Provincial Lower Limb Ischemia Primary Care Pathway

Quick Links: Primer & Expanded details | Provider resources | Patient resources | Provide feedback

Inclusion into this pathway requires confirmation that a pedal pulse is absent.

1. Lower Limb Ischemia Suspected

- Trophic/Colour changes to single leg
- Leg pain when walking (especially if single limb)
- Forefoot pain at rest
- Persistent slow-healing infections (> 2 weeks)

2. Red Flag: Abrupt Motor/Sensory Loss

→ **Urgent Referral**
Call RAAPID or Call 911

3. Alarm Features: Chronic Limb Threat

- Tissue loss, skin ulceration or digital gangrene
- Constant pain in foot at rest WITH confirmatory feature of Peripheral Arterial Disease (PAD)

→ **Provincial Vascular** Referral Pathway

No Red Flags or Alarm Features

4. Confirmatory Features

- History of vascular claudication (muscle pain with exercise)
- History of Peripheral Arterial Disease (PAD)
- Limb pulse absent

Note: Index of suspicion higher in patients with pre-existing cardiovascular risk factors, coronary artery

5. Investigations

Do Not Delay Referral for Non-Invasive Vascular Lab Studies.

If available in region, consider obtaining:

- Doppler Ultrasound
- Ankle Brachial Index

Differential Dx of PAD

Claudication Pain?

No → 6. Management

Yes → **Severity?**

Mild

- Intermittent claudication / pain managed
- Can continue with work/life activities

→ 6. Management

Moderate/ Severe

- Pain unmanageable with walking
- Pain limits mobility (unable to walk >20m)
- Unable to work or engage in life activities
- ABI less than or equal to 0.40 (*If known)
- Absolute toe pressure less than 30 mmHg (*If known)

(*If known: ABI and toe pressure values can trigger referral. However, do not delay referral pending vascular lab study results)

→ Provincial Vascular Referral Pathway

Initiate/continue aggressive management of cardiovascular risk factors during referral process

6. Management

- Assess and aggressively manage cardiovascular risk factors including statin, antihypertensive, and single antiplatelet medications
- Specific emphasis on smoking cessation due to the increased impact of smoking on claudication
- Encourage exercise to promote vessel collateralization
- Coach patient to return with specific signs/symptoms (rest pain and non-healing wounds)
- Access regional foot care clinics as appropriate (see expanded details)
- Return to top of algorithm if clinical presentation changes

This primary care pathway was co-developed Primary Care Physicians, Vascular Surgeons, Patient and Family Advisors, and the Alberta Health Services (AHS) Provincial Pathways Unit. It is intended to be used in conjunction with specialty advice services, when required, to support care within the medical home.

EXPANDED DETAILS

Pathway Primer

Peripheral arterial disease (PAD) is a widely prevalent condition in Canada. Recent evidence suggests that nearly 800,000 Canadians live with PAD, and approximately 10% of patients with intermittent claudication are likely to deteriorate within five years. Of the patients who develop critical limb ischemia (CLI), up to 30% will require a major amputation. Additional evidence demonstrates that Indigenous Canadians experience a disproportionate percentage of atherosclerotic diseases (Bonneau, et al., 2018)

Avoiding the major complications of limb ischemia is accomplished through early detection and management of PAD in the primary care setting. This pathway supports primary care providers in the conservative management of chronic vascular-related limb ischemia, which includes the promotion of lifestyle, diet, and medications related to cardiovascular risks. If conservative management is not effective, this pathway differentiates what clinical presentations would trigger either a non-urgent or an urgent referral to vascular specialty care.

Note: Vascular surgery services are in Calgary and Edmonton only. This has important implications for the timely identification, differentiation, and management of limb ischemia in primary care. Travel considerations may factor into the choice patients make regarding a *next-available* specialist or a *closest* specialist during the referral process.

1. Limb Ischemia Suspected

It is estimated that between 2-3% of young healthy individuals will have an absent dorsalis pedis artery pulse on palpation [1]. The absence of a pedal pulse without any of the accompanying signs of poor perfusion suggests that there is no underlying vessel stenosis.

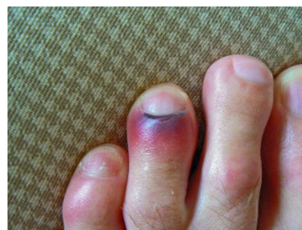
The following signs and symptoms suggest the presence of lower limb ischemia for inclusion into this pathway:

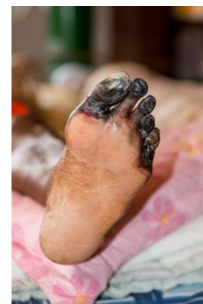
<u>Patient Symptoms/Chief Complaint(s)</u>

- Leg pain while walking (possible claudication)
- Forefoot pain
- Forefoot pain at rest
- Limb pain that emerges while in a recumbent position

<u>Physical Exam</u>

- Trophic/colour changes to a single limb
- Cool mottled limb (unilaterally)
- Persistent, slow healing limb infections
- Presence of early-stage gangrene
    - Dry (as opposed to “wet” and “gas”) gangrene is most associated with peripheral arterial disease. Early onset of gangrene is characterized by the presence of dry and shriveled skin that looks brown, purplish, blue, or black.





2. Red Flag(s)

An urgent referral is required when lower limb ischemia presents with abrupt motor/sensory loss. The abrupt onset and loss of function is consistent with a major vessel occlusion due to an embolus.

3. Alarm Features

The presentations that warrant an urgent referral are:

Wet Gangrene: Characterized by swelling, blistering, and a wet appearance of the skin. The infection will spread rapidly and must be treated immediately. An urgent referral is required to address the underlying vascular insufficiency which caused the infection.

Large Vessel Occlusion: Acute lower limb ischemia is most often related to an arterial occlusion. In rarer circumstances, limb ischemia is venous based (phlegmasia). The etiology of a large vessel occlusion includes exacerbation of thrombosis in a previously patent vessel, direct tissue trauma, an arterial aneurysm, or a proximal embolus migrating into the limb [2]. The occlusive process can be gradual as in the presence of deteriorating patency from atherosclerosis, or the occlusion can be more sudden as in the presence of a migrating embolus.

Clinical presentations: Proximal occlusion of a large vessel from an embolus will develop symptoms over a period of hours. The symptoms can range from worsening claudication to a complete paralysis of the limb. In the case of an embolus, the patient will often be able to articulate the moment their symptoms began. The six "P"s of acute arterial occlusion are:

i. Pain
ii. Pallor
iii. Poikilothermia – cool limb
iv. Pulselessness
v. Paresthesia
vi. Paralysis (Red Flag)

4. Confirmatory Features

For this pathway, it is important to confirm that the poor perfusion is caused by a vascular issue, and not diabetes for example. Establishing a differential diagnosis for pain, the source of infections, and whether an issue is local to a single limb are all important diagnostic considerations.

Differential Diagnosis for pain [3]:

- Vascular-related pain occurs after an interval of recumbency. Limb pain at night is listed as a confirmatory feature. The pain is also exacerbated by walking (claudication).
- Diabetic neuropathy pain is not related specifically to recumbency. Patients may lose light-touch sensation (mono-filament test) and experience a decreased vibratory sense. The *Diabetes Foot Care Clinical Pathway* is a comprehensive guide that includes the evaluation of peripheral arterial disease.
- Night cramps occur in the calf muscle and will wake the patient from sleep. Pain is relieved by massaging the muscle, by walking, or using anti-spasmodic agents.
- Arthritis pain in the metatarsal bones may cause foot pain that is relieved by standing.
- Sciatica pain originates in the lower back and typically travels down one leg. A differentiating characteristic is that pain typically goes away within a few weeks, and pain that can be relieved by stretching, ice packs and OTC pain medication [4].

Etiology of Infection: A confirmatory sign for inclusion into this pathway is the presence of persistent infections in the limb. It is important to differentiate between perfusion-based infections and those infections caused by environmental factors such as cold, wet, and/or unsanitary conditions.

All gangrene infections require careful and timely management, but all infections may not need a vascular referral. Identifying the underlying cause should help guide the urgent management of this clinical presentation. Gangrene infections that do not respond to conservative management in the community should be referred to vascular specialty care (See Red Flags on the first page algorithm).

Unilateral Findings: Poor perfusion can cause neurological symptoms such as paresthesia and diminished function. The differentiator for vascular causes is that the signs and symptoms are isolated to a single limb, which suggests a local vascular cause versus a systemic neurological cause.

5. Investigations

Important Note: The goal of this pathway is to ensure that rapid access to specialty care is based on signs and symptoms of vascular insufficiency (e.g., severe claudication). Referral to Vascular specialty does not require Ankle Brachial Index (ABI) values or toe pressure lab values because that requirement could unnecessarily delay access to surgical interventions. However, if one or both of those values become known during management, the Primary Care Provider should consider referring to Vascular specialty with an ABI of ≤0.4 or an absolute toe pressure of <30 mmHg.

Test Results

- Non-Invasive Vascular Lab Study: During ongoing management, obtaining a Doppler ultrasound and ABI can provide addition insight into the severity of the occlusion. An ABI ≤ 0.4 with accompanying claudication should trigger a non-urgent referral. An absolute toe pressure less than 30mmHG should trigger a referral.
- Bloodwork: Assess and aggressively manage cardiovascular risk factors. A lipid panel and HgA1C informs clinical management.

Lower Limb Assessment Clinics

High risk foot teams and wound assessment clinics are in all five provincial zones (North, Edmonton, Central, Calgary, South). Consider these resources during ongoing management in the Primary Care setting.

Link: [Diabetes Foot Care Clinical Pathway Toolkit | Alberta Health Services]

Note: A CT scan is not recommended as a routine evaluation for chronic limb ischemia. However, during the referral process the vascular specialist may determine that a CT is required for their clinical planning.

6. Management in the Primary Care Setting

The management of lower limb ischemia in Primary Care is focused on supporting the underlying cardiovascular risk factors.

- Patient Coaching: Sudden and acute exacerbation of ischemia can occur in patients with pre-existing peripheral arterial disease. Helping patients to recognize the signs and symptoms of red flags and/or alarm features is a key component of management. Patients should be advised to access medical care immediately if concerning signs/symptoms develop. The accompanying patient pathway provides guidance for patients.
- Aggressive Management of Cardiovascular Risk Factors: A aggressive multi-pronged approach using medications, along with promoting lifestyle and diet modification, is necessary.
- Patient Resources:

  Peripheral Arterial Disease (myhealth.alberta.ca)

  Alberta Healthy Living Program | Alberta Health Services (All five provincial zones)

  Supervised Exercise Programs (Not in all communities)

  Prescription to get active

  Healthier Together

  AlbertaQuits (healthiertogether.ca) Smoking cessation information. Evidence demonstrates a strong link between smoking and claudication [5,6].
- Consider Dietitian Support where available.

7. Referral Process

Referral pathways are guidelines to help referring providers know what information, labs and diagnostic imaging are required with their referral to a specialty. These pathways are co-designed with Primary and Specialty Care, AHS Operations, and patients to ensure the right amount of information is included throughout the referral process to triage the patient as quickly as possible. To ensure referring providers have referral information at their fingertips, referral pathways may link to clinical pathways when available. AHS manages referral pathways and extensive work is ongoing as part of the Alberta Surgical Initiative. If you have questions or want to know more about the referral pathway development process, please email access.ereferral@ahs.ca.

- **Urgent Referral –** Call surgeon on call via RAAPID or call 911.
- Provincial Referral Pathways (if available).
- Send referral to Vascular Surgery; see Alberta Referral Directory for referral information.

BACKGROUND

About this pathway

- This pathway was developed in collaboration with Primary Care Providers, Vascular Surgeons, Patient and Family Advisors, and the Alberta Health Services (AHS) Provincial Pathways Unit.
- Condition-specific clinical pathways are intended to offer evidence-based guidance to support primary care providers in caring for patients with a range of clinical conditions.

Authors and conflict of interest declaration

- The authors represent a multi-disciplinary team. Names of the content creators and their conflict-of-interest declarations are available on request by emailing AlbertaPathways@ahs.ca.

Pathway review process, timelines

- Primary care pathways undergo scheduled review every two years, or earlier if there is a clinically significant change in knowledge or practice. The next scheduled review is Q3 2025. However, we welcome feedback at any time. Please email comments to AlbertaPathways@ahs.ca.

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PROVIDER RESOURCES

Specialist Advice options

Non-urgent advice is available to support family physicians.

- Specialist advice is available across the province via Alberta Netcare eReferral Advice Request (responses are received within five calendar days). Visit www.albertanetcare.ca/eReferral.htm and FAQ: Create an Advice Request for more information.
- In the Calgary Zone, Specialist Link connects family physicians and specialists in real time via a tele-advice line. Family physicians can request non-urgent advice online at www.specialistlink.ca or by calling **403-910-2551**. The service is available from 8 a.m. to 5 p.m. (with some exceptions), Monday to Friday (excluding statutory holidays). Calls are returned within one hour.
- Family physicians in the Edmonton Zone can request tele-advice via ConnectMD, which is available by calling **1-844-633-2263** or by visiting www.pcnconnectmd.com. The service is available from 8 a.m. to 6 p.m., Monday to Friday (excluding statutory holidays and Christmas break). Calls are returned within two business days.

Other resources

Diabetes Foot Care SCN Pathway Toolkit	www.albertahealthservices.ca/scns/Page13331.aspx
Non-Alcoholic Fatty Liver Disease Pathway	www.albertahealthservices.ca/assets/about/scn/ahs-scn-dh-pathway-nafld.pdf
Provincial Vascular Referral Pathway	Under development

PATIENT RESOURCES

Peripheral Arterial Disease (MyHealth Alberta)	https://myhealth.alberta.ca/health/pages/conditions.aspx?Hwid=aa105361
Your Journey with Lower Limb Ischemia (Patient Pathway)	https://myhealth.alberta.ca/lower-limb-ischemia-pathway

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