

# Best Practice Statement

## Compression hosiery

2015



### SECOND EDITION

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Full holistic assessment

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Hosiery classification  
and product selection

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Hosiery application  
and removal, self-care  
and hosiery care

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Disease and service  
management

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**BEST PRACTICE STATEMENT:  
COMPRESSION HOSIERY  
(2ND EDITION) 2015**

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# Developing best practice for compression hosiery

Compression hosiery is used to manage conditions associated with chronic venous insufficiency, including post-thrombotic syndrome, varicose veins, venous eczema, lipodermatosclerosis, and swelling in the legs associated with pregnancy (NICE, 2012). It is also effective as part of an integrated, multi-faceted approach to managing oedema, as it has been demonstrated to help improve skin integrity, restore limb shape and enhance patient quality of life (Osborne, 2009).

Compression hosiery options vary in degrees of compression, fabric, stiffness, size, length, and whether they are closed- or open-toe; these variances can lead to inconsistency in the way compression hosiery is selected and prescribed (NICE, 2012). Additionally, a large amount of care is delivered by non-qualified staff and carers, who may lack knowledge of the principles of compression. Users therefore need to be supported with a multidisciplinary approach that involves patients, healthcare practitioners, pharmacists, social care organisations and others.

All healthcare practitioners (HCPs) need to work as part of a multidisciplinary team (MDT) to optimise prevention, management and maintenance therapy in venous disease and chronic oedema. Furthermore, practitioners and patients alike face the same challenges when using compression hosiery in practice, as outlined in Figure 1 — it is important that members of the MDT keep these challenges in mind when creating a patient-centred partnership that will encourage concordance with compression hosiery.

Registered and non-registered HCPs and carers need clear, concise guidance about how to appropriately assess for, choose and apply compression hosiery. There is also a need for guidance regarding managing patients within an MDT service, in which the role of each member is clearly defined, to optimise therapy and support for patients with venous disease and chronic oedema (Appendix 1, p18).

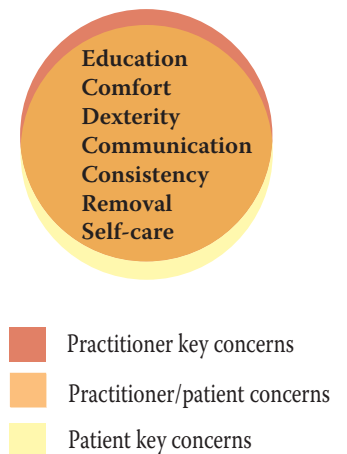
This second edition of *Best practice statement: Compression hosiery* aims to provide that guidance. A broad range of informational sources have been reviewed and distilled. During the peer-review process, a panel of experts — including tissue viability, vascular and lymphoedema specialists — has discussed, commented and agreed this text in order to produce a document that provides practical information for clinical decision-making, key principles of best practice and tools for everyday use.

To guide practice and encourage a consistent and cohesive approach to care, this best practice statement covers the following areas of concern to HCPs who work with patients who use compression hosiery:

- Full holistic assessment (p2)
- Hosiery classification and product selection (p5)
- Hosiery application and removal, self-care and hosiery care (p10)
- Disease and service management (p14)
- Roles and competencies (p18)
- Decision-making algorithm (p20).

**Jackie Stephen-Haynes**  
Chair

**Figure 1. Challenges in compression hosiery**



## GUIDE TO USING THIS DOCUMENT

Each section offers advice about creating a patient-centred experience when assessing for, selecting, prescribing and delivering care with compression hosiery. The best practice statements, their rationales, and how to demonstrate best practice appear at the end of each of the four sections. There are also two appendices: roles and competencies, elucidating the contributions that may be possible for members of the multidisciplinary team, and a clinical decision-making algorithm, for guiding clinical and service management.

## SECTION 1. FULL HOLISTIC ASSESSMENT

Patients with signs and symptoms of venous or lymphatic insufficiency should be prescribed appropriate hosiery as early as possible to manage the underlying condition and prevent disease progression. The diagnosis should be informed by an accurate assessment of the patient, the severity of the disease progression, and any complications or comorbid conditions that may inform the treatment pathway.

### Causes of chronic oedema

Oedema that has been present for longer than 3 months and is not resolved by elevation, bed rest or diuretics is known as chronic oedema. It develops in part as a result of a compromised lymphatic system, but may have a more complex underlying aetiology (Moffatt et al, 2003).

Surgery, injury, infection or genetic abnormality can also lead to lymphatic failure. In particular, chronic oedema and lymphatic dysfunction are closely associated with chronic venous disease — a progressive condition in which acute or chronic venous insufficiency due to venous obstruction (e.g. deep vein thrombosis) or valvular incompetence (as occurs in varicose veins) results in chronic venous hypertension. Left untreated, chronic oedema can lead to failure of the lymphatic system and,

in turn, localised fluid retention and tissue swelling known as lymphoedema (Lymphoedema Framework, 2006).

Many of the signs and symptoms of chronic oedema — including dermatitis, distortion of limb shape, bouts of cellulitis, development of hyperkeratosis, non-pitting when pressure is applied and hyper-pigmentation of the skin — may be indicative of some of these potential venous or lymphatic conditions (Figure 1):

- Early venous disease
- Advanced venous disease (+/- ulceration)
- Lymphovenous disease (+/- ulceration)
- Secondary lymphoedema (e.g. with cancer)
- Primary lymphoedema
- Active deep vein thrombosis
- Post-thrombotic syndrome
- Latent venous disease or lymphoedema
- Lipoedema.

As a result, it may be difficult to differentiate between venous and lymphatic diseases. A full, holistic assessment is therefore required in patients with chronic oedema.

### Initial assessment

The initial assessment should be carried out by a qualified practitioner, who has achieved

### Key points:

1. Before hosiery can be selected and prescribed, the patient must have a differential diagnosis that is informed by an accurate assessment of the patient condition, severity and any complications or comorbid conditions that may inform the treatment pathway.
2. The initial assessment should be carried out by an appropriately qualified practitioner with access to the knowledge, skills and resources required to make decisions about and any referrals for the patient's care.
3. In particular, the practitioner should assess the skin, lower limb and circulation statuses to diagnose the underlying disease process.
4. Based on the results of the initial assessment, patients should be risk-stratified to determine when they should receive Doppler ultrasound assessment of limb arterial perfusion and venous duplex ultrasonography.
5. Based on the holistic assessment, patients should be provided with a diagnosis that will lead to the prescription and application of compression hosiery, or referred on to the appropriate specialist for further assessment and/or treatment.

Figure 1. Signs and symptoms checker

Disease progression	Severity stage	Signs and symptoms
	Prevention	Spider and visible, superficial veins Mild swelling, aching, heavy legs Mild/moderate varicose veins Ankle flare Mild hyperkeratosis Hyperpigmentation Venous dermatitis (with or without swelling)
	Early/medium intervention and Ongoing maintenance	Varicose eczema/contact dermatitis Atrophie blanche Induration Healed or open ulcer Severe varicose veins Cellulitis Chronic oedema (toes/feet/leg)
	Intensive management	Acute-chronic lipodermatosclerosis Severe hyperkeratosis Skin folds Papillomatosis Lymphangiomas Lymphorrhoea (wet legs)

the necessary competencies, and has access to the knowledge, skills and resources required to make decisions and referrals for the patient's care (Appendix 1, p18). The practitioner must undertake and document a holistic assessment of the patient and limb with the goals of completing a full assessment, reaching an accurate diagnosis regarding the condition and stage of disease (Figure 1, p2), providing an appropriate service and treatment in primary care settings, and referring appropriately to secondary care or other specialist services.

Patients should receive a comprehensive assessment within 10 working days of presentation with symptoms to establish the underlying aetiology of venous or oedema-related skin changes (Wounds UK Guidelines for Practice, 2013). When deemed urgent, assessment should be done within 3 working days. Triage by phone or remote video can be done to aid prioritisation.

**Components of holistic assessment**

On presentation, a comprehensive assessment should be taken, beginning with a detailed history, including past medical and surgical history, history of limb trauma and skin infection, medications (e.g. steroids), concurrent illnesses, a family history of venous disease or limb swelling, and ankle mobility (Partsch, 2003). The practitioner should assess the skin, lower limb

and circulation statuses to help diagnose the underlying disease process (Table 1) (Lymphoedema Framework, 2006).

Wellbeing, quality of life and lifestyle factors — such as occupation, mobility, obesity status, history of previous ulceration, interests and limitations to daily activities — should also be assessed and, if possible, addressed, to manage patient expectations of treatment outcomes (Keeley, 2008; Upton, 2013). Age should also be a consideration, as incidence of venous disease increases with older age, and intervention at an early stage is important.

