

Diabetes Foot Care Primary Care Pathway

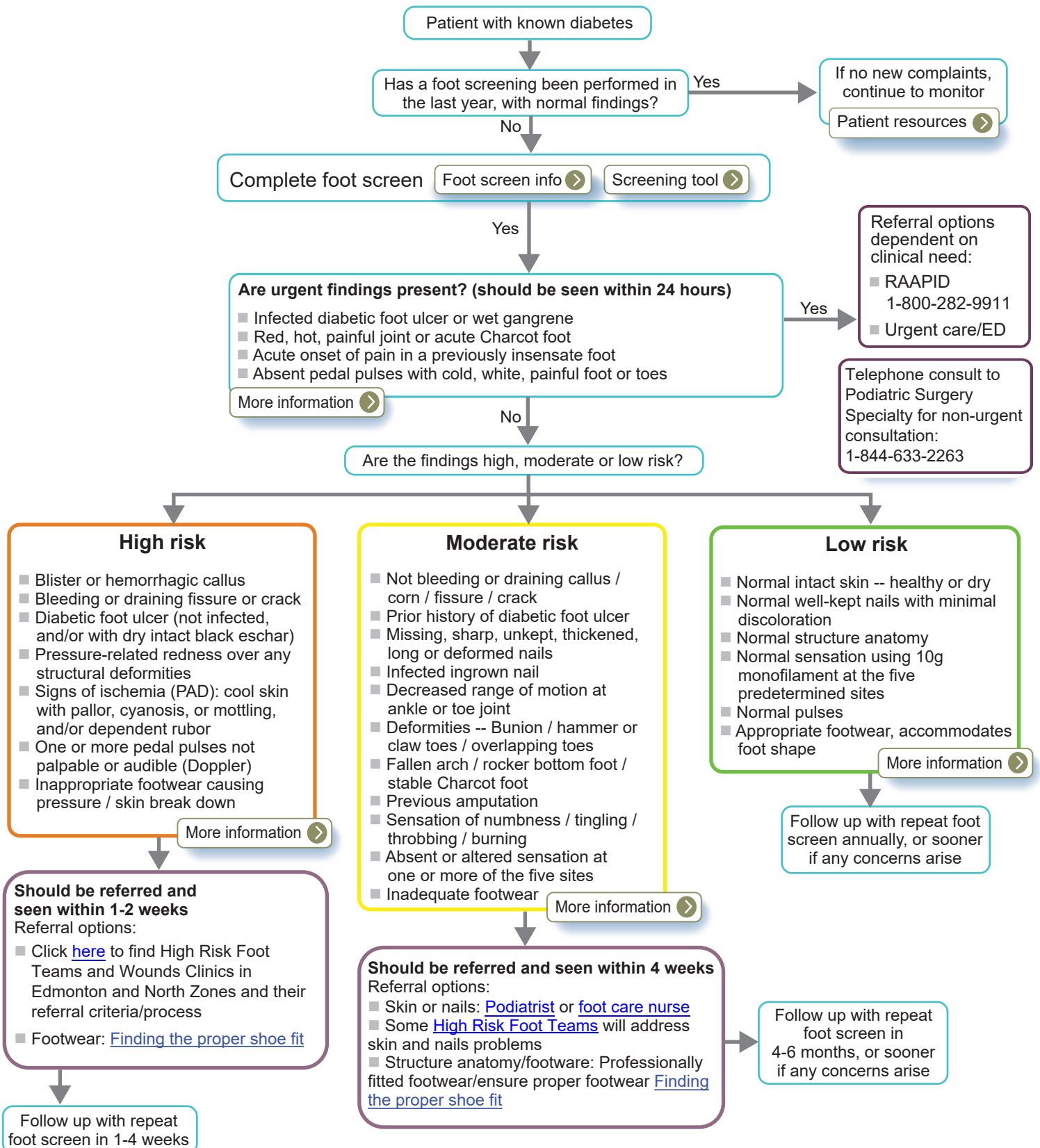
Quick links:

[Pathway primer](#)

[Expanded details](#)

[Provider resources](#)

[Patient resources](#)



PATHWAY PRIMER

- The [2018 Diabetes Canada Clinical Practice Guidelines](#) recommends that healthcare providers perform foot examinations to identify people with diabetes at risk for ulcers and lower-extremity amputation, at least annually and at more frequent intervals in high-risk people.
- Diabetes increases the chance of foot ulcers, a complication accounting for 70% of lower limb amputations in Alberta. The lifetime risk for a foot ulcer in people with diabetes may be as high as 34 per cent (%) (1) and, across Canada, 14 lower-limb amputations happen every day due to a diabetic foot ulcer that did not heal properly (2). Research shows that amputations can be reduced up to 85% by prevention and treatment of foot ulcers. The mortality rate five years after an amputation is up to 74%.
- The loss of protective sensation at the plantar surface of the foot significantly increases the risk of future foot ulcer. Most amputations are preceded by an ulcer, which can be prevented with regular screening, proper foot care and footwear.
- As per 2018 Diabetes Canada Clinical Practice Guidelines (3), the risk factors for developing foot ulcers in people with diabetes include:
 - peripheral neuropathy
 - previous ulcer or amputation
 - structural deformity
 - limited joint mobility
 - peripheral arterial disease
 - microvascular complications
 - increased levels of glycated hemoglobin (A1C)
 - onychomycosis

EXPANDED DETAILS

Foot Screen Information

- The [Diabetes Foot Care Clinical Pathway \(DFCCP\)](#) consists of five steps (click here to access the [Pathway Overview](#)):
 - 1) **Screening** – Examining patient's feet:
 - Identify state of skin and nails, deformities, arterial compromise, and neuropathy
 - Identify state of their shoes (inside and out)
 - 2) **Assessment** – Using the foot screen to assess the patient's risk
 - The overall risk is determined by the highest level assessed for either foot
 - 3) **Referral** – Referring the patient to the right provider
 - 4) **Treatment** – The patient receiving the right treatment
 - 5) **Follow-Up** – The patient returning for the next preventative foot screen
 - Provide the patient with a follow-up appointment
- The [Diabetes Foot Screening Tool](#) is designed to help comprehensively examine the patient's feet and determine the level of risk. There are six screening components (skin, nails, structure anatomy, sensation, vascular, and footwear) and four levels of risks (low, moderate, high, and urgent).



- **Screening components:**

- 1) **Skin:** check in-between the toes for skin breakdown or excess moisture; look for callus, corn, fissure, crack, or wound/ulcer. Check skin temperature.
 - Management of calluses includes ensuring appropriate footwear and pairing down the callus to prevent ulcer formation under the callus
 - In a neuropathic foot, a callus is eleven times more likely to ulcerate than a site without a callus
- 2) **Nails:** thickened nails may indicate vascular or fungal infection.
- 3) **Structure anatomy:** neuropathy can cause changes in the shape of the foot. Assess range of motion (ankle and toe joint), look for redness over bony abnormalities.
 - Bony abnormalities can create pressure points that can lead to skin breakdown
 - Pressure redistribution through appropriate footwear and inserts if required is recommended to prevent skin breakdown
- 4) **Sensation testing for loss of protective sensation (LOPS):** Assess for sensation using the 10 g Semmes-Weinstein 5.07 monofilament, test 5 sites on each foot (see picture). Ask if patient has sensation of numbness, tingling, burning, feeling of insects crawling on their feet or legs.



- LOPS is the leading predictor of foot ulceration
- 5) **Vascular testing for arterial compromise:** Palpate dorsalis pedis & posterior tibial pulses, check capillary refill (color should take < 3-4 seconds to return), skin temperature, dependent rubor, claudication.
 - Lower Limb Assessment (LLA)
 - An Ankle Brachial Pressure Index (ABPI) is only one part of a lower limb assessment and decisions based solely on the ABPI value are not always clinically sufficient
 - It is important to recognize that persons with diabetes may have a “false high” ankle brachial pressure index due to calcification of the vessels (greater than 1.3 mmHg: Diabetes Canada, 2008)
 - It is recommended that individuals with diabetes undergo additional assessment such as toe pressures (PPG/photoplethysmography) or toe brachial index (TBI) to give additional information regarding peripheral arterial perfusion
 - PPGs and TBIs are based on measurement of small vessel perfusion to the toes
 - If edema is present, the history and cause of edema must be determined. It is important that assessment of peripheral arterial circulation is completed prior to implementing an edema management plan, such as compression

Ankle Brachial Pressure Index (ABPI)	Toe Pressure (PPG)	Toe Brachial Pressure Index	Ankle Doppler Wave Form	Diagnosis
≥0.8-1.3 mm Hg	≥50 mm Hg	≥0.7 mm Hg	Biphasic or Triphasic (Normal)	No significant arterial disease
≥0.6- 0.8 mm Hg	≥40 mm Hg	≥0.4-0.7 mm Hg	Biphasic / Monophasic	Arterial disease



≥0.4-0.6 mm Hg	<40 mm Hg	< 0.4 mm Hg	Monophasic	Significant arterial disease
< 0.4 mm Hg	≤25 mm Hg	≤ 0.2 mm Hg	Monophasic	High risk of critical limb ischemia

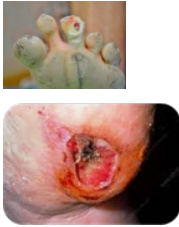




NOTE: These values may not be universally accepted as marginal variations exist within the current literature. Accessibility to testing and interpretation of results may be limited to certain areas of specialty.

6) Footwear: Visually and manually examine footwear inside and out, ask patient how old their shoes are, what their regular footwear is, and if they wear shoes inside their home. Inspect socks for signs of blood or other discharge. Look for pressure/skin breakdown related to inappropriate footwear.

- 55% of ulcers are attributed to pressure from footwear
- Reddened areas may progress to development of skin breakdown, wound and/or infection in a short period of time
- It is recommended to wear a good supportive shoe with a large toe box that accommodates the foot shape inside and outside the house, click here for more info: [Finding the Proper Shoe Fit - Wounds Canada](#)

- For more in-depth information about the foot screening exam, including screening tips and action plan according to the risk level, consult [AHS Diabetes Foot Care Clinical Pathway Healthcare Provider Guide](#)

Urgent Risk Findings

Infected diabetic foot ulcer or wet gangrene	Red, hot, painful joint or acute Charcot foot	Acute onset of pain in a previously insensate foot	Absent pedal pulses with cold, white, painful foot or toes
	 <p>Image Source: Rafi Mahandaru https://www.slideshare.net/rafimahandaru/charcot-foot</p>  <ul style="list-style-type: none"> • Treatment of acute Charcot foot requires immobilization of the foot, typically for several months & up to one year in a removable walker device or total contact cast (until excessive foot temperatures return to normal) • Patient to completely offload pressure on affected foot. Damage done by 	 <ul style="list-style-type: none"> • Neuropathy can impact a patient's ability to feel pain. When pain occurs in an insensate foot this is an indicator of an urgent situation 	 <ul style="list-style-type: none"> • Critical ischemia or significant loss of arterial perfusion to leg can be extremely painful even at rest








	walking on an acute Charcot foot is permanent <ul style="list-style-type: none"> • Patient safety: if the patient is unable to safely offload the foot then provide appropriate aids such as a wheelchair 		
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- Assessment findings include:
 - Infected diabetic foot ulcer or wet gangrene
 - Red, hot, painful joint or acute Charcot foot
 - Acute onset of pain in previously insensate foot
 - Absent pedal pulses with cold, white, painful foot or toes
- Urgent Risk Referral: Patients with urgent risk findings **require immediate assessment and treatment (within 24 hours)**. Depending on the patient need consider referral to:
 - Urgent care/ED
 - RAAPID 780-735-0811

High Risk Findings

- Assessment findings include: skin breakdown/ulcer, redness over any structural abnormalities and/or impaired circulation with no signs of infection or cellulitis. High Risk assessment finding examples include:

• Skin



Blister	Hemorrhagic callus (bleeding beneath)	Fissure or crack (bleeding or draining)	Diabetic foot ulcer (not infected)	Diabetic foot ulcer with intact dry black eschar
				 <ul style="list-style-type: none"> • A dry black eschar should be left intact if eschar is not boggy, no exudate, and no pain or redness, until patient can be seen for assessment

• Structural abnormalities


Redness over any structural deformities (pressure related)




- **Vascular testing**

Signs of ischemia (PAD): cool skin with pallor, cyanosis or mottling, and/or dependent rubor	One or more pedal pulses not palpable or audible (Doppler)
 <p>Other signs of peripheral arterial disease include:</p> <ul style="list-style-type: none"> • Thin, fragile, shiny skin • Loss of hair growth on lower leg 	

- **Inappropriate footwear causing pressure/skin breakdown**

	<ul style="list-style-type: none"> • Inspect foot including toes and heel for red areas or open skin/wounds
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High Risk Referral

- Patients with any high risk findings **should be referred and seen within 1-2 weeks of assessment** and follow-up with their primary care provider every 1 to 4 weeks.
 - Click [here](#) to find High Risk Foot Teams and Wounds Clinics in Edmonton and North Zones and their referral criteria and process
 - Reinforce the need for proper footwear: [Finding the Proper Shoe Fit](#)

Moderate Risk Findings



- Moderate risk assessment findings include: skin, nail, anatomical or sensory abnormality, inappropriate footwear with no skin breakdown/ulcer. Historical assessment factors include: prior history of foot ulcer, or partial or complete amputation of toes or foot. Moderate risk assessment findings examples include:

- **Skin**

Callus or corn	Fissure or crack	Fungus
	 <p>(not bleeding or draining)</p>	




- **Nails**

Missing, sharp, unkept, thickened, long or deformed	Infected ingrown nail
	


- **Structural Abnormalities**

Decreased range of motion at ankle or toe joint	Bunion	Hammer or claw toes	Overlapping toes	Fallen arch, rocker bottom, stable Charcot foot
				

- **Altered Sensation**

	<p>Absent or altered sensation at one or more of the five sites (loss of protective sensation)</p> <ul style="list-style-type: none"> • Sensation of numbness/tingling/throbbing or burning • Other patient descriptors to describe peripheral diabetes neuropathic pain may include: <ul style="list-style-type: none"> ○ Painful cold ○ Electric shocks ○ Pins and needles ○ Itching
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- **Inadequate Footwear**

	<p>Footwear that:</p> <ul style="list-style-type: none"> • Doesn't fit properly <ul style="list-style-type: none"> ○ Is too small, tight or loose ○ Does not accommodate foot deformities • Is in poor condition <ul style="list-style-type: none"> ○ Worn-out ○ Has rough seams or foreign objects inside ○ Has broken insoles • Has abnormal wear patterns
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Moderate Risk Referral


- Patients with moderate risk findings need to be referred and **seen within 4 weeks of assessment**. Referral options based on assessment findings include:
 - **Skin or nails issues:** refer to a [podiatrist](#) or [foot care nurse](#). Some [High Risk Foot Teams](#) will also address skin and nails problems
 - **Structure anatomy/Footwear:** Professionally fitted footwear/ensure proper footwear [Finding the Proper Shoe Fit](#)
 - Ongoing foot assessments for these patients should occur every 4-6 months.




Low Risk Findings

- Low risk findings indicate a normal foot assessment with no significant skin, nail, anatomical, sensory or vascular abnormalities, and appropriate footwear. Requires a foot assessment annually. Low risk assessment finding examples include:


- Skin**

<p>Normal intact skin – healthy or dry</p> 	<ul style="list-style-type: none"> Check in-between toes for skin breakdown or excess moisture Check skin temperature; compare both feet Consider recommending patient purchases Diabetic Socks Dry skin requires a moisturizer that contains urea
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- Nails and structure anatomy**

	<ul style="list-style-type: none"> Normal nails, well-kept, minimal discoloration Normal structure anatomy (no noted visual abnormalities)
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- Sensation testing**

<p>Normal sensation to 10g monofilament exam</p>	<ul style="list-style-type: none"> Sensory neuropathy is a progressive problem affecting 40-50% of people with diabetes within 10 years of their diagnosis Loss of the ability to detect pain and temperature poses tremendous risk for puncture, pressure, friction, chemical and thermal injuries For more information on how to perform a monofilament testing, consult the Healthcare Provider's Guide pp.12-13
	

- Footwear**

<p>Footwear is appropriate and accommodates foot shape</p>	<ul style="list-style-type: none"> Inspect feet for reddened areas that may indicate pressure points created by poorly fitted footwear Inspect socks for signs of blood or other discharge Encourage the patient to have their shoes professionally fitted Shoes should be worn all the time when walking, even in the house Bare feet should be avoided
	

General Referral Information

Various supports may be available for diabetic footcare depending on the screening findings. These include:

- High Risk Foot Teams (HRFTs):** Multidisciplinary teams of health care providers that specialize in the assessment and management of patients who are at risk of a diabetic foot ulcer as well as patients who already have a foot ulcer. Click [here](#) to access the list of the HRFTs in Edmonton and North Zones.
- Wound Clinics:** Multidisciplinary teams of health care providers that specialize in the assessment and management of wounds. Click [here](#) to access the list of Wound Clinics in Edmonton and North Zones.



- **[Alberta Aids for Daily Living \(AADL\)](#)**: will provide Therapeutic Footwear for persons with diabetes who meet the [AADL criteria \(page 8\)](#) with a cost sharing component: Albertans pay 25% of the benefit cost to a maximum of \$500 per individual or family per year. Low-income Albertans and people receiving income assistance do not pay the cost-sharing portion. A prescription is required by an [AADL High Risk Foot Team prescriber](#). Patients referred to a High Risk Foot Team will be assessed for footwear if appropriate.
- **[Foot care nurses](#)**: specially trained nurses in foot care who provide, through a comprehensive assessment, nail cutting, callus/corn treatment, patient education and prevention of foot issues. There is a fee for this service and patients are encouraged to contact the foot care nurse directly to inquire about their fees.
- **[Podiatrists](#)**: Medical specialists trained in the diagnosis and treatments of disorders and diseases affecting the foot, ankle and lower leg. Patients are encouraged to contact the podiatrist directly to inquire about their fees.

BACKGROUND

About this pathway

- In 2014, the Diabetes, Obesity & Nutrition Strategic Clinical Network (DON SCN)TM studied the provincial lower-limb amputation rates and discovered that 70% of all amputations were preceded by a diabetic foot ulcer. This data prompted the DON SCNTM to take action and develop the [Diabetes Foot Care Clinical Pathway](#) (DFCCP) with the aim to increase and standardize foot screening practices in primary care.
- The DFCCP was developed in 2015 using a systems approach which included broad engagement of many stakeholders, including primary care practitioners, patients with diabetes, home care, foot and wound care experts, and footwear program policy makers. The pathway was successfully piloted in three different communities (one urban and two rural) and the process and outcomes were evaluated which informed the spread and scale strategy.
- The DFCCP has been developed to enhance early detection and timely treatment of diabetes related foot problems and includes a collection of tools and resources to support healthcare providers in performing diabetes foot screening exams and referring patients to the most appropriate healthcare provider(s) within the recommended time frames. The pathway also includes patient resources to enable self-care and to identify when to seek medical help for foot problems.
- A return on investment study was completed in 2019 to understand the cost impact of the pathway on the health system. This was a retrospective cohort study that compared one-year post health services utilization rates and costs of a cohort of patients with diabetes who did not receive a foot screen with a group who had their feet screened and managed using the DFCCP. The results showed a significant reduction in hospital admissions and physician visits in the screened group. This service reduction translated to an annual cost avoidance of \$3,500 per patient screened. Click here to access the article:
<https://www.sciencedirect.com/science/article/pii/S0168822720304915?via%3Dihub>



