

This decision support tool is intended primarily for front-line clinicians. It is provided for guidance only and does not replace the judgment of the clinician performing the activities reserved to him or her by law or regulation. This document has been designed on the basis of clinical recommendations developed by the INESSS using a systematic approach and supported by the scientific literature as well as by the knowledge and experience of clinicians from different specialties and areas of expertise. The content of this tool excludes newborns and young children. Tools to guide wound assessment and the determination of healing potential, as well as decision support on an optimal treatment plan based on wound etiology, vascular supply, and infectious risk, tissue type and exudate quality, are also provided, along with a reminder of dressing specifics. For further details, visit [inesss.qc.ca](http://inesss.qc.ca).

**PATHOPHYSIOLOGY**

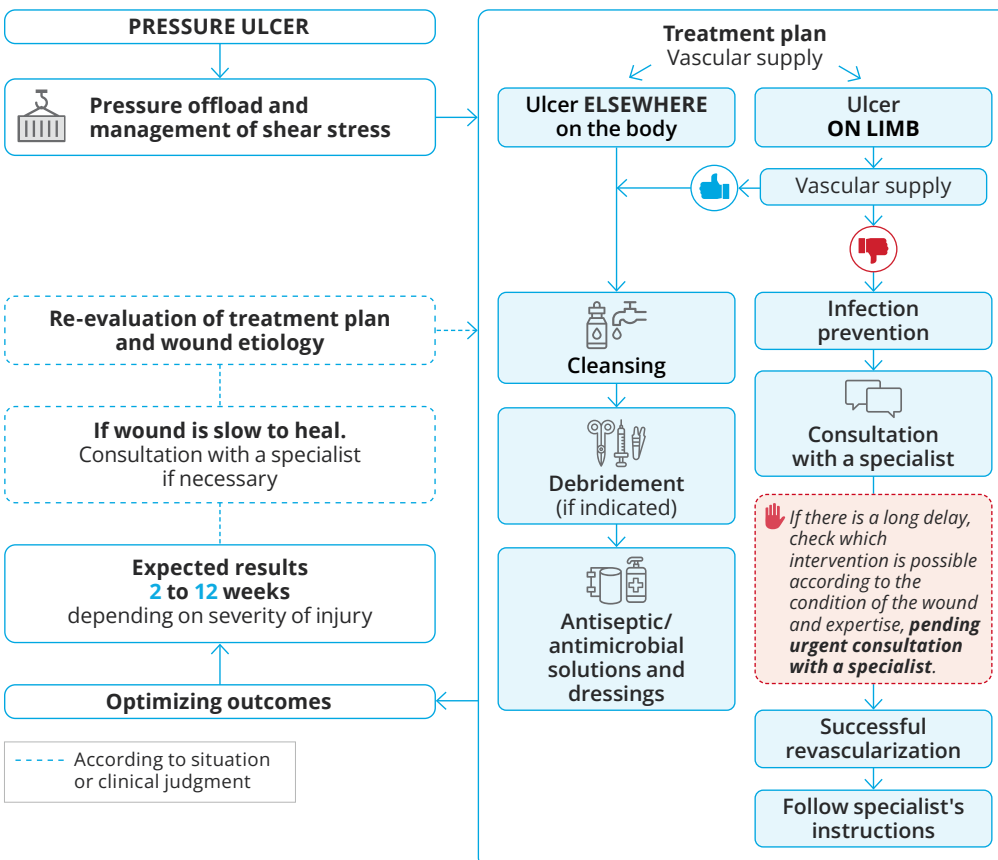
- Skin ulceration caused by pressure and shearing of soft tissue between the skin and a bony prominence. Friction can exacerbate its development.
- The three most common sites of onset are the sacrum, ischium and heel.
- When incontinence is present, it can coexist with moisture-associated skin damage, which starts at the skin surface, unlike pressure ulcer, which begin beneath the skin.



⚠ *Given our current state of knowledge, pressure ulcer mainly affect people of advanced age, those with reduced mobility, those who are malnourished and those who are hospitalized.*

**TREATMENT PRINCIPLES**

⚠ Prompt management and close monitoring of the individual at increased risk of developing a pressure ulcer (e.g., bedridden, paraplegic).



**SOMMARY**

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## CLINICAL EMERGENCY

- [Signs of sepsis](#)
- [Infected gangrene](#)
- [Necrotizing fasciitis](#)
- [Cellulitis/lymphangitis with warning signs](#)



Refer to emergency

## HOLISTIC EVALUATION OF THE INDIVIDUAL

! Evaluate and, if necessary, control pain.

1	Medical history	Expected location	Vascular condition
	<ul style="list-style-type: none"> <li>Ask the individual or family members about the wound, lifestyle habits, and health.</li> <li>Verify relevant history of lab testing results to the etiology of the wound.</li> <li>Document the location of the wound.</li> </ul>	<ul style="list-style-type: none"> <li>Pressure points when lying or sitting for long periods, or wounds caused by medical devices.</li> <li>Friction points - e.g., repeated rubbing in ill-fitting shoes or repeated contact with damp skin.</li> <li>Shearing points - e.g., slipping in bed with the head of the bed raised.</li> </ul>	<p>Check if the ulcer is located on a lower limb. For wounds elsewhere on the body, this step may be considered if the ulcer is not healing.</p> <p>⚠️ <b>Vascular assessment</b> with more than one measurement to detect peripheral atherosclerotic vascular disease (PAD).</p> <p>🗨️ If vascular supply is inadequate or uncertain: in-depth evaluation by a qualified professional or specialized service.</p>

2	Causal and risk factors for pressure ulcers	
	<p><b>Causal Factor</b></p> <ul style="list-style-type: none"> <li>Mechanical or pressure stress</li> </ul>	
	<p><b>Risk Factors</b></p> <ul style="list-style-type: none"> <li>Malnutrition - underweight or obesity</li> <li>Advanced age</li> <li>Dehydration</li> <li>History of pressure injury</li> <li>Loss of perception - e.g., pain, proprioception</li> <li>Anemia</li> <li>Reduced mobility, paraplegia, bed rest</li> <li>Reduced cognitive ability</li> <li>Skin in prolonged contact with moisture sources - e.g., incontinence</li> <li>Medical devices</li> </ul>	<ul style="list-style-type: none"> <li>Peripheral arterial disease</li> <li>Diabetes</li> <li>Thyroid disorder</li> <li>Edema</li> <li>Treatment with vasopressors</li> <li>Lack of adherence to treatment</li> <li>End-stage renal failure</li> <li>Immunosuppression caused by disease or its treatment</li> <li>Inadequate hygiene and living conditions</li> <li>End of life</li> </ul>

3	Paraclinical examinations and laboratory analyses		
	<ul style="list-style-type: none"> <li>Appreciation of <a href="#">nutritional status</a></li> </ul>	<ul style="list-style-type: none"> <li>Detection of <a href="#">neuropathy</a></li> </ul>	<ul style="list-style-type: none"> <li>Appreciation of indicators contributing to pressure injury</li> </ul>

## DETERMINATION OF WOUND HEALABILITY

→ Consult the [wound assessment and determination of wound healability decision support tool](#) to determine whether the pressure ulcer is **curable**, **under maintenance**, or **incurable**.

## ASSESSMENT OF VASCULAR SUPPLY FOR A WOUND LOCALIZED ON A LIMB

- Wound healability is directly associated with the quality of vascular supply.
- A vascular evaluation should be performed in all individuals who present with a **wound on a lower or upper limb**.
- Symptoms and signs of peripheral atherosclerotic vascular disease (PAD) should be investigated **before** :
  - any form of [debridement](#) - e.g., autolytic, conservative sharp, enzymatic.

*Further vascular evaluation may be required at the onset of a new wound in the presence of PAD.*

### Vascular assessment for a wound on an upper limb

#### Assessment

- Check for abnormal clinical signs - e.g., coldness, pallor, pain, slow capillary return, Allen maneuver.
- Pulses palpation.

### Vascular assessment for a wound on a lower limb

#### Initial assessment

- Check for abnormal clinical signs - e.g., coldness, pallor, pain, slow capillary return.
- Palpation of dorsalis pedis **and** posterior tibial artery pulses.
- Auscultation of femoral sounds and inspection of legs and feet.

*When in doubt consult an experienced colleague or a specialist*




#### Subsequent assessment

- Ankle-brachial systolic pressure index (ABPI) at dorsalis pedis **and** posterior tibial artery in supine position.
- If required, toe brachial index or toe pressure.

#### In-depth assessment

- Clinical signs of inadequate or uncertain vascular supply - non-palpable or weak pulses, critical ABPI values - should be confirmed by arterial wave quality analysis with portable Doppler by an appropriately qualified professional, vascular laboratory, vascular surgeon, or other.

**!** *ABPI is less accurate in some **diabetic individuals, chronic renal failure** or with **advanced age** or **cardiac arrhythmias** due to possible calcification of the arteries.*

Vascular assessment by at least TWO methods to determine adequate vascular supply in a limb				
Vascular supply	Presence of palpable pulses	Ankle-brachial systolic pressure index (ABPI)	If available in the setting and if knowledgeable for interpretation of collected values	
			Toe brachial index (TBI)	Toe pressure (TP, mmHg)
Uncertain or inadequate  Suggests calcified vessels	No	ABPI > 1.4	If non-compressible arteries identified by ABPI are present, measurement of toe brachial index or toe pressure is recommended.	
Adequate Reduces the possibility of PAD	Yes	1.0 < ABPI ≤ 1.4	TBI > 0.7 <sup>2</sup>	TP ≥ 70
Uncertain/grey area <sup>1</sup> May suggest mild PAD	Weak	0.8 ≤ ABPI ≤ 1.0	0.6 < TBI ≤ 0.7	TP < 70
Inadequate  ABPI < 0.5 suggests significant to severe PAD	No	ABPI < 0.8	TBI ≤ 0.6	TP < 70
Critical limb ischemia 	No	ABPI < 0.4	TBI ≤ 0.2	TP < 30

Adapted from AHA 2016, HSE 2018 and Wounds Canada (Beaumier *et al.* 2020)

 Consultation with a specialist or experienced colleague

1. ABPI values between 0.91 and 0.99 correspond to a grey area that requires assessment of the clinical picture - e.g., modifiable, or non-modifiable risk factors.
2. A toe brachial index value of over 0.75 generally rules out PAD.

## WOUND PREPARATION PRIOR TO EVALUATION

⚠ **Evaluate and, if necessary, control pain**

### CLEANSING

- With aqueduct water (unless deep structures are exposed) or physiological solution (NaCl 0.9%).
- Applied in large quantities at room or body temperature. Consult the [techniques](#) used.
- ✓ On extremities with **inadequate or uncertain vascular supply**: for dry necrosis, disinfection with povidone-iodine (10%) or alcohol-free chlorhexidine (2%); for moist necrosis, povidone-iodine (1%) or other antiseptic/antimicrobial solution compatible with the dressing, if necessary and according to clinical judgment.

### DEBRIDEMENT

- ✓ **Removal of dry or moist necrosis**, debris, foreign material or blood clots, use tweezers or a pressure stream of aqueduct water or physiological solution.
- ✗ **If ulcer localized to an extremity with inadequate or uncertain vascular supply.**

## WOUND ASSESSMENT

→ [Wound assessment](#) should consider the following:

1	Appearance of wound and surrounding skin	Identification of tissue type and exudate type	Identify symptoms and signs of an infected wound or biofilm	
	<ul style="list-style-type: none"> <li>• Parameters such as size and depth are, ideally, quantified before, during and after treatment for accurate wound monitoring. Visible structures are also documented.</li> <li>• Pain, absent or intense, may indicate an urgent clinical condition linked to severe infection.</li> </ul>	<ul style="list-style-type: none"> <li>• Tissue type influences subsequent steps.</li> <li>• The type of exudate, together with other clinical symptoms and signs, or with other factors, helps to identify clinical conditions that are urgent (e.g., severe infection) or less urgent (e.g., presence of underlying disease).</li> </ul>	<p>Clinical observations are generally <b>sufficient</b>, and wound culture is not recommended.</p> <p><b>Local infection</b></p> <ul style="list-style-type: none"> <li>• can be fully taken care of by front-line healthprofessionals.</li> </ul>	<p><b>Deep Soft tissue infection</b></p> <p>☞ <b>Immediate</b> consultation with an experienced colleague, and if necessary, referral to an infectious disease microbiologist</p>
	<p><b>Clinical tools</b> to evaluate infection severity of infected pressure ulcer:</p> <ul style="list-style-type: none"> <li>• Wifi</li> <li>• Scottish Ropper Scale</li> </ul>			
2	Exposure of deep structures (e.g., tendons, nerves or bones)			
	<p>☞ Consult a specialist department or experienced colleague about management specifics, including the appropriateness of initiating antibiotic prophylaxis if a bone is exposed.</p> <ul style="list-style-type: none"> <li>• Keep exposed area moist, avoiding maceration.</li> </ul>			

### 👉 Signs to look for regarding osteomyelitis

- Risk factors for osteomyelitis:
  - local infection on a prominent bone
  - deep foot injury (e.g., fascia, tendon, muscle, cartilage, bone)
  - exposed bone
  - bone with rough texture, softness, or discolouration changes
  - recurrent wound with deep-lying orthopedic material
- Explore the wound with a sterile metal stilet to exclude any bone contact. This also helps evaluate depth and the presence of underlying sinuses.

## PRESSURE OFFLOADING

- Pressure and shearing relief are the most important aspects of pressure injury treatment.
- Pressure offloading can be achieved using therapeutic surfaces, technical aids, and positional changes.

### Examples of pressure and friction redistribution according to ulcer location

Ischions	Sacrum	Heel
Dorsal or lateral recumbency	Lateral recumbency or seated position	Heels in empty space if in supine position or heel clearance by therapeutic surface

## DETERMINE TREATMENT PLAN ACCORDING TO VASCULAR SUPPLY, INFECTIOUS RISK, TISSUE TYPE, AND EXUDATE AMOUNT

- ! Control pain as needed
- ! Ensure adequate vascular supply **BEFORE** cleansing, debridement, and dressing application

- The treatment plan steps by tissue type are described in the [Optimal treatment plan decision support tool, based on wound etiology, vascular supply, infectious risk, tissue type and exudate quantity.](#)
- The information below complements the treatment plan specific to the pressure ulcer.

### TYPE OF TISSUE

Dry necrosis



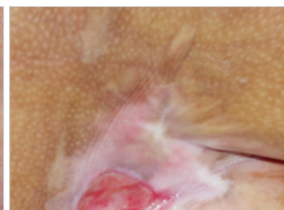
Moist necrosis



Granulation tissue



Epithelial tissue



Macerated tissue

Photo not available


### CHOICE OF CLEANSING AND DEBRIDEMENT

- ! A pressure ulcer located elsewhere than in the extremities can be cleaned and debrided independently of the vascular supply in the upper and lower limbs.



#### Cleansing






- Aqueous water or physiological solution (NaCl 0.9%) in large quantities and at room or body temperature.
- ✓ On extremities with **inadequate or uncertain vascular supply**: for dry necrosis, disinfection with povidone-iodine (10%) or alcohol-free chlorhexidine (2%); for moist necrosis, povidone-iodine (1%) or other antiseptic/antimicrobial solution compatible with the dressing, if necessary and according to clinical judgement.
- If ulcer is highly exudative or in presence of incontinence, also clean surrounding skin, avoiding friction.
- Antiseptic/antimicrobial solution if local infection is present or to facilitate the debridement (e.g., prontosan) if there is a suspicion of biofilm in the wound.

 <p><b>Debridement</b></p>	<ul style="list-style-type: none"> <li>✓ <b>Conservative sharp</b> for curable wounds and maintenance.</li> <li>✓ Autolytic and enzymatic to be considered if non-infected ulcer and small amount of necrosis present.</li> </ul> <p><i>Other debridements are possible, depending on the individual and the wound. Consult <a href="#">debridement methods</a> for details.</i></p>
	<ul style="list-style-type: none"> <li>✗ If dry necrosis at an extremity with inadequate or uncertain vascular supply (e.g., weak, or absent pedal pulses).</li> <li>⚠ After discussion with an experienced colleague or specialist team and evaluation of the risks and benefits, debride <b>non extensively the ischemic moist necrosis</b> according to the comfort and skill of the professional and apply an antimicrobial agent pending urgent consultation with a specialist.</li> <li>✗ Granulation tissue and epithelial tissue not infected.</li> <li>✗ Dry black eschar on the heel.</li> </ul>

## APPLICATION OF AN ANTISEPTIC/ANTIMICROBIAL SOLUTION

<p><b>Local infection or presence of biofilm</b></p>	<p><b>Therapeutic use</b></p> <ul style="list-style-type: none"> <li>• If local infection is confirmed or the presence of biofilm is clinically suspected.</li> <li>• Consult <a href="#">antiseptic/antimicrobial solutions</a> for details.</li> </ul>
	<p><b>Prophylactic use</b></p> <ul style="list-style-type: none"> <li>• <b>Not generally recommended</b> except in one of the clinical situations that require it. Consult <a href="#">antiseptic/antimicrobial solutions</a> for <a href="#">reasons</a> of prophylactic use.</li> </ul>

## DRESSING CHOICE

 <p><b>Dressings</b></p>	<p><b>General</b></p> <ul style="list-style-type: none"> <li>• Depending on the amount of <b>exudate, from light</b>  <b>to heavy</b>   .</li> <li>• Prefer <b>semi-occlusive dressings</b> as proposed in the <a href="#">treatment plan</a>.</li> <li>• If dry necrosis on an extremity with inadequate or uncertain vascular supply: possibility of protecting the necrosis with a dry, non-adherent dressing (e.g., cotton pad).</li> <li>• If moist necrosis on an extremity with inadequate or uncertain vascular supply: apply iodine cadexomer.</li> <li>• Consider anatomical location to avoid pressure, friction, and shearing.</li> </ul>
	<p><b>Special features</b></p> <ul style="list-style-type: none"> <li>• In cases of urinary or fecal incontinence, use a dressing that prevents stool and urine from passing underneath.</li> <li>• For areas that are difficult to dress, such as the gluteal fold, use a hydrophilic paste dressing.</li> </ul>
	<p><b>Local infection</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Antimicrobial dressings</a></li> </ul>
<p><b>Avoid</b></p>	<ul style="list-style-type: none"> <li>✗ For <b>plantar</b> ulcers, hydrocellular foams are not recommended, as they encourage maceration.</li> </ul>
<p><b>Considerations</b></p>	<ul style="list-style-type: none"> <li>• If the ulcer is highly exudative or incontinent, consider using a barrier product (liquid, cream, ointment, dressing) around the ulcer to protect the surrounding skin from maceration.</li> </ul>