Other patient-specific factors include sleep status, nutrition status, psychological and social impact, weight and wound history. Patients should be assessed for their understanding of the role of hosiery in disease treatment, the need to wear hosiery long-term and how they will apply/remove hosiery, because concordance with hosiery is critical to good outcomes.

**Vascular assessment**

Doppler ultrasound for ankle-brachial pressure index (ABPI) is considered the standard tool for vascular assessment to rule out arterial involvement (RCN, 2006; SIGN, 2010). Compression is contraindicated where there is significant arterial disease (e.g. ABPI<0.5, critical ischaemia) (SIGN,

**Table 1. Components of assessment**

Skin	Limb	Circulation
Hydration (e.g. dryness)	Mobility and ankle movement	Vascular history
Pigmentation/lipodermatosclerosis	Measurement of limb circumference	Deep vein thrombosis history
Fragility	Measurement of limb volume, or series of circumference measurements	Presence of spider veins/ankle flare
Presence of itch	Feet (e.g. whether oedema is present in feet, or feet are unaffected, as seen in lipoedema)	Diagnostic testing (e.g. Doppler ankle-brachial pressure index, duplex ultrasound)
Deepened skin folds	Oedema above the knee, in the thigh or involving the trunk	Erythema/pallor/cyanosis
Fungal infection	Shape of both limbs (e.g. oedema is generalised, unilateral, bilateral)	Warmth/coolness
Scarring related to previous surgery or trauma		Ulcer in the gaiter area or evidence of healed ulcer
Skin changes (e.g. fibrosis, hyperkeratosis, ulceration)		Risk factors for or comorbidities associated with circulatory disease
Signs of cellulitis		Discomfort related to varicose veins

2010) or where arterial disease is suspected. These patients should be therefore be referred for assessment and further diagnostic testing by a vascular specialist to determine adequacy of blood flow in the limb:

- If ABPI is carried out by the initial assessing practitioner, the patient should be referred if <0.9 or >1.3–1.5, depending on the results of the holistic assessment (SIGN, 2010; NICE, 2014).
- Where the results of the assessment lead the practitioner to suspect arterial disease, e.g. painful cramping in leg muscles during activity, leg numbness or weakness, change in colour of legs, shiny skin on legs, hair loss or slower hair growth on feet and legs, slower growth of toenails.
- All patients presenting with a venous leg ulcer should be referred to either a specialist leg ulcer clinic or a vascular team (NICE, 2014; Wounds UK Guidelines for Practice, 2013).
- Patients at risk of (e.g. due to diabetes, immobility) or presenting with lower-limb signs or symptoms, who require compression at a level of higher than 18mmHg, should undergo a full vascular assessment with a specialist before hosiery is prescribed.
- Where very oedematous limbs make ABPI difficult to carry out, and access to a non-vascular practitioner skilled in carrying out and interpreting an ABPI reading may be limited. These patients should be referred to a vascular specialist for further evaluation (e.g. duplex ultrasonography) to determine treatment in line with the underlying disease.
- If under the care of a lymphoedema specialist, ABPI may be deemed inappropriate due to the

distribution of oedema or presence of advanced disease. In such cases, all other aspects of a full vascular assessment should be carried out by a practitioner who has achieved competence in this area and can confidently determine suitability for compression. Consultation with a vascular specialist is recommended.

- Younger patients (e.g. 20 to 30 years old) may have high ABPI readings that are not indicative of vascular insufficiency; these patients should be referred for vascular assessment only if other risk factors are present, not based on ABPI alone (Al-Qaisi et al, 2009).
- For patients who are deemed low risk for arterial insufficiency, hosiery ≤17mmHG can be issued without a full vascular assessment (see page 6, column 1, for more information). Such patients will still require monitoring. This may not be a long-term option, as venous, lymphatic and arterial status could deteriorate over time. The patient may in future require a full vascular assessment, specialist review and change of treatment.

It is important to consider local guidelines when determining whether to refer a patient to a specialist. Patients who have had a vascular assessment should be sent for regular, subsequent assessments incorporating Doppler, usually at 3-, 6- or 12-month intervals, depending on initial and ongoing assessment outcomes, patient needs, or according to local guidelines (NICE, 2014). Those at high risk of arterial disease should be monitored and reassessed more frequently.

**BPS APPLICATION TO PRACTICE: ASSESSMENT**

Best practice statement (BPS)	Reason for BPS	How to demonstrate best practice
Before hosiery can be selected and prescribed, the patient must have a diagnosis that is informed by an accurate assessment of the patient condition, severity and any complications or comorbid conditions	To ensure that the correct treatment pathway will be followed	Ensure a full holistic assessment has been carried out by documenting its components and the resulting diagnosis in the patient's case notes. Include past medical history, hosiery history, diagnostic test results and clinical signs of disease. This may, where relevant, record hosiery history, sensitivity history, and any patient preferences
The initial assessment should be carried out by an appropriately qualified practitioner with access to the knowledge, skills and resources required to make decisions about care and referrals if required	To ensure patients receive appropriate, multidisciplinary care on an ongoing basis	The practitioner should be trained and competent in assessment, diagnosis and appropriate care planning, referring to specialist services where necessary
Based on the results of the initial and vascular assessment, patients should be risk-stratified	To determine when further diagnostic testing, such as Doppler or duplex, is needed	Document the results of risk-stratification assessment in the patient record, making particular note of the rationale for the decision and outlining the care plan to be followed
Based on the holistic assessment, patients should be provided a diagnosis that will lead to the prescription and application of compression hosiery, or referred on to the appropriate specialist for further assessment and/or treatment	To ensure the patient receives appropriate compression hosiery or is seen by the appropriate specialists	Document the diagnosis resulting from holistic assessment in the patient record, making particular note of the rationale for the decision and outlining the care plan to be followed

## SECTION 2: HOSIERY CLASSIFICATION AND PRODUCT SELECTION

Hosiery must be selected based on the outcomes of the holistic assessment, and according to the goals of treatment. Product selection should also take into account limb size and shape (measurements and availability of appropriately sized hosiery), the strength and stiffness of the garment, skin condition, allergies and sensitivities, and patient considerations (e.g. dexterity, psychosocial issues).

### Construction of compression hosiery

Hosiery materials may be inelastic (also known as short-stretch) or elastic. Inelastic compression hosiery is favoured for those with chronic oedema, as the fabric does not yield to expansion related to the oedema. Hosiery can be constructed in two ways: circular-knit or flat-knit. Both types are used in the UK; in some parts of Europe and for the management of lymphoedema, flat-knit is predominantly used (Anderson and Smith, 2014).

#### Circular-knit

The fabric is knitted on a cylinder with circular needles and has no seam. The fabric tends to be finer, which patients often find more cosmetically acceptable. Circular-knit is generally used to create ready-to-wear hosiery (although it can be used for made-to-measure hosiery) and is most suitable where there is no or minimal limb distortion due to oedema (Anderson and Smith, 2014).

#### Flat-knit

The edges of a flat fabric are sewn together, creating a seam. The fabric tends to be relatively thick and stiff, which lets it lie across skin folds without cutting into the skin. Flat-knit is usually used for made-to-measure garments because it can be more readily adapted to limb shape distortion (Lymphoedema Framework, 2006).

Hosiery available in standard sizes, which may not be appropriate for all patients or limb sizes/shapes, is known as 'ready to wear'. Where the patient does not fit into standard sizing, made-to-measure hosiery can be ordered and customised according to the measurements and shape of the limb being treated.

### Classes of compression hosiery

The manufacturers of medical and support hosiery follow different standards, which describe the medical support or compression applied to the lower leg by compression hosiery, and focus on *in vitro* measurement of the pressures likely to be applied at various points on the limb (Lymphoedema Framework, 2006).

Stiffness — defined as the pressure increase produced by compression hosiery per 1cm of increase in leg circumference — is, in more simple terms, the ability of the bandage/stockings to oppose the muscle expansion during contraction (Mosti, 2012). The stiffness of the compression hosiery material therefore affects the compression levels exerted by different types and classes of hosiery.

The compression measured at the ankle is used to classify the hosiery into compression classes; however, the pressure range used to define each class varies between the different standards, and different techniques are used to measure compression (Lymphoedema Framework, 2006).

Because the various classes may not correlate to one another, it is important to understand the terminology, classes and corresponding compression levels for different hosiery types (Table 1, p6).

### Functions of compression hosiery

Compression hosiery may be used in patients with either venous disease for primary prevention, early/medium intervention, intensive management and ongoing maintenance/secondary prevention. In patients with chronic oedema, the key function of hosiery is ongoing maintenance.

Different classes of hosiery should be used at different stages of disease progression, depending on the conditions and symptoms present, and whether or not oedema is present (Figure 1, p6).

### Primary prevention

Prevention is a key NHS strategy for maintaining public health and minimising

### Key points:

1. Hosiery may be inelastic or elastic, may be circular- or flat-knit, and may be available off the shelf or made to measure.
2. The manufacturers of medical and support hosiery follow different manufacturing standards, which describe methods used to characterise the graduated compression applied to the lower limb by compression hosiery.
3. Compression hosiery may be used in patients with either venous disease for primary prevention, early/medium intervention, intensive management and ongoing maintenance/secondary prevention.
4. In patients with chronic oedema, the key function of hosiery is ongoing maintenance and prevention of progression.
5. Compression hosiery works only if measurements are correct and hosiery is subsequently selected, applied and worn correctly.
6. Patient-specific factors should be taken into consideration as part of a patient-centred approach.
7. To support patients in making a choice, practitioners must know what hosiery choices are available and be able to instruct the patient on the various ways to don, doff and care for hosiery.

Compression class	British standard*	European classifications*
Class 1	14–17mmHg	18–21mmHg
Class 2	18–24mmHg	23–32mmHg
Class 3	25–35mmHg	34–46mmHg
Class 4	Not available	49–70mmHg (not commonly used by non-specialists)
Class 4 super	Not available	60–90mmHg (not commonly used by non-specialists)

(BNF, 2015) | \*Quality and test specifications carried out according to national norms

the burden on healthcare (Wounds UK Guidelines for Practice, 2013). Successful prevention of ulceration, chronic oedema or lymphoedema depends on early patient presentation. However, awareness of early signs of venous disease, chronic oedema and lymphoedema is poor, and patients often delay in presenting (Wounds UK Guidelines for Practice, 2013).

Compression hosiery may also be used when there are early signs of lymphoedema (to prevent further swelling) or venous insufficiency (to prevent ulcer development), or for the prevention of deep vein thrombosis in at-risk patients (e.g. due to surgery) (NICE, 2014).

Many of these patients can be prescribed 14–17mmHg without a full vascular assessment, to avoid delays in applying compression. (The responsibility regarding this decision rests with the hosiery prescriber.) In addition, this level of compression is generally safe to use, as it is low strength, classified as ‘support hosiery’, and available over the counter. However, this may not be a long-term solution, and these patients should be monitored regularly.

Patients who are candidates for immediate 14–17mmHg prescription should have:

- A diagnosis
- Intact sensation
- No signs of critical limb ischaemia
- Appropriate build (poor shape/size of the limb can contraindicate)
- Risk of swelling (e.g. pregnancy).

Conditions	With oedema	Without oedema
<b>Primary prevention</b>		
<ul style="list-style-type: none"> <li>• Spider and visible superficial veins</li> <li>• Tired, aching, heavy legs</li> <li>• Mild to moderate varicose veins</li> <li>• Ankle flare</li> <li>• Mild hyperkeratosis</li> <li>• Hyperpigmentation</li> <li>• Venous dermatitis</li> </ul>	<b>18–21 mmHg</b> <ul style="list-style-type: none"> <li>• Off-the-shelf</li> <li>• Flat-knit made-to-measure</li> </ul>	<b>14–17 mmHg</b> <ul style="list-style-type: none"> <li>• Off-the-shelf</li> <li>• Circular knit/made-to-measure</li> </ul> <b>18–24 mmHg</b> <ul style="list-style-type: none"> <li>• Off-the-shelf</li> <li>• Circular knit/made-to-measure</li> </ul>
<b>Ongoing maintenance and early/medium intervention</b>		
<ul style="list-style-type: none"> <li>• Varicose eczema/contact dermatitis</li> <li>• Atrophie blanche</li> <li>• Severe varicose veins</li> <li>• Moderate hyperkeratosis</li> <li>• Healed ulcer</li> <li>• Recurring ulcer</li> <li>• Cellulitis</li> <li>• Chronic oedema (toes, feet, leg)</li> </ul>	<b>22–32 mmHg</b> <ul style="list-style-type: none"> <li>• Off-the-shelf</li> <li>• Flat-knit made-to-measure</li> </ul> <b>34–46 mmHg</b> <ul style="list-style-type: none"> <li>• Off-the-shelf</li> </ul> <b>40mmHg (hosiery kit)</b>	<b>18–24 mmHg</b> <ul style="list-style-type: none"> <li>• Off-the-shelf</li> <li>• Circular knit/made-to-measure</li> </ul> <b>25–35 mmHg</b> <ul style="list-style-type: none"> <li>• Off-the-shelf</li> <li>• Circular knit/made-to-measure</li> </ul> <b>40mmHg (hosiery kit)</b>
<b>Intensive management</b>		
<ul style="list-style-type: none"> <li>• Acute or chronic lipodermatosclerosis</li> <li>• Severe hyperkeratosis</li> <li>• Skin folds</li> <li>• Papillomatosis</li> <li>• Lymphangiomas</li> <li>• Lymphorrhoea (wet legs)</li> <li>• Lymphoedema/lipoedema</li> </ul>	<b>34–46mmHg</b> <ul style="list-style-type: none"> <li>• Flat-knit made-to-measure</li> </ul>	<b>40mmHg (hosiery kit), if appropriate</b>

**Figure 1. Functions of compression hosiery (Timmons and Bianchi, 2008)**



If the patient has a history of peripheral arterial disease but is otherwise asymptomatic, Class I may be implemented, along with onward referral for specialist assessment. Depending on the severity of symptoms, a Doppler/duplex scan may be advised after prescription of Class I hosiery to confirm the outcomes of the clinical examination. Lack of dexterity or a carer who can apply hosiery may contraindicate prescription of compression that can be applied at home.

### Ongoing maintenance

Compression hosiery is most commonly used post-ulcer healing to control oedema and reduce venous hypertension, both of which help prevent ulcer recurrence (secondary prevention) (Anderson and Smith, 2014). Patients are also commonly post-thrombotic. In patients with chronic oedema and lymphoedema, all use of compression hosiery is considered to be ongoing maintenance, to control oedema, with some reduction if possible.

Any patient who will be prescribed pressures  $\geq 18$ mmHg (e.g. Class II British standard, European class I or higher) for ongoing maintenance or intensive management (see next section) should undergo vascular assessment and may require further diagnostic testing before prescription or compression application.

### Intensive management

Compression bandaging historically has been considered the gold-standard treatment for venous ulceration (Ashby et al, 2014). However, for patients who find ban-

dages difficult to tolerate or who have low-exuding ulcers, recent research indicates that hosiery kits may provide an equally effective alternative for treating active ulcers.

In the multicentre, randomised, controlled VenUS IV trial, 453 participants randomly allocated into hosiery kits (230) and bandaging (223) groups finished the trial. Median time to ulcer healing was 99 days in the hosiery group (70.9% healed ulcers) and 98 days in the bandaging group (70.4% healed), indicating that both compression hosiery and the 'gold standard' of VLU treatment may be equally effective during the intensive management phase (Ashby et al, 2014).

Furthermore, the researchers' economic analysis found that the average mean costs were about £300 lower per participant per year in the hosiery group than in the bandage group (Ashby et al, 2014), making compression hosiery a potentially more cost-effective option.

Although participants "had more complaints about discomfort with hosiery," Ashby et al (2014) did note "a significant reduction in recurrence in people allocated to hosiery," which might support the idea that patients who became used to wearing hosiery as an ulcer treatment would be "more likely to wear it as a maintenance treatment after healing and therefore reduce their risk of ulcer recurrence". The authors concluded that "increased use of hosiery as a treatment is likely to result in substantial savings for the NHS and improved quality of life for people with venous ulcers" (Ashby et al, 2014).

#### Box 1. Tips for hosiery measurement

- Take measurements as early in the morning as possible, when oedema is at a minimum
- Take measurements directly against the skin to ensure accuracy (use a skin marker to ensure reproducibility and accuracy)
- Take measurements for each leg as they may differ in size
- Take measurements when the patient is sitting down, with feet flat on the floor
- Use the correct measuring guide for the brand of hosiery to be prescribed, as each manufacturer will vary
- If the patient has skin folds due to oedema, or the limb is particularly misshapen, a specialist flat-knit garment and, therefore, referral for specialist assessment may be required
- If a patient feels uncomfortable or embarrassed when having their legs measured, try to make them feel more at ease by:
  - Taking the measurements in a private area
  - Explaining how you are going to measure their legs before you start, including how far up the leg you will need to measure for thigh-length hosiery
  - Explaining why it is important to get the right size hosiery so that it works properly
  - Explaining what you are doing at each stage

Compression hosiery kits have an inner layer (liner) that delivers approximately 10–20mmHg to the limb (depending on manufacturer specifications). A higher-pressure hosiery garment is then applied to increase pressure to the limb, usually up to 40mmHg in total. The inner layer helps the stronger outer layer to be applied more easily, as it provides a smoother surface than skin. However, these kits may be difficult to apply over some dressings, especially if they are bulky or there is a high level of exudate present. When there is severe oedema present, compression bandaging may be worn to improve the management of oedema and exudate levels before application of compression hosiery.

### Measurement and sizing

Compression hosiery works only if measurements are correct and hosiery is subsequently applied correctly. Legs should therefore be measured and hosiery prescribed according to each manufacturer's own measuring guide, as sizes vary according to manufacturer. Every effort should be made to reduce oedema before hosiery is measured. In most cases, bandaging should be used short-term during the intensive management phase to help reshape the limb and/or treat the ulcer. Once the ulcer has healed and oedema has reduced, patients can be measured for hosiery (Box 1, p7) and prescribed a garment that will deliver sufficient pressure to control oedema on an ongoing basis.

If a patient does not fit into the measurements on the manufacturer's sizing chart

for standard sizes, customised ('made-to-measure') hosiery should be prescribed. This may require referral to a practitioner with knowledge of how to correctly measure for made-to-measure garments. Current suppliers are outlined in the drug tariffs for England and Wales, Scotland and Northern Ireland (BNE, 2014).

### Patient considerations

Patient-specific factors should be taken into consideration but, more than that, a patient-partnership approach should be taken (Box 2). The practitioner should speak in clear language patients can easily understand, to encourage shared decision-making.

Identify the focus of the consultation. The patient needs to know what to expect at each stage. Encourage patients to return to the same pharmacy, nurse or GP for repeat assessment; explain that hosiery should be removed at bedtime, but may be worn up to 7 days before bedtime removal and morning reapplication if necessary, based on appropriate assessment and advice. Patients also need to be aware that patient choice cannot always be 100% accommodated, that there may have to be some balance between clinical need and patient preference. This can enhance concordance, because patients will understand what the trade-offs are for effective care.

Discuss modification of treatment to use a lower class if high compression is not tolerated, but also explain that, over time, as tolerance builds, compression levels may also

### Box 2. Patient-specific considerations

- Mobility
- Dexterity
- Skin status (friable skin should not be a contra-indication, but should be approached with caution)
- Limb shape
- Site of oedema
- Weight status/build
- Sex
- Age
- Comorbidities
- Other regular/ongoing treatments (e.g. podiatry care for diabetic foot)
- Preference for open- versus closed-toe hosiery
- Ability with/preference for a particular application aid
- Ability to self-care/-manage
- Availability of help/assistance
- Ability of carer
- Psychosocial factors
- Colour preference
- Whether the patient will need/can afford to buy extra pairs

### Box 3. Questions to ask patients to encourage concordance

- What is their understanding of their condition?
- What is their previous experience of compression? If previous prescriptions have slipped down, prescribing a garment with a stay-up silicone band may ameliorate this issue. (However, keep in mind that some patients may be sensitive or allergic to silicone.)
- How does compression affect their day-to-day lifestyle?
- What are their priorities?
- Who could help them apply/remove compression?
- What application aids do they prefer? Discuss applicators with the person.
- Are they happy with the hosiery's colour? Pattern? Texture? Softness? Offer alternatives if they are unhappy with selection. (Especially important to ask as summer approaches, so patients have hosiery they are comfortable with when wearing lighter/shorter clothing.)
- Do they have two pairs? Patients must wash and wear two pairs alternately (not keeping one 'in good shape' for later). Some patients are very heavy on use and may need even more pairs.
- If wearing with work uniform, will it match appropriately?
- Do they prefer open- or closed-toe?
- Can they afford to buy extra hosiery if needed?

be increased. Practitioner and patient alike should understand that compression is an ongoing treatment that needs to be worn long-term, just as long-term medication regimens should be adhered to.

A patient may require open-toe hosiery because:

- The patient has arthritic or clawed toes
- The patient has a fungal infection
- The patient prefers to wear a sock over the compression hosiery
- The patient has a long foot size compared with calf size (hosiery with longer foot-size options available, if necessary)
- The patient requires regular podiatry/chiropody appointments
- There is no oedema present in the toes, and the patient prefers open-toe hosiery (NICE, 2012).

Ultimately, the hosiery selected should be the patient's choice. The practitioner's job is to explain the options and direct the patient towards the clinically optimal choice, but

some compression is better than no compression, and patient concordance is crucial to positive clinical outcomes. It is important that the practitioner understand the psychosocial issues that may result in non-concordance, and that he or she try to identify these factors (Box 3, p8).

#### **Who selects and prescribes hosiery**

To support patients in choosing, practitioners must know what hosiery choices are available and be able to instruct the patient on the various ways to don and doff hosiery. The practitioner should have an understanding of venous and lymphatic disease processes, and be able to advise according to the patient's condition and limb shape (British Lymphology Society Tariff Costings Document, 2013).

Finally, the practitioner should prescribe two pairs every 6 months (one to wash, one to wear) to ensure effectiveness of compression, regardless of the type of compression or class. Prescriptions should be clearly and thoroughly specified to ensure accurate dispensing.

#### **BPS application to practice hosiery classification and product selection**

Best practice statement (BPS)	Reason for BPS	How to demonstrate best practice
Once venous disease or chronic oedema is confirmed, hosiery must be selected based on the outcomes of the holistic assessment, and according to the goals of treatment	To ensure that the patient receives the most appropriate, optimised care for his or her condition	Document the care plan to be followed, in line with the diagnosis
Product selection should also take into account limb size and shape, the strength and stiffness of the garment, and patient considerations	Because hosiery may be inelastic or elastic, may be circular- or flat-knit, and may be available off the shelf or made to measure, and the manufacturers of medical and support hosiery follow different standards for construction	The practitioner should be competent in knowledge regarding hosiery construction: the different classes, standards and strengths of hosiery; the indications associated with these different types of hosiery; and how to accommodate patient considerations while optimising hosiery choice
Patient-specific factors should be taken into consideration as part of a patient/practitioner-partnership approach	To encourage patients to be part of the conversation about their care; to promote ownership and self-management of the condition	The practitioner should speak in clear language patients can easily understand, and engage patients by discussing the range of treatment options, the trade-off with lower compression, and compromise
Practitioners must know what hosiery choices are available, be able to advise according to the patient's condition and limb shape, and be aware of the wear times for hosiery (typically two pairs every 6 months)	To support patients in making a choice	The practitioner should be competent in knowledge regarding hosiery choices, how they affect the patient's condition, and the practical factors that may affect hosiery choice in relation to patient condition

## SECTION 3. HOSIERY APPLICATION AND REMOVAL, SELF-CARE AND HOSIERY CARE

The practitioner who measured, selected and prescribed the hosiery should ideally be the one to guide the patient through first application, and to educate on application at home, skin care under compression and care of the compression hosiery. If this is not possible, another qualified practitioner, who is educated in these facets of compression hosiery treatment and has achieved the required competencies, should guide the patient.

### Fitting at first application

If the patient has a current compression prescription, it should not be discontinued until the new hosiery present. Even if the patient is experienced with compression hosiery, he or she should not independently apply compression hosiery for the first time or if the prescription has changed. This will let the practitioner judge whether the prescribed hosiery fits correctly (Figures 1a–b; Box 1, p11).

Try to perform education around what constitutes a good fit with a carer present, if possible. First application of a hosiery prescription should be done in a private area, to protect patient dignity, and every step of the experience should be explained. In a social care setting, patients may wish to have application performed within the context of the group; the key is that they be concordant with this option.

Many patients are elderly and may experience limited dexterity when trying to apply compression hosiery. This may be overcome by supplying them with a smooth, inner toe liner (if the hosiery is open-toe) or an aid to ease application and/or removal, despite minimal grip strength.

The practitioner should demonstrate donning and doffing, then help the patient practise until they are competent at applying and taking off compression hosiery on their own. If relevant, patients should also be instructed on use of the chosen application aid, and allowed to practise with it as well (Table 1, pp11–12).



Figures 1a–b.  
Examples of good  
fit in compression  
hosiery

Application and removal aids are typically fabric or rigid, but there are other options, such as non-slip mats and roll-on adhesives. A fabric compression stocking aid is usually made from a slippery fabric, and is designed to make it easier to slide compression hosiery over the foot and leg. Patients will still need to be able to bend to reach their feet with fabric aids.

Rigid aids typically provide a frame that lets the patient step into hosiery or pull up garments without bending to reach the floor (Dilks and Green, 2005). Aids should be chosen according to each patient's physical needs, and whether they require a device that is on drug tariff.

### Skin care under compression

Precautions must be taken with regard to skin care under compression, regardless of whether skin is already fragile. Skin care should be considered part of hosiery management and the overall treatment plan, rather than a discrete condition to be managed on its own.

Provide patients pragmatic advice about skin care and skin changes to look for, and take steps to prevent skin-related issues. For example, prescribe an appropriate emollient and soap substitute, if required, or prescribe cotton-bonded hosiery, or skin-friendly under-hosiery garments or heel-less socks that can help protect skin and ease donning and doffing — during which injuries to the skin may occur. Advise patients who

### Key points:

1. The practitioner who measured, selected and prescribed the hosiery should ideally be the one to guide the patient through first application/removal, and to educate on application at home, skin care under compression and care of the compression hosiery.
2. Hosiery or bandaging should not be discontinued until the new hosiery prescription is in hand, and a good fit has been ensured.
3. Precautions must be taken with regard to skin care under compression, regardless of whether skin is already fragile.
4. Skin care should be considered part of the overall treatment plan, rather than a discrete condition to be managed on its own.
5. Advise patients in the care of their hosiery, to extend the effective life until re-prescription is due.
6. Select removal/application aids according to the patient's assistance needs.

**Table 1. Hosiery application and removal aids**

Application and removal aids are typically fabric or rigid, but there are other options, such as non-slip mats and roll-on adhesives. A fabric compression stocking aid is usually made from a slippery fabric, and is designed to make it easier to slide compression hosiery over the foot and leg. Patients still need to be able to bend to reach their feet with fabric aids. Rigid aids typically provide a frame that lets the patient step into or pull up hosiery without bending to the floor (Dilks and Green, 2005). Aids should be chosen according to each patient's physical needs, and whether they require a device on drug tariff.

	Aid (manufacturer)	Benefits of use	Mechanism of use	On tariff?
Fabric	ActiGlide (Activa Healthcare)	<ul style="list-style-type: none"> <li>■ Can be used to apply open- or closed-toe hosiery</li> <li>■ One-size-fits-all; two can be linked to accommodate larger limbs</li> <li>■ Easy to carry, fold up and store</li> <li>■ Designed for independent use</li> </ul>	Slides on limb to reduce friction between the hosiery and leg, and is removed after hosiery application	✓
	2in1 (medi)	<ul style="list-style-type: none"> <li>■ Can be used to apply and remove open- or closed-toe hosiery</li> <li>■ One-size-fits-all, all stocking lengths accommodated</li> <li>■ Easy to carry, fold up and store</li> <li>■ Designed for independent use</li> </ul>	Slides on between limb and hosiery to reduce friction, and is removed after hosiery application. Slides on over hosiery, which is then folded down over the top of the aid. The hosiery is then pulled down over the heel and instep towards the toes, with the aid inside the garment, reducing friction during removal	✓
	Easy-Slide (Credenhill)	<ul style="list-style-type: none"> <li>■ Can be used to apply open- or closed-toe hosiery</li> <li>■ Comprehensive size range</li> <li>■ Easy to carry and store</li> <li>■ Ideal for use with assistance (e.g. carer)</li> </ul>	Slides on limb to reduce friction between the hosiery and leg, and can be removed after hosiery application	✓
	Gus Comfort (Haddenham)	<ul style="list-style-type: none"> <li>■ Can be used to apply open- or closed-toe hosiery</li> <li>■ One-size-fits-all</li> <li>■ Easy to carry, fold up and store</li> <li>■ Designed for independent use</li> </ul>	Slides on limb to reduce friction between the hosiery and leg, and can be removed after hosiery application	✓
	Rolly (Sigvaris)	<ul style="list-style-type: none"> <li>■ Can be used to apply, remove and adjust open- or closed-toe hosiery</li> <li>■ Compact and conformable</li> <li>■ Designed for independent use or with assistance</li> </ul>	After initial application of hosiery, the flexible elastic membrane, which is filled with soapy water, slides up to the top of the garment. The hosiery is folded down over the aid, which is then slid down the leg, rolling the hosiery as it goes. Hosiery can then be rolled on by putting the foot into the garment and rolling upwards. Similarly, hosiery can be adjusted during wear	✗

have issues with hand-grip strength to wear 'washing-up' gloves when applying and removing hosiery, to improve their grips and protect fingernails from damaging the hosiery material or skin.

Note any skin changes, as these may indicate progression of venous or lymphatic diseases. Educate patients on what healthy skin looks like, and what a healthy-skin regimen should include (Box 2, p12). It is important that patients or carers remove hosiery daily (or as often as possible) to inspect the skin for any breaks, signs of infection (e.g. increased temperature or tenderness) and rashes or fungal infections (e.g. tinea pedis), or the early signs of pressure damage. Pay particular attention to areas where there is

reduced sensation, such as under skin folds and between the toes.

### Care of hosiery

Patients and carers will largely have the responsibility for keeping compression hosiery in good condition, so it is critical that they receive good education in order to maximise the life and effectiveness of a garment until the next prescription. Use the tips for hosiery care in Box 3 (p13) as a handout for patient education, or as a checklist of education to be communicated to the patient. Note that many of these dos and don'ts also help encourage good skin care and donning practices. Providing written information that patients can refer to on an ongoing basis is essential.

### Box 1. Indicators of good compression hosiery fit

- Hosiery not loose, with no slippage
- Hosiery not twisted/rolled
- No compression ridges/creases on the skin
- Hosiery not too high on back of knee or thigh
- Hosiery does not pinch skin or cause pain
- Hosiery does not result in numbness, discomfort or discolouration
- Hosiery does not cause shortness of breath

**Table 1. Hosiery application and removal aids (continued)**

	Aid (manufacturer)	Benefits of use	Mechanism of use	On tariff?
Rigid	Ableware Heel Guide (Maddak)	<ul style="list-style-type: none"> <li>Can be used to apply open- or closed-toe hosiery</li> <li>Extra-wide cone shape</li> <li>Handles with multiple grip positions</li> <li>Can be disassembled for storage</li> </ul>	Hosiery is folded down over the plastic cone, so that the patient can insert the foot, then roll up hosiery using the handles	✓
	Butler (medi)	<ul style="list-style-type: none"> <li>Can be used to apply open- or closed-toe hosiery</li> <li>Reduces need for bending down</li> <li>Comes in an extra-wide size (and with long handle option) for larger limbs</li> </ul>	Plastic-coated metal frame stretches hosiery to make it easier to step into and apply	✓
	Dorking Stocking Donner (Homecraft Rolyan)	<ul style="list-style-type: none"> <li>Extendable handles aid patients with limited reach</li> <li>Handles can be rotated 90°, for multiple grip positions</li> <li>Central column accommodates larger limb sizes and has a ridge that prevents movement during application</li> <li>Reduces need for bending down</li> </ul>	Hosiery is folded down over the inner plastic-coated frame, so that the patient can insert the foot, then roll up hosiery using the handles	✓
	Easy Fit (Juzo)	<ul style="list-style-type: none"> <li>Can be used to apply or remove open- or closed-toe hosiery</li> <li>Comes in an extra-wide size for larger limbs</li> <li>Reduces need for bending down</li> <li>Aids patients with poor dexterity or grip strength</li> </ul>	Hosiery is rolled down over the inner plastic-coated shaft, so that the patient can insert the foot, then roll up the hosiery by lifting the unit. To remove, the patient steps into the column, rolls the top of the hosiery over the shaft, secures it with a clasp, and then steps out of the hosiery	✓
	Easy-Lever (Credenhill)	<ul style="list-style-type: none"> <li>Can be used to remove open- or closed-toe hosiery</li> <li>Reduces need for bending down</li> <li>Aids patients with poor dexterity or grip strength</li> </ul>	Slides between hosiery and leg to push off rolled-down garment	✗
	Easy Off (medi)	<ul style="list-style-type: none"> <li>Can be used to remove open- or closed-toe hosiery</li> <li>Reduces need for bending down</li> <li>Aids patients with poor dexterity or grip strength</li> </ul>	Slides between hosiery and leg, with ridge that pushes garment down and off	✗
	Ezy-As	<ul style="list-style-type: none"> <li>Can be used to apply open- or closed-toe hosiery</li> <li>Comes in 3 sizes and additional length for unassisted application</li> </ul>	Hosiery is folded down over plastic frame, so that the patient can insert foot, then roll up hosiery	✓
	Ezy-on Compression Stocking Frame (The Helping Hand Company)	<ul style="list-style-type: none"> <li>Can be used to apply or remove open- or closed-toe hosiery</li> <li>Comes in an extra-wide size for larger limbs</li> <li>Reduces need for bending down</li> <li>Aids patients with poor dexterity or grip strength</li> </ul>	Hosiery is rolled down over the inner plastic-coated shaft, so that the patient can insert the foot, then roll up the hosiery by lifting the unit	✗
	Sockaid (Urgo Medical)	<ul style="list-style-type: none"> <li>Can be used to apply open- or closed-toe hosiery</li> <li>Can be used in or out of bed</li> </ul>	Hosiery is folded down over plasticised metal frame, so that the patient can insert foot, then roll up hosiery	✓
Miscellaneous	Gus Grip Mat (Haddenham)	<ul style="list-style-type: none"> <li>Anti-slip mat to aid application and removal of hosiery</li> </ul>	Patient places foot on mat while donning or doffing hosiery, to avoid slipping	✗
	Gloves (various)	<ul style="list-style-type: none"> <li>Rubber gloves with soft interior linings to aid grip during application and removal of hosiery</li> </ul>	Patient wears gloves for improved grip during application and removal of hosiery	✗
	Roll-on adhesive (various)	<ul style="list-style-type: none"> <li>Roll-on substance that helps hosiery 'stick' to the limb while remaining pliable, and that can be washed off with water</li> </ul>	Roll adhesive on to skin using the applicator bottle, apply hosiery and press to secure	✗

**Box 2. Tips for good skin care**

- Apply skin care products (e.g. emollients, topical corticosteroids) in the evening, after removing hosiery for bed
- Check skin daily (or as often as possible) for changes, including on the legs, toes/nails and interdigital spaces
- Gently elevate legs when resting to reduce pooling of oedema that can result in skin damage (high elevation is not necessary)
- Keep physically active to the fullest extent possible, depending on each patient's specific situation
- Don hosiery first thing in the morning, when oedema is at its lowest levels, to help avoid skin damage and limb expansion

## Box 3. Dos and don'ts of hosiery care

- ✓ Be careful donning and removing over areas of hard skin that can damage hosiery, or while wearing jewellery.
- ✓ Ensure legs are dry before putting on hosiery, to protect skin and garment integrity. If the skin is fully intact and in good condition, consider patting legs dry to absorb excess moisture.
- ✓ Speak to the GP, a pharmacist or other relevant specialist if compression hosiery is not fitting well.
- ✓ Follow the manufacturer's wash and care instructions. Note: Some garments can go in the normal wash, at lower temperatures, although labels say hand-wash.
- ✓ Air-dry hosiery to maintain elasticity unless stated otherwise.
- ✓ If applying or removing compression hosiery is too difficult, speak to the GP, pharmacist or other relevant specialist about being prescribed a new application aid.
- ✓ If there is new numbness to the toes, remove hosiery and inform the GP or the practitioner who fitted the hosiery.
- ✓ **See the GP immediately if the leg suddenly swells, there is redness or warmth of the skin, new numbness or tingling in the toes, fatigue in the leg or pain that may increase when standing or walking. These are potential signs of a potentially life-threatening blood clot or localised cellulitis infection. If the swelling increases so that hosiery does not fit, removal of hosiery is necessary.**
- ✗ Do not roll or fold down compression stockings during wear; it hampers circulation and increases the risk of a blood clot.
- ✗ Avoid applying emollients (e.g. lotions or creams) just before application of hosiery, as they can make the garment harder to put on.
- ✗ Do not cut holes into the elastic or hold-up bands of compression hosiery.
- ✗ Do not cut off the feet of the hosiery — discuss options with the GP, pharmacist or other relevant specialist.
- ✗ Do not wear compression stockings while sleeping unless specifically advised otherwise by a healthcare professional.
- ✗ Do not wear larger-sized compression hosiery without speaking to the GP, pharmacist or other relevant specialist about alternative options.
- ✗ Do not buy extra pairs of compression hosiery off prescription unless you have been advised to do so by a relevant practitioner.
- ✗ Do not double-layer compression hosiery unless specifically advised otherwise by a healthcare professional.
- ✗ Do not wear compression hosiery that has been prescribed for someone else.
- ✗ Do not keep old hosiery after new pairs have been prescribed, to avoid wearing over-stretched or ill-fitting garments.

## BPS application to practice: Hosiery application and removal, self-care and hosiery care

Best practice statement (BPS)	Reason for BPS	How to demonstrate best practice
The practitioner who measured, selected and prescribed the hosiery should guide the patient through first application, and educate on application at home, skin care under compression and care of compression hosiery	To ensure continuity of care and that the practitioner has the requisite specialist skills to guide the patient in beginning compression hosiery therapy	The practitioner should be able to demonstrate competence in knowledge regarding hosiery application, skin care under compression and care of compression hosiery
Hosiery or bandaging should not be discontinued until the new hosiery prescription is available, and a good fit has been ensured	To ensure continuity of care, and that the new prescription is appropriate	Schedule a fitting appointment with the patient as soon after dispensing as possible. Inspect the limb for signs of improper fit. Help the patient practise application and removal, to get used to the new garment. Document the results of the inspection and the patient education provided
Even if the patient is experienced with compression hosiery, he or she should not independently apply compression hosiery for the first time or if the prescription has changed	To ensure the hosiery prescription fits the limb properly	Schedule a fitting appointment with the patient as soon after dispensing as possible. Inspect the limb for signs of improper fit. Help the patient practise application and removal, to get used to the new garment. Document the results of the inspection and the patient education provided
Skin care should be considered part of hosiery management and the overall treatment plan, rather than a discrete condition to be managed on its own	To prevent skin breakdown under compression	Provide patients pragmatic advice about skin care and skin changes to look for, and take steps to prevent skin-related issues. Document the education in the patient's notes
Instruct patients to remove hosiery daily (or as often as possible) to inspect the skin for changes (e.g. breaks, signs of infection and rashes)	Skin changes should be noted, as these may indicate progression of venous or lymphatic diseases	Educate patients on what healthy skin looks like, and what a healthy-skin regimen should include. Document the education provided in the patient's notes
Instruct patients in the care requirements of their hosiery	To extend the hosiery's effective life until re-prescription is due	Document the education provided in the patient's notes. Provide literature that patients can refer to if needed when self-applying and removing hosiery

## SECTION 4. DISEASE AND SERVICE MANAGEMENT

The multidisciplinary team (MDT) should be involved in the ongoing, comprehensive care of the person using compression hosiery, with specialist referral used where specific skills are needed to add value to care. Each MDT member's scope of practice should focus on the skills and roles in which competency can be reasonably/have been achieved, rather than being narrowly limited by the constraints of job titles. The patient and his or her journey should be at the centre of all care provided in the context of an MDT (Figure 1, p16).

### Linking treatment roles

Thorough assessment improves the ability to accurately diagnose and triage patients, with referral back to GPs or onward as appropriate to specialist services for patients with mixed or arterial disease, or lymphoedema (Gardner, 2013). In addition, patients with chronic oedema are at increased risk of cellulitis, which may require referral to a dermatologist or hospital admission in acute cases (BLS/LSN, 2006). Patients with these conditions are not immediately suitable for treatment with compression hosiery, as the underlying diseases and/or accompanying conditions will have to be controlled and/or resolved before proceeding.

Roles should be linked on a decision-making and referral pathway to ensure the right patients are connected to clinicians with the appropriate and necessary skills, which more efficiently uses time and resources. The reasons for referral need to be made clear to patients so they understand they are being referred elsewhere to receive more appropriate care, and subsequent referral (e.g. back to the GP, on to a leg ulcer clinic or lymphoedema service) instructions should be clear to the specialist practitioner or service.

Regardless of role and extent of involvement, every member of the MDT should be charged with communicating about care with both the patient and other members of the MDT as appropriate (Appendix 2, p20). For example, pharmacists are particularly well-placed to communicate with patients, GPs and various specialists, and can help ensure the patient gets the appropriate care or that practitioners receive the appropriate information (Box 1, p15). Organisations using the social model of

care can also act as a referral/communication source that links with the MDT (Box 2, p16). An integrated pathway of care in which decisions are made with consultation and referrals (where appropriate), that supports the patient journey for the long term, is critical to ensuring concordance with compression therapy.

### Ongoing review and care

As with any chronic disease, there should be regular contact with the patient to monitor their treatment. It may be difficult for some patients to accept that compression hosiery must be worn for life if the desired effect and prevention of recurrence is to be achieved, but audit data have demonstrated that systematic well-leg checks and ongoing health education can prevent recurrence and encourage concordance with ongoing maintenance (Dowsett, 2011). High-risk patients require more regular review and should be asked to report back at appropriate intervals — and contacted if they do not. In areas where a lack of resources may lead to less-than-ideal review periods and difficulty referring a patient to a specialist, it is important to work with clinical commissioning groups (where applicable) to ensure sufficient access to ongoing review and care.

Based on the results of the initial assessment, patients should be risk-stratified to determine when they should receive another holistic, comprehensive assessment (Box 3, p16). In most cases, it is recommended that compression hosiery be remeasured and replaced every 3–6 months (NICE, 2012). Reassessments may be carried out by a practitioner who has more generalised competency in care of the lower-limb, such as a community nurse or pharmacist.

The results of this risk stratification should be recorded in the comprehensive assessment, and the patient followed up to ensure they return for subsequent holistic assessment. Keep in mind that other considerations — including age, nutritional status, and depression/mental health issues/psychosocial factors — may change the risk stratification and result in more frequent reassessment.

In addition, patients should be assessed for compliance with compression hosiery treat-

### Key points:

1. The multidisciplinary team (MDT) should be involved in the ongoing, comprehensive care of the person with compression hosiery, with specialist referral used where specific skills are needed to add value to care.
2. Roles should be linked on a decision-making and referral pathway to ensure the right patients are connected to clinicians with the appropriate and necessary skills, which more efficiently uses time and resources.
3. The role of pharmacists is changing, in terms of their ability to act both as a direct contact with the patient and a care link with MDT members.
4. Patients can be referred to, or self-refer into, a leg ulcer clinic, lower-leg care service or Leg Club.
5. There should be regular MDT contact with patients prescribed compression hosiery, to monitor suitability of treatment and its outcome.
6. Based on the results of the initial assessment, patients should be risk-stratified to determine when they should receive another holistic, comprehensive assessment.
7. When possible, patients should take some responsibility for their care, supported by practitioners taking a caring and motivational approach.



ment and be re-measured and re-fitted for a new hosiery prescription every 6 months. Old hosiery should be checked for lack of expected wear or over-use. Patients should be given the option of regular contact to monitor treatment, such as face-to-face appointments, telephone or text message check-ins or via online methods.

Pharmacists undertake Medicines Use Reviews (MURs; known as Chronic Medication Service in Scotland and Managing Your Medicines in Northern Ireland) on long-term, repeat prescriptions. In these structured reviews, pharmacists identify and discuss prescriptions and over-the-counter medications with patients, sending the results of the review to patients' GPs.

The MUR process may seem more informal to patients, but it should be part of the formal ongoing review process, with triggers for intervention and referral. Trigger questions for prescribing or re-prescribing may include:

- Are you experiencing swelling in your legs?  
If yes: Have you been prescribed appropriate compression hosiery?
- Do you have any problems with the skin on your legs?
- Do you have any issues with your compression hosiery?
- Have you had an ABPI in the last year?

Any problems reported by patients should trigger a re-assessment. In addition, the pharmacist could intervene when a patient presents at the pharmacy for the dispensing of other prescriptions or healthcare needs, and share information with the GP. In this way, the pharmacist can act as the 'safety net' of the MDT.

### Patient involvement and concordance

Although patients do need to take some responsibility for their care, this should be supported by practitioners taking a caring and motivational approach. When patients are involved in decision-making (Hopkins, 2004; International Consensus, 2012) practitioners can improve patient concordance with medical advice by tailoring treatment to individual patients' needs and desires. However, ensuring concordance with compression therapy remains a challenge (Box 4, p17). Listening to a patient to understand important lifestyle

factors can help to find solutions (Moffatt, 2004). Written information should be provided, to support patients at home.

This might result in balancing evidence-based care with what patients will accept and use, to improve concordance. For example, if an elderly patient cannot tolerate the indicated level of compression or is unwilling based on a previous experience of pain, the practitioner might need to be pragmatic and apply reduced compression to re-introduce compression to gain the patient's trust (Vowden and Vowden, 2012; Beldon, 2013). It is acceptable to discuss compromise, as it keeps the patient engaged and can help ease patients into the idea of committing to a long-term treatment such as compression hosiery.

#### Box 1. The changing role of pharmacists

Differently placed from other practitioners, pharmacists can work both as a direct contact with the patient and a care link with the members of the multidisciplinary team. Because pharmacists may be the first point of contact for patients (and potential patients), and may see some patients more often than GPs do, they are ideally positioned to engage people at risk of venous or lymphatic disease on a daily basis, and discuss intervention at an early stage (O'Hanlon, 2013). Patients may be at risk due to:

- Hereditary factors (e.g. a parent had venous disease)
- Pregnancy (including after birth, in addition to during gestation)
- Occupation (e.g. standing for long periods of time)
- Injury to the legs
- Being overweight
- Age (vein elasticity is gradually lost with age)
- Travel, particularly long-haul air travel.

Pharmacists are in a prime position to make interventions on a regular basis with patients, based on their medication histories, by observing them or by asking relevant questions while face-to-face with patients. They are therefore ideally positioned to help:

- People with untreated swelling of the limbs, or changes in the appearance of the skin on their lower limbs
- People who don't re-order hosiery
- People with ill-fitting hosiery and related problems
- People with mobility problems that may make hosiery difficult to self-apply
- Changes to the person's original condition. For example, a deterioration in the varices or the other leg becoming affected.

In addition, pharmacists can intervene when a patient presents at the pharmacy with a prescription. For example, where GPs prescribe only one pair instead of two, or one leg instead of both, or patients decline to fill repeat prescriptions. Where this is seen, the pharmacist can speak to the patient or contact the GP or practice to advise.

Medicines Use Reviews (MURs; known as Chronic Medication Service in Scotland and Managing Your Medicines in Northern Ireland) are opportunities to see whether a patient has been re-prescribed hosiery at the appropriate intervals. The pharmacy team, including pharmacy technicians, can also use patient medication records to identify when reassessment and re-prescription of hosiery is needed, to help improve compliance. Further, the pharmacist and technicians can opportunistically enquire about hosiery during pharmacy visits, asking how they are wearing it and whether they are having any issues with it. If patients are not complying with treatment, the pharmacist can explain why hosiery should be worn, initiate a discussion about referral back to the GP for follow-up, and offer possible solutions (e.g. different style or colour).

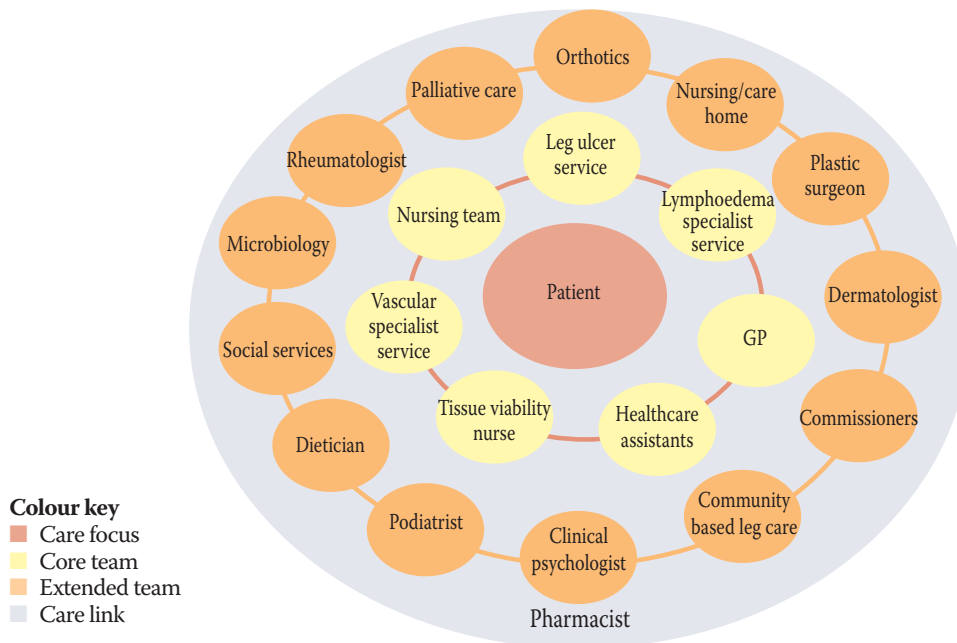


Figure 1. Patient-focused care in the context of a multidisciplinary team

Give patients practical advice. Have them bring hosiery with them to appointments, and spend time reiterating good practice in donning and doffing. Be realistic about the challenges of everyday life for some patients when advising on hosiery removal and application, hosiery wear times, and how to care for the garment. Let patients know they are able to choose colours that aren't on drug tariff, and

will have to pay only the excess above the tariff price.

Explore other avenues that will aid treatment and make compression more tolerable, e.g. skin care, elevation, activity and weight loss (bringing a dietician into the MDT if necessary). Discuss the advantages and disadvantages of application aids that may

**Box 3. Risk stratification for re-assessment\***

**Annual**

- No cellulitis
- Limited or well-controlled comorbidities
- Healed ulcer (no recurrence in 12 months)
- Stable oedema
- Fully concordant, no reported problems with hosiery
- ABPI >0.9

**6-monthly**

- Lower-leg infection, even if it has been resolved
- Diagnosed with new disease/comorbidity
- History of recurrent lower-limb problems
- Multiple morbidities on an established regimen

**3-monthly**

- History of non-concordance
- Repeated poor fit
- Increasing oedema
- Skin breakdown/ulceration
- Rapidly changing medical condition (e.g. palliative)

\*Expedite new assessment if there is increased oedema, lower-leg pain or new ulceration

**Box 2. The role of the social model of care**

Loneliness or loss of social contact in patients with leg ulceration has been linked to lack of motivation, increased levels of wound recurrence and poor clinical outcomes (Hawkins and Lindsay, 2006). These occurrences are not always best addressed by medically based clinics (Hopkins, 2004). Leg treatment services that include a social dimension can therefore enhance patient perception of quality of life, help improve healing rates, engender positive health benefits (eliminating sick-role behaviours), improve morale and reduce pain levels.

Lindsay Leg Clubs were developed as a way to treat patients suffering from or at risk of leg ulceration, within a social model of care (Lindsay, 2004). This was intended to address both healing and the wider factors affecting this patient group, such as social isolation and wellbeing. The Leg Club model partners practitioners with the local community, letting patients become stakeholders in the delivery of their own care, empowered to make informed decisions and take ownership of their treatment and continuing well-leg maintenance.

Leg Clubs provide informal, drop-in facilities for easy access and an un-intimidating, non-medical setting that encourages people of all age groups to seek advice when they might not consider attending a formal clinic or GP surgery. This presents an ideal environment for opportunistic and early diagnosis, health promotion and treatment of advanced lower-limb problems — especially where this service works as a gateway to other members of the multidisciplinary team.

In partnership with practitioners, Leg Clubs are managed by a committee of volunteers from the local community, who provide services

such as administrative support, moral support, refreshments and transport. Fundraising within the community provides for hiring premises and for the purchase of specialised equipment such as Doppler machines, ultrasound and digital cameras, as well as all the social services deemed by the club's members to be important.

In this environment, leg care is carried out collectively; patients are able to share their experiences and gain peer support, which can effectively address many patient-centred issues, particularly when used alongside a well-planned clinical decision-making pathway.

Follow-up care by social leg services is an essential part of preventing recurrence (in the case of venous leg ulcers), encouraging ongoing maintenance and promoting a well-leg regimen. Once every three months, patients attending for well-leg monitoring receive a full reassessment, including a Doppler scan to ensure ABPI remains satisfactory. Before prescribing new hosiery, the patient is re-measured to ensure that stockings are correctly fitted.

Outcomes for patients attending Lindsay Leg Clubs tend to be very encouraging, with a dramatic decrease in ulcer recurrence rates, combined with high levels of patient satisfaction, wellbeing and cost-effectiveness (Clark et al, 2014).

The best way for patients to join a Leg Club is for them to be referred by their general practitioner. Where there is not a formal Leg Club in place, a similar structure can be organised to offer an alternative social model of care.

suit the patient's needs, and supply the one that is chosen. In addition, there is anecdotal evidence that including a clinical psychologist in the MDT, who is available for patients during clinic times, can positively affect patient compliance. If this isn't a practical option, an alternative is to train practitioners in motivational interviewing (Rollnick et al, 2010), which might prove to be more cost-effective.

Use a motivational interviewing approach to ask questions such as:

- How do you feel treatment is working?
- Why have you not been able to comply?
- What issues do you have with application and removal?
- How is your carer helping you? What is your social structure?
- Have you had recent episodes of memory loss or self-neglect?

- Why do you think treatment has been prescribed?
  - What are the effects of temperature, weather, work/occupation, etc., on your daily hosiery wear?
  - How does your age (younger versus older) affect wear and application/removal?
- There will be different issues and attitudes depending on the age group, so care may need to be adjusted accordingly.

Where patients are non-concordant, demonstrate informed choice by documenting attempts at numerous interventions, using a variety of methods of communication. Patients can then sign this document, stating they have been fully informed, understand the proposed care options, and wish to take a decision against medical advice. This route should be used as a last resort only.

**Box 4. Fundamental steps to patient concordance (Brown, 2013)**

- 1 Ask about overall well-being, keeping in mind the patient is a person with individual needs
- 2 Prioritise wellbeing when assessing, measuring and fitting compression hosiery
- 3 Offer a genuine choice in treatment options and provide treatment accordingly
- 4 Use patient feedback to plan and adapt care
- 5 Collaborate with the multidisciplinary team, particularly to develop strong local referral pathways

**BPS application to practice: Disease and service management**

Best practice statement (BPS)	Reason for BPS	How to demonstrate best practice
The multidisciplinary team (MDT) should be involved in care of the person with compression hosiery, with specialist referral used where specific skills are needed to add value to care	To ensure comprehensive, holistic ongoing care and efficiently use time and resources	Develop decision-making and local referral pathways that link roles and connect patients with practitioners with the appropriate and necessary skills
Each MDT member's scope of practice should focus on the skills and roles in which competency can be reasonably/have been achieved, rather than being narrowly limited by the constraints of job titles	To ensure patients receive expansive, ongoing care related to their compression hosiery, while maximising care resources	Train members of the MDT in the necessary skills to achieve competency where possible in care related to compression hosiery. Document training and achievement of competence
The pharmacist should be educated and included in the MDT as both a care link to other members and as a direct contact with the patient	Pharmacists are differently placed from other practitioners, and can act as a safety net for patients with compression hosiery prescriptions, or those who might be candidates for hosiery	Develop communication channels with local pharmacists. Educate patients on the role of the pharmacist
Refer patients to a Leg Club or similar structure (e.g. leg ulcer clinic, lower-leg clinic, lymphoedema clinic, self-management courses)	To help empower patients to make informed decisions about and take ownership for their treatment and continuing well-leg maintenance	Create links with a local socially-based care model. Document referral of the patient
Ensure regular MDT contact with patients prescribed compression hosiery	To monitor treatment. Systematic well-leg checks and ongoing health education can prevent recurrence and encourage concordance with maintenance therapy	Develop a decision-making pathway and care plan that call for regular appointments or communications with patients. Document encounters, and audit to ensure contact rates match those prescribed by the care plan
Based on the results of the initial assessment, patients should be risk-stratified	To determine when they should receive another holistic, comprehensive assessment	The results of this risk stratification should be recorded in the comprehensive assessment, and the patient followed up to ensure they return for subsequent holistic assessment
Patients need to take some responsibility for their care, but should be supported by practitioners taking a caring and motivational approach	When patients are involved in decision-making, practitioners can improve patient concordance with medical advice by tailoring treatment to individual patients' needs and desires	Provide patients pragmatic advice about their care options on an ongoing basis. Use motivational interviewing techniques and prioritise their concordance with treatment. Document the education and discussion notes in the patient record

## APPENDIX 1: ROLES AND COMPETENCIES

### GENERAL ROLE DEFINITIONS

#### Dermatologist

A specialist physician who diagnoses and treats conditions of the skin, hair and nails.

**Role:** Referral may be needed in the event of cellulitis, suspected sensitivities or other skin conditions concurrent with chronic oedema or venous insufficiency.

#### Dietitian

A person professionally qualified to translate the science of nutrition into everyday information about food, typically working in the hospital, GP surgery and community settings.

**Role:** Optimising patients' nutritional status to help treat underlying conditions.

#### Community nurse (including practice nurses)

A nurse who visits and treats patients in their homes or in the GP practice, operating in a specific area or in association with a particular general practice surgery or health centre. **Role:** Direct contact with the patient, in support of the GP's/clinical specialist's plan of care.

#### General practitioner

Medical doctor who treats acute and chronic illnesses and provides preventive care and health education to patients. **Role:** Often the first point of contact for patients with lymphatic or venous diseases; develops care plan with other MDT members, referring the patient as necessary; primary follow-up contact.

#### Healthcare assistant

Sometimes known as nursing auxiliaries or support workers, healthcare assistants are not qualified nurses, but work in a skill-mix team with nurses, midwives and other healthcare professionals. **Role:** Supports care and patients' comfort and well-being.

#### Lymphoedema specialist practitioner

Clinical specialist practitioner who provides lymphoedema-focused care for patients, including assessment and diagnosis, and lymphoedema information to other healthcare professionals. **Role:** Assess, diagnose and treat patients with lymphoedema; measure, prescribe, fit and explain the use and care of compression hosiery; communicate information about care to other members of the MDT.

#### Pharmacist

A person professionally qualified to prepare and dispense medicinal drugs and other prescriptions from an appropriate practitioner; may also prescribe for medical conditions within their own competences. **Role:** Perform annual prescription reviews, linking information back to the GP; advise members of the MDT in prescribing best practices; use frequent contact with patients to communicate to other members of the MDT; act as a 'safety net'.

#### Physiotherapist

Licensed healthcare professional who can help patients reduce pain and improve or restore mobility through manual therapy, therapeutic exercise and the application of electro-physical modalities. **Role:** Help increase patients' mobility status; direct patients to GP if increased oedema or skin changes in the limb are noted.

#### Podiatrist

A medical professional who diagnoses and treat abnormalities of the lower limb, typically in the foot and ankle. **Role:** Direct patients to GP if increased oedema or skin changes in the limb are noted; support ongoing use of compression.

#### Rheumatologist

A specialist physician focusing on the investigation, diagnosis and management of patients with arthritis and other musculoskeletal conditions. **Role:** Direct patients to GP if oedema increases or skin changes occur in the limb.

#### Tissue viability nurse

Clinical specialist nