West Hertfordshire Hospitals NHS
NHS Trust

Hertfordshire Community NHS
NHS Trust

Prevention and Management of Diabetic Foot Disease

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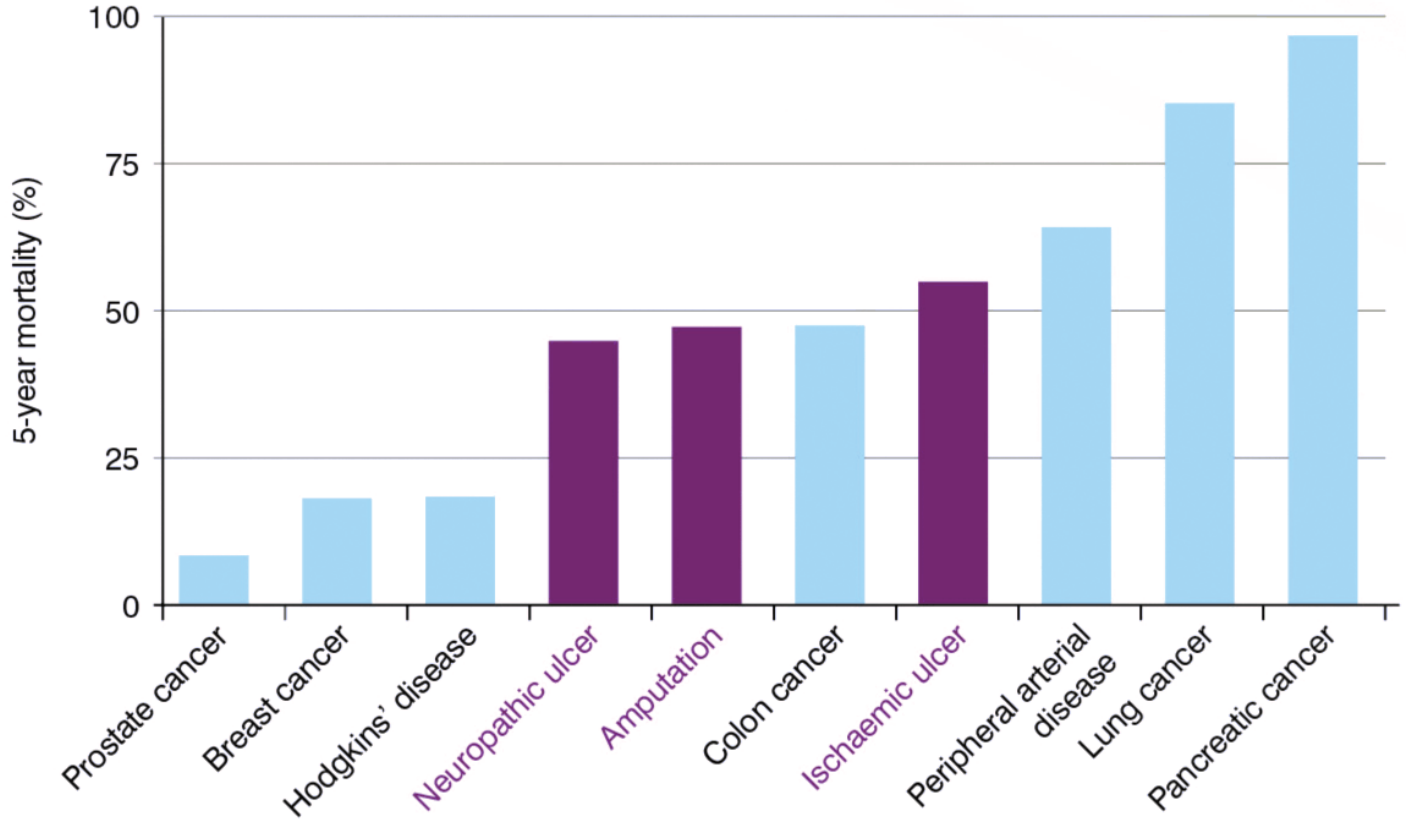
Format

- Background & Epidemiology
- Case studies
- Standards of Care
- Guidelines and Referral Care Pathways
- Management of the diabetic foot
- Summary
- Question time

Epidemiology of the Diabetic Foot

- Leading cause of all non traumatic lower limb amputation (40-60%)
- Commonest cause of hospital bed occupancy (most common cause of hospital admission amongst diabetes patients, NaDIA)
- 85% are preceded by foot ulceration
- Lower limb amputations ↑ x 15 in diabetes
- > 50% require amputation of other limb within 3-5 years
- 50% patients die within 5 years

“Are diabetes-related wounds and amputations worse than cancer?”[1]



1. Adapted from Armstrong DG, Wrobel J, Robbins JM. Int Wound J. 2007 Dec; 4(4): 286-7.

Cost of poor diabetic foot care to NHS

In 2010-11, the NHS in England spent an estimated **£639 million-£662 million, 0.6–0.7% of its budget,** on diabetic foot ulceration and amputation

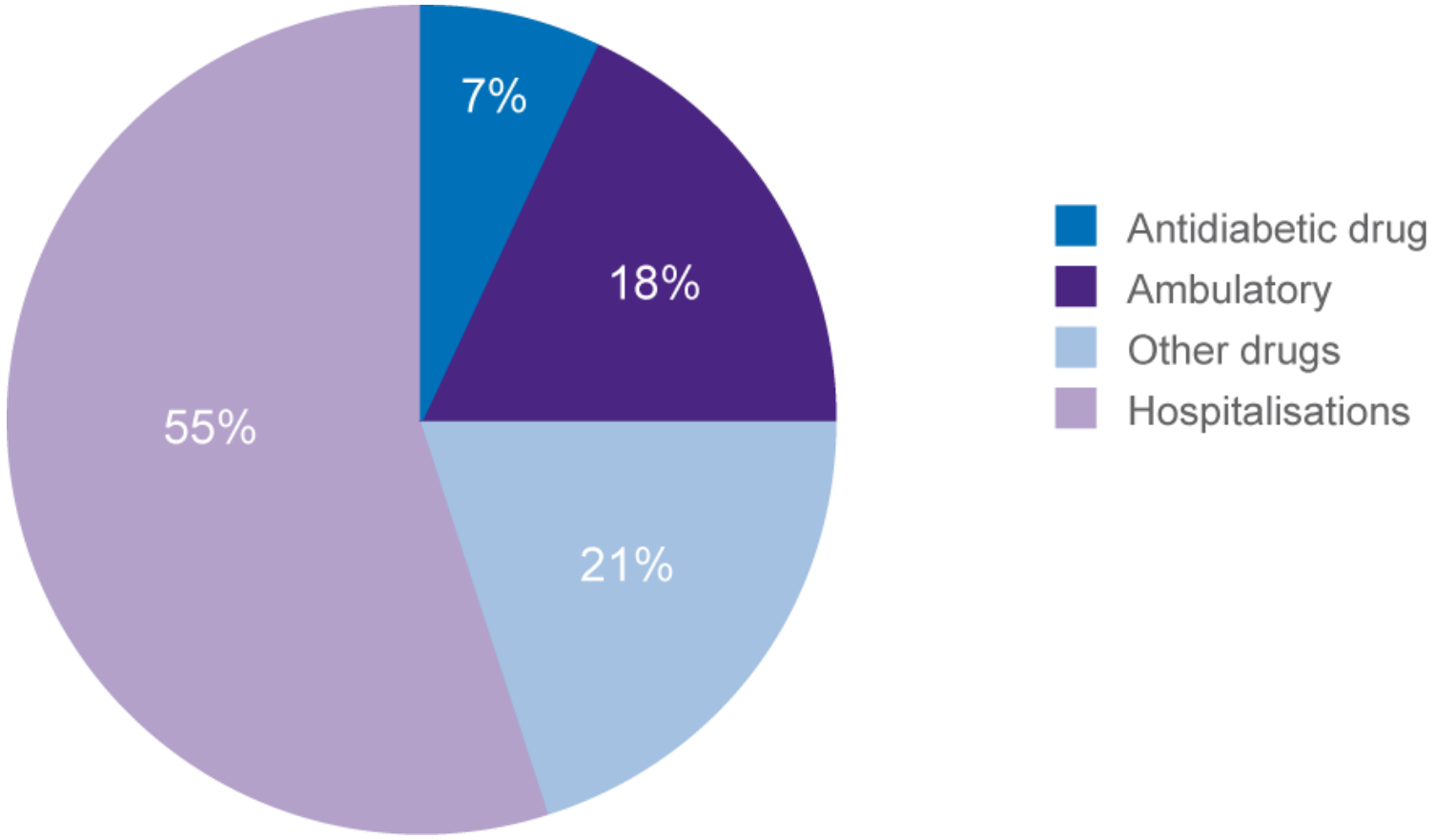
	Lower estimate	Upper estimate
Primary, community and outpatient care	£306,508,970	£323,062,601
Accident and emergency		£849,278
Inpatient care – ulceration	£213,151,916	£213,151,916
Inpatient care – amputation	£43,546,901	£48,896,732
Post-amputation care	£75,807,423	£75,807,423
Total	**£639,015,210**	**£661,767,953**

Estimated cost of ulceration and amputation in people with diabetes, England, 2010–11

£1.75-£1.81 million a day!

NHS Diabetes. Foot Care for People with Diabetes: The Economic Case for Change. March 2012. Available at www.diabetes.nhs.uk/document.php?o=3372.

Hospitalisation represents the greatest proportion of overall costs[1]

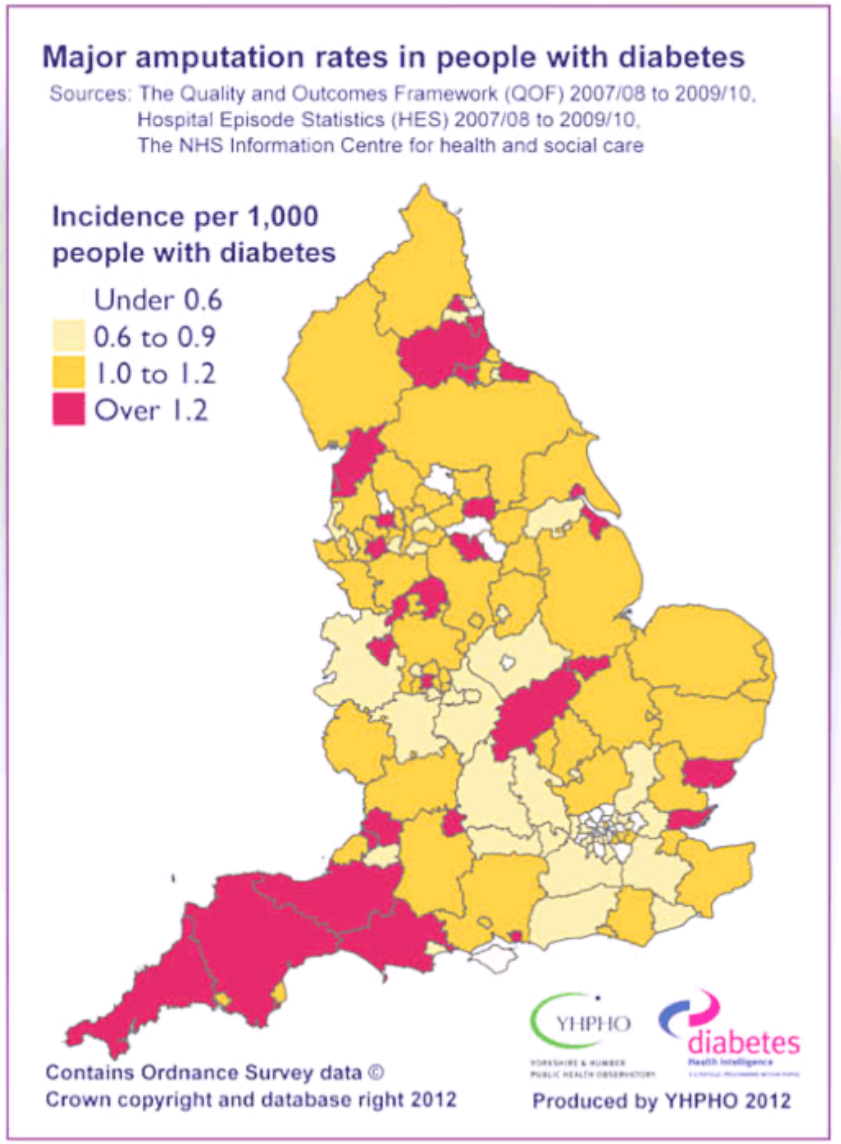


Ref. Jönsson B. Diabetologia 2002; 45: S5–S12.

Variation in amputation rates 'shocking' *(BBC News 2010, 2012)*

- Department of Health data reveals the rate of major amputations in the South West, at 3 in 1000, almost twice the rate in the South East

- Are we doing any better in Hertfordshire?



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Diabetes Footcare Activity Profile August 2016

(www.gov.uk/phe, www.ncvin.org.uk)

Key facts	Herts Valleys CCG	East & North Herts CCG	England
Total episodes of inpatient care for diabetic foot disease	1,776	1,241	167,224
Annual episodes of care for diabetic foot disease per 1,000 adults with diabetes	24.6	16.6	19.8
Total nights in hospital due to diabetic foot disease	13,006	11,731	1,357,714
Annual nights in hospital for diabetic foot disease per 1,000 adults with diabetes	180.1	156.6	161.0
Episodes of care where an amputation is performed on those with diabetes	212	119	22,109
Annual amputations per 1,000 adults with diabetes	2.9	1.6	2.6

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Why the variation in foot outcomes?

Root cause analysis

- What structures and systems are in place locally? (commissioning/organisation)
- Are there clear guidelines/protocols for
    - referral routes/care pathways?
    - process of care?
- Do patients & health care professionals know them, how and where to access them?
- What are the current resources (podiatry, primary and secondary care, inpatients)
- Are all patient being risk assessed appropriately?
- Are all patients at risk being followed up as required?
- Are the appropriate review/discharge care planning arrangements in place? (Continuity of care)
- Optimal communication between HCPs involved (Use of different IT system)?

Case studies

What level of care should the diabetic patient with a foot problem expect?

What can **you** do to improve your diabetic patients' footcare?

Quality standards

- Putting Feet First 2003

PUTTING FEET FIRST

Commissioning/planning a care pathway for foot care services for people with diabetes

BACKGROUND

- The consequences of poor management of the foot in diabetes are considerable: prolonged ulceration and ill-health, gangrene and amputation, depression and death. The annual costs to health care agencies in the UK are estimated to exceed £1billion.
- Good management requires close coordination between different groups of health care professionals. Such coordinated management is not yet widespread.
- Four UK centres have shown that by changing the structure of care, it is possible to reduce the incidence of limb loss by amputation to as little as 20 per cent of its baseline level.
- It is imperative that such re-organisation is implemented in order to improve health outcomes and reduce costs.

THE STRUCTURE OF AN EFFECTIVE FOOT CARE PATHWAY

The essential elements of an effective clinical service have been described in *Putting Feet First* (2003), and *Putting Feet First National Minimum Skills Framework* (2011), both released jointly by Diabetes UK and NHS Diabetes. These documents define the services by which each person with diabetes should have access – for both prevention and treatment of foot disease. The National Minimum Skills Framework also defines the constitution and responsibilities of the teams necessary to provide these services: the Foot Protection Team (FPT) with a primary responsibility for prevention, and the Multidisciplinary Team (MDT) which should coordinate the management of all new disease. The FPT and MDT must work closely together.

Pathways of care must ensure prompt and effective transition of care across health care boundaries, including traditional boundaries that exist within the community, between community and hospital, and between different specialist groups in hospitals. The publication in April 2011 of new QOF indicators for general practice, together with the NICE Guidance CG 119, SIGN Guideline 116 and the NICE Quality Standard 10 completes the picture for the minimum expectations for people with diabetes. The present document demonstrates the way in which these requirements can be brought together in an integrated pathway of care.

COMMISSIONING/ PLANNING

The central roles of the FPT and the MDT have been emphasised in NICE clinical guidelines CG 10 (2004) and CG 119 (2011), SIGN guidelines 116 (2010), as well as in the NICE Quality Standard Statement 10 (2011). The provision of effective ulcer prevention and wound management by such teams should be the basis of the commissioning/planning of foot care services in diabetes.

REFERENCES

TRANSFORMING FOOT CARE SERVICES IN DIABETES

1 PREVENTION OF ACTIVE DISEASE OF THE FOOT IN THOSE AT INCREASED RISK

Referral of those at increased risk to the Foot Protection Team (FPT)* Foot risk status correlates closely with outcome. The need to document risk of each individual with diabetes was incorporated in QOF targets in April 2011. The 2011 NICE Quality Standard 10 and the Diabetic Foot Risk Stratification and Triage (SIGN 116) also states that all people at increased risk will receive regular review by a member of a FPT. People with diabetes should be aware of their risk status and this entitlement. All people at increased risk should be referred promptly to a member of the FPT.

Education of specialist staff and patients It is necessary that those who examine the feet to determine risk status have the necessary training and competence. Training will be a role which can be provided by the FPT. An essential part of the annual review of feet is patient education. The person with diabetes should be aware of the reason for the examination being undertaken, the results of the examination, the services to which they should have access if they require specific preventive measures and action to be taken if they develop a foot problem.

A free online training programme is available at www.diabetesframe.org

* Sometimes referred to as the Foot Care Team

2 TREATMENT OF ACTIVE DISEASE OF THE FOOT

Active disease of the foot includes:

- Ulceration, with or without infection and peripheral arterial disease
- Peripheral arterial disease without ulceration
- Acute Charcot foot
- Painful peripheral neuropathy
- Disease of the foot unrelated to diabetes

Ulceration All ulcers should be referred to the MDT within 24 hours.

Peripheral arterial disease without ulceration People thought to have symptomatic peripheral arterial disease should be referred either to a vascular surgical unit for assessment, or to the MDT.

Acute Charcot foot People with diabetes and neuropathy who develop unexplained inflammation of the foot should be assumed to have an acute Charcot foot and referred by phone for urgent assessment by the MDT. They should be told not to take weight on the foot until they have been seen.

Painful peripheral neuropathy Guidelines for the management of painful neuropathy have been published (NICE CG 96 and SIGN 116) and this can be supervised in general practice, provided that the GP is confident that the neuropathy is the cause of the pain. Referral to an MDT may be necessary for assessment.

Disease of the foot unrelated to diabetes Symptoms or signs of other diseases should be managed appropriately.

3 MANAGEMENT OF THE PERSON WHOSE FOOT DISEASE HAS BEEN TREATED

Prevention of new foot disease The person who has had an episode of foot disease has a 40 per cent risk of a second episode within 12 months. This group is at highest risk and they should:

- remain under regular review by a member of the FPT or the MDT
- understand the importance of prompt assessment by the MDT of any newly occurring problem.

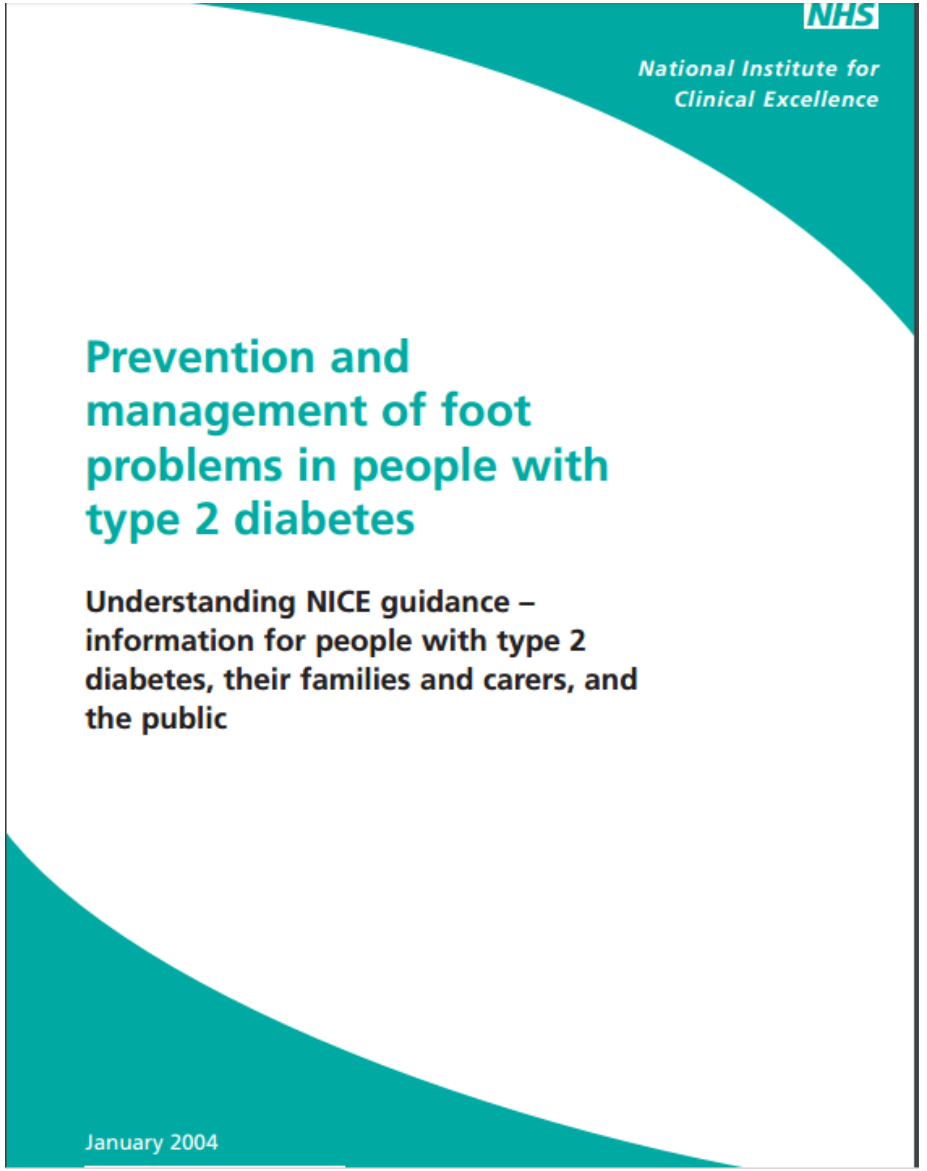
Reduction of cardiovascular risk The average survival rate at five years is just 50 per cent for people who present with active disease of the foot. Average life expectancy is reduced by 14 years – even in those with predominantly neuropathic disease. As the main cause of increased mortality is cardiovascular, it is essential that all necessary steps are taken to reduce cardiovascular risk.