## OPTIMIZING OUTCOMES



- A pressure ulcer may take a long time to heal or may recur if the underlying cause and risk factors are not controlled.
- In addition, it is important to evaluate other [possible underlying causes](#) of the signs and symptoms observed.

### CARE RELATED TO PRESSURE ULCER TREATMENT

Redistribution and pressure offload and shearing management	Infection prevention	Revascularization in lower limbs if appropriate	↑ Mobility by limiting pressure and friction
Optimization : • <b>Nutrition</b> (high protein content) • Hydration	Incontinence control and moisture management	Comorbidity management	Social, physical, psychological support

### INFORMATION TO BE GIVEN TO THE INDIVIDUAL AND FAMILY

- Maintain good personal hygiene while protecting dry necrosis and exposed structures when showering.

#### General

- Ideally, and depending on available resources, have the ulcer evaluated by an **occupational therapist or physiotherapist**. Alternatively, if the ulcer is located on the feet, evaluation by a podiatrist.
- Redistribute pressure and weight by repositioning yourself regularly, as instructed.
- Seek help for repositioning using a technique that reduces friction or shearing.
- If incontinent, change incontinence garments as soon as they become soiled, or establish elimination routines to prevent stool and urine from coming into contact with the seat.
- Eat a healthy diet, drink enough water, and stop smoking. A consultation with a **dietician-nutritionist** is often useful to promote healthy eating.

#### Skin care

- Good hygiene of surrounding skin with a soft wipe or similar, especially if incontinent. Dab dry.
- Lubricate dry, intact surrounding skin with an emollient.

#### Frequent, regular inspection of the wound and surrounding skin and, especially if obese or incontinent, skin folds:

- by a healthcare professional or
- by the individual or family

## MONITORING AND FOLLOW-UP

### ! Evaluate and, if necessary, control pain.

- The pressure ulcer may worsen rapidly **3 to 10 days** after its initial appearance.
- Re-evaluation recommended every 48 to 72 hours if mental, physical, or sensory acuity is unstable, or once a week if acuity is stable.

## DRESSING CHANGE/FREQUENCY

Any dressing **more than 50%** soiled or detached should be changed, and the change frequency increased.

Non-infected wounds	<ul style="list-style-type: none"><li>• Wear dressing according to manufacturer's maximum recommended duration or clinical judgment.</li></ul>
Infected wounds	<ul style="list-style-type: none"><li>• Regular dressing changes depending on wound properties, the individual's condition and, above all, the action mechanism of the dressing/antimicrobial product.</li></ul>

## WOUND MONITORING TECHNIQUES

1. **Clinical visual** indicators with photographs taken if equipment available.
2. **Calculated clinical indicators (reduction in wound area)**: a reduction of at least 40% in wound area after 4 weeks of optimal treatment is predictive of healing of the pressure ulcer at 12 weeks.  
*Symptoms and signs of local, deep soft-tissue or systemic infection should be investigated in addition to taking photographs or measuring wound-area reduction at follow-up.*

## CONSULTATION WITH SPECIALIST

### CLINICAL SITUATIONS REQUIRING CONSULTATION WITH A SPECIALIST

- Gangrene
- Severely infected ulcer
- Inadequate or uncertain vascular supply in the affected lower or upper limb
- Exposure of bone or deep structure
- Uncontrollable pain
- No significant improvement after **4 to 12 weeks** despite appropriate treatment and clinical judgment
- Persistent infection despite appropriate treatment; a microbiologist-infectiologist may be consulted

### INTERDISCIPLINARY TEAM

- The treatment plan implemented by the care team (nurses, physicians, podiatrists if located on foot, occupational therapists, physiotherapists) could benefit from the intervention of other health professionals depending on needs and availability of resources in the community - e.g., dieticians-nutritionists.

## MAIN REFERENCES

- References are presented in the INESSS [report](#) associated with this tool.