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?”

## 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.

<table>
<thead>
<tr>
<th></th>
<th>Lower estimate</th>
<th>Upper estimate</th>
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<tbody>
<tr>
<td>Primary, community and outpatient care</td>
<td>£306,508,970</td>
<td>£323,062,601</td>
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<tr>
<td>Accident and emergency</td>
<td></td>
<td>£849,278</td>
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<tr>
<td>Inpatient care – ulceration</td>
<td>£213,151,916</td>
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<td>Inpatient care – amputation</td>
<td>£43,546,901</td>
<td>£48,896,732</td>
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<td>Post-amputation care</td>
<td>£75,807,423</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>£639,015,210</strong></td>
<td><strong>£661,767,953</strong></td>
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Estimated cost of ulceration and amputation in people with diabetes, England, 2010–11

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**UKCYM01503b February 2013**

Hospitalisation represents the greatest proportion of overall costs¹

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?

# Diabetes Footcare Activity Profile August 2016


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<th>East &amp; North Herts CCG</th>
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Diabetes Footcare Activity Profile August 2016

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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 patients 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
Quality standards

• Putting Feet First 2003

• NICE 2004 CG10 (Type 2 Diabetes foot problems: Prevention and Management of Foot problems)
Quality standards

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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)
• 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 (NDFA)](https://www.diabetes.org.uk/national-diabetes-foot-care-audit)
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 (increased) risk
- High risk
- Active & the Urgent/Emergency diabetic foot
### Foot Risk stratification for the patient with diabetes (2)

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<th><strong>Moderate (Increased) risk</strong></th>
<th><strong>High risk</strong></th>
</tr>
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<td>• deformity <strong>or</strong></td>
<td>• previous ulceration <strong>or</strong></td>
</tr>
<tr>
<td>• neuropathy <strong>or</strong></td>
<td>• previous amputation <strong>or</strong></td>
</tr>
<tr>
<td>• non-critical limb ischaemia</td>
<td>• on renal replacement therapy <strong>or</strong></td>
</tr>
<tr>
<td></td>
<td>• neuropathy and non-critical limb ischaemia together <strong>or</strong></td>
</tr>
<tr>
<td></td>
<td>• neuropathy in combination with callus and/or deformity <strong>or</strong></td>
</tr>
<tr>
<td><strong>• Review by Foot protection team (3-6 months)</strong></td>
<td>• non-critical limb ischaemia in combination with callus and/or deformity <strong>or</strong></td>
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• 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 Specialist 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
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 callos
- Check for signs of ulceration
- Ask about any previous ulceration and what it means, explain what to look out for and provide emergency contact numbers
- Tell patient how to look after their feet and provide written information
- Tell patient their risk status and what it means

Identification of Foot Risk Status and the Action to Take

Level of Risk
- **ACTIVE**
  - Ulnar artery or
  - Previous ulceration or
  - Previous amputation or
  - Neuropathy (loss of sensation) and lower limb peripheral arterial disease together or
  - Neuropathy (loss of sensation) in combination with callos or/and deformity or
  - Lower limb peripheral arterial disease in combination with callos and/or deformity.
- **HIGH**
  - Deformity* or
  - Neuropathy (loss of sensation) or
  - Lower limb peripheral arterial disease.
- **MODERATE**
  - No risk factors, as listed above, present.
  - Callos alone is considered low risk.
- **LOW**
  - Annual screening by a suitably trained Healthcare Professional.
  - Agree self-management plan.
  - Provide written and verbal education with emergency contact numbers.

Action
- Rapid referral (within one working day) to the Foot Protection Service (FPS) or the multidisciplinary foot team, for review 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 required.
  - Liaise with other healthcare professionals eg GP as necessary.
- Refer to a specialist podiatrist or member of the foot protection service (FPS) and request an assessment within 2–4 weeks.
  - This is 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 required.
  - Liaise with other healthcare professionals eg GP as necessary.
- Refer to a specialist podiatrist or member of the foot protection service (FPS) and request an assessment within 0–6 weeks.
  - Therafter 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 required.
  - Liaise with other healthcare professionals eg GP as necessary.

*ADVICE TO 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 review

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

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Diabetes UK
CARE, CONNECT, CAMPAIGN.
Managing a diabetic foot problem

Child, young person or adult with a diabetic foot problem

When to refer

Patient information

Charcot arthropathy

Diabetic foot infection

Diabetic foot ulcer

Investigation

Investigation

Investigation

Treatment

Treatment

Treatment
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 specialist foot care team (MDT Foot clinics) if
  - new ulcer
  - new swelling
  - 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)
• Plain 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.
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

Diabetes nurse

Primary care team

Splints/casting

Vascular surgeon

Microbiologist

Orthopaedic surgeon

Orthotist

Physician

Podiatrist
**Diabetic Foot Osteomyelitis (DFO)**

- **Diabetic foot Osteomyelitis** is a 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**
  
  - Plain foot 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 parenteral

**Microbiology, pathophysiology:**

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

- Clindamycin; Daptomycin; Rifampicin especially effective for bone infection; others Fluoroquinolones;
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
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/clinics)
• 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 Foot 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