LOWER LIMB ULCERS

PREVENTION AND MANAGEMENT

CLINICAL PRACTICE GUIDELINE

Version number :	6.0
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Mental Health and LD	
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CONTENTS TABLE		
Section Number	**Section heading**	**Page Number**

POLICY TRACKING TABLE	
Title	**Leg Ulcer Prevention & Management**
Policy Number	V 6.0
Summary:	Contains guidance for clinical staff on the assessment and management of patients with or 'at risk' of, lower limb ulcers
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This document replaces	Leg Ulcer Prevention and Management Guidelines 2018 and version 5.1

1.0 Policy Summary

This document has been written by the Tissue Viability Service (TVS) and contains guidance for clinical staff on the prevention, assessment and management of patients with lower leg ulceration based on guidance from the National Wound Care Strategy Programme(NWCSP): Lower Limb recommendations for clinical care (2020), NICE (2020) Leg ulcer infection: antimicrobial prescribing guidelines, SIGN (2010) Management of chronic venous leg ulcers: a national clinical guideline, National Institute for Clinical Excellence (NICE 2021, revised guidelines) and Best practice Statement on venous leg ulcer management (2016). It replaces previous local guidance published in 2018. These guidelines should be read in conjunction with National Guidance and the other Clinical Practice Guidelines in the TVS Portfolio.

2.0 Overriding Duty of Care Statement

Should the content or operation of these guidelines be challenged on any grounds whatsoever then the impact on the past, present or future duty of care to patients will be taken to be a primary factor in deciding the outcome of that challenge.

3.0 To whom this Guideline applies

This document is aimed at practitioners who are responsible for the prevention, assessment and management of patients with lower leg ulceration.

4.0 Background & Scope

Lower Limb ulcers are wounds on the lower leg (below the knee) and foot that are slow to heal. It is estimated that approximately 1.5% of the adult population in the UK is affected by active leg and foot ulceration, which equates to 730,000 patients. Caring for patients with lower leg ulcers accounts for a significant proportion of nursing time and is estimated to cost the National Health Service (NHS) between £600 million and £1.94 billion every year (Guest et al, 2017).The effects on patients' quality of life and their ability to cope with aspects of daily living are not so easily quantified. There are many causes of lower limb ulceration and unless the correct diagnosis is made early, patients' may experience long delays in healing and poor outcomes.

This document is intended to provide a practical guide for the prevention, assessment and management of patients with the most common causes of lower limb ulcers. It is not intended to replace national guidance and therefore, should be read in conjunction with full national guidance, best practice statements and subsequent research publications. Patients with the less frequent causes of lower limb ulceration or unknown diagnosis require referral to the relevant specialist service for assessment and further advice on management.

5.0 Aims & Objectives

1. To provide a reference guide for assessing and managing the common causes of lower limb ulcers, to include recommendations from the National Wound Care Strategy Programme (2020).
2. To ensure an evidence-based, standardised approach to the management of patients with the more common causes of lower limb ulcers.
3. To ensure standardised, evidence based approach is taken to the prevention of recurrence of venous leg ulcers.
4. To provide a framework to ensure that the quality of care for patients in this area can be monitored and improved in line with the Trusts quality improvement strategy.

6.0 Quality Assurance & Audit

The principles upon which this document is based are:

- An individualised holistic assessment should be undertaken and evidence-based treatment plans commenced, which take into account the underlying aetiology, patient's circumstances, patient's wishes, the overall goals of therapy, the practitioners clinical judgement, available resources and knowledge of more recent research findings.
- Those who undertake assessment, planning, implementation and evaluations of care should be trained/educated/competent in lower limb ulcer assessment, management and prevention of recurrence. They should have attended the leg ulcer in-house training programmes, had supervised practice in the leg ulcer clinics/home care and be deemed competent by the caseload holder using the ELFT leg ulcer competency framework document (Appendix 4)
- The patient and their carers should be fully informed, given consent and share in the decision making process.
- The process should be clearly documented in the patient's electronic records and made accessible to all those caring for the patient to ensure continuity of care.
- A collaborative, multi-disciplinary, inter agency approach is taken to meet all the needs of patients with or 'At risk' of lower limb ulcers developing.
- Patients, staff and carers should have access to the equipment and resources necessary to deliver quality care.
- Monitoring of ulcer healing rates and recurrence rates as an indicator of quality care should be undertaken regularly.

7.0 Dissemination

This document is available to all staff on the Trust Intranet site. The recommendations have been incorporate into the virtual training programme for lower limb care.

8.0 DEFINITIONS: Lower limb wounds

Leg ulceration

A wound on the leg is defined as a wound that originates on or above the malleolus. It should be noted that a **"leg ulcer" is not a diagnosis** but a manifestation of the underlying disease process, which requires diagnosis if the correct treatment pathway is to be selected. Seventy percent of lower limb ulcers are caused by venous disease, 10 per cent are caused by peripheral arterial disease and the remaining of 'other causes for example mixed aetiology, trauma, lymphoedema, oedema, vasculitis or immunological disorders.

Foot ulceration

A foot ulcer is a break of the skin of the foot (below the malleolus) that includes minimally the epidermis and part of the dermis. Foot ulceration is also an issue of concern. People with diabetes are 23 times more likely to have a leg, foot or toe amputation than someone without diabetes, and both ulceration and amputation are associated with high mortality. The growing burden of diabetes and its complications has led to a national diabetes strategy with examples of significant regional service transformation. However, over half of all major amputations are in patients who do not have diabetes

9.0 ASSESSMENT

All lower limb ulcers have an underlying cause and an accurate diagnosis is essential to determine the appropriate treatment pathway. **A full clinical history and physical examination should be conducted for a patient presenting with either their first or recurrent lower limb ulcer and assessment should be ongoing thereafter.** The assessment of the patient and diagnosis of the cause of ulceration **should be undertaken by a health care professional trained in leg ulcer management within 14 days of referral** and include the following information

9.1 Demographic Details

- Date and time of initial assessment
- Name, address, NHS number, contact telephone number, date of birth
- District/Community/ Clinic nurses name, contact details
- GP's name, address, telephone number

9.2 Current Leg ulcer treatments and investigation

- Allergies/skin sensitivities and medication
- Include any pathology test results
- Results of investigations; Vital signs, BMI, recent blood results

9.3 Medical History

- Past & Current medical history: e.g. Diabetes mellitus. Tick box as appropriate
- Anaemia
- Deep vein thrombosis (DVT) in the affected leg
- Phlebitis of the affected leg
- Number of pregnancies
- Obesity
- Past surgery: including past venous & arterial operations
- Past fractures of the legs and lower limb orthopaedic operations
- Any prolonged periods of bed rest i.e. more than 4 days
- Smoking & alcohol history
- Nutritional and hydration level
- Family history including leg ulceration, varicose veins, heart disease, stroke, diabetes etc.
- Medications

9.4 Pain

- Patient reported pain using a 1-10 scale with 10 being the most pain.
- Constant or intermittent
- Day or night
- At dressing change

- What helps the patients
- Impact of the ulcer on the patients quality of life

9.5 Nutritional Assessment

- All patients should be screened for 'risk of' or actual malnutrition, and be advised on a well-balanced diet in accordance with their wishes. Use of MUST tool recommended.
- Patients considered as 'malnourished', or 'at risk' of malnutrition should be managed according to local and national guidance.
- Nutritionally compromised patients who have wounds may have an increased dietary need and a referral to a Dietician should be considered for further assessment, advice and supplementation.
- Weight, height and body mass index (BMI) should be recorded at initial assessment and then regularly throughout the treatment phase.

