

- rationale and impact sections that explain why the committee made the 2019 recommendations and how they might affect practice
- the guideline context.

Information about how the guideline was developed is on the [guideline's page](#) on the NICE website. This includes the evidence reviews, the scope, and details of the committee and any declarations of interest.

Full details of the evidence and the committee's discussion on the 2019 recommendations are in the [evidence reviews](#). Evidence for the 2011 and 2015 recommendations is in the [full version](#) of the 2015 guideline

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1 Recommendations

People have the right to be involved in discussions and make informed decisions about their care, as described in [your care](#).

[Making decisions using NICE guidelines](#) explains how we use words to show the strength (or certainty) of our recommendations, and has information about prescribing medicines (including off-label use), professional guidelines, standards and laws (including on consent and mental capacity), and safeguarding.

2 **1.1 Care within 24 hours of a person with diabetic foot** 3 **problems being admitted to hospital, or the detection of** 4 **diabetic foot problems (if the person is already in hospital)**

5 1.1.1 Each hospital should have a care pathway for people with diabetic foot
6 problems who need inpatient care. **[2011]**

7 1.1.2 A named consultant should be accountable for the overall care of the
8 person, and for ensuring that healthcare professionals provide timely care.
9 **[2011]**

10 1.1.3 Refer the person to the multidisciplinary foot care service within 24 hours
11 of the initial examination of the persons feet. Transfer the responsibility of
12 care to a consultant member of the multidisciplinary foot care service if a
13 diabetic foot problem is the dominant clinical factor for inpatient care.
14 **[2011]**

15 1.1.4 The named consultant and the healthcare professionals from the existing
16 team should remain accountable for the care of the person unless their
17 care is transferred to the multidisciplinary foot care service. **[2011]**

18 **1.2 Care across all settings**

19 1.2.1 Commissioners and service providers should ensure that the following are
20 in place:

- 1
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- 13
- 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. This may also be known as an interdisciplinary foot care 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. **[2015]**

14 1.2.2 The foot protection service should be led by a podiatrist with specialist
15 training in diabetic foot problems, and should have access to healthcare
16 professionals with skills in the following areas:

- 17
- 18
- 19
- Diabetology.
 - Biomechanics and orthoses.
 - Wound care. **[2015]**

20 1.2.3 The multidisciplinary foot care service should be led by a named
21 healthcare professional, and consist of specialists with skills in the
22 following areas:

- 23
- 24
- 25
- 26
- 27
- 28
- 29
- 30
- 31
- Diabetology.
 - Podiatry
 - Diabetes specialist nursing.
 - Vascular surgery.
 - Microbiology.
 - Orthopaedic surgery.
 - Biomechanics and orthoses.
 - Interventional radiology.
 - Casting.

- 1 • Wound care. **[2015]**

2 1.2.4 The multidisciplinary foot care service should have access to rehabilitation
3 services, plastic surgery, psychological services and nutritional services.
4 **[2015]**

5 1.2.5 Healthcare professionals may need to discuss, agree and make special
6 arrangements for disabled people and people who are housebound or
7 living in care settings, to ensure equality of access to foot care
8 assessments and treatments for people with diabetes. **[2015]**

9 1.2.6 Take into account any disabilities, including visual impairment, when
10 planning and delivering care for people with diabetes. **[2015]**

11 **1.3 *Assessing the risk of developing a diabetic foot problem***

12 **Frequency of assessments**

13 1.3.1 For children with diabetes who are under 12 years, give them, and their
14 family members or carers (as appropriate), basic foot care advice. **[2015]**

15 1.3.2 For young people with diabetes who are 12–17 years, the paediatric care
16 team or the transitional care team should assess the young person's feet
17 as part of their annual assessment, and provide information about foot
18 care. If a diabetic foot problem is found or suspected, the paediatric care
19 team or the transitional care team should refer the young person to an
20 appropriate specialist. **[2015]**

21 1.3.3 For adults with diabetes, assess their risk of developing a diabetic foot
22 problem at the following times:

- 23 • When diabetes is diagnosed, and at least annually thereafter (see
24 recommendation 1.3.11).
25 • If any foot problems arise.
26 • On any admission to hospital, and if there is any change in their status
27 while they are in hospital. **[2015]**

1 **Assessing the risk of developing a diabetic foot problem**

2 1.3.4 When examining the feet of a person with diabetes, remove their shoes,
3 socks, bandages and dressings, and examine both feet for evidence of
4 the following risk factors:

- 5 • Neuropathy (use a 10 g monofilament as part of a foot sensory
6 examination).
- 7 • Limb ischaemia (see the NICE guideline on [lower limb peripheral](#)
8 [arterial disease](#)).
- 9 • Ulceration.
- 10 • Callus.
- 11 • Infection and/or inflammation.
- 12 • Deformity.
- 13 • Gangrene.
- 14 • Charcot arthropathy. **[2015]**

15 1.3.5 Use ankle brachial pressure index in line with the NICE guideline on [lower](#)
16 [limb peripheral arterial disease](#). Interpret results carefully in people with
17 diabetes because calcified arteries may falsely elevate results. **[2015]**

18 1.3.6 Assess the person's current risk of developing a diabetic foot problem or
19 needing an amputation using the following risk stratification:

- 20 • Low risk:
 - 21 – no risk factors present except callus alone.
- 22 • Moderate risk:
 - 23 – deformity **or**
 - 24 – neuropathy **or**
 - 25 – non-critical limb ischaemia.
- 26 • High risk:
 - 27 – previous ulceration **or**
 - 28 – previous amputation **or**
 - 29 – on renal replacement therapy **or**
 - 30 – neuropathy and non-critical limb ischaemia together **or**

- 1 – neuropathy in combination with callus and/or deformity **or**
- 2 – non-critical limb ischaemia in combination with callus and/or
- 3 deformity.
- 4 • Active diabetic foot problem:
- 5 – ulceration **or**
- 6 – spreading infection **or**
- 7 – critical limb ischaemia **or**
- 8 – gangrene **or**
- 9 – suspicion of an acute Charcot arthropathy, or an unexplained hot,
- 10 red, swollen foot with or without pain. **[2015]**

11 **Managing the risk of developing a diabetic foot problem**

12 1.3.7 For people who are at low risk of developing a diabetic foot problem,
13 continue to carry out annual foot assessments, emphasise the importance
14 of foot care, and advise them that they could progress to moderate or high
15 risk. **[2015]**

16 1.3.8 Refer people who are at moderate or high risk of developing a diabetic
17 foot problem to the foot protection service. **[2015]**

18 1.3.9 The foot protection service should assess newly referred people as
19 follows:

- 20 • Within 2-4 weeks for people who are at high risk of developing a
21 diabetic foot problem
- 22 • Within 6-8 weeks for people who are at moderate risk of developing a
23 diabetic foot problem. **[2015]**

24 1.3.10 For people at moderate or high risk of developing a diabetic foot problem,
25 the foot protection service should:

- 26 • Assess the feet.
- 27 • Give advice about, and provide, skin and nail care of the feet.
- 28 • Assess the biomechanical status of the feet, including the need to
29 provide specialist footwear and orthoses.

- 1
- Assess the vascular status of the lower limbs.
- 2
- Liaise with other healthcare professionals, for example, the person's
- 3
- GP, about the person's diabetes management and risk of
- 4
- cardiovascular disease. **[2015]**

5 1.3.11 Depending on the person's risk of developing a diabetic foot problem,

6 carry out reassessments at the following intervals:

- 7
- Annually for people who are at low risk.
- 8
- Frequently (for example, every 3–6 months) for people who are at
- 9
- moderate risk.
- 10
- More frequently (for example, every 1–2 months) for people who are at
- 11
- high risk, if there is no immediate concern.
- 12
- Very frequently (for example, every 1–2 weeks) for people who are at
- 13
- high risk, if there is immediate concern.

14

15 Consider more frequent reassessments for people who are at moderate

16 or high risk, and for people who are unable to check their own feet.

17 **[2015]**

18 1.3.12 People in hospital who are at moderate or high risk of developing a

19 diabetic foot problem should be given a pressure redistribution device to

20 offload heel pressure. On discharge they should be referred or notified to

21 the foot protection service. **[2015]**

22 **Patient information about the risk of developing a diabetic foot problem**

23 1.3.13 Provide information and clear explanations to people with diabetes and/or

24 their family members or carers (as appropriate) when diabetes is

25 diagnosed, during assessments, and if problems arise. Information should

26 be oral and written, and include the following:

- 27
- Basic foot care advice and the importance of foot care.
- 28
- Foot emergencies and who to contact.
- 29
- Footwear advice.
- 30
- The person's current individual risk of developing a foot problem.

- Information about diabetes and the importance of blood glucose control (also see recommendation 1.3.14). **[2015]**

1.3.14 For guidance on education programmes and information about diabetes, see the [education and information](#) section in type 1 diabetes in adults: diagnosis and management (NICE guideline NG17), the [patient education](#) section in type 2 diabetes in adults: management (NICE guideline NG28) and the sections [education and information for children and young people with type 1 diabetes](#) and [education and information for children and young people with type 2 diabetes](#) in diabetes (type 1 and type 2) in children and young people: diagnosis and management (NICE guideline NG18). **[2015]**

1.4 Diabetic foot problems

Referral

1.4.1 If a person has a limb-threatening or life-threatening diabetic foot problem, refer them immediately to acute services and inform the multidisciplinary foot care service (according to local protocols and pathways; also see recommendation 1.2.1), so they can be assessed and an individualised treatment plan put in place. Examples of limb-threatening and life-threatening diabetic foot problems include the following:

- Ulceration with fever or any signs of sepsis.
- Ulceration with limb ischaemia (see the NICE guideline on [lower limb peripheral arterial disease](#)).
- Clinical concern that there is a deep-seated soft tissue or bone infection (with or without ulceration).
- Gangrene (with or without ulceration). **[2015]**

1.4.2 For all other active diabetic foot problems, refer the person within 1 working day to the multidisciplinary foot care service or foot protection service (according to local protocols and pathways; also see recommendation 1.2.1) for triage within 1 further working day. **[2015]**

1 Patient information about diabetic foot problems

2 1.4.3 Provide information and clear explanations as part of the individualised
3 treatment plan for people with a diabetic foot problem. Information should
4 be oral and written, and include the following:

- 5 • A clear explanation of the person's foot problem.
- 6 • Pictures of diabetic foot problems.
- 7 • Care of the other foot and leg.
- 8 • Foot emergencies and who to contact.
- 9 • Footwear advice.
- 10 • Wound care.
- 11 • Information about diabetes and the importance of blood glucose control
12 (also see recommendation 1.3.14). **[2015]**

13 1.4.4 If a person presents with a diabetic foot problem, take into account that
14 they may have an undiagnosed, increased risk of cardiovascular disease
15 that may need further investigation and treatment. For guidance on the
16 primary prevention of cardiovascular disease, see the NICE guideline
17 on [lipid modification](#). **[2015]**

18 1.5 *Diabetic foot ulcer*

19 Investigation

20 1.5.1 If a person has a diabetic foot ulcer, assess and document the size, depth
21 and position of the ulcer. **[2015]**

22 1.5.2 Use a standardised system to document the severity of the foot ulcer,
23 such as the SINBAD (Site, Ischaemia, Neuropathy, Bacterial Infection,
24 Area and Depth) or the University of Texas classification system. **[2015]**

25 1.5.3 Do not use the Wagner classification system to assess the severity of a
26 diabetic foot ulcer. **[2015]**

27 Treatment

28 1.5.4 Offer 1 or more of the following as standard care for treating diabetic foot
29 ulcers:

- 1 • Offloading.
- 2 • Control of foot infection.
- 3 • Control of ischaemia.
- 4 • Wound debridement.
- 5 • Wound dressings. **[2015]**

6 1.5.5 Offer non-removable casting to offload plantar neuropathic,
7 non-ischaemic, uninfected forefoot and midfoot diabetic ulcers. Offer an
8 alternative offloading device until casting can be provided. **[2015]**

9 1.5.6 In line with the NICE guideline on [pressure ulcers](#), use
10 pressure-redistributing devices and strategies to minimise the risk of
11 pressure ulcers developing. **[2015]**

12 1.5.7 When treating diabetic foot ulcers, debridement in hospital should only be
13 done by healthcare professionals from the multidisciplinary foot care
14 service, using the technique that best matches their specialist expertise
15 and clinical experience, the site of the diabetic foot ulcer and the person's
16 preference. **[2015]**

17 1.5.8 When treating diabetic foot ulcers, debridement in the community should
18 only be done by healthcare professionals with the relevant training and
19 skills, continuing the care described in the person's treatment plan. **[2015]**

20 1.5.9 Consider negative pressure wound therapy after surgical debridement for
21 diabetic foot ulcers, on the advice of the multidisciplinary foot care service.
22 **[2015]**

23 1.5.10 When deciding about wound dressings and offloading when treating
24 diabetic foot ulcers, take into account the clinical assessment of the
25 wound and the person's preference, and use devices and dressings with
26 the lowest acquisition cost appropriate to the clinical circumstances.
27 **[2015]**

1 1.5.11 Consider dermal or skin substitutes as an adjunct to standard care when
2 treating diabetic foot ulcers, only when healing has not progressed and on
3 the advice of the multidisciplinary foot care service. **[2015]**

4 1.5.12 Do not offer the following to treat diabetic foot ulcers, unless as part of a
5 clinical trial:

- 6 • Electrical stimulation therapy, autologous platelet-rich plasma gel,
7 regenerative wound matrices and dalteparin.
- 8 • Growth factors (granulocyte colony-stimulating factor [G-CSF],
9 platelet-derived growth factor [PDGF], epidermal growth factor [EGF]
10 and transforming growth factor beta [TGF- β]).
- 11 • Hyperbaric oxygen therapy. **[2015]**

12 1.5.13 When deciding the frequency of follow-up as part of the treatment plan,
13 take into account the overall health of the person with diabetes, how
14 healing has progressed, and any deterioration. **[2015]**

15 1.5.14 Ensure that the frequency of monitoring set out in the person's
16 individualised treatment plan is maintained whether the person with
17 diabetes is being treated in hospital or in the community. **[2015]**

18 **1.6 Diabetic foot infection**

19 **Investigation**

20 1.6.1 If a diabetic foot infection is suspected and a wound is present, send a
21 soft tissue or bone sample from the base of the debrided wound for
22 microbiological examination. If this cannot be obtained, take a deep swab
23 because it may provide useful information on the choice of antibiotic
24 treatment. **[2015]**

25 1.6.2 Consider an X-ray of the person's affected foot (or feet) to determine the
26 extent of the diabetic foot problem. **[2015]**

27 1.6.3 Think about osteomyelitis if the person with diabetes has a local infection,
28 a deep foot wound or a chronic foot wound. **[2015]**

1 1.6.4 Be aware that osteomyelitis may be present in a person with diabetes
2 despite normal inflammatory markers, X-rays or probe-to-bone testing.

3 **[2015]**

4 1.6.5 If osteomyelitis is suspected in a person with diabetes but is not confirmed
5 by initial X-ray, consider an MRI to confirm the diagnosis. **[2015]**

6 **Treatment**

7 1.6.6 Start antibiotic treatment for suspected diabetic foot infection as soon as
8 possible. Take samples for microbiological testing before, or as close as
9 possible to, the start of antibiotic treatment. **[2019]**

10 1.6.7 When choosing an antibiotic for people with a suspected [diabetic foot](#)
11 [infection](#) (see recommendations 1.6.8 and 1.6.9) take account of:

- 12 • the [severity of diabetic foot infection](#) (mild, moderate or severe)
- 13 • the risk of developing complications
- 14 • previous microbiological results
- 15 • previous antibiotic use
- 16 • patient preferences. **[2019]**

To find out why the committee made the 2019 recommendations on antibiotic treatment for diabetic foot infection and how they might affect practice see [rationale and impact](#).

17 **Choice of antibiotic**

18 1.6.8 When prescribing antibiotics for a suspected diabetic foot infection in
19 adults aged 18 years and over, follow the recommendations in table 1.
20 **[2019]**

21 1.6.9 Give oral antibiotics first-line if the person can take oral medicines, and
22 the severity of their condition does not require intravenous antibiotics.
23 **[2019]**

24 1.6.10 Review intravenous antibiotics by 48 hours and consider switching to oral
25 antibiotics if possible. **[2019]**

- 1 1.6.11 Base antibiotic course length on the severity of the infection and a clinical
 2 assessment of response to treatment. Review the need for continued
 3 antibiotics regularly. [2019]

4 **Table 1. Antibiotics for diabetic foot infection in adults aged 18 years and over**

Antibiotic ¹	Dosage and course length ²
Mild infection - first choice oral antibiotic for 7 days (up to a further 7 days may be needed based on clinical assessment ³ ; guided by microbiological results when available)	
Flucloxacillin	500 mg four times a day
Mild infection - alternative oral antibiotics (for penicillin allergy or if flucloxacillin unsuitable) for 7 days (up to a further 7 days may be needed based on clinical assessment³; guided by microbiological results when available)	
Clarithromycin	500 mg twice a day
Erythromycin (in pregnancy)	500 mg four times a day
Doxycycline	200 mg on first day, then 100 mg once a day
Moderate infection - first choice antibiotics for a minimum of 7 days (up to 6 weeks for osteomyelitis) based on clinical assessment ⁴ ; guided by microbiological results when available ^{5,6,7}	
Flucloxacillin <i>with or without</i>	500 mg four times a day orally or 500 mg to 2 g four times a day IV
Gentamicin <i>and/or</i>	Initially 5 to 7 mg/kg once a day IV, subsequent doses adjusted according to serum gentamicin concentration ⁸
Metronidazole	400 mg three times a day orally or 500 mg three times a day IV
Co-amoxiclav <i>with or without</i>	500/125 mg three times a day orally or 1.2 g three times a day IV
Gentamicin	See doses above
Co-trimoxazole (in penicillin allergy) <i>with or without</i>	960 mg twice a day orally or 960 mg twice a day (increased to 1.44 g twice a day in severe infection) IV
Gentamicin <i>and/or</i>	Initially 5 to 7 mg/kg once a day IV, subsequent doses adjusted according to serum gentamicin concentration ⁸
Metronidazole	400 mg three times a day orally or 500 mg three times a day IV
Severe infection - first choice antibiotics for a minimum of 7 days (up to 6 weeks for osteomyelitis) based on clinical assessment ⁴ ; guided by microbiological results when available. Antibiotics given IV for at least 48 hours (until stabilised) ^{5,6,7}	
As for moderate infection, but additional choices of:	
Piperacillin with tazobactam	4.5 g three times a day IV (increased to 4.5 g four times a day if severe infection)
Ceftriaxone <i>with</i>	2 g once a day IV
Metronidazole	400 mg three times a day orally or 500 mg three

	times a day IV
Intravenous antibiotics to be added if suspected or confirmed MRSA infection (combination therapy with an intravenous antibiotic listed above)^{6,7}	
Vancomycin	15 to 20 mg/kg two or three times a day (maximum 2 g per dose), adjusted according to serum-vancomycin concentration ⁹
Linezolid (if vancomycin cannot be used; specialist advice only)	600 mg twice a day
<p>¹ See BNF for appropriate use and dosing in specific populations, for example, hepatic impairment, renal impairment, pregnancy and breast-feeding, and administering intravenous antibiotics.</p> <p>² Oral doses are for immediate-release medicines.</p> <p>³ Skin takes some time to return to normal, and full resolution of symptoms at 7 days is not expected.</p> <p>⁴ Review the need for continued antibiotics regularly.</p> <p>⁵ Give oral antibiotics first-line if the person can take oral medicines, and the severity of their condition does not require intravenous antibiotics.</p> <p>⁶ Review intravenous antibiotics by 48 hours and consider switching to oral antibiotics if possible.</p> <p>⁷ Other antibiotics may be appropriate based on microbiological results and specialist advice.</p> <p>⁸ Therapeutic drug monitoring and assessment of renal function is required (BNF, February 2019).</p> <p>⁹ Therapeutic drug monitoring and assessment of renal function is required. A loading dose of 25 to 30 mg/kg (maximum per dose 2 g) can be used in seriously unwell people to facilitate rapid attainment of the target trough serum vancomycin concentration (BNF, February 2019).</p>	

1

To find out why the committee made the 2019 recommendations on choice of antibiotic (including dose frequency, route of administration and course length) for diabetic foot infection and how they might affect practice see [rationale and impact](#).

2 Advice

3 1.6.12 When prescribing antibiotics for a diabetic foot infection, give advice
4 about:

- 5 • possible adverse effects of the antibiotic
- 6 • seeking medical help if symptoms worsen rapidly or significantly at any
- 7 time, or do not start to improve within 2 to 3 days. **[2019]**

To find out why the committee made the 2019 recommendations on advice to give people when prescribing an antibiotic for diabetic foot infection and how this might affect practice see [rationale and impact](#).

1 **Reassessment**

2 1.6.13 When microbiological results are available:

- 3
- review the choice of antibiotic, **and**
 - change the antibiotic according to results, using a narrow spectrum antibiotic, if appropriate. **[2019]**
- 4
- 5

6 1.6.14 Reassess people with a suspected diabetic foot infection if symptoms
7 worsen rapidly or significantly at any time, do not start to improve within 2
8 to 3 days, or the person becomes systemically very unwell or has severe
9 pain out of proportion to the infection. Take account of:

- 10
- other possible diagnoses, such as pressure sores, gout or non-infected ulcers
 - any symptoms or signs suggesting a more serious illness or condition, such as osteomyelitis, necrotising fasciitis or sepsis
 - previous antibiotic use. **[2019]**
- 11
- 12
- 13
- 14

To find out why the committee made the 2019 recommendations on reassessment of people with diabetic foot infection and how they might affect practice see [rationale and impact](#).

15 **Prevention**

16 1.6.15 Do not offer antibiotics to prevent diabetic foot infections. Give advice
17 about seeking medical help if symptoms of a diabetic foot infection
18 develop. **[2019]**

To find out why the committee made the 2019 recommendations on antibiotics to prevent of diabetic foot infection and how they might affect practice see [rationale and impact](#).

1 **1.7** ***Charcot arthropathy***

2 **Investigation**

3 1.7.1 Be aware that if a person with diabetes fractures their foot or ankle, it may
4 progress to Charcot arthropathy. **[2015]**

5 1.7.2 Suspect acute Charcot arthropathy if there is redness, warmth, swelling or
6 deformity (in particular, when the skin is intact), especially in the presence
7 of peripheral neuropathy or renal failure. Think about acute Charcot
8 arthropathy even when deformity is not present or pain is not reported.
9 **[2015]**

10 1.7.3 To confirm the diagnosis of acute Charcot arthropathy, refer the person
11 within 1 working day to the multidisciplinary foot care service for triage
12 within 1 further working day. Offer non-weight-bearing treatment until
13 definitive treatment can be started by the multidisciplinary foot care
14 service. **[2015]**

15 1.7.4 If acute Charcot arthropathy is suspected, arrange a weight-bearing X-ray
16 of the affected foot and ankle. Consider an MRI if the X-ray is normal but
17 Charcot arthropathy is still suspected. **[2015]**

18 **Treatment**

19 1.7.5 If the multidisciplinary foot care service suspects acute Charcot
20 arthropathy, offer treatment with a non-removable offloading device. If a
21 non-removable device is not advisable because of the clinical, or the
22 person's, circumstances, consider treatment with a removable offloading
23 device. **[2015]**

24 1.7.6 Do not offer bisphosphonates to treat acute Charcot arthropathy, unless
25 as part of a clinical trial. **[2015]**

26 1.7.7 Monitor the treatment of acute Charcot arthropathy using clinical
27 assessment. This should include measuring foot–skin temperature
28 difference and taking serial X-rays until the acute Charcot arthropathy
29 resolves. Acute Charcot arthropathy is likely to resolve when there is a

1 sustained temperature difference of less than 2 degrees between both
2 feet and when X-ray changes show no further progression. **[2015]**

3 1.7.8 People who have a foot deformity that may be the result of a previous
4 Charcot arthropathy are at high risk of ulceration and should be cared for
5 by the foot protection service. **[2015]**

6 ***Terms used in this guideline***

7 **Diabetic foot infection**

8 Diabetic foot infection is defined by the presence of at least 2 of the following:

- 9 • local swelling or induration
- 10 • erythema
- 11 • local tenderness or pain
- 12 • local warmth
- 13 • purulent discharge.

14 **Severity of diabetic foot infection**

15 Infection severity is classified as:

- 16 • **Mild:** local infection involving only the skin and subcutaneous tissue; if erythema,
17 must be 0.5 to less than 2 cm around the ulcer (exclude other causes of
18 inflammatory response, such as trauma, gout, acute Charcot neuro-
19 osteoarthropathy, fracture, thrombosis and venous stasis).
- 20 • **Moderate:** local infection with erythema more than 2 cm around the ulcer or
21 involving structures deeper than skin and subcutaneous tissues (such as abscess,
22 osteomyelitis, septic arthritis or fasciitis), and no systemic inflammatory response
23 signs.
- 24 • **Severe:** local infection with signs of systemic inflammatory response (such as
25 temperature >38°C or <36°C, increased heart rate or increased respiratory rate).

26 **Recommendations for research**

27 The guideline committee has made the following recommendations for research.

1 ***Key recommendations for research***

2 **1 Intensive monitoring for people at risk of diabetic foot problems**

3 Does intensive monitoring of people at risk of diabetic foot disease reduce the
4 morbidity associated with developing the disease and is such monitoring cost
5 effective?

6 **2 Referral criteria for the foot protection service and the multidisciplinary foot
7 care service**

8 When and with what criteria should people with diabetes be referred to the foot
9 protection service or the multidisciplinary foot care service?

10 **3 Education and psycho-behavioural interventions for prevention**

11 What is the role of educational models and psycho-behavioural interventions in
12 prevention of diabetic foot complications?

13 **4 Prevention strategies for Charcot arthropathy**

14 What strategies may be useful in the prevention of Charcot arthropathy?

15 **5 Diabetic ulcer dressings**

16 What is the clinical effectiveness of different dressing types in treating diabetic foot
17 problems?

18 ***Other recommendations for research***

19 **Referral of people who have diabetic foot problems**

20 Within the hospital MDT, when is it appropriate and effective to refer people with
21 diabetes who have foot problems to specialist services such as investigative or
22 interventional radiology, orthopaedic or vascular services, specialist pain
23 management and specialist orthotics?

24 **Prevention of diabetic foot problems**

25 What is the effectiveness of different footwear, insoles and orthoses in the
26 prevention of foot problems?

1 **Review of people with diabetic foot problems**

2 How often should people with diabetic foot problems (foot ulcers, soft tissue
3 infections, osteomyelitis or gangrene) be reviewed?

4 **Diabetic foot ulcer**

5 What is the clinical effectiveness of negative pressure wound therapy in the
6 treatment of diabetic foot ulcers?

7 **Diabetic foot ulcer**

8 What is the clinical effectiveness of maggot debridement therapy in the debridement
9 of diabetic foot ulcers?

10 **Charcot arthropathy**

11 Which risk stratification tools can be used to predict the likelihood of Charcot
12 arthropathy?

13 **Charcot arthropathy**

14 When is it safe to stop contact casting in the treatment of acute Charcot arthropathy?

15 **Rationale and impact**

16 These sections briefly explain why the committee made the recommendations and
17 how they might affect practice. They link to details of the evidence and a full
18 description of the committee's discussion.

19 ***Treatment***

20 Recommendations [1.6.6](#) and [1.6.7](#)

21 **Why the committee made the recommendations**

22 The committee agreed that in people with diabetes all foot wounds are likely to be
23 colonised with bacteria. However, for people with a [diabetic foot infection](#), prompt
24 treatment of the infection is important to prevent complications. The committee
25 agreed to retain the recommendation from the 2015 guideline that antibiotics should
26 be started as soon as possible if a diabetic foot infection is suspected. The choice of
27 antibiotic would depend on the [severity of infection](#), although the committee
28 acknowledged that the studies they looked at did not always differentiate between

1 severities. The committee accepted the Infectious Diseases Society of America's
2 definitions of mild, moderate and severe infection, and recommended that this
3 should be taken into account when choosing an antibiotic.

4 The committee retained the 2015 recommendation that samples should be taken for
5 microbiological testing before, or as close as possible to, the start of antibiotic
6 treatment. This would allow empirical antibiotic treatment to be changed if needed
7 when results are available.

8 **How the recommendations might affect practice**

9 This recommendation is consistent with current practice.

10 Full details of the evidence and the committee's discussion are in [evidence review X:](#)
11 [title](#).

12 [Return to recommendations](#)

13 ***Choice of antibiotic, dose frequency, route of administration and*** 14 ***course length***

15 Recommendations [1.6.8 to 1.6.11](#)

16 **Why the committee made the recommendation**

17 The evidence showed no difference in clinical outcomes for most antibiotics. But the
18 antibiotics used in the studies were not wholly representative of UK practice, with
19 some not being available in the UK and others not widely used. There were no
20 differences in adverse events for many antibiotic comparisons. However, there were
21 differences between some antibiotic classes, with lower rates of adverse effects
22 generally for beta-lactam antibiotics.

23 The committee agreed, based on the evidence and their experience, that the choice
24 of antibiotic should be based on severity of infection (mild, moderate or severe) and
25 the risk complications, while minimising adverse effects and antibiotic resistance.
26 This means using narrow spectrum antibiotics first, where possible, and using
27 microbiological results when available to guide treatment. Patient preference is also
28 important, particularly for if treatment will involve a hospital stay or be prolonged.

1 Diabetes is a chronic condition and people may have had previous foot infections,
2 with previous courses of antibiotics, that will influence their preferences.

3 No evidence was identified comparing antibiotic dose, frequency or route of
4 administration. However, the committee knew that a person with a diabetic foot
5 infection may already be on a number of other medications, and this should be taken
6 into account when deciding on dose, frequency and route of administration of an
7 antibiotic.

8 In line with the NICE guideline on [antimicrobial stewardship](#) and Public Health
9 England's [Start smart – then focus](#), the committee agreed that oral antibiotics should
10 be used in preference to intravenous antibiotics where possible. Intravenous
11 antibiotics should only be used for people who are severely ill, unable to tolerate oral
12 treatment, or where oral treatment would not provide adequate coverage or tissue
13 penetration. The use of intravenous antibiotics should be reviewed by 48 hours
14 (taking into account the person's response to treatment and any microbiological
15 results) and switched to oral treatment where possible.

16 The committee agreed that a shorter course was generally as effective as a longer
17 course for adults with a mild diabetic foot infection, and a 7-day course was sufficient
18 for most people. However, they agreed that a longer course (up to a further 7 days)
19 may be needed for some people based on a clinical assessment of their symptoms
20 and history. They discussed the limited evidence on antibiotic course length, which
21 compared 6 weeks with 12 weeks in adults with diabetic foot osteomyelitis. The
22 committee agreed that for people with a moderate or severe diabetic foot infection
23 (which includes osteomyelitis), a 7-day course would be a minimum, with antibiotic
24 treatment for up to 6 weeks if people have osteomyelitis. When prolonged antibiotic
25 treatment is given, they recommended reviewing the need for continued antibiotics
26 regularly.

27 **How the recommendations might affect practice**

28 The recommendations aim to optimise antibiotic use and reduce antibiotic
29 resistance.

30 Full details of the evidence and the committee's discussion are in [evidence review X:](#)
31 [title.](#)

1 [Return to recommendations](#)

2 **Advice**

3 Recommendation [1.6.12](#)

4 **Why the committee made the recommendations**

5 The committee based the recommendation on their experience and safety netting
6 advice from the NICE guideline on [antimicrobial stewardship](#). They agreed that if
7 symptoms worsened rapidly or significantly at any time, or did not improve within 2
8 to 3 days, people with a diabetic foot infection should be advised to seek medical
9 help.

10 **How the recommendations might affect practice**

11 The recommendations should ensure that appropriate safety netting is in place.

12 Full details of the evidence and the committee's discussion are in [evidence review X:](#)
13 [title](#).

14 [Return to recommendations](#)

15 **Reassessment**

16 Recommendations [1.6.13 to 1.6.14](#)

17 **Why the committee made the recommendations**

18 The committee agreed that when microbiological results are available, they should
19 be used to guide antibiotic choice. The committee also discussed factors that would
20 indicate that a person with a diabetic foot infection would need to be reassessed.
21 These included if an infection was rapidly or significantly worsening or not improving,
22 if other diagnoses were possible, or symptoms suggested a more serious illness or
23 condition.

24 **How the recommendations might affect practice**

25 This recommendations should ensure that appropriate reassessment is in place.

26 Full details of the evidence and the committee's discussion are in [evidence review X:](#)
27 [title](#).

1 [Return to recommendations](#)

2 **Prevention**

3 Recommendation [1.6.15](#)

4 **Why the committee made the recommendations**

5 The committee agreed to retain the 2015 recommendation that antibiotics should not
6 be given to prevent diabetic foot infections. No evidence was identified for antibiotic
7 prophylaxis and the committee agreed that antibiotic prophylaxis is not appropriate
8 because of concerns about antimicrobial resistance. People should be advised to
9 seek medical help if symptoms of a diabetic foot infection develop.

10 **How the recommendations might affect practice**

11 This recommendation is consistent with current practice.

12 Full details of the evidence and the committee's discussion are in [evidence review X:](#)
13 [title.](#)

14 [Return to recommendations](#)

15 **Context**

16 Diabetes is 1 of the most common chronic diseases in the UK and its prevalence is
17 increasing. In 2013, there were almost 2.9 million people in the UK diagnosed with
18 diabetes. By 2025, it is estimated that more than 5 million people in the UK will have
19 diabetes. In England, the number of people diagnosed with diabetes has increased
20 by approximately 53% between 2006 and 2013, from 1.9 million to 2.9 million. The
21 life expectancy of people with diabetes is shortened by up to 15 years, and 75% die
22 of macrovascular complications.

23 The risk of foot problems in people with diabetes is increased, largely because of
24 either diabetic neuropathy (nerve damage or degeneration) or peripheral arterial
25 disease (poor blood supply due to diseased large and medium sized blood vessels
26 in the legs), or both. Peripheral arterial disease affects 1 in 3 people with diabetes
27 over the age of 50, and can also increase the risk of heart attack and stroke. For
28 more information, see the NICE guideline on lower limb peripheral arterial disease.

1 Foot complications are common in people with diabetes. It is estimated that 10% of
2 people with diabetes will have a diabetic foot ulcer at some point in their lives. A foot
3 ulcer can be defined as a localised injury to the skin and/or underlying tissue, below
4 the ankle, in a person with diabetes.

5 Diabetes is the most common cause of non-traumatic limb amputation, with diabetic
6 foot ulcers preceding more than 80% of amputations in people with diabetes. After a
7 first amputation, people with diabetes are twice as likely to have a subsequent
8 amputation as people without diabetes. Mortality rates after diabetic foot ulceration
9 and amputation are high, with up to 70% of people dying within 5 years of having an
10 amputation and around 50% dying within 5 years of developing a diabetic foot ulcer.
11 This high mortality rate is believed to be associated with cardiovascular disease, and
12 emphasises the importance of good diabetic and cardiovascular risk management.
13 Although people of South Asian, African and African Caribbean family origin are
14 more at risk of diabetes, there is no evidence that the prevalence of diabetic foot
15 ulceration and amputation is higher in these subgroups than in the general
16 population of people with diabetes in the UK.

17 Foot problems in people with diabetes have a significant financial impact on the NHS
18 through primary care, community care, outpatient costs, increased bed occupancy
19 and prolonged stays in hospital. A report published in 2012 by NHS Diabetes
20 estimated that around £650 million (or £1 in every £150 the NHS spends) is spent on
21 foot ulcers or amputations each year.

22 **Finding more information and resources**

23 To find out what NICE has said on topics related to this guideline, see our web page
24 on [diabetes](#).

25 **Update information**

26 **March 2019**

27 This guideline is an update of NICE guideline NG19 (published August 2015).

28 We have reviewed the evidence on antimicrobial prescribing for people with a
29 diabetic foot infection.

1 Recommendations are marked **[2019]** if the evidence has been reviewed.

2 ***Recommendations that have been deleted or changed***

3 We propose to delete some recommendations from the 2015 guideline. [Table 2](#) sets
4 out these recommendations and includes details of replacement recommendations.

5 If there is no replacement recommendation, an explanation for the proposed deletion
6 is given.

7 In recommendations shaded in grey and ending **[2011]** or **[2015]**, we have not
8 reviewed the evidence.

9 See also the [previous NICE guideline and supporting documents](#).

10 **Table 2 Recommendations that have been deleted**

Recommendation in 2015 guideline	Comment
All hospital, primary care and community settings should have antibiotic guidelines covering the care pathway for managing diabetic foot infections that take into account local patterns of resistance (1.6.6)	This recommendation has been deleted because the updated recommendations, including the choice of antibiotics table, take into account antimicrobial resistance.
Choose the antibiotic treatment based on the severity of the diabetic foot infection, the care setting, and the person's preferences, clinical situation and medical history and, if more than 1 regimen is appropriate, select the regimen with the lowest acquisition cost (1.6.9)	Replaced by: When choosing an antibiotic for people with a suspected diabetic foot infection take account of: <ul style="list-style-type: none"> • the severity of diabetic foot infection (mild, moderate or severe) • the risk of developing complications • previous microbiological results • previous antibiotic use • patient preferences. [2019] (1.6.7) and information in the antibiotic prescribing table.
Decide the targeted antibiotic regimen for diabetic foot infections based on the clinical response to antibiotics and the results of the microbiological examination. (1.6.10)	Replaced by: When choosing an antibiotic for people with a suspected diabetic foot infection take account of: <ul style="list-style-type: none"> • the severity of diabetic foot infection (mild, moderate or severe) • the risk of developing complications • previous microbiological results • previous antibiotic use • patient preferences. [2019] (1.6.7) When microbiological results are available:

	<ul style="list-style-type: none"> review the choice of antibiotic, and change the antibiotic according to results, using a narrow spectrum antibiotic, if appropriate. [2019] (1.6.13) <p>and information in the antibiotic prescribing table</p>
Do not offer tigecycline to treat diabetic foot infections unless other antibiotics are not suitable. (1.6.11)	Recommendation no longer needed because the antibiotic prescribing table contains all antibiotic options.
For mild diabetic foot infections, initially offer oral antibiotics with activity against gram-positive organisms. (1.6.12)	This recommendation has been deleted because the information is now contained within the antibiotic prescribing table.
Do not use prolonged antibiotic treatment (more than 14 days) for the treatment of mild soft tissue diabetic foot infections. (1.6.13)	This recommendation has been deleted because the information is now contained within the antibiotic prescribing table.
<p>For moderate and severe diabetic foot infections, initially offer antibiotics with activity against gram-positive and gram-negative organisms, including anaerobic bacteria, as follows:</p> <ul style="list-style-type: none"> Moderate infections: base the route of administration on the clinical situation and the choice of antibiotic. Severe infections: start with intravenous antibiotics and then reassess, based on the clinical situation. (1.6.14) 	This recommendation has been deleted because the information is now contained within the antibiotic prescribing table.
Offer prolonged antibiotic treatment (usually 6 weeks) to people with diabetes and osteomyelitis, according to local protocols. (1.6.15)	This recommendation has been deleted because the information is now contained within the antibiotic prescribing table.
Start antibiotic treatment for suspected diabetic foot infection as soon as possible. Take cultures and samples before, or as close as possible to, the start of antibiotic treatment. (1.6.8)	<p>Replaced by:</p> <p>Start antibiotic treatment for suspected diabetic foot infection as soon as possible. Take samples for microbiological testing before, or as close as possible to, the start of antibiotic treatment. (1.6.6)</p>
Do not offer antibiotics to prevent diabetic foot infections. (1.6.7)	<p>Replaced by:</p> <p>Do not offer antibiotics to prevent diabetic foot infections. Give advice about seeking medical help if symptoms of a diabetic foot infection develop. (1.6.15)</p>

1

2 Minor changes since publication

3 **[January 2016]:** Recommendation 1.3.6 has been updated to clarify the risk factors
4 for and stratification of risk of developing a diabetic foot problem.

DRAFT FOR CONSULTATION

- 1 **[December 2015]:** Recommendation 1.3.14 has been amended to refer to the
- 2 updated NICE guideline on [type 2 diabetes in adults](#).
- 3 © NICE 2019. All rights reserved. Subject to [Notice of rights](#).