

**Risk Classifications**

Diabetes Canada

**Grade 0:** Skin intact

**Grade 1:** Superficial ulcer

**Grade 2:** Ulcer extending to tendon, capsule, or bone

**Grade 3:** Deep ulcer with osteomyelitis or abscess

**Grade 4:** Gangrene of toes or forefoot

**Grade 5:** Gangrene of midfoot or hindfoot

NICE

**Low risk:** No risk factors present except callus alone

**Moderate risk:** Deformity or neuropathy, or non-critical limb ischemia

**High risk:** Previous ulceration, previous amputation, renal replacement therapy, neuropathy and non-critical limb ischemia together, neuropathy in combination with callus and/or deformity, or non-critical limb ischemia in combination with callus and/or deformity.

**Active diabetic foot problem:** Ulceration, spreading infection, critical limb ischemia, gangrene, suspicion of an acute Charcot arthropathy, or an unexplained hot, red, swollen foot with or without pain.

IWGDF

**Category 0:** Very low risk (no LOPS and no PAD)

**Category 1:** Low risk (LOPS or PAD)

**Category 2:** Moderate risk (LOPS + PAD or LOPS + foot deformity or PAD + foot deformity)

**Category 3:** High risk (LOPS or PAD, and one or more of the following: history of a foot ulcer, a lower-extremity amputation – minor or major – end-stage renal disease)

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# Preventive Foot Care for Patients With Diabetes: A Summary of Evidence-Based Guidelines

People with diabetes are at a high risk of developing foot problems (commonly referred to as “diabetic foot”), including infection and diabetic foot ulcers. Diabetic foot ulcers tend to be chronic and can develop into serious complications that may lead to the need for amputation – the surgical removal of the infected foot or toe.

Diabetic foot care and early detection are important in the prevention of foot ulceration.

CADTH has reviewed available evidence-based guidelines, both Canadian and international, as part of a review of the evidence on preventive foot care for patients with diabetes.<sup>1</sup>

This document provides a summary of the following three evidence-based guidelines included in the CADTH review:<sup>a</sup>

- Diabetes Canada<sup>2</sup>
- NICE-National Institute for Health and Care Excellence in the UK<sup>3b</sup>
- IWGDF-International Working Group on the Diabetic Foot (guideline applicable to all countries).<sup>4,5c</sup>

**Intended Users:** Clinicians

**Population of Interest:** Patients with diabetes

**Intervention:** Preventive foot care (e.g., foot inspection, basic care, education, and information on foot care)

<sup>a</sup> In some cases, information from the guideline documents is paraphrased slightly for brevity reasons.

<sup>b</sup> Since the completion of the CADTH Rapid Response, the NICE guideline on *Diabetic foot problems: prevention and management* has been updated,<sup>6</sup> but the guidance on prevention has not changed.

<sup>c</sup> This summary also includes information from the 2019 IWGDF-International Working Group on the Diabetic Foot guideline on the prevention of foot ulcers in persons with diabetes (not reviewed in the CADTH Rapid Response).

**ABOUT CADTH**

CADTH is an independent, not-for-profit organization responsible for providing Canada’s health care decision-makers with objective evidence to help make informed decisions about the optimal use of drugs and medical devices in our health care system.

CADTH receives funding from Canada’s federal, provincial, and territorial governments, with the exception of Quebec.

December 2019

**Table 1: Summary of Evidence-Based Recommendations on Preventive Diabetic Foot Care Practices**

	Diabetes Canada	NICE	IWGDF
<b>Identifying the At-Risk Foot (Foot Examination)</b>	"Health-care providers should perform foot examinations to identify people with diabetes at risk for ulcers and lower-extremity amputation." <sup>2</sup>	"Assess the risk of developing a diabetic foot problem at the following times: <ul style="list-style-type: none"> <li>• when diabetes is diagnosed, and at least annually thereafter</li> <li>• if any foot problems arise</li> <li>• on any admission to hospital, and if there is any change in their status while they are in hospital."<sup>3</sup></li> </ul>	"Examine a person with diabetes at very low risk of foot ulceration (IWGDF risk 0) annually for signs or symptoms of LOPS and PAD, to determine if they are at increased risk for foot ulceration." <sup>5</sup>
<b>Recommended Frequency of Foot Examination</b>	At least annually and at more frequent intervals in high-risk people	<b>Low risk:</b> Once a year <b>Moderate risk:</b> Every three to six months <b>High risk (no immediate concern):</b> More frequently; for example, every 1 to 2 months <b>High risk (immediate concern):</b> every 1 to 2 weeks "Consider more frequent reassessments for people who are at moderate or high risk, and for people who are unable to check their own feet." <sup>3</sup>	<b>Very low ulcer risk:</b> Once a year <b>Low ulcer risk:</b> Every 6 to 12 months <b>Moderate ulcer risk:</b> Every 3 to 6 months <b>High ulcer risk:</b> Every 1 to 3 months
<b>Recommended Components of Foot Examination</b>	Assess: <ul style="list-style-type: none"> <li>• neuropathy</li> <li>• skin changes (e.g., calluses, ulcers, infection)</li> <li>• PAD (e.g., pedal pulses and skin temperature)</li> <li>• structural abnormalities (e.g., range of motion of ankles and toe joints, bony deformities)</li> </ul>	Examine both feet for evidence of: <ul style="list-style-type: none"> <li>• neuropathy</li> <li>• limb ischemia</li> <li>• ulceration</li> <li>• callus</li> <li>• infection and/or inflammation</li> <li>• deformity</li> <li>• gangrene</li> <li>• Charcot arthropathy</li> </ul>	Screen a person at risk of foot ulceration (IWGDF risk 1 to risk 3) for: <ul style="list-style-type: none"> <li>• history of foot ulceration or lower-extremity amputation</li> <li>• diagnosis of end-stage renal disease</li> </ul> Examine the foot for: <ul style="list-style-type: none"> <li>• presence or progression of foot deformity</li> <li>• limited joint mobility</li> <li>• abundant callus</li> <li>• any pre-ulcerative sign on the foot</li> </ul>
<b>Recommended Interventions for High-Risk Patients</b>	<ul style="list-style-type: none"> <li>• Foot care education (including counselling to avoid foot trauma)</li> <li>• Professionally fitted footwear</li> <li>• Early referral to a health care professional trained in foot care, when foot complications occur</li> </ul>	Referral to the foot protection service to: <ul style="list-style-type: none"> <li>• assess the feet</li> <li>• give advice about, and provide skin and nail care, of the feet</li> <li>• assess the biomechanical status of the feet, including the need to provide specialist footwear and orthoses</li> <li>• assess the vascular status of the lower limbs</li> <li>• liaise with other health care professionals (e.g., the person's doctor) about the person's diabetes management and risk of cardiovascular disease</li> </ul>	<ul style="list-style-type: none"> <li>• Appropriate treatment for pre-ulcerative signs or abundant callus on the foot, for ingrown toenails, and for fungal infections on the foot</li> <li>• Instructions and structured education on foot self-care and foot self-management (see below)</li> <li>• For a person with diabetes experiencing neuropathic pain, nerve decompression procedure is not recommended; instead, use accepted standards of good quality care to help prevent a foot ulcer</li> </ul>
<b>Interprofessional/Integrated Care</b>	Treatment by an interprofessional health care team (when available) with expertise in the treatment of foot ulcers is recommended for people with diabetes who develop a foot ulcer or show signs of infection even in the absence of pain.	A foot protection service for providing continued and integrated care across all settings (community and hospital) is recommended. "The foot protection service should be led by a podiatrist with specialist training in diabetic foot problems, and should have access to healthcare professionals with skills in the following areas: diabetology, biomechanics and orthoses, and wound care." <sup>3</sup>	Integrated foot care that includes professional foot care, adequate footwear, and structured education about self-care is recommended for a person with diabetes who is at high risk of foot ulceration (IWGDF risk 3) to help prevent a recurrent foot ulcer. The need for care should be re-evaluated every one to three months, as necessary.
<b>Patient Education</b>	"People with diabetes who are at high risk of developing foot ulcers should receive foot care education (including counseling to avoid foot trauma)..." <sup>2</sup>	"Provide information and clear explanations to people with diabetes and/or their family members or carers (as appropriate) when diabetes is diagnosed, during assessments, and if problems arise. Information should be oral and written, including: basic foot care advice and the importance of foot care, foot emergencies and who to contact, footwear advice, the person's current individual risk of developing a foot problem, information about diabetes and the importance of blood glucose control." <sup>3</sup>	Risk 1-3 foot care instructions include: <ul style="list-style-type: none"> <li>• never walking barefoot, in socks without shoes, or in slippers with thin soles, even indoors<sup>5</sup></li> <li>• daily inspection of the entire surface of each foot and the inside of the shoes; daily washing of feet, drying them carefully, especially between the toes; applying emollients to dry skin; trimming toenails straight across; and avoiding the removal of calluses or corns<sup>5</sup></li> </ul> Risk 1 or 2 foot care advice considerations include: <ul style="list-style-type: none"> <li>• that foot and mobility-related exercises be performed to reduce ulceration risk factors<sup>5</sup></li> <li>• moderately increasing daily walking-related weight-bearing activities (i.e., an extra 1,000 steps/day) and wearing appropriate footwear and checking the skin often during these activities.<sup>5</sup></li> </ul>
<b>Skin Temperature Monitoring</b>	"Assessment of skin temperature is important because increased warmth may indicate the presence of inflammation or acute Charcot neuroarthropathy in a foot that has lost protective sensation. In addition, erythema and swelling may be indicators of cellulitis or Charcot neuroarthropathy." <sup>2</sup> (not a recommendation but part of the document, page S223)	"Suspect acute Charcot arthropathy if there is redness, warmth, swelling or deformity (in particular, when the skin is intact, especially in the presence of peripheral neuropathy or renal failure)." <sup>3</sup>	"Consider instructing a person with diabetes who is at moderate or high risk of foot ulceration (IWGDF risk 2-3) to self-monitor foot skin temperatures once per day to identify any early signs of foot inflammation and help prevent a first or recurrent plantar foot ulcer. If the temperature difference is above-threshold between similar regions in the two feet on two consecutive days, instruct the patient to reduce ambulatory activity and consult an adequately trained health care professional for further diagnosis and treatment." <sup>5</sup>
<b>Therapeutic Footwear</b>	The foot examination should include footwear assessment. Professionally fitted footwear is recommended for people with diabetes who are at high risk of developing foot ulcers.	For people at moderate or high risk of developing a diabetic foot problem, the foot protection service should include provision of specialist footwear and orthoses. Footwear advice should be provided to people with diabetes and/or their carers when diabetes is diagnosed, during assessments, and if problems arise.	Risk 1-3 foot care advice considerations include prescribing orthotics to help reduce abundant callus formations. <sup>5</sup> Risk 2 or Risk 3 (where the patient has healed from a non-plantar foot ulcer) foot care instructions include having the patient wear properly fitted therapeutic footwear to reduce plantar pressure and, if there is a foot deformity or a pre-ulcerative sign, prescribing custom-made footwear or insoles, or toe orthoses. <sup>5</sup> Risk 3 (where the patient has healed from a plantar foot ulcer) foot care instructions include prescribing therapeutic footwear shown to relieve plantar pressure during walking to help prevent a recurrent plantar foot ulcer, and encouraging the patient to consistently wear the footwear. <sup>5</sup>

IWGDF = International Working Group on the Diabetic Foot; LOPS = loss of protective sensation; NICE = National Institute for Health and Care Excellence; PAD = peripheral artery disease.