9.6 Ulcer History

- How the ulcer(s) started
- Duration of ulcer(s) past and present
- Number of episodes of ulceration
- Time to healing in previous episodes
- Ankle movement
- Measurement of ankle circumference

9.7 Assessment of the ulcer and surrounding skin

- Site of ulcer(s) - position on the leg. For example: medial, lateral, anterior, posterior, within the gaiter area, on the foot, over the malleolus etc.
- Size of ulcer(s) – record maximum length by maximum width in centimetres. This should be recorded on the Wound Assessment Form in the patient's electronic notes and should be repeated and compared with previous measurements every 4 weeks.
- Photographs should be taken on initial assessment and every four weeks with the patient's consent. Verbal consent can be obtained for record keeping purposes. Please use the Trusts consent form for photographs that will be used for Product evaluations, teaching or publication purposes and upload the consent and photograph to the patients electronic records and delete from the camera. Refer to wound management guidelines for more information.
- Verbal consent can be obtained for photographs used for wound monitoring and evaluation, triage and for providing information to the Tissue viability team for virtual advice
- Presence or absence of odour and exudate including colour and volume.
- Appearance of wound bed including colour i.e. black/grey/green/yellow/red/pink.
- Type of tissue i.e. necrotic, sloughy, purulent, granulating, epithelialising, infected.
- Clinical observations and changes to the ulcer bed and edges should be documented at each dressing change.

9.8 Condition of the Legs

- Shape of leg. For example: inverted champagne bottle, thin or normal shaped
- Presence of oedema. If yes is it pitting? How far up the leg does the oedema extend? Is this caused by heart failure, prolonged limb dependency or lymphoedema?
- Varicose veins, superficial veins, ankle flare, atrophie blanche
- Temperature of skin along leg length including foot
- Skin condition. For example: dry skin, eczema, broken areas, brown staining, red and inflamed areas, lack of hair, shiny skin, capillary refill (more or less than 3 seconds), scars on the leg.
- Foot condition. For example: discolouration of toes or feet (white, bluish, red), number of toes, thickening of toenails.
- Foot pulses - present or absent, can they be felt or heard using Doppler ultrasound? How many pulse sounds can be heard? triphasic, biphasic or monophasic

- Ankle movement - full/restricted movement or fixed ankle joint?
- Walking ability - full/restricted/with aids - is the movement heel to toe to move calf muscle pump?
- Ankle and calf measurements (cm)

9.9 Investigations: Ankle Brachial Pressure Index (ABPI)

Measurement ABPI using MESI or a hand held Doppler ultrasound should be taken during the initial assessment.
ABPI assessment is not intended for the diagnosis of venous disease, but rather for exclusion of significant arterial disease and therefore confirmation of safe practice (i.e. to confirm that use of compression treatment is safe). Measuring ABPI provides an assessment of the patient's peripheral arterial system.

- Patients do not need to rest before the procedure if using the MESI device but should lie still during the procedure
- The MESI device will calculate the ABPI which will be displayed on the screen.
- If using a hand held Doppler the patient should have rested, as flat as possible, for at least 20 minutes. Inaccurate readings will occur if the patient sits up or the legs are dependent or very oedematous.
- Ankle systolic pressure: locate, obtain and document pressure readings from all pulse points if possible and use the highest reading in each foot to calculate ABPI. Pulses to identify: Dorsalis Pedis and Posterior Tibial.
- Brachial systolic pressure - using the Doppler ultrasound to take readings from both arms and use the highest reading when calculating ABPI.

The ankle brachial pressure index (ABPI) provides an index of vessel competency by measuring the ratio of systolic blood pressure at the ankle to that in the arm, with a value of 1 being normal. Measurement of the ABPI should be undertaken by an experienced operator using validated equipment

- ABPI ratio less than 0.5 suggests severe arterial disease. Refer the person to vascular services. Compression is contraindicated
- ABPI greater than 0.5 to less than 0.8 suggests the presence of arterial disease or mixed/venous disease. Refer the person for vascular assessment. Reduced compression may be suitable but only under the supervision of the specialist team with strict supervision.
- ABPI between 0.8 and 1.3 suggests no evidence of significant arterial disease. Compression may be safely applied in most people.
- For people with cardiac failure, consider seeking specialist advice as there may be a risk of fluid overload if not closely monitored.
- ABPI greater than 1.3 may suggest the presence of arterial calcification, such as in some people with diabetes, rheumatoid arthritis, systemic vasculitis, atherosclerotic diseases, and advanced chronic renal failure. Please seek advice from specialist services. Compression therapy should be used with caution in people with diabetes, who may have unreliable ABPIs due to arterial calcification as well as an underlying sensory neuropathy
- ABPI values should always be interpreted in the context of signs and symptoms,for example, if it is within the normal range but the person has symptoms of peripheral arterial disease (such as intermittent claudication or rest pain), consider vascular referral
- There is no consensus among guidelines on the frequency of repeat ABPI measurements. Ideally studies should be repeated every 6-12 months (or earlier if clinically indicated)

NB: ABPI readings indicate strength of arterial blood flow to the foot. A common misunderstanding among inexperienced staff is that ABPI readings between 0.8 and 1 indicate the ulcer is venous in origin. This is incorrect. The range represents the arterial strength required to apply compression therapy if clinically indicated

The National Wound Care Strategy Programme recommendations suggest that a **minimum data set** that needs to be collected as part of the lower limb assessment to include the following information (Appendix 1)

The assessment should be documented on the patient electronic notes under assessment templates. All ulcers should fit into one of the following categories and associated treatment pathway:

- Venous ulcer: simple or complex (see Appendix 2 and 3)
- Arterial ulcer
- Mixed aetiology ulcer
- Diabetic Foot ulcer – (Neuropathic, ischaemic)
- Traumatic
- Rheumatoid
- Vasculitic.
- Unknown

9.10 Immediate and Necessary Care

The NWCSP lower limb recommendations recommend immediate and necessary care where 'RED FLAGS' have been identified including

- Acute infection of leg or foot (e.g. increasing unilateral redness, swelling, pain, pus, heat)
- Symptoms of sepsis
- Acute or chronic limb threatening ischaemia
- Suspected deep vein thrombosis (DVT)
- Suspected skin cancer

Action: Treat infection and immediately escalate. For people in the last few weeks of life, seek input from their other clinicians. People with leg and foot wounds with red flag symptoms should not be treated with compression.

10.0 On- going care and review

All patients should be re-assessed at each dressing change to review effectiveness of their treatment plan and escalate any concerns. Assess for a reduction in wound size and document using wound measurement and photography every 4 weeks. People with wound that show no significant progress towards healing at 12 weeks or are deteriorating should be escalated to the tissue viability service. Where possible, self-care should be encouraged and supported.