Authors and conflict of interest declaration

- This pathway was reviewed and revised by the DON SCN and Edmonton area PCNs to make content align with the Edmonton Zone approach to primary care pathways. Names of participating reviewers and their conflict of interest declarations are available on request.

Pathway review process, timelines

- Primary care pathways undergo scheduled review every three years, or earlier if there is a clinically significant change in knowledge or practice. The next scheduled review is January 2025. However, we welcome feedback at any time. Please email comments to don.scn@ahs.ca

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DISCLAIMER

This pathway represents evidence-based best practice but does not override the individual responsibility of health care professionals to make decisions appropriate to their patients using their own clinical judgment given their patients' specific clinical conditions, in consultation with patients/alternate decision makers. The pathway is not a substitute for clinical judgment or advice of a qualified health care professional. It is expected that all users will seek advice of other appropriately qualified and regulated health care providers with any issues transcending their specific knowledge, scope of regulated practice or professional competence.

References

1. Armstrong DG, Boulton AJM, Bus SA. Diabetic foot ulcers and their recurrence. N Engl J Med. 2017;376:2367-75.
2. Diabetes Canada. Impacting Canadian lives: the facts. Available at: www.diabetesstrategynow.ca/facts. Accessed Dec. 16, 2020.
3. John M. Embil MD, FRCPC, FACP, Zaina Albalawi MD, FRCPC, Keith Bowering MD, FRCPC, FACP, Elly Trepman MD. Diabetes Canada 2018 Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada: Foot Care. Can J Diabetes 2018;42(Suppl 1):



PROVIDER RESOURCES

Description	Website
The Diabetes Foot Risk Assessment Triage Referral Form assists in navigating the patient to the right service and treatment	Diabetes Foot Risk Assessment Triage Referral Form
Healthcare Provider Guide: guides the provider through the Diabetes Foot Screening Tool	Diabetes Foot Care Pathway Healthcare Provider Guide
Video that explains how to perform a foot screen	Video-How to Perform a Foot Screen
E-Learning modules to educate providers on how to perform a foot screen	Saving Limbs and Lives (Primary Health Care Learning Portal and My Learning Link for AHS employees)
Awareness tool for providers to print out and post in patient care areas	Awareness Poster
Implementation guide that supports primary care providers and team in implementing the pathway into their practice	Pathway Implementation Guide
Provides an overview of the referral options	Referral Process Guidelines
Guides patients in finding the right shoes to protect their feet and prevent injury	Finding the Proper Shoe Fit
Diabetes Canada Clinical Practice Guidelines 2018-Foot Care chapter	http://guidelines.diabetes.ca/cpg/chapter32



PATIENT RESOURCES

Description	Website
A patient education booklet which describes the various risk levels, how to take care of their feet and prevent progressing to a higher level of risk	Foot Care for People with Diabetes
Patient information on self-foot care for low risk foot problems	Diabetic Foot Care for the Low Risk Foot
Patient information on self-foot care for moderate risk foot problems	Diabetic Foot Care for the Moderate Risk Foot
Patient information on self-foot care for high risk foot problems	Diabetic Foot Care for the High Risk Foot
Tool that guides patients in checking and caring for their feet at home	Diabetes Foot Health Self-Screening Tool