DIABETES UK
CARE. CONNECT. CAMPAIGN.

www.diabetes.org.uk

Quality standards

- Putting Feet First 2003
- NICE 2004 CG10 (Type 2 Diabetes foot problems: Prevention and Management of Foot problems



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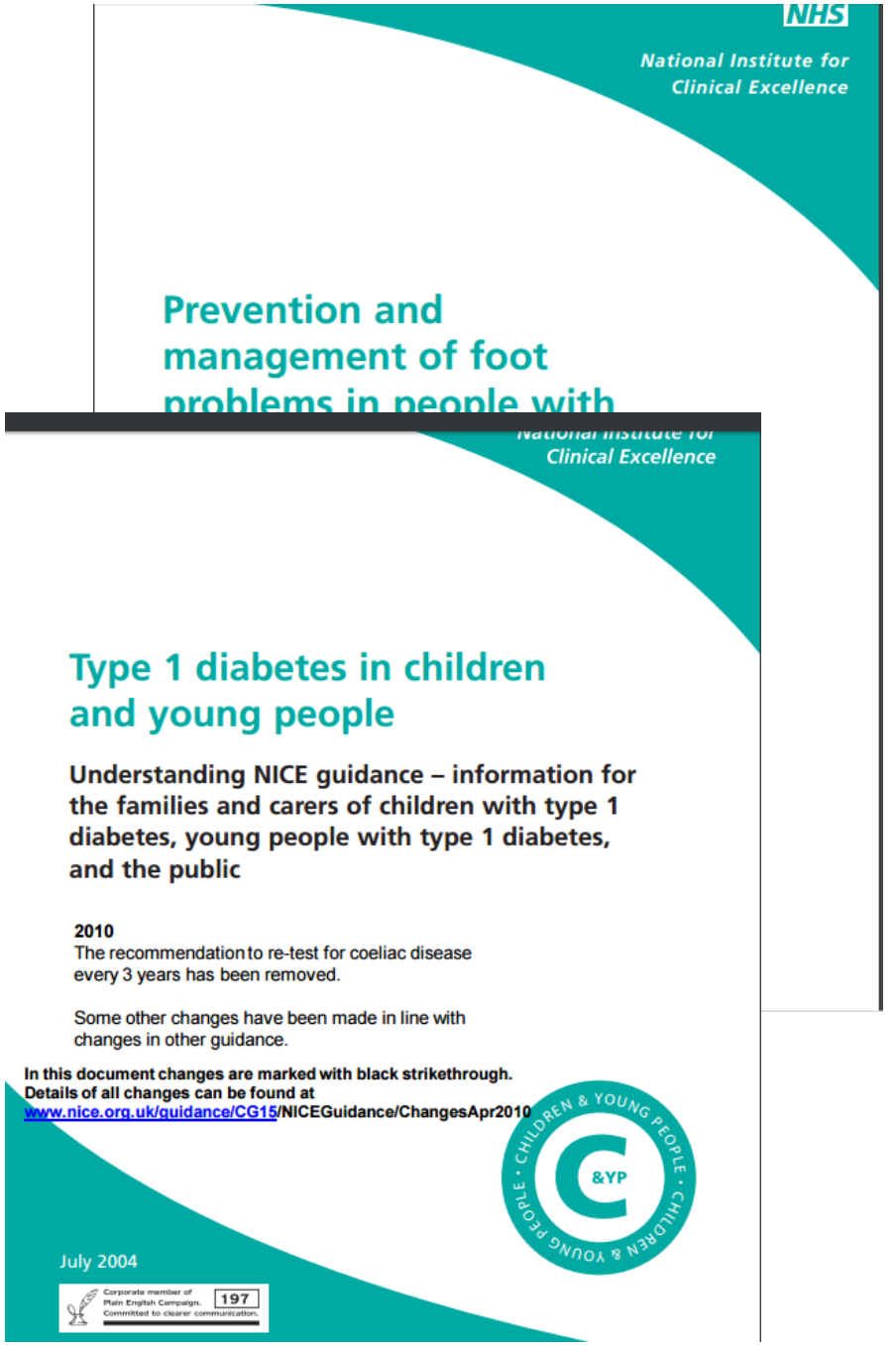
- NICE CG15 2004 (Diagnosis and management of Type 1 diabetes in children, young people and adults)



Quality standards

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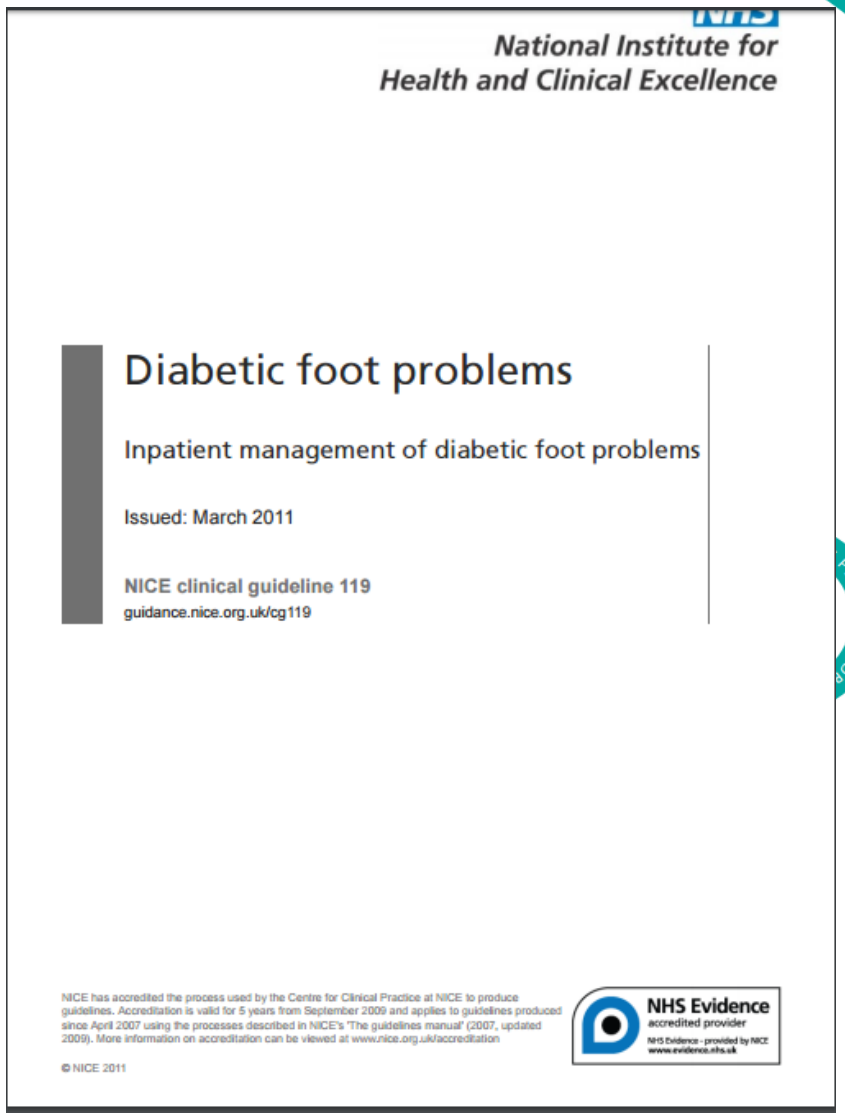
- NICE CG15 2004 (Diagnosis and management of Type 1 diabetes in children, young people and adults)
- NICE CG119 March 2011 (Diabetic foot problems: Inpatient management of diabetic foot problems)



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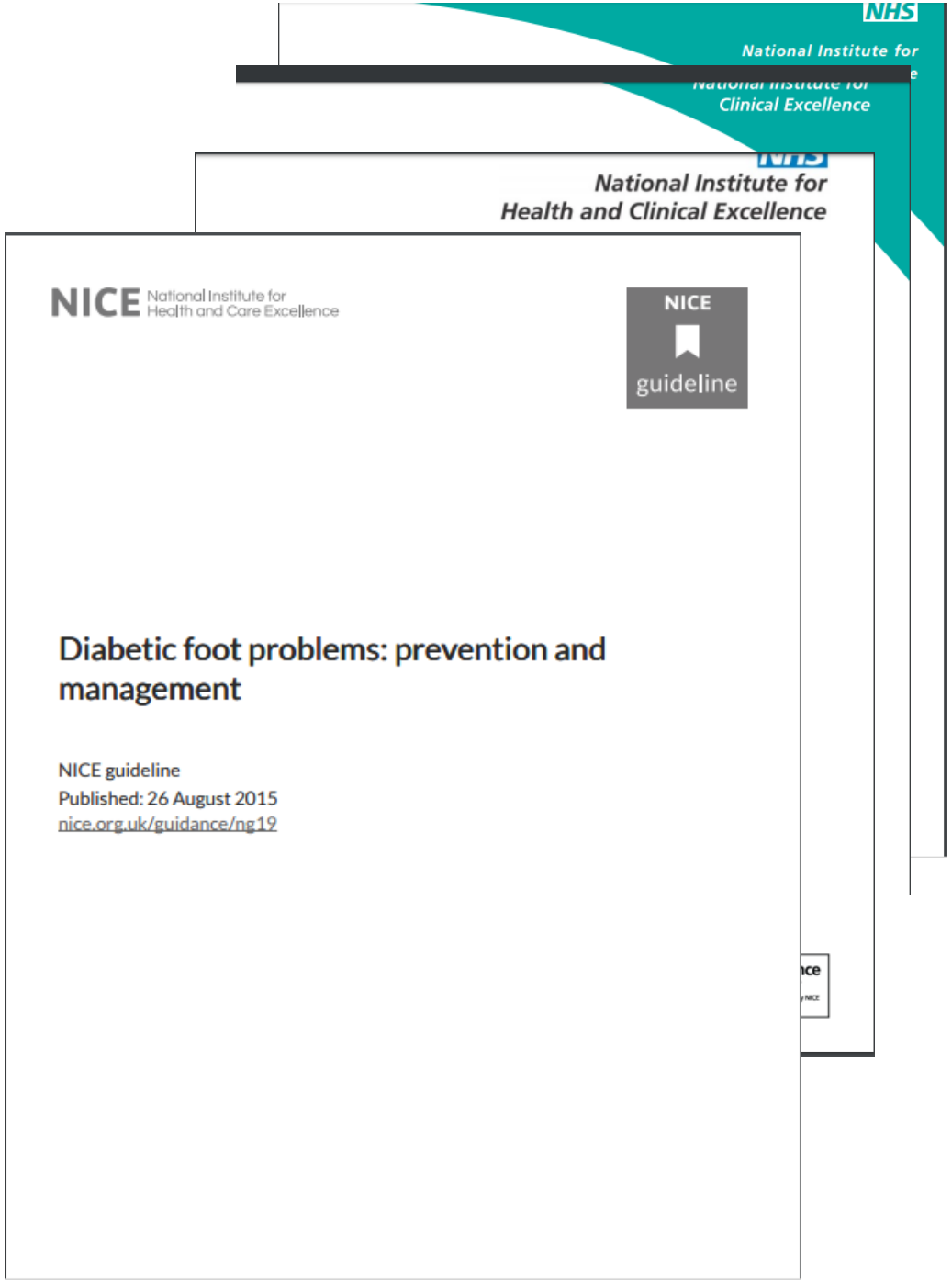
- NICE CG119 March 2011 (Diabetic foot problems: Inpatient management of diabetic foot problems)
- NICE CG19 Aug 2015, updated Jan 2016 (Diabetic foot problems: prevention and management)



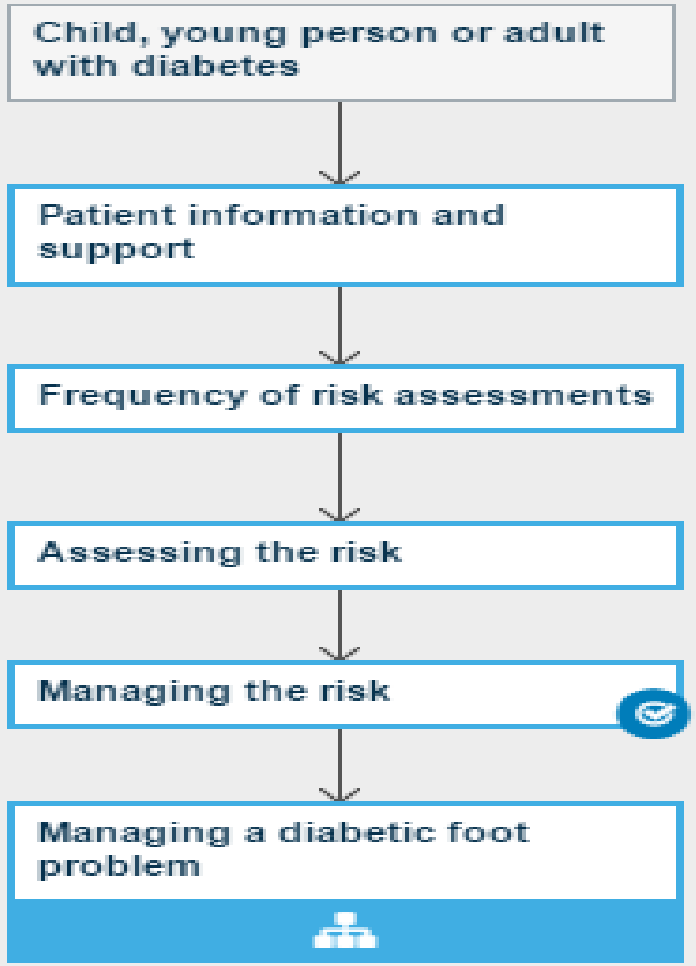
Commissioners and service providers should ensure that the following are in place:

- A foot protection service for preventing diabetic foot problems, and for treating and managing diabetic foot problems in the community
- A multidisciplinary foot care service for managing diabetic foot problems in hospital and in the community that cannot be managed by the foot protection service
- Robust protocols and clear local pathways for the continued and integrated care of people across all settings, including emergency care and general practice. The protocols should set out the relationship between the foot protection service and the multidisciplinary foot care service
- Regular reviews of treatment and patient outcomes, in line with the National Diabetes Foot Care Audit

NICE National Institute for Health and Care Excellence

Reducing the risk of developing a diabetic foot problem

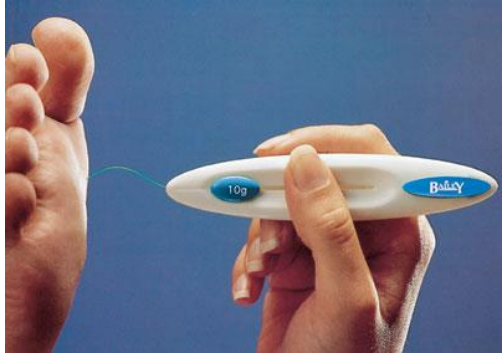
- Education, Education, Education..... (patients, carers, HCPs)
- On-going care: annual review & recall
- Detection of risk factors for ulceration
- Classification of foot risk
- Refer early to Community Podiatry & MDT foot clinics



How frequently should you assess your diabetic patients' feet?

- At time of diagnosis and at least annually thereafter
- If any foot problems arise
- On any admission to hospital, and if there is any change in their status while they are in hospital

Assessing the risk of developing a diabetic foot problem



Remove the patient's shoes, socks, bandages and dressings, and examine both feet for evidence of the following risk factors:

- Neuropathy (use a 10 g monofilament as part of a foot sensory examination)
- Limb ischaemia
- Ulceration
- Callus
- Infection and/or inflammation
- Deformity
- Gangrene
- Swelling (Charcot arthropathy)

Factors associated with foot ulcer

- Previous ulcer/amputation
- Neuropathy
  - Sensorimotor
- Trauma
  - Poor footwear
  - Walking barefoot
  - Falls/accidents
  - Objects inside shoes
- Biomechanics
  - Limited joint mobility
  - Bony prominences
  - Foot deformity/osteoarthropathy
  - Callus
- Peripheral vascular disease
- Socio-economic status
  - Low social position
  - Poor access to healthcare
  - Non compliance/neglect
  - Poor education

Foot Risk stratification for the patient with diabetes (1)

- Low risk (normal sensation, palpable pulses, +/- callus)
- Moderate risk
- High (increased) risk
- Active & the Urgent/Emergency diabetic foot

Foot Risk stratification for the patient with diabetes (2)

Moderate risk

- deformity **or**
- neuropathy **or**
- non-critical limb ischaemia

- **Review by Foot protection team (3-6 months)**

High (Increased) risk

- previous ulceration **or**
- previous amputation **or**
- on renal replacement therapy **or**
- neuropathy and non-critical limb ischaemia together **or**
- neuropathy in combination with callus and/or deformity **or**
- non-critical limb ischaemia in combination with callus and/or deformity
- **Refer to Foot protection team (Community Podiatry).**
- **Review 1-2 months, 1-2 weeks if any concern**

Active diabetic foot problem

- ulceration **or**
- spreading infection

- **Refer urgently to the MDT Foot clinic**

This is an emergency

- critical limb ischaemia **or**
- gangrene **or**
- suspicion of an acute Charcot arthropathy, or an unexplained hot, red, swollen foot with or without pain

- **Refer urgently to AAU**

PUTTING FEET FIRST

Annual Foot Review for everyone with diabetes over 12 years old

How to do an annual foot check:

- Remove shoes and socks/ stockings
- Test foot sensations using 10g monofilament or vibration with a tuning fork
- Palpate foot pulses
- Inspect for any deformity
- Inspect for significant callus
- Check for signs of ulceration
- Ask about any previous ulceration
- Inspect footwear
- Ask about any pain
- Tell patient how to look after their feet and provide written information
- Tell patient their risk status and what it means. Explain what to look out for and provide emergency contact numbers.

ADVISE THE PATIENT TO:

- Check their feet every day
- Be aware of loss of sensation
- Look for changes in the shape of their foot
- Not use corn removing plasters or blades
- Know how to look after their toenails
- Wear shoes that fit properly
- Maintain good blood glucose control
- Attend their annual foot review

IDENTIFICATION OF FOOT RISK STATUS AND THE ACTION TO TAKE

LEVEL OF RISK		ACTION
ACTIVE	• Ulceration or • spreading infection or • critical limb ischaemia (severe peripheral arterial disease) or • gangrene or • suspicion of acute Charcot foot or an unexplained hot, red, swollen foot with or without pain.	• Rapid referral (within one working day) to the Foot Protection Service (FPS) or the multidisciplinary foot team, for triage within one further working day. • Assess feet and lower limbs, then agree a tailored treatment plan. • Provide written and verbal education with emergency contact numbers. • Refer for special intervention if/ when required. • Liaise with other healthcare professionals eg GP as necessary.
HIGH	• Previous ulceration or • previous amputation or • on renal replacement therapy (dialysis or transplant) or • neuropathy (loss of sensation) and lower limb peripheral arterial disease together or • neuropathy (loss of sensation) in combination with callus and/ or deformity* or • lower limb peripheral arterial disease in combination with callus and/or deformity*.	• Refer to a specialist podiatrist or member of the foot protection service (FPS) and request an assessment within 2–4 weeks. • Thereafter they should be assessed every 1–2 weeks if there is immediate concern or every 1–2 months if there is no immediate concern. This is in addition to their annual assessment. Both assessments should be carried out by a specialist podiatrist or a member of the FPS. • Assess feet and lower limbs, then agree a tailored treatment plan. • Provide written and verbal education with emergency contact numbers. • Refer for special intervention if/ when required. • Liaise with other healthcare professionals eg GP as necessary.
MODERATE	• Deformity* or • neuropathy (loss of sensation) or • lower limb peripheral arterial disease.	• Refer to a specialist podiatrist or member of the foot protection service (FPS) and request an assessment within 6–8 weeks. • Thereafter they should be assessed every 3–6 months in addition to their annual assessment, by a specialist podiatrist or a member of the FPS. • Assess feet and lower limbs, then agree a tailored treatment plan. • Provide written and verbal education with emergency contact numbers. • Refer for special intervention if/ when required. • Liaise with other healthcare professionals eg GP as necessary.
LOW	• No risk factors, as listed above, present. • Callus alone is considered low risk.	• Annual screening by a suitably trained Healthcare Professional. • Agree self management plan. • Provide written and verbal education with emergency contact numbers.

Record risk status and inform patient of their risk status and what it means.

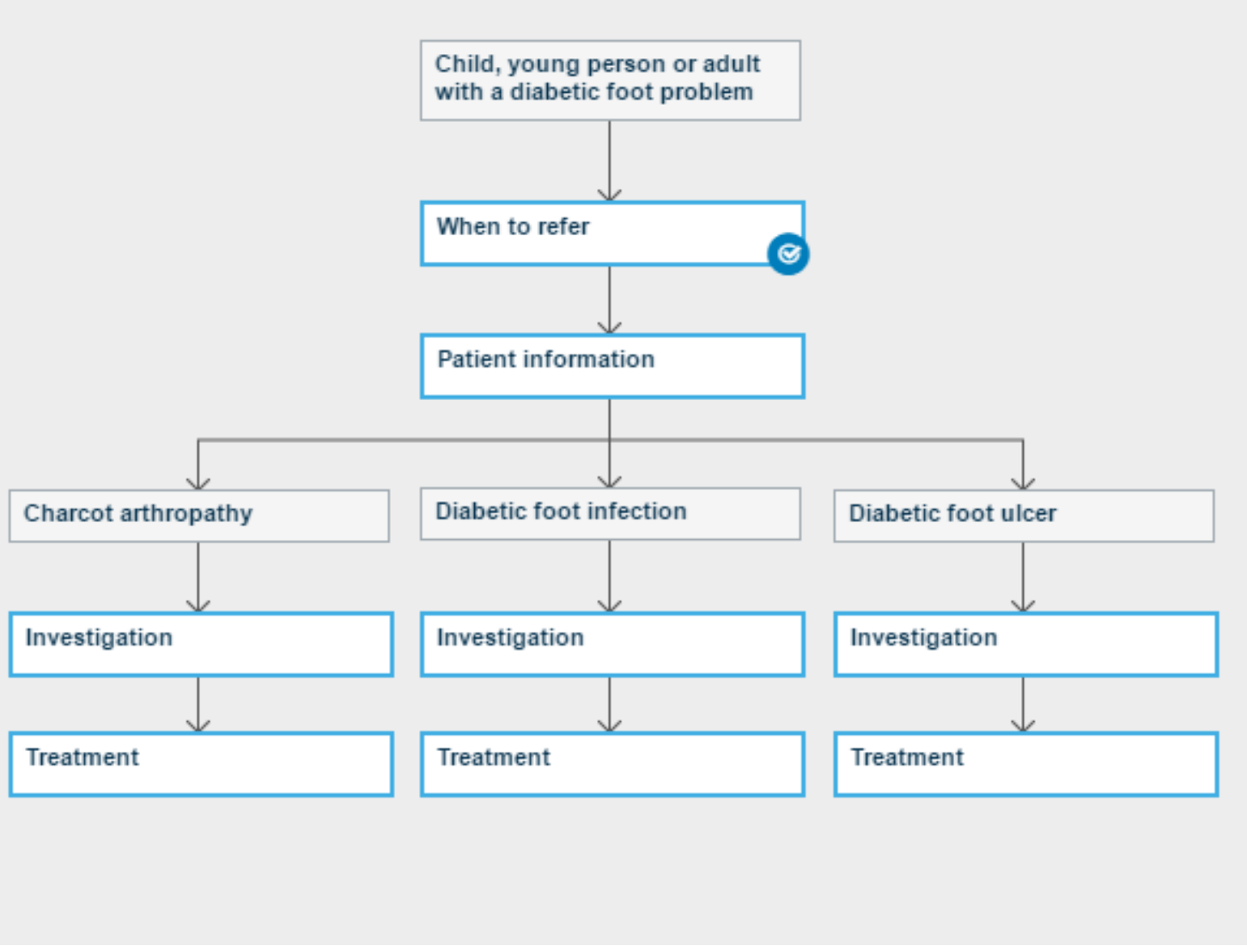
*A change in foot shape that results in difficulty in fitting a standard shoe, as assessed by the practitioner.

These risk categories relate to the use of the SCI-DC foot risk stratification tool and NICE guidance (NG19, 2015).

Produced by the Scottish Diabetes Foot Action Group

NICE National Institute for Health and Care Excellence

Managing a diabetic foot problem



Key priorities are to:

- Treat any infection that is present
- Treat vascular disease, if present
- Alleviate pressure to aid healing (off-loading)
- Achieve good metabolic (glycaemic) control and control of risk factors for cardiovascular disease (smoking, dyslipidaemia)

Emergency referral

- **Refer within 24 hrs to multidisciplinary foot care team (MDT Foot clinics) if**

  - new ulcer

  - new swellling

  -new discolouration

  - no critical ischaemia (needs urgent vascular review)

Management of active foot ulcers (1)

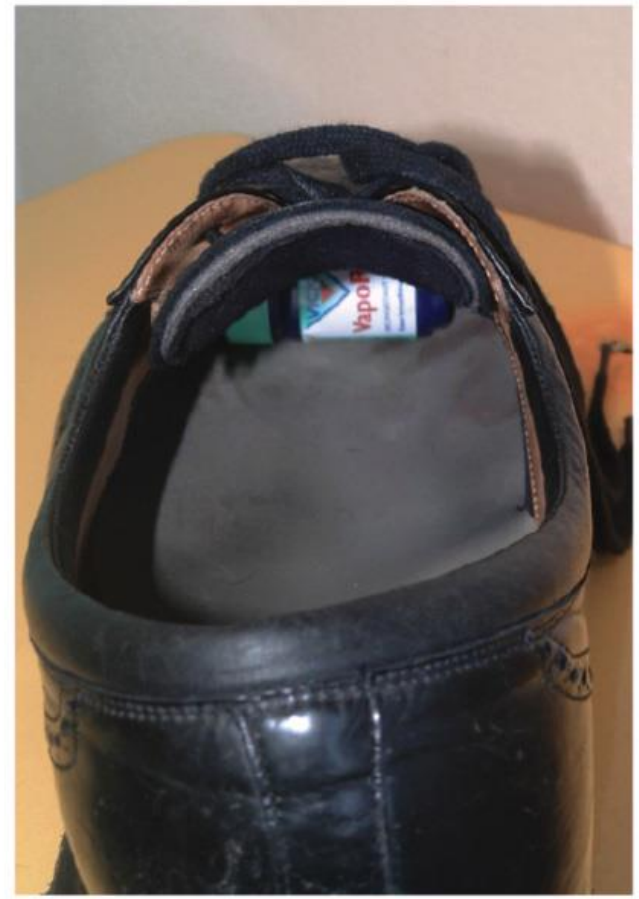
- If clinical signs of active infection (redness, pain, swelling, discharge), give intensive systemic antibiotic therapy
    - Flucloxacillin 1g qds PO for 7-14 days
    - Doxycycline 100 mgs bd if penicillin allergic
- Use wound dressings that best match clinical experience, patient preference, site of the wound (no strong evidence). Consider cost of dressing.
- Regular monitoring & dressing change of wounds
- Wound debridement (by specialist podiatrists or vascular surgeons)
- Foot Xray if wound persistent and deep with oedema, suspicious of osteomyelitis
- Refer urgently to MDT Foot clinics and Community Podiatry
- Admit if moderate to severe infection especially if patient septic or evidence of critical ischaemia

Management of diabetic foot ulcers (2)

For a diabetic foot ulcer to heal, the following conditions must be satisfied

- Arterial inflow is adequate
- Infection is treated appropriately
- Pressure is removed from the wound and the immediate surrounding area

The most common cause of non-healing of neuropathic foot ulcers is the failure to remove pressure from the wound and immediate surrounding area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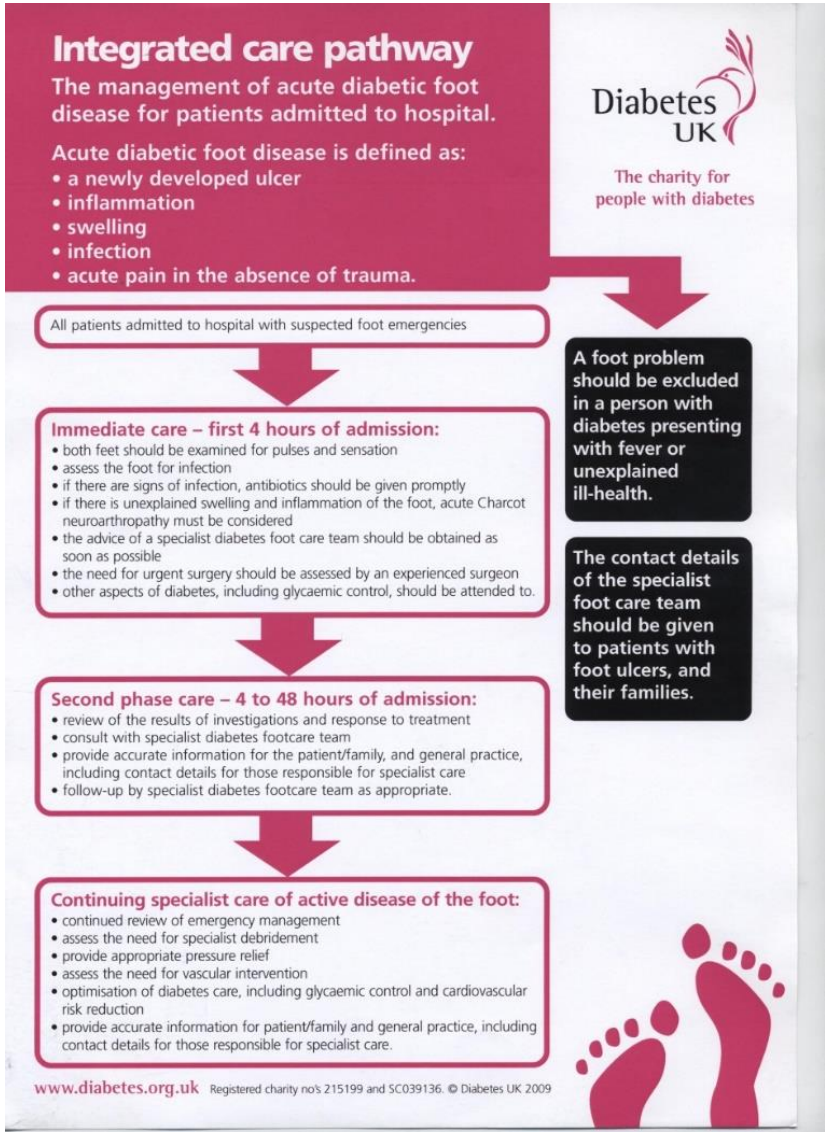
People with foot care emergencies and foot ulcers

- Foot care emergency (new ulcer, swelling, discolouration)
- Refer to multidisciplinary foot care team within 24 hrs
- Investigate & treat vascular insufficiency
- Initiate & supervise wound management

  - appropriate dressings & debridement

  - systemic antibiotics for cellulitis or/and bone infection
- Specialist footwear, orthotics & casts
- Optimise metabolic control, glucose levels, control cardiovascular risk factors




Multi-disciplinary team
Antibiotic pharmacist
Primary care team
Diabetes nurse
Splints/casting
Vascular surgeon
Microbiologist
Orthopaedic surgeon
Orthotist
Physician
Podiatrist

Diabetic Foot Osteomyelitis (DFO)

- **Diabetic foot Osteomyelitis is common problem, found in 20% overall to >60% (severe) diabetic foot infections – increase risk of LE amputation (up to 23)**
- **Suspect if:**

  - long wound duration, recurrent infection

  - wound deep >3 mm, large > 2 cm, bony prominence visible

  - bone/joint - “sausage” toe

Probe to bone is useful if done and interpreted correctly

- **Blood tests**: WBC, CRP, PCT, ? Biomarkers

  (No new serology tests yet found useful)

- **Imaging**

  - X-ray is the first test, limited sensitivity (early) & Specificity (late) - ?
  - Repeat in 6-8 weeks if required

  - if advanced imaging needed, MRI current best, marrow oedema

  - Newer Imaging (SPECT/PET/CT/MRI) promising

Management of Diabetic Foot Osteomyelitis (DFO)

- Management is medical if detected and treated early
- Infection typically contiguous spread from soft tissue
- For wound culture, tissue specimens should be obtained by scraping the base of the ulcer with a scalpel or curette
- Oral antibiotic Rx probably as good as parental

Microbiology, pathophysiology:

- **S aureus predominant, Coag negative Staph,**
- Beta-hemolytic streptococci (group A, B, and others)
- **Gram negative Rod (polymicrobial),**
- Anaerobic organisms

- Rifampicin especially effective for bone infection; others Fluoroquinolones; Clindamycin; Daptomycin

- RCT of DFO treated with antibiotics X 6 weeks Vs 12 weeks gave equivalent rates at 1 year

People with Charcot osteoarthropathy

- Immediate referral to multidisciplinary foot care team
- Immobilise affected joint(s)
- Longstanding management is offloading
- No pharmacological cure/treatment
- BUT closely correlated with glycaemic control

Total Contact Cast

Diabetes Foot care Pathway in Hertfordshire – How do we compare with NICE?

- Currently NICE incompliant for new foot ulcers and urgent foot problems (all patients should be referred to MDT foot team)
- **BUT** major capacity issue for MDT foot clinics across all trusts
- Absence of a dedicated inpatient MDT specialist Footcare team (complete absence of inpatient podiatry at WHHT!!)
- Patients are being referred too late (NDFA 2016)
- ?Risk stratification of patients

Summary

- Significant proportion of amputations are preventable (but not all….)
- Early identification & treatment intervention is vital
- Management of the diabetic foot is complex and requires a multidisciplinary approach
- Refer early to the specialist podiatry team (Foot protection team) & MDT Diabetes Specialist Team
- Identify and treat any infection after a deep wound swab (NB Diabetic wounds may not always look actively infected)
- Regular foot checks vital
- Education of HCPs, patients & carers is essential
- Regular follow-up surveillance and education for all patients especially for moderate and high risk groups

Key messages/learning points

- Examine your patient's feet & risk stratify
- Recognise severity of the acute foot problem, especially infection & critical ischaemia
- Arrange appropriate investigations including plain Xray
- Suspect underlying osteomyelitis if persistent non-healing ulcer
- Suspect acute Charcot's arthropathy in any unexplained leg/foot swelling
- Refer urgently to MDT Specialist Foot clinic if new ulcer
- Low threshold for antibiotics

Questions?

Discussion: How do we compare with NICE?

- Community support
- Foot education (prevention – patients & carers)
- Vulnerable patients
- Referral & access
- Process of care (assessment, antibiotics, communication with GPs & community)
- Multidisciplinary team
- Staffing levels v/s caseload
- Resource issues
- In-patients
- Education of HCPs