10.1 Repeat ABPI measurements

There is no consensus among guidelines on the frequency of repeat ABPI measurements. Ideally studies should be repeated every 6-12 months (or earlier if clinically indicated)

- An ulcer is deteriorating
- Patient presents with ulcer recurrence
- Before commencing compression therapy
- Patient is to commence wearing compression hosiery as a preventive measure
- There is a sudden increase in ulcer size
- There is a sudden increase in ulcer pain
- Foot colour and/or temperature of foot changes
- Ongoing assessment at 3, 6 or 12 months depending on initial and ongoing assessment outcomes, cardiovascular risk profile and patient needs (NICE 2020).

11.0 WOUND & SKIN CARE

11.1 Wound Cleansing

- Clean the ulcer, where necessary, with UCS cleansing and debridement wipes. These are available in a box of 10 sachets PIP code: 384-4271.If not available use warmed (body temperature) tap water or sterile 0.9% sodium chloride. In most cases tap water will be suitable, but should be assessed on an individual basis. Consider: patient comfort, quality of tap water, environment, equipment available, the need to cleanse surrounding skin, volume needed, moving

and handling of loads (buckets).

- If patients wish to shower Limbo Waterproof protectors can be prescribed. Please refer to the Trusts Wound Management Formulary 2018.
- Other antiseptic cleansing solutions may be recommended for wounds with infection or at high risk from infection. However these should not be used routinely. Please refer to the Trusts Wound Management Formulary 2018 and or seek advice from the tissue viability service.
- Use the No Touch Wound Dressing Technique to prevent cross infection. Universal precautions should be maintained. Hands should be washed before and after using gloves and between patients.

11.2 Care of the Skin surrounding the ulcer

- Dry skin should be moisturised with bland emollients. For example: 50:50 liquid paraffin and white soft paraffin, Zerobase or Epaderm. Please follow local guidelines on emollient formulary and guidelines (May 2015). The dryer the skin the more 'greasier' a preparation and more frequent application is required. Emollients containing petroleum should be used with caution due to the risk of fire.
- Varicose eczema may benefit from the topical application of steroid ointment or cream, which may reduce inflammation and limit the spread of skin breakdown. It should be noted that topical steroid therapy should **only** be applied to eczematous skin and not the ulcer. Use a cream for wet eczema and an ointment for dry eczema. Apply amount according to size of surface area affected. For example: 1 fingertip unit to cover the surface area equivalent to that of two adult hands and use the appropriate potency for the severity of the eczema.
- The surrounding skin should be protected from wound exudate, which may cause excoriation and/or maceration by using dressings that absorb exudate and skin protectors. Please refer to the Trusts Wound Management Formulary 2016.
- If skin problems persist please consult the patients GP for onward referral to dermatology services.

11.3 Contact Sensitivity

Patients can become sensitised to elements of their treatment at any time. The most common sensitizers include lanolin, perfumes, preservatives; natural rubber latex and topical antibiotics and these should be avoided. Patients with suspected sensitivity reactions should be referred to a dermatology specialist to identify the allergen. After patch testing, identified allergens must be documented; avoided and medical advice on treatment should be sought.

11.4 Debridement

Wounds may be covered by a combination of sloughy or necrotic tissue, fibrin, exudate and dressing residue, which can harbour bacteria, increase the risk of infection and can delay healing by prolonging the inflammatory response. Therefore, it is important to remove devitalised tissue and excess exudate to promote healing. This may be achieved through autolysis, chemical or enzymatic or mechanical debridement.

Debridement methods include:

- Autolysis debridement using dressings such as: hydrogels, hydrocolloids, hydrofibres and foams.
- Mechanical debridement: use of debridement wipes and pads e.g. debrisoft
- Enzymatic debridement.
- Bio-surgery otherwise known as sterile larvae (maggots).
- Sharp debridement: using a blade or scalpel, but this must only be undertaken by a healthcare professional with specific training. Please seek advice from the tissue viability service
- Surgical excision: performed by a surgeon in sterile conditions

NB: Decisions about debridement method should be made by a registered health professional that has undergone appropriate training and demonstrated competence.

11.5 Infection

NICE (2020) guidelines for leg ulcer infection: antimicrobial prescribing, recommend only giving antibiotics for adults with a leg ulcer when there are symptoms or signs of infection (for example,

redness or swelling spreading beyond the ulcer, localised warmth, increased pain or fever).First choice oral antibiotic is Flucloxacillin 500mg to 1g four times a day for 7 days. Please see NICE guidelines for those who are unsuitable for Flucloxacillin. Do not take a sample for microbiological testing from a leg ulcer at initial presentation – consider sending a sample (after cleaning) if symptoms or signs of the infection are worsening or have not improved as expected within 2-3 days of starting antibiotics. For treatment of local wound infection follow the recommended antimicrobial dressings in the wound care formulary 2018.

11.6 Dressings

There is little evidence to support that any individual dressing is more effective in healing leg ulcers. The underlying cause **must** be addressed. For example: venous hypertension, arterial insufficiency. However, the following principles should be considered when choosing a dressing:

- easy to apply and remove without causing trauma or pain
- able to cope with various amounts of exudate
- able to mask or minimise odour
- hypo-allergenic
- Low or non adherent. Avoid adhesive dressings or tape on the skin. Tubular bandages (e.g. Actifast) or cotton bandages may be used to retain non-adhesive dressings in place without the need for adhesive tape.
- Be cost effective
- Acceptable to the patient

NB: Antimicrobial dressings e.g. silver dressings should only be used when the wound is infected and should be used for no longer than 14 days (2 week challenge). If the problem has not resolved please refer to the tissue viability service.

12.0 DIFFERENTIAL DIAGNOSIS, AETIOLOGY & MANAGEMENT

12.1 Venous Ulcer Aetiology

The major cause of leg ulcers in the UK is chronic venous hypertension. The following checklist can be used to identify patient risk factors and presenting signs and symptoms for venous leg ulceration.

Checklist for patient risk factors that may contribute to developing a venous leg ulcer (NHS, 2016)

■ Obesity or being overweight – this increases the hydrostatic pressure in the veins of the lower limb and abdomen
■ Issues with mobility and/or walking – this compromises the activation of the calf muscle pump, which aids venous return
■ Previous deep vein thrombosis (DVT) – blood clots in the deep venous system can result in damage to the valves in the veins, which will affect venous return
■ Varicose veins – swollen and enlarged veins caused by malfunctioning valves
■ Previous injury to the leg, such as a broken or fractured bone, which may cause DVT or impair walking
■ Previous surgery to the leg, such as fractures or flap surgery, which can cause damage to the veins, lymphatics, ankle mobility and gait
■ Increasing age – people find it harder to move around as they get older, particularly if they suffer from arthritis
■ Chronic oedema – associated with inflammatory processes, and compromises skin and tissue condition
■ Familial history of VLUs
■ History of intravenous drug use

Venous ulcers are usually situated within the gaiter area of the leg and are more prevalent over the malleoli (ankle bones). Varicose veins may be apparent and the skin may feel hard and indurated in texture. There may be red/brown staining of the skin due to leakage from red blood cells (hyper-pigmentation), ankle flare (distension of veins around the malleolus and foot), atrophie blanche (loss of pigment in the skin due to capillary infarction) and venous eczema.

Patients with venous insufficiency should be referred to vascular services for assessment for venous surgical/endovenous interventions (NWCSP 2020).

