Screening and Risk Stratification for the Prevention of Diabetic Foot Ulcers: A Summary of Evidence-Based Guidelines

Diabetic foot ulcers are the most common complication of diabetes, affecting 4% to 10% of patients. Diabetic foot ulcers tend to be chronic and can develop into serious complications, including wound infection, osteomyelitis (infection in bone), or cellulitis (infection of the skin), and may lead to amputation (surgical removal of infected foot or toe).

Early detection can prevent foot ulceration and related complications. Early treatment can improve the healing of diabetic foot ulcers and reduce the risk for amputation.

Primary care screening programs for diabetic foot ulcers in patients with diabetes may include assessment of risk (risk stratification), patient education, and referral to more specialized care. Risk stratification considers factors such as whether a patient has neuropathy (damage to peripheral nerves, often causing weakness, numbness, and pain, usually in hands and feet) or peripheral vascular disease (a circulatory problem in which narrowed arteries reduce blood flow to the limbs) to help determine their risk for developing a diabetic foot ulcer. Depending on a patient’s level of risk, suitable preventive measures can be undertaken.

CADTH has reviewed available evidence-based guidelines (from Canada and from other countries) as part of a review of the evidence on screening and assessing risk for diabetic foot ulcers in adults with diabetes.¹

The recommendations from nine evidence-based guidelines are summarized in Table 1.
Table 1: Summary of Evidence-Based Recommendations on Screening and Risk Stratification for Diabetic Foot Ulcers

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<td>Target Users</td>
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<td>Health care professionals and administrators</td>
<td>Nurses, other health care professionals, and administrators</td>
<td>Health care professionals</td>
<td>Health care professionals involved in the care of patients with diabetes</td>
<td>Health care professionals and health care workers in urban and rural or remote care and specialized centres</td>
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Recommended Screening for Foot Ulcers

- **Physical examination of the feet to assess risk factors for foot ulceration and amputation should be performed by a health care professional.**

- **It is recommended that patients with diabetes undergo annual interval foot inspections by physicians or advanced practice providers with training in foot care.**

- **For all patients with diabetes an annual comprehensive foot examination to identify risk factors predictive of ulcers and amputations should be performed.**

- **As part of an annual review, trained personnel should examine patient’s feet to detect risk factors for ulceration.**

- **All patients with diabetes should be screened to assess their risk for developing a foot ulcer.**

- **It is recommended that patients with diabetes mellitus type 1 and type 2 are included in structured programs of screening, risk stratification, and prevention and treatment of the foot at risk.**

- **All people with diabetes should be assessed by a suitability trained health care professional and the risk for developing complications should be stratified.**

- **For patients visiting a general diabetes clinic: “The evidence suggests that a two-stage foot screening program, followed by a protection program for those patients identified with a high-risk foot, may reduce the incidence of major amputation.”**

**Recommended Components of Screening and Risk Assessment**

- **Assessment of skin changes, arterial abnormalities (e.g., range of motion of ankles and toes, palpable pedal pulses); temperature, evaluation for neuropathy and peripheral artery disease, ulcers and evidence of infection (e.g., recommended)***

- **In patients with diabetes, risk assessment includes:***
  - History of previous foot ulcers
  - Smoking
  - Structural and biomechanical abnormalities
  - Circulation; and
  - Self-care behaviour and knowledge

- **A history of prior foot ulceration or amputation and a history of poor visual acuity should be evaluated.**

- **It is recommended that the foot examination include:***
  - Visual inspection of the feet
  - Palpation of pedal pulses
  - Palpation of ulcer base
  - Palpation of foot deformity

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- **Circumcision should ask about history of previous foot ulceration or amputation, neuropathic or peripheral vascular disease, impaired sensation, tobacco use, and foot care practices.**

- **It is recommended that the foot examination include:***
  - Assessment of foot pulses
  - Test for loss of protective sensation (SLOS) (10 g monofilament testing or any one of the following testing: vibrometry, cold test, pinprick sensation, ankle reflexes, or vibration perception threshold).

- **Recommended Frequency of Screening and Risk Assessment**

  - **At least annually and at more frequent intervals in those at high risk.**

  - **At least annually in all people with diabetes over the age of 15 and at more frequent intervals in those at higher risk.**

  - **Annual interval foot inspections for patients with diabetes.**

  - **Patients determined to be at increased risk (presence of neuropathy, ischemia, and/or deformity) should have more frequent foot evaluations by foot specialists and increased involvement of direct patient education.**

  - **S inconsistently described.**

  - **Annual comprehensive foot examination for all patients with diabetes.**

  - **Patients identified as being at higher risk for foot ulceration, especially those with a history of prior ulcer or amputation.**

  - **Regular (at least annually).**

  - **There is no evidence to support the frequency of screening; however, the guideline group considers that at least an annual screening from the diagnosis of diabetes is appropriate.**

  - **Recommended for patients at high risk.**

- **Criteria for Risk**

  - **Low Risk: “Normal sensation, palpable pulses.”**

  - **Increased High Risk: “Neuropathy and/or absence of pulses +/- intermittent claudication +/- digital changes or previous ulcers.”**

  - **High Risk: “Neuropathy or absence of pulses.”**

  - **Peripheral Arterial Disease:**

    - **Moderate Risk: “Risk factor present.”**

    - **High Risk: “Risk factor present.”**

- **Recommended Interventions for High-Risk Patients**

  - **For people at high-risk foot ulceration, an annual assessment and a tailored management plan by a specialist podiatrist is recommended. Additional referral for specialist intervention, if needed, is also recommended.**

- **Patients assessed as having intermediate-risk or ‘high-risk’ feet should be offered a foot protection program that includes foot care education, podiatry review, and appropriate footwear.”**

- **Patients at high risk of lower-extremity amputation should be followed by a protection program to prevent amputation.”**

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**Notes:**

- The University of Texas Diabetic Wound Classification System is cited (see guideline for classification).

- **Based on assessment of risk factors, [patient] should be classified as ‘low’ or ‘high risk’ for foot ulceration or amputation.**

- **See guideline for classification.**

- **Criteria: Normal Risk Profile (annual evaluation).**

- **Category 2: Neuropathy with Deficiency and/or Peripheral Arterial Disease (surgery: early referral).**

- **Category 3: Previous ulcer or Amputation (monthly or quarterly evaluation).**

- **The risk of ulcers or amputations is increased in people who have the following risk factors:**

  - **Previous amputation
  - Foot ulcer history
  - Peripheral vascular disease
  - Visual impairment
  - Diabetic retinopathy (especially patients on dialysis)
  - Glycemic control
  - Cigarette smoking.”

- **Patients with risk factors for ulceration should be referred to a foot protection team.**

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**Source:**

- ADA = American Diabetes Association; CDA = Canadian Diabetes Association; INACO = National Health and Medical Research Council; NSP = North West Podiatry Services; OSTEBA = Basque Office for Health Technology Assessment; INACO = Registered Nurses’ Association of Ontario; SIGN = Scottish Intercollegiate Guidelines Network; NHMRC = Australian National Health and Medical Research Council; UHA = University of Adelaide.
References


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