODIATRY CONTINUED

- **Phases** — Doppler signals
    - Monophasic — linked to PAD
    - Biphasic — generally healthy
    - Triphasic — healthy
- ([pad-database.co.uk](http://pad-database.co.uk))



# VASCULAR ASSESSMENT: PALPATE FOOT PULSES

Dorsalis pedis



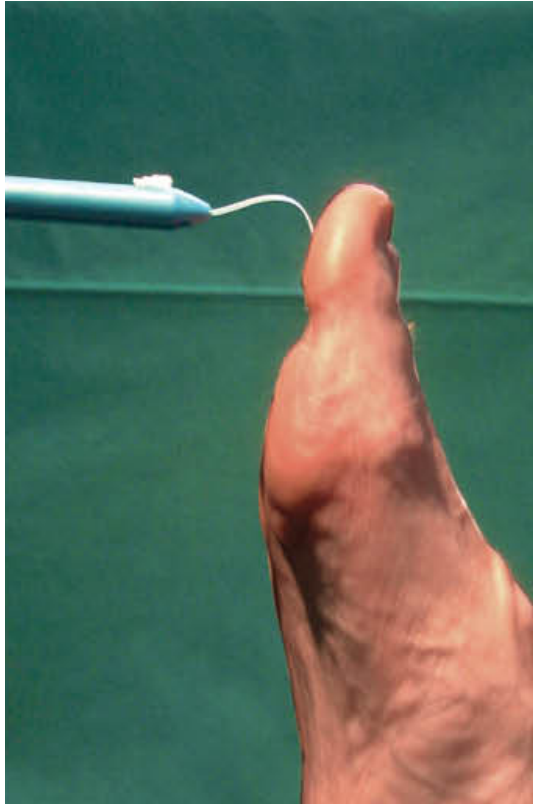
Posterior tibial



# PRESSURE AND NEUROPATHY



# 10G MONOFILAMENT TEST — LOSS OF PROTECTIVE SENSATION (LOPS)



- Test 1<sup>st</sup> toe, 1<sup>st</sup> MTPJ and 5<sup>th</sup> MTPJ (International Working Group on the Diabetic Foot [IWGDF], 2019)
- Ask patient to say yes when they feel they have had their foot touched and to advise where they felt it (IWGDF, 2019)
- Test each site three times using a mock/sham test as well (IWGDF, 2019)
- 10g monofilament is 91% accurate at recognising any type of neuropathy (Pham et al, 2000)





# ABSENCE OF MONOFILAMENT: IPSWICH TOUCH TEST



**DIABETES UK**  
CARE. CONNECT. CAMPAIGN.

About the test	1
Reference guide	1
Step-by-step instruction	2
Recording the results	3
What the results mean and what to do	3

## ABOUT THE TEST

The **Touch the toes test**\* is quick and easy, designed to assess sensitivity in your feet, and can be done in the comfort of your own home.

### Why is sensitivity important?

Sensitivity is an important way that the body can alert you to other problems. Sensations, like sharp pain or throbbing, can tell you when you may have damage to a part of your body. In the case of feet, pain could be due to a burn, blister or cut and because you feel it you can take prompt action and appropriate treatment.

If sensation is impaired you may not realise if minor damage has occurred and left unknown and untreated the risk of infection is increased. Infections and ulcers are also painful – but not if that part of the foot also lacks sensation.

Knowing if you have impaired sensitivity requires you to rely more on regular visual checking for discoloration or swelling for instance.

It is important to remember that impaired sensation itself **does not cause infection** and ulceration.

Please note that the **Touch the toes test** is not a substitute for your annual foot review by an appropriately trained person.

## REFERENCE GUIDE



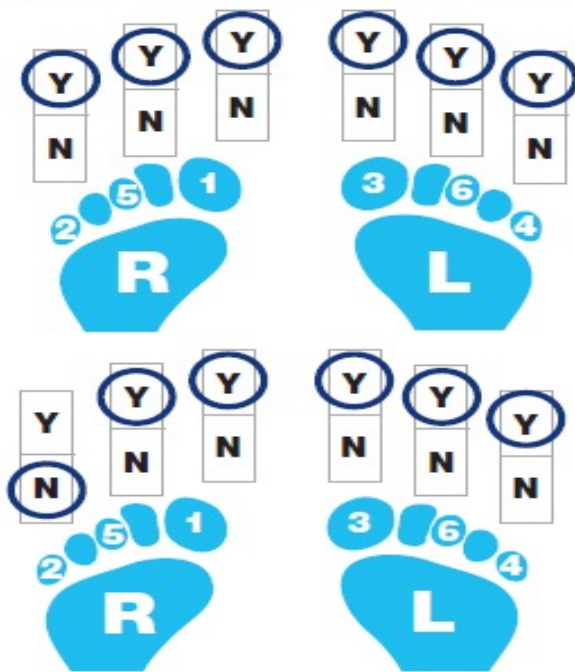
\*Officially known as the Ipswich Touch Test which was designed by Garry Flayman and the team at Ipswich Hospital

# IPSWICH TOUCH TEST

## WHAT THE RESULTS MEAN AND WHAT TO DO

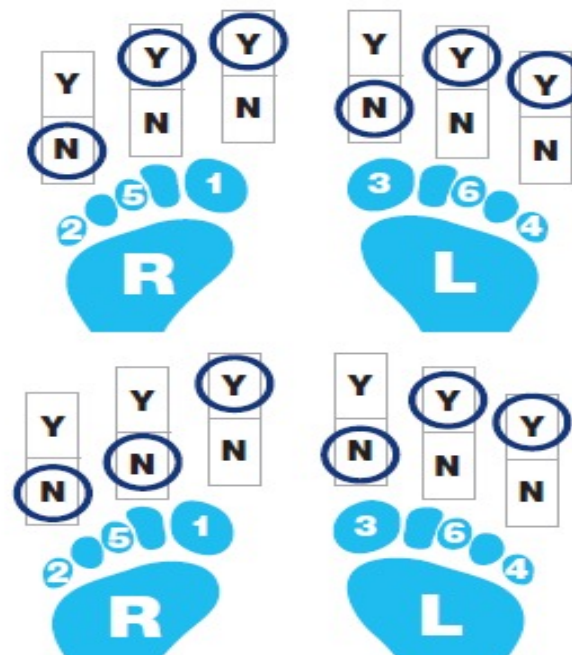
### NORMAL SENSATION

If you felt the touch at all six or five of the six toes, as shown in the example below, then your sensation is normal and you are **not** at increased risk of developing a foot problem because of lack of sensation. However, you must continue having the more detailed foot checks that you should be receiving annually.



### IMPAIRED SENSATION

If you did not feel when touched at two or more of the six toes, as shown in the examples below, then you are very likely to have reduced sensation and may be at risk of a diabetic foot ulcer. This needs to be confirmed by further testing. We suggest you visit your surgery and ask for a full examination of your feet. After that examination you should ask for the results of the assessment and then if it is abnormal you should be referred to a diabetes specialist podiatrist, foot protection team, or the diabetes foot clinic depending on the severity.



# VIBRATION TEST, IF UNCONFIRMED 10G MONOFILAMENT



- Test 128Hz tuning fork
- Place on bony part around great toe
- Ask patient not if they can feel the fork, but what they feel – repeat three times  
(two or three out of three is normal)

**Vibration sense can decrease with age, so it is better to combine it with another test.**

# IWGDF CLASSIFICATIONS

Category	Ulcer risk	Characteristics	Assessment frequency
0	Very Low	No LOPS and No PAD	12 months
1	Low	LOPS or PAD	6–12 months
2	Moderate	LOPS + PAD or LOPS + foot deformity or PAD + foot deformity	3–6 months
3	High	LOPS or PAD, and one or more of the following: <ul style="list-style-type: none"><li>• history of a foot ulcer</li><li>• a lower-extremity amputation (minor or major)</li><li>• end-stage renal disease</li></ul>	1–3 months



# INSPECT FOR DEFORMITY



(Photos by Neil Baker who granted Lilly a non-exclusive licence to use the copyright in the images.)

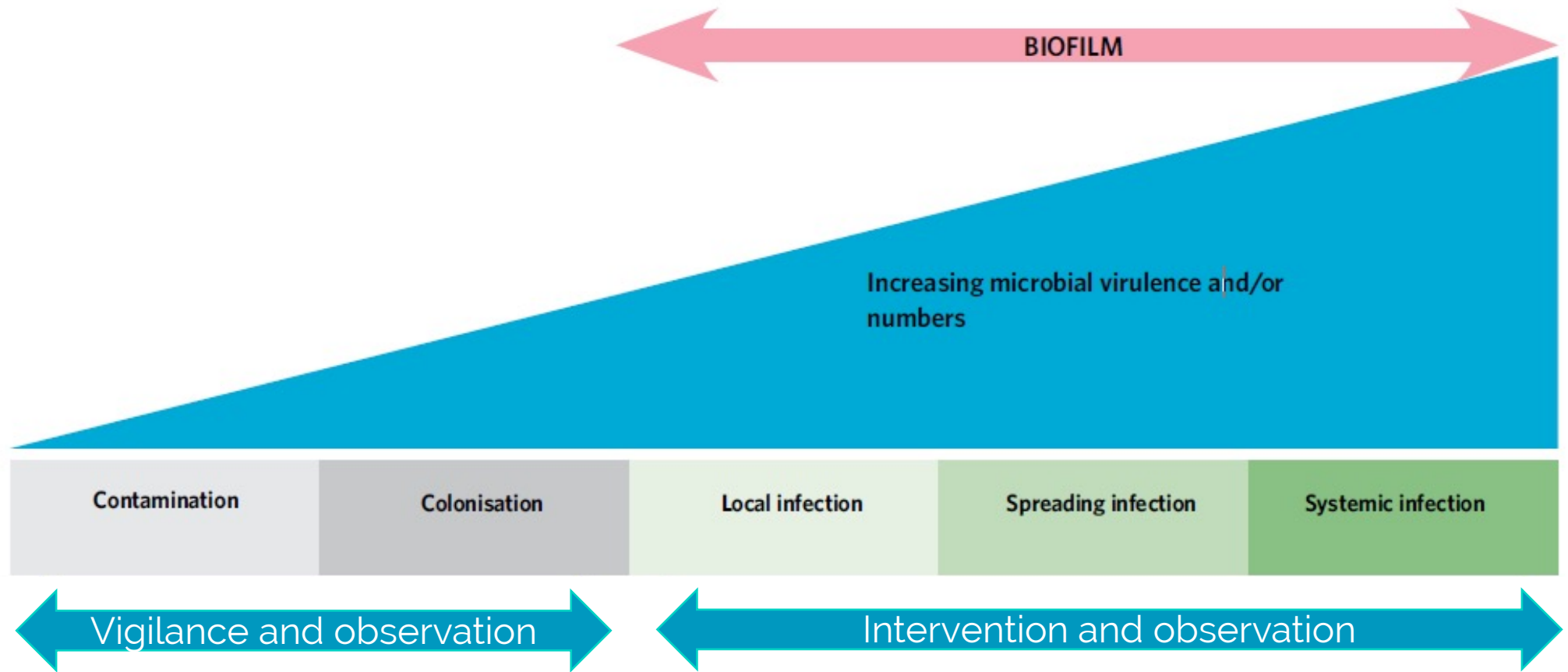
# INSPECT FOR SIGNIFICANT CALLUS



# INFECTION



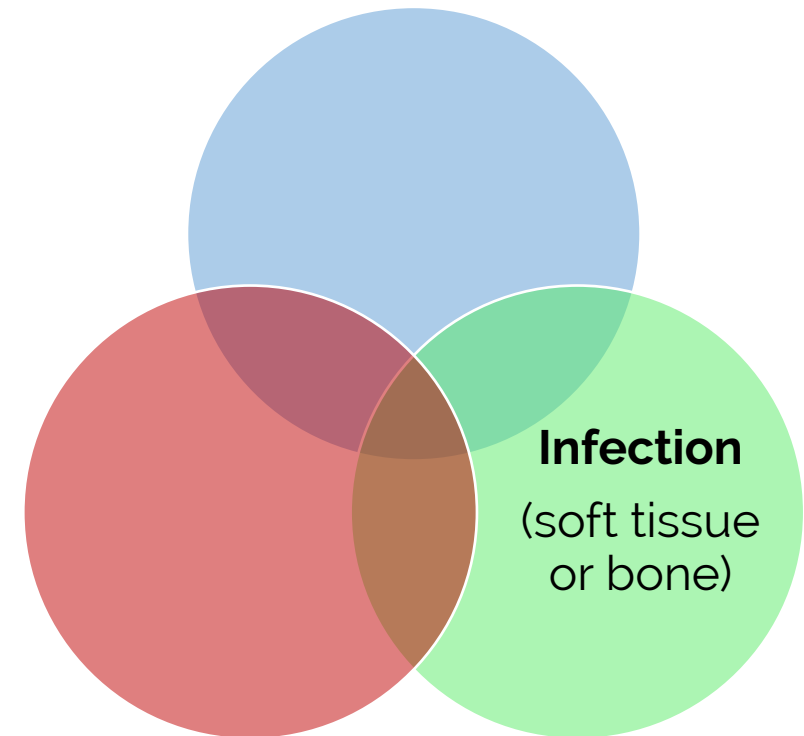
# INFECTION CONTINUUM



(International Wound Infection Institute [IWII], 2016)

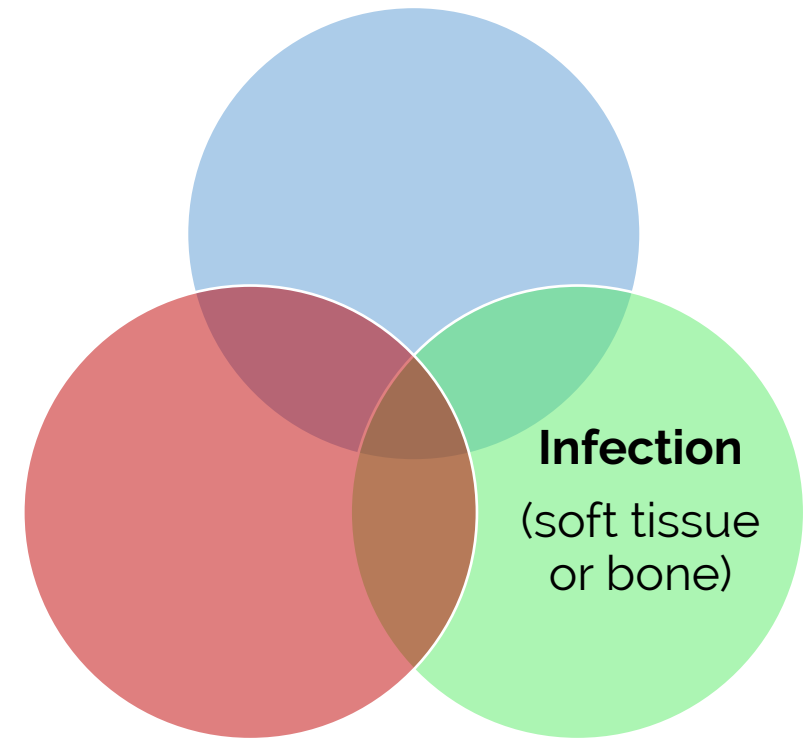
# INFECTION AND DFU

- 150-fold increased risk of lower extremity amputation compared to no infection
    - 58% of DFUs at presentation are infected
    - 82% of patients hospitalised for DFU have infection
- (Prompers et al, 2007)

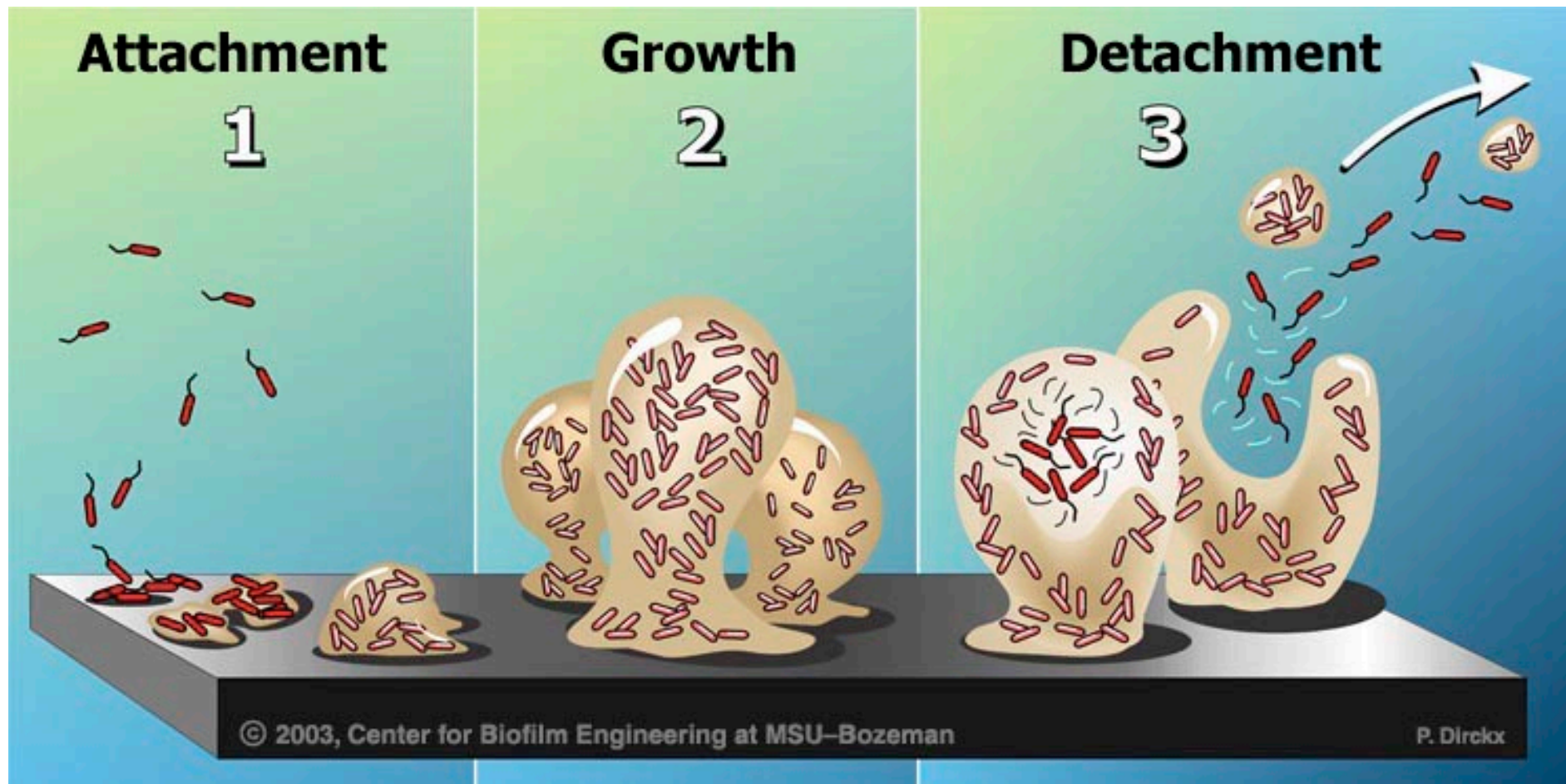


# INFECTION AND BIOFILM

- Planktonic bacteria
  - Free floating bacteria are freely mobile and 'vulnerable' but can attach
- Attached bacteria multiply and encase themselves with slime forming protected colonies
  - Known as biofilms



# BIOFILM



# RECOGNISING BIOFILM

- Excessive moisture/exudate
- Poor-quality granulation tissue (e.g. friable, hypergranulation)
- Localised infection
- Antibiotic failure or recurring infection
- Negative wound culture
- Non-healing in spite of optimal wound management
- Infection >30 days
- Responds to corticosteroids and anti-TNF medication
- Gelatinous material easily removed from wound surface.

(Keast et al, 2014)

# EFFECTS DIABETES HAS ON WOUND HEALING

- High risk of sepsis spreading, systemic infection
- Osteomyelitis
- The diabetic foot is also a significant economic problem, particularly if amputation results in prolonged hospitalisation, rehabilitation, and an increased need for home care and social services

# CASE EVALUATION

- 19 people (13 men; 6 women) with 29 wounds were enrolled in an evaluation to assess a dialkylcarbamoylechloride (DACCC) coated dressing's ability to manage infection in DFUs
- Wound healing occurred in less than four weeks in more than a quarter of cases, and exudate volume reduced in 96% of those enrolled in the evaluation
- Participants scored the dressings as 'excellent' for comfort, acceptability and ease of use.



# CASE EVALUATION CONTINUED



Ulcer at enrollment



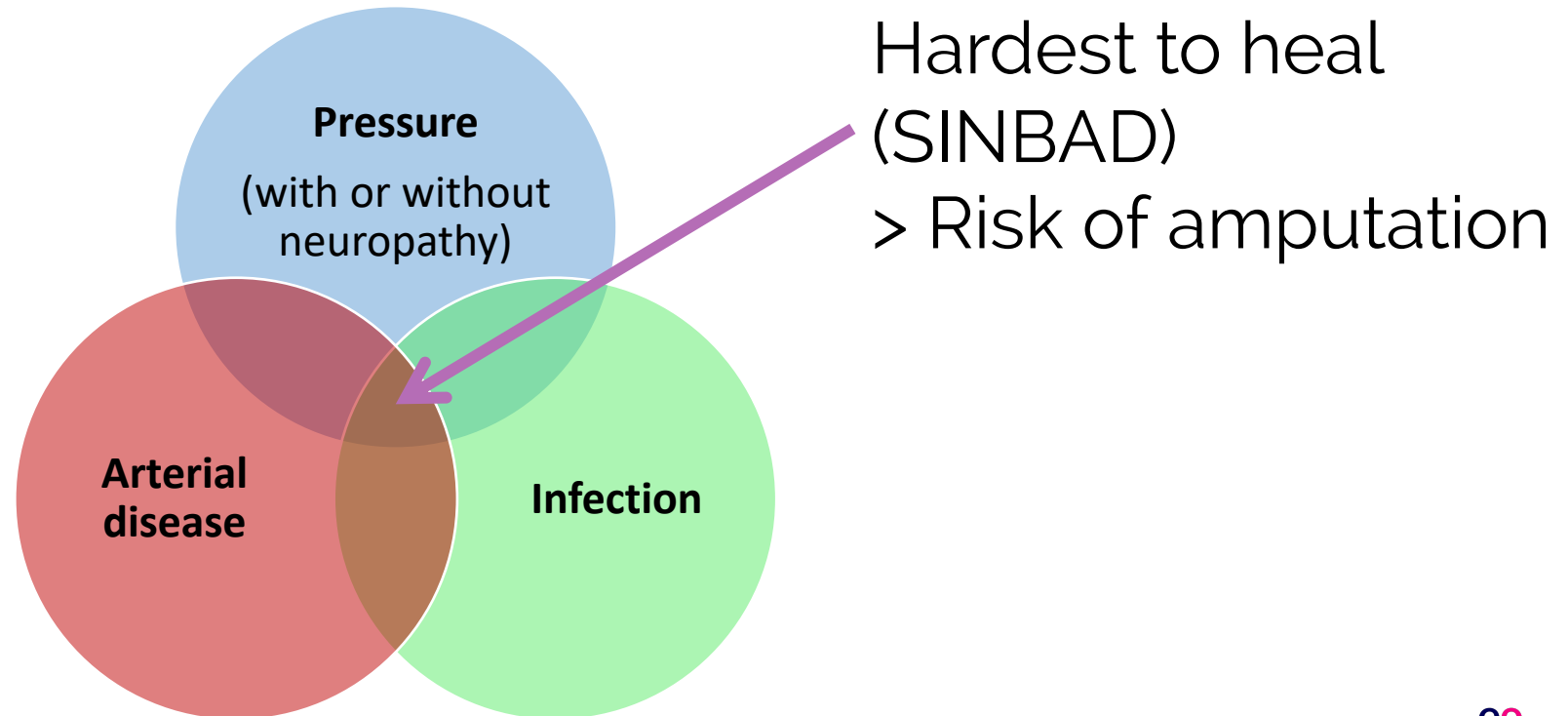
After one week's treatment with the DACC-coated dressing



Healed wound 20 days later

# RECOGNISING HARD-TO-HEAL WOUNDS

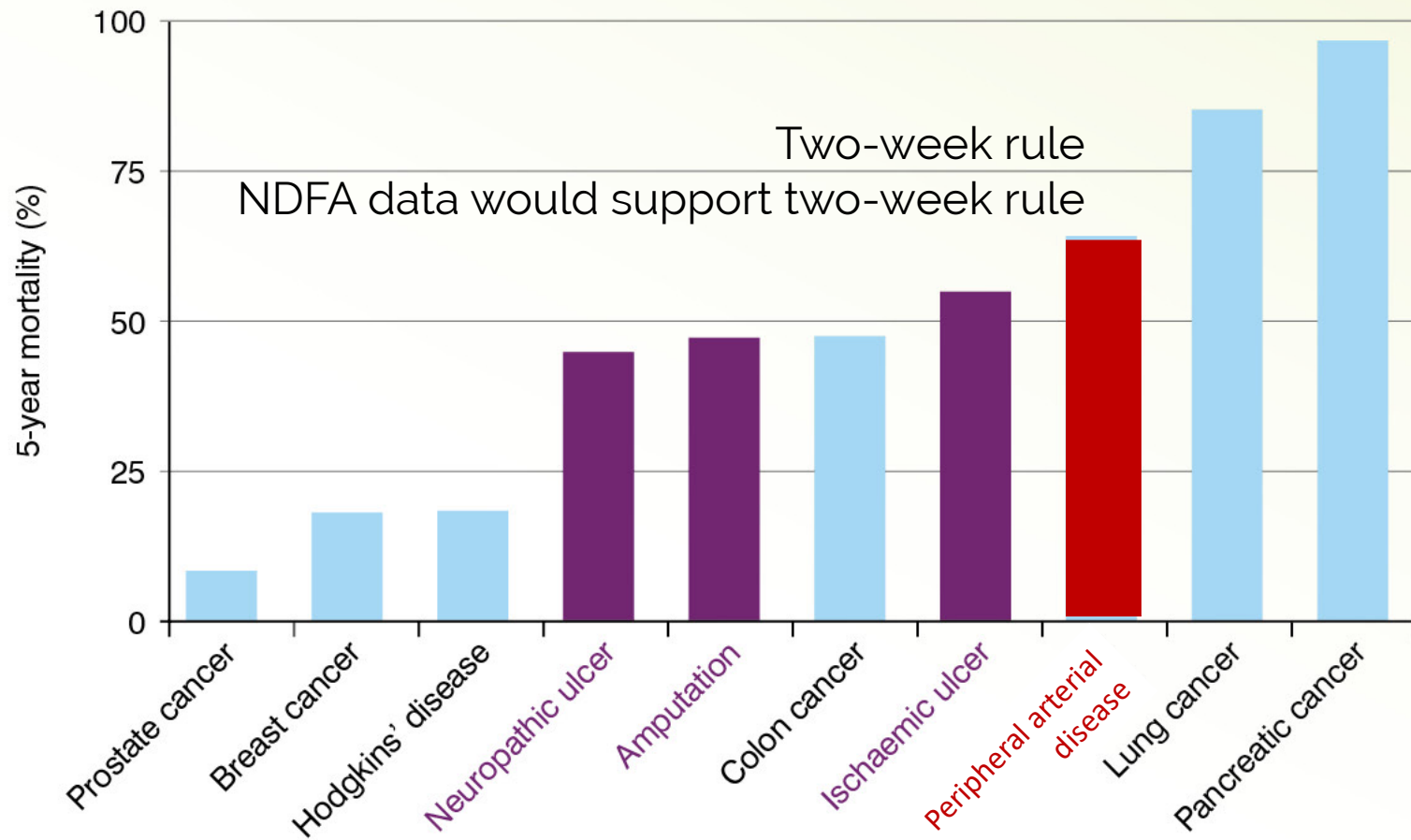
- **Multi-factor ulcers (e.g. diabetic foot ulcer)**
  - Plantar foot pressures with neuropathy, arterial disease and infection.



# ROLE OF THE MULTIDISCIPLINARY FOOT SERVICE

Podiatry, Diabetes, Orthopaedic, Vascular, Microbiology, Radiology,  
Tissue viability, Orthotics, Plastics and/or Psychology services

# EARLY INTERVENTION IN DIABETIC FOOT IS KEY

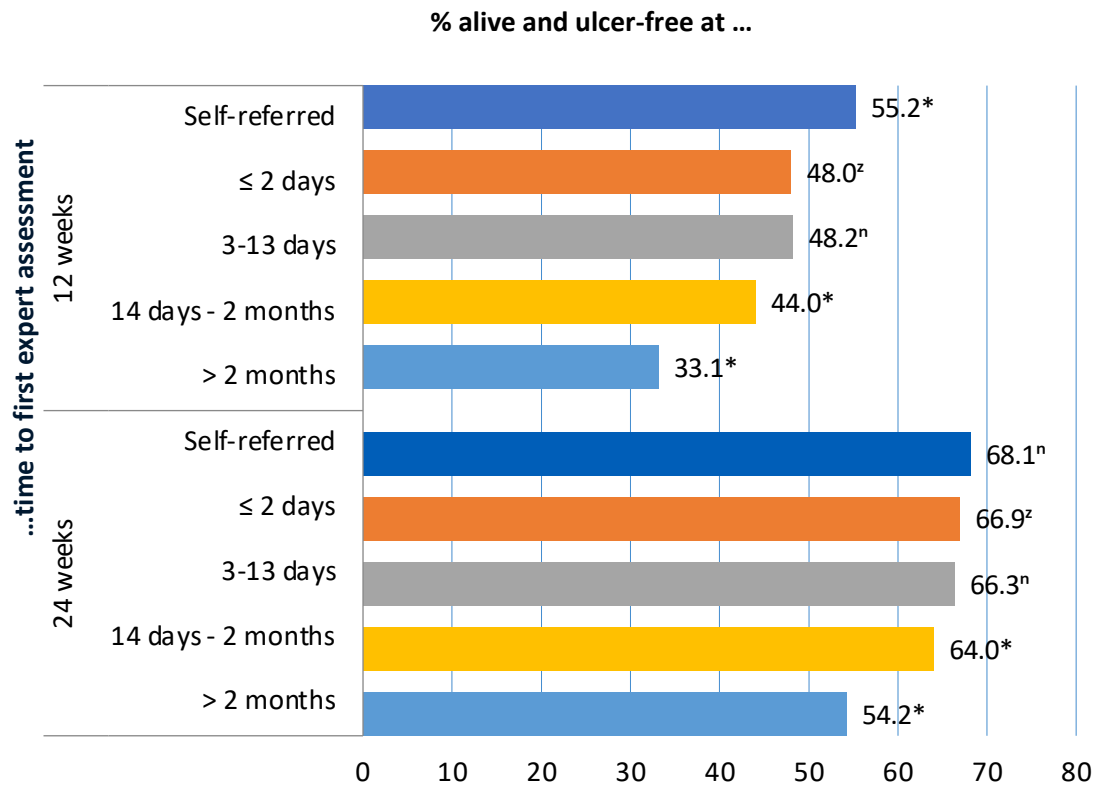


# EARLY INTERVENTION IN DIABETIC FOOT IS KEY

**Five-year mortality** rate after **DFU onset** is **43–55%**, comparable to colon cancer and worse than prostate, breast cancer and Hodgkins' disease. **Why is this the case?** (Robbins et al, 2008)

# POTENTIAL 'TWO-WEEK RULE' IN DFU MANAGEMENT

Alive and ulcer-free by time to first expert assessment, England and Wales 2014-2017



Notes: \* = statistically significant at the 0.05 level (vs ≤2 days).  
n = not statistically significant (vs ≤2 days). z = not applicable. Used as comparison group.



Time to assessment of **14+ days** result in **worse** outcomes at 12 and 24 weeks

Compared to less than 14 days



**Self-referred** ulcers are **more likely** to be healed at **12 weeks**

But no difference at 24 weeks (vs. less than 14 days)

# CONCLUSION

- Diabetic foot disease is a combination of arterial disease, pressure, sensation loss and/or infection
- The impact of diabetic foot disease and its associated complications is set to rise
- Everyone can play a part in recognition
- Early referral to MDFS and intervention leads to improved patient outcomes.





Q & A

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