Venous leg ulcers can be further classified as simple or complex based on their duration, size and complexity

12.1.1 Simple Venous Leg ulcer

- Venous leg ulcer(s) with ABPI greater than 0.8 and less than 1.3
- Wound area is less than 100 cm2
- Ulcers will not have been present for more than 1 year

12.1.2 Complex Venous Leg Ulcers

- Venous leg ulcer with ABPI greater than 0.8 and less than 1.3
- Wound has been present for more than 1 year on first presentation to the service
- Patient has Lymphovenous disease (in some circumstances this comorbidity will not necessarily result in a classification of complex and will be agreed with providers/local health economy)
- Patient has current infection and/or has history of recurrent infections
- Patient has elevated protease activity – use wound diagnostics tool if available
- Wound area is greater than 100 cm2
- Patient has history of non-concordance
- Wound has failed to reduce in size by 20 - 40% despite best practice at 4 weeks

Venous ulcer prevalence increases with age as does the prevalence of peripheral arterial disease (PAD), therefore, older patients with predominantly venous ulcers may also have arterial insufficiency. These ulcers are termed "Mixed aetiology" (See section 12.5).

12.2 Venous Ulcer Management

- The first line treatment for uncomplicated venous ulcers is graduated compression therapy. The following compression bandages are recommended for use in East London Foundation Trust.
- K2 compression bandage – multicomponent system
- 4 layer compression bandage
- Short stretch bandage
- Compression hosiery kits/Compression hosiery with a foam dressing
- Compression wraps

Compression Bandage Systems and Hosiery Kits/Wraps			
4-Layer	**Ankle pressures (18-25cm)**	**Application**	**Examples**
1. Sub-compression wadding	-	Spiral To protect bony prominences	Profore1
2. Crepe	-	Spiral No stretch	Profore 2 Hospicrepe
3. Light compression	@ 17 mmHg	50% overlap & 50% stretch Figure 8 application	Profore3 Elset
4. Cohesive bandage	@ 23 mmHg	Elasticised bandage. 50% stretch & 50% overlap Spiral Use with sub-compression wadding	Profore4 Coban
Multicomponent bandages	K-Tech K-Press	Short stretch- gives 80% of the pressure Long stretch gives 20% of the pressure	Urgo KTwo

		50% overlap for 40mgHg and use of pressure indicator to achieve correct pressure. Oval becomes a circle	
Short stretch bandages	Pressure when moving calf muscle 40mmHg	Inelastic bandage Use with sub-compression wadding	Actico
Compression hosiery kits	25mmHg – 40mmHg	Liners or understocking Overstocking	Mediven Activa Hosiery kits
Compression wraps	Up to 40mmHg	Colour coded Velcro overlap 50%	Activa Ready Wrap

- Chose a compression system that supports the patient to self-care when possible such as hosiery kits and wraps. When oedema is present in the leg or the patient is not suitable for kits/wraps use a multi-component compression bandage systems e.g. KTwo as first line intervention. Compression bandages should be changed once a week, however more frequent application may be required if the ulcer is exuding heavily or infection is present. Graduated, multi-component, high compression systems aim to provide 40 mmHg of pressure at the ankle decreasing gradually to 20 mmHg at the knee if applied according to manufacturers' instructions on a leg with a normal shape and regular size ankle (18-25cm).
- If the ankle circumference is < 18cms or > 25cms please use the recommended kits or number of layers of bandage e.g. Profore plus or two layers of short stretch bandage
- If no improvement is seen within **two weeks with compression therapy** (NICE 2021) refer to the Tissue Viability Service for re-assessment and advice. Further referral to the vascular team may be required.
- Ankle, Brachial Pressure Index (ABPI) readings must be taken on all patients prior to the application of compression therapy.
- The ABPI should be between 0.8 and 1.3 and the limb should be adequately padded to prevent pressure damage. If the ABPI is less than (<) 0.8 but greater than (>) 0.7 reduced compression may be indicated, but only under the recommendation of the Vascular team/Tissue Viability and should be used with caution by experienced practitioners. Please refer to tissue viability for further advice.
- Patients/carers/practitioners are advised to observe for loss of colour, movement, sensation or increasing pain levels in compressed limbs. If observed the patient should be advised to remove the compression layer(s) and call for assistance from the nursing team.

NB: Decisions to use compression therapy should be made by a registered health professional that has undergone appropriate training and demonstrated competence. Healthcare professionals should have completed the Trust competency assessment and be deemed competent by team leaders in applying compression therapy.

12.3 Arterial Ulcer Aetiology

About 10 per cent of leg ulcers are caused by arterial occlusion, which causes deprivation of oxygen and essential nutrients to the skin. The prevalence of PAD increases with age and smoking exacerbates the condition; therefore, patients should be advised to stop smoking. Arterial ulcers can be found on the foot or the lower leg and are usually small (but may be larger) and are described as having a 'punched out' appearance and may contain sloughy or necrotic tissue. The leg may be cold and pale or deep red, blanching when elevated to approximately 45 degrees from level and slowly recovering its colour when lowered. Capillary refill time is more than three seconds when a toe is squeezed lightly. The patient may complain of pain when walking, which subsides with rest (intermittent claudication. Also, the patient may complain of pain when the limb is elevated, which resolves when lowered. Arterial ulcers are often more painful on elevation, and as a result these patients often sleep in a chair or get up frequently in the night to walk about. The skin on the leg may be shiny and hairless and the toenails may have become thickened, owing to lack of nutrient diffusion from poor blood supply.

12.4 Arterial Ulceration Management

- Patients who have critical limb ischaemia or ischaemia pain **must not** have compression therapy.
- Refer to a vascular services to establish the location and extent of the occlusion or the presence of small vessel disease and to advise on surgical intervention
- If ABPI is less than 0.7 and the patient shows signs and symptoms of claudication ask for an "URGENT" referral.

12.5 Mixed Aetiology Ulceration

A percentage of leg ulcers show signs and symptoms of both arterial and venous disease and are termed "mixed aetiology". For example: signs of venous hypertension may be present but the arterial blood supply may be lower than normal.

12.6 Mixed Aetiology Ulcer Management

- If ABPI is below (<) 0.8 but greater than (>) 0.7 and the patient does not show signs or symptoms of claudication then reduced compression may be used cautiously under the supervision of the vascular team. This should only be applied by registered clinicians experienced in compression application and leg ulcer management, and with close observation for compromised circulation.
- If ABPI is less than (<) 0.7 and the ulcer is not healing, this indicates significant arterial disease and a referral to a vascular surgeon for assessment is indicated.
- If ABPI less than (<) 0.6 and the patient show signs and symptoms of arterial disease the referral should be marked as "URGENT".

12.7 Wounds on the foot

Foot wounds can be due to different underlying causes, but amputation is a risk for many of these causes, especially in people with diabetes mellitus. People with foot wounds are at high risk of infection and other complications. A multi-disciplinary team (MDT) approach to care is essential. All foot ulcers should be referred to Foot Health services for assessment and identification of contributing causes. People with foot ulcers and diabetes should be referred to a specialist diabetic foot podiatrist and care provided in line with NICE (2019) guidelines for diabetic foot problems.

There are 2 main types of diabetic foot ulceration:

- **Neuropathic ulcers**
- **Neuro- Ischaemic ulcers**

12.7.1 Neuropathic Ulcers.

Damage to the nerves in lower limbs can lead to physiological changes and loss of sensation in the feet, which increases the risk of developing foot ulcers. Neuropathic ulceration is associated with callus formation and occurs on the plantar surface of the foot, on bony pressure points. The skin is usually warm and dry, pulses are palpable but sensation is impaired. The ulcer may be painless but can penetrate to bone. The presence of neuropathy should be tested using a 10g monofilament and patients should be referred to a Podiatrist for ongoing sharp debridement of the callus, toe nail cutting, for foot wear assessment and education.

12.7.2 Neuro-ischaemic Ulcers

These may be painful, but depends on the degree of neuropathy present. The skin may be cold, pulses may be absent and ulcers may be seen on the tips of toes. Sensation is often impaired and there may be evidence of claudication. The patient should be referred urgently to a vascular surgeon for assessment and care in line with NICE guidelines for peripheral arterial disease.

Diabetic foot ulcers are highly susceptible to infection and result in 5-15 per cent of people needing lower extremity amputation. Therefore, medical advice should be sought immediately if infection is suspected. In addition, the normal signs of infection (redness, warmth, inflammation and pain), may be absent or diminished therefore wound swabs for MC&S, should be taken without other clinical signs of infection being present, especially if the ulcer is on the foot. All diabetic patients and their carers should be taught how to inspect their feet daily for trauma and signs of infection.

12.8 Management of ulcers in patients with Diabetes Mellitus

All patients with diabetic foot ulceration who have a limb-threatening or life-threatening diabetic

foot problem they should be referred immediately to acute care to the multidisciplinary foot health team in consultation with their General Practitioner. Examples of life-threatening diabetic foot problems include

- Ulceration with fever or any signs of sepsis
- Ulceration with limb ischaemia
- Clinical concern that there is a deep-seated soft tissue or bone infection (with or without ulceration)
- Gangrene (with or without ulceration)

For all other active diabetic foot problems refer the patient within one working day to the Foot Health Service for triage within one further working day.

12.8.1 Foot Health Service

The foot health service will work in conjunction with other services to offer one or more of the following for treating diabetic foot ulcers

- Offloading
- Control of foot infection
- Control of ischaemia
- Wound debridement
- Wound dressings

Liaise with the podiatrist and follow the recommended treatment plan. Debridement should be carried out by the specialist podiatrist. Negative pressure wound therapy should be considered after surgical debridement for diabetic foot ulcers, on the advice of the multidisciplinary foot care service (NICE 2016)

12.10 Malignant Ulceration

Malignancy is a rare cause of ulceration and more rarely a consequence of chronic ulceration but the possibility should not be overlooked. Malignancies may include: - squamous cell carcinoma, basal cell carcinoma and malignant melanoma. Some characteristics of malignant ulcers are displayed in Table 2.

Table 2. Characteristics of malignant ulcers

Type	Characteristics	Presentation	Referral Pathway
Basal Cell Carcinoma	• common, slow growing • locally invasive	• red/brown • dome shaped nodule • central ulceration • raised rolled border • Translucent pearly appearance	• refer to dermatologist for biopsy and diagnosis
Squamous Cell Carcinoma	• aggressive, malignant tumour • rapid deterioration	• opaque, skin coloured • fleshy papules, nodules or plaques • scaly • may have friable surface	• refer **urgently** to dermatologist for biopsy and diagnosis
Malignant Melanoma	• malignant growth of pigmented cells	• change in appearance of existing mole • fragile • inflamed border • may bleed or discharge fluid	• refer **urgently** to dermatologist for biopsy and diagnosis

12.11 Management of Malignant Ulceration

All ulcers suspected to be in this group require **urgent** referral to Dermatology services for biopsy, diagnosis and treatment in collaboration with the patients General Practitioner.

12.12 Ulceration in People with Rheumatoid Arthritis

Leg ulceration is common among people with rheumatoid arthritis and this group is at very high risk of developing coronary arterial disease and peripheral vascular disease, even if they have never smoked. Therefore, they should be referred to a vascular consultant for assessment. The underlying aetiology in this group is thought to be a combination of:

- local vasculitis
- poor venous return due to immobility of the ankle joint
- Debilitating effect of prolonged steroid therapy on the skin.

The ulcers appear:

- deep and well demarcated
- punched out
- very slow to heal
- Often situated on the calf or dorsum of the foot.

NB: Patients with rheumatoid arthritis may also develop ulcers associated with other diseases so a full holistic assessment is required prior to diagnosis.

12.13 Vasculitic Ulcers

Ulcers caused by vasculitis tend to appear suddenly and deteriorate rapidly and are slow to heal. They may present as multiple, small, 'punched out', painful ulcers. Vasculitic ulcers are also associated with other, less common, inflammatory connective tissue disorders, or rarely may be caused by reactions to medications.

12.14 Management of Rheumatoid / Vasculitic Ulcers

The treatment is usually systemic steroid therapy, moist interactive wound dressing and non-compression bandages. If vasculitic ulcers are suspected, the patient should have a medical and vascular assessment as soon as possible, vasculitic blood screen with potential wound biopsy.

12.15 Uncertain Diagnosis

If there is any doubt about the aetiology of an ulcer the patient should be referred, to the appropriate specialist.

13.0 PREVENTION OF VENOUS ULCER RECURRENCE

Venous ulceration is associated with a high rate of recurrence; unless the underlying venous disease can be improved surgically. Therefore all patients whose venous ulcer has healed should have an individualised prevention of recurrence programme and referral back to their GP for onward referral to vascular services for investigations and suitability for surgery.
Programmes should include:

- **Compression Hosiery** - usually for the patient's lifetime
- **Regular ABPI readings** to exclude arterial insufficiency: Three monthly for patients with: diabetes, immobility, previous ABPI of less than 0.9 and for those who develop symptoms of claudication. 6-12 monthly for mobile patients with no signs or symptoms of arterial disease. As a general rule the ABPI should be repeated when the patient is measured for new hosiery (usually every six months but see each manufacturer's instructions for details).
- **Limb measurements** - use a disposable tape measure for each patient to prevent cross infection, these are available from NHS Logistics Authority catalogue. Record limb measurements in centimetres and document in the patient's notes.
- **Ankle circumference** - taken just above the malleolus at the narrowest point while the patient is standing or has their foot flat on the floor.
- **Calf circumference** - taken at the widest point while the patient is standing or has their foot flat on the floor.
- **Foot length** - taken from tip of great toe to heel, for closed toe hosiery and from the base of the toes to the heel for open toe hosiery. Measure while the patient is standing or has their foot flat on the floor. Open toed hosiery is recommended when the patient: requests them, wants to wear a sock on top, has arthritic or misshapen toes, needs to use certain application aids, (for example, a Chinese slipper), requires podiatrist care or has a fungal infection.

- **Below knee length** - taken from just below the back of the knee to the base of the heel, while the patient is standing or has their foot flat on the floor.
- **Thigh circumference** (for thigh length hosiery) - taken at the widest point while the patient is standing.
- **Length of the leg** (for thigh length hosiery) - taken while the patient is standing. Thigh length hosiery is usually advised where varicose veins extend above the knee, or when oedema accumulates above the knee joint or arthritic changes to the knee increase discomfort from below knee hosiery.
- All leg measurements should be taken after a period of elevation, directly on removal of compression bandaging and preferably just as the patient gets out of bed, before oedema can develop.
- Measure legs separately if compression hosiery is required for both legs.
- Patients should be advised to apply the hosiery before they put their feet to the floor in the mornings, before oedema can develop.
- If not already in use, patients with oedema may require treatment with compression bandages prior to measurement and fitting of compression hosiery.
- **Condition of skin** - the skin on the lower leg should be checked regularly by the patient or carer, for; dry skin, varicose eczema, ulcer recurrence, pressure damage from compression, oedema. Patients/carer should be shown how to maintain basic skin care such as washing with a soap substitute and using an emollient regularly to prevent dryness, itching and skin cracking. Patients/carers should be advised to apply creams or ointments in downward strokes to prevent the product accumulating at the base of the hair shaft, reducing the risk of folliculitis. Products containing perfumes, lanolin or preservatives should be avoided as these can cause sensitivities, irritation or allergy. Oil-based emollients should be avoided as these can accumulate and damage the material.
- **Condition of feet** - a podiatrist or orthotist may be required if specialist footwear or nail care is indicated.
- **Allergies or contact sensitivities** - ask the patient about allergies to products such as natural rubber latex, nylon, Lycra, perfumes, emollients etc.
- As compression hosiery must be worn every day to be effective it is important to involve the patient in the decision making process, this includes which stocking, style and colour they prefer. This may increase concordance.
- Depending on the patient/carers abilities the hosiery may be removed at night and reapplied in the morning or worn for a period of up to 7 days.
- **Patient education** - including skin care, how to apply and when to remove hosiery, how to launder hosiery, leg and foot exercises, mobility, leg elevation when not mobilising, when and who to contact at the first sign of ulcer recurrence and when the hosiery is damaged or due for replacement.
- Vascular referral - for investigations such as colour venous duplex studies and surgery if appropriate. Developments in venous surgery have reduced the need for general anaesthesia and hospital admission.

13.1 Compression Hosiery

Ready-made hosiery is available on FP10; however, for patients with limb sizes outside the ranges, hosiery can be made to measure and is also available on FP10.

13.2 Classification of Compression Hosiery

There are a number of classification systems for compression hosiery. RAL hosiery offers higher pressures and is the recommended first choice. However some patients may not be able to tolerate higher pressures and therefore British class hosiery offers an alternative.

TITLE	AVAILABLE	STRENGTHS	FEATURES
Support Hosiery	Retail Shops	Less than 10mmHg.	Non-Medical
Anti-Embolism Stockings	Hospitals, for DVT Prophylaxis	Thrombexin 18® 16 – 18 mmHg.	For patients pre, peri & post surgery.
Travel Socks	Over the Counter or Direct from medi UK	mediven® travel 20 mmHg. (medi is clinically proven)	For travel on planes, trains, cars, coaches and long journeys.
British Standard Hosiery	FP10 Prescription	cl 1 14 – 17 mmHg cl 2 18 – 24 mmHg cl 3 25 – 35 mmHg	Clinically effective for up to 3 months. 4 sizes. Lower Limb only.
RAL Standard Hosiery	Hospital Prescription Appliances/Orthotics Vascular Specialist Available on FP10	mediven® cl 1 18 – 21 mmHg cl 2 23 – 32 mmHg cl 3 34 – 46 mmHg cl 4 over 49 mmHg	Clinically effective for up to 6 months. 7 off the shelf sizes/ custom made. Comprehensive range of styles and colours.

13.3 Advice on Prescribing Hosiery

- Article and brand name, for example: Medi compression hosiery Compression level: Class 1, 2 or 3.
- Length - below knee or thigh length
- Quantity - single or number of pairs, it is usual to have two stockings per leg, one to wash and one to wear.
- Size required - measure ankle, calf and foot to select appropriate size from manufacturers measuring guide.
- Open or closed toe.
- Colour - ask the patient as this may improve compliance. See manufacturer's guide.
- For made to measure hosiery: measure limb according to manufacturer's instructions, fill in made to measure form, attach form to prescription sheet requesting made to measure hosiery from the named company.

13.4 Advice on Fitting Compression Hosiery

Compression hosiery is not put on like ordinary socks, stockings or tights. If the compression stocking is gathered together in the typical 'doughnut' fashion, the effect of the elastic material is multiplied and it becomes hard to apply.

To apply correctly:-

- Insert a hand down the shaft of the stocking to the heel pocket only and turn stocking inside out.
- Position stocking over foot up to heel pocket position, pulling the garment as far along the foot as possible.
- Gradually unfold/peel the stocking up the leg from the top opening. The last piece of material to be fitted should be just below the knee or thigh.
- Hosiery should be applied with care to prevent skin trauma and damage to the hosiery. Using a tubular bandage as a liner may aid application e.g. Tubifast.
- The patient's ability to apply and remove the stockings should be assessed and application aids considered. For example, silk/nylon (Chinese/pixie) slipper, applicator frame (available from manufacturers).
- Patients unable to apply stockings will need assistance from a relative, friend or other carer who should be trained to apply the hosiery correctly.
- The patient/carer should be advised about how to care for the stockings and the information should be given verbally from the manufacturer's instructions as well as leaving the instructions for them to read. For example, wash in warm soapy water, let the stockings dry naturally away from direct heat and not over a radiator or near a fire, ensure nails and hands are free from snags to prevent ladders.
- Once the patient has been fitted with hosiery they should be followed up to check comfort, fit, skin condition and their ability to manage and level of compliance. It is also important to check that the hosiery is having the desired therapeutic effect.

- Patients should be advised to contact a named healthcare professional immediately if they have problems or concerns about the skin on their leg. Early intervention might prevent ulcer recurrence or deterioration.
- As a general guide, patients should be re-measured, re-Doppler and stockings replaced every 6-12 months (see manufacturer's instructions for details).
- Patients/carers should be supplied with an educational leaflet to reinforce any advice given verbally.

13.5 Potential Hazards of Compression Hosiery

- Pressure damage due to undiagnosed arterial disease or badly fitting hosiery.
- Friction or pressure damage due to ill-fitting hosiery. Usually seen over the tips and joints of toes, mid foot, medial and lateral malleoli, tibial crest or the anterior bend in the ankle
- Tourniquet effect caused by badly applied hosiery.
- Skin irritation or allergies.
- Compression hosiery should be used with caution when treating patients with diabetes mellitus or rheumatoid arthritis because these patients are susceptible to small vessel disease and compression could cause further occlusion and pressure necrosis.

14.0 EXERCISES

Poor mobility and fear of falling are common problems for older patients with leg ulceration. An assessment of the patient's ability to walk should be performed and documented. The problems may be due to oedema, pain, joint stiffness and obesity etc. It is important that a patient's mobility is maintained and improved, as this will aid venous return, by moving the calf muscle pump, in addition to reducing the risk of developing other problems associated with immobility (12). Patients should be advised to walk, where possible and, if able, perform ankle and foot exercises while sitting and standing. A referral to the physiotherapist may be indicated. When resting, those patients with venous disease and/or oedema should be advised to elevate their legs, with ankles slightly above hip level, rather than sitting with their legs hanging down. This may be more easily achieved by resting on a bed or sofa with pillows/cushions underneath the lower section of the leg. Foot stools are not recommended as they are generally not high enough to reverse venous hypertension and reduce oedema and they can increase pressure at the heel, which may increase the risk of pressure ulceration in this area for 'At Risk' patients.

15.0 EDUCATION & TRAINING

Health care professionals involved in the care of patients with leg ulcers should have attended training in leg ulcer management and be knowledgeable and skilled in the following areas;

- Pathophysiology of leg ulceration
- Leg ulcer assessment & differential diagnosis skills
- Use of Doppler ultrasound to measure ABPI
- Normal and abnormal wound healing
- Compression therapy - theory, management and application
- Dressing selection
- Skin care and management
- Health education
- Prevention of recurrence
- Criteria for referral for specialised assessment, including vascular services

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APPENDIX 1

MIMINUM DATA SET FOR LOWR LIMB ASSESSMENT

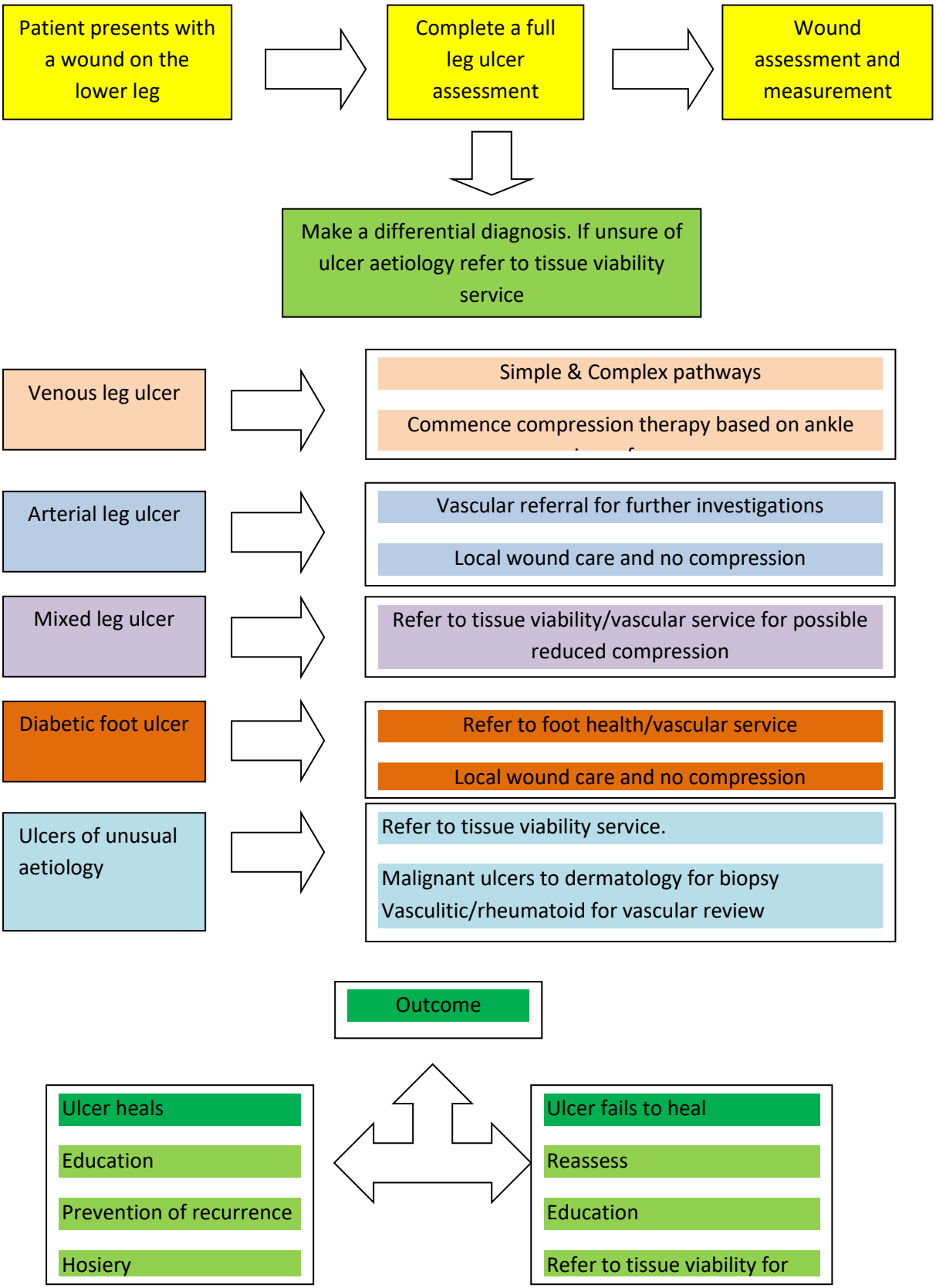
Minimum that should be documented in a Lower Limb Assessment

Domain	Data item
General Health Information	Risk factors for delayed wound healing Allergies Skin sensitives Impact of the wound on quality of life (physical, social & emotional Information provided to patients and carers
Wound baseline information	Number of wounds Wound location Wound type/classification Wound duration Treatment aim Planned re-assessment date
Wound assessment parameters	Wound size (maximum length, width and depth) Undermining/tunnelling Category (pressure ulcers only) Wound bed tissue type Wound bed tissue amount Description of wound margins/edges Colour and condition of surrounding skin Whether the wound has healed
Wound symptoms	Presence of wound pain Wound pain frequency Exudate amount Exudate consistency/type/colour Odour occurrence Signs of systemic infection Signs of local infection Whether a swab has been taken
Lower limb specific	Signs of venous disease Lower limb oedema (including ankle circumference) Joint mobility Assessment of arterial supply

APPENDIX 2

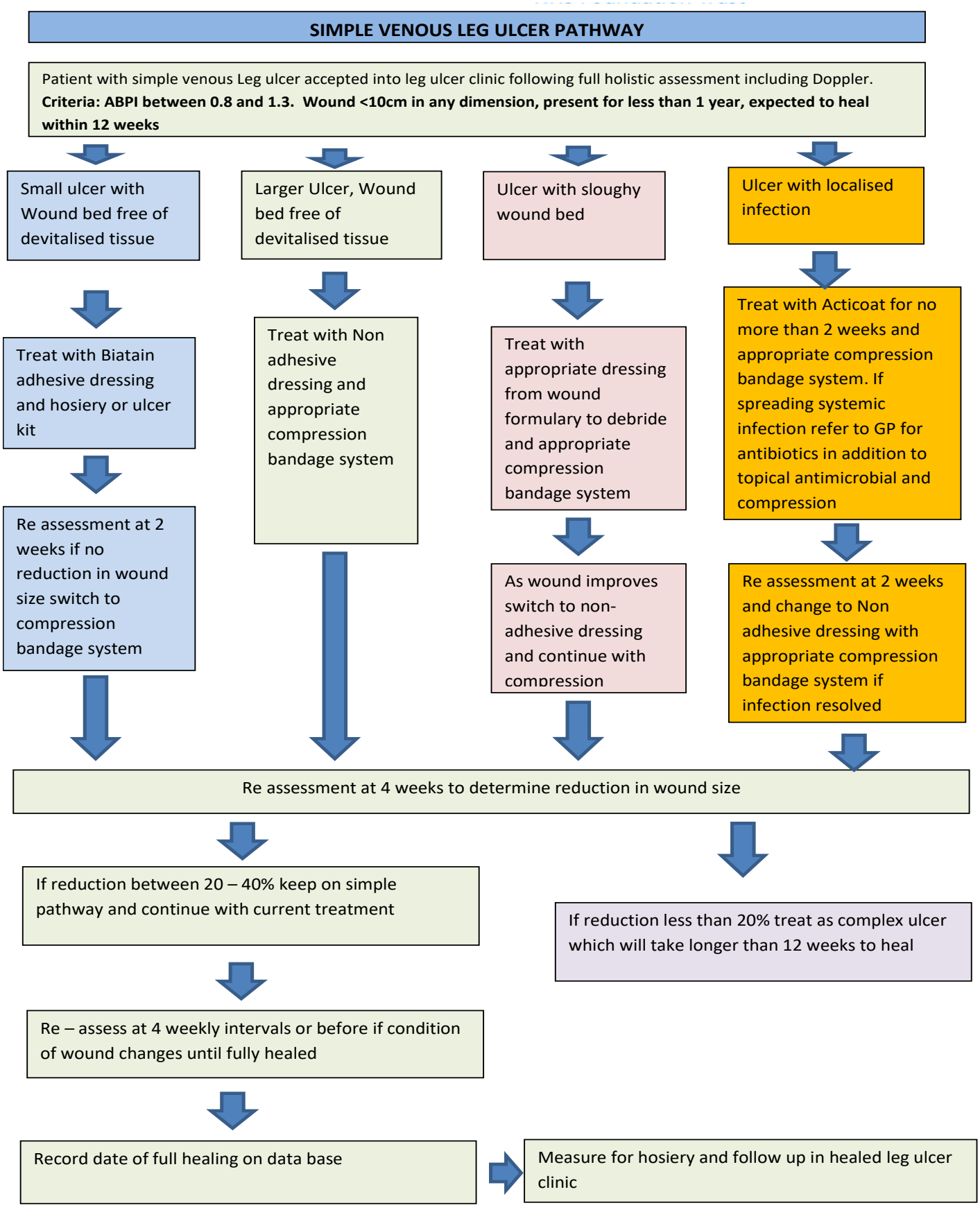
Pathway for the Management of Leg Ulcers

Pathway for the Management of Leg ulceration



APPENDIX 3

Simple Venous Leg Ulcer Pathway



APPENDIX 4
Complex Venous Leg Ulcer Pathway

COMPLEX VENOUS LEG ULCER PATHWAY

Patient with Complex venous Leg ulcer accepted into leg ulcer clinic following full holistic assessment including Doppler.

Criteria: ABPI between 0.8 and 1.3. Not expected to heal within 12 weeks and may have other comorbidities such as Diabetes or Rheumatoid arthritis. Ulcer presents with any or a combination of the following. Some degree of Lymphedema, Wound size > 10cm in any dimension, ulcer present for >1yr, recurrent infection, On the simple pathway and non-healing by 20-40% at 4 weeks or non-concordant with recommenced treatment plan

Ulcer, Wound bed free of devitalised tissue

Treat with Non adhesive dressing and appropriate compression bandage system

Ulcer with sloughy wound bed

Treat with appropriate dressing from wound formulary to debride and appropriate compression bandage system

As wound improves switch to non-adhesive dressing and continue with compression

Ulcer with localised infection

Treat with Acticoat for no more than 2 weeks and appropriate compression bandage system. If spreading systemic infection refer to GP for antibiotics in addition to topical antimicrobial and compression

Re assessment at 2 weeks and change to Non adhesive dressing with appropriate compression bandage system if infection resolved

Re – assess at 4 weekly intervals or before if condition of wound changes until fully healed

Record date of full healing on data base

Measure for hosiery and follow up in healed leg ulcer clinic

APPENDIX 5

Leg ulcer Competency Assessment Framework

Name: **Assessor:**

Locality/Ward: **Date Assessed:**

LEG ULCER COMPETENCY ASSESSMENT

	Leg Ulcer Care Competencies For Health Care Professionals LEG ULCER ASSESSMENT INCLUDING DOPPLER TO MEASURE ANKLE BRACHIAL PRESSURE INDEX (ABPI) COMPETENCIES					
Domain	**Competency**	**Competency indicator**	**Comment Reflection**	**Pass/ Not passed**	**Mentors signature**	**Date**
Patient assessment including Doppler	Can undertake a leg ulcer assessment	Demonstrates ability to explain the procedure to the patient. Carries out a full and detailed leg ulcer assessment using the recommended Trust guidelines and documentation/EMIS template Undertakes a Doppler assessment using the correct equipment: Probe, gel Demonstrates knowledge of appropriate position and rest time for the patient. Locate and identify appropriate pulses Distinguish arterial and venous blood supply. Distinguish normal and abnormal sounds Select correct readings to calculate ABPI and perform calculations and document findings. Assess the wound, the wound edges and peri-wound skin to include wound bed, wound size, location and duration. Measure ankle circumference to determine level of compression				
Diagnosis	Can make a differential diagnosis based on the assessment	Develop a care plan and discuss the care with the patient based on the results of the full leg ulcer assessment and Doppler results. Knows when findings are inconsistent and when to refer the patient				

	Leg Ulcer Care Competencies For Health Care Professionals LEG ULCER CARE AND TREATMENT INCLUDING COMPRESSION THERAPY AND PREVENTION					
Domain	**Competency**	**Competency indicator**	**Comment Reflection**	**Pass/ Not passed**	**Mentors signature**	**Date**
Leg ulcer/skin care and treatment	Can provide leg ulcer care consistent with recommended best practice	Explains the importance of leg ulcer cleansing and moisturising of the skin to the patient. Can cleanse the legs using UCS debridement pad or water with soap substitute. Follows recommended infection control procedures. Appropriately selects an emollient. Appropriate use of steroids according to prescription if appropriate. Can identify methods of wound debridement if required.				
Dressing selection	Can select an appropriate dressing	Ability to give rational for dressing selection based on exudate, pain, sensitivities and objective of treatment. Demonstrates knowledge of the Trusts wound care formulary when making dressing choice. Demonstrates knowledge of when to select an antimicrobial dressing. Documents dressing selection and review date.				
Compression therapy selection and application	Can select and apply the correct compression therapy	Discusses the compression therapy options with the patient and offers choice to include bandages, systems, hosiery kits or hosiery as appropriate. Provides the patient with information on the chosen compression therapy. Selects appropriate size/bandage/hosiery kit/compression system based on ankle and limb measurements. Can correctly apply the compression bandage/system/kit/hosiery based on manufacturer's instructions. Modifies the shape of the leg to ensure compression is				

		graduated from ankle to knee. Checks for accuracy after fixing bandage/system/kit/hosiery and for patient comfort. Gives patient information on how to contact the service if any concerns. Documents the care and procedure in the patients notes				
Prevention of recurrence	Can select and apply compression hosiery to prevent recurrence	Can articulate when the patient should be transferred into hosiery. Can measure the leg for compression hosiery and select the compression hosiery involving the patient in choice. Provides the patient with information on skin care, hosiery application and hosiery care. Is able to apply the hosiery correctly Knows when to re-assess and re Doppler the patient.				

Summary of Competency Assessment: Action Plan: Review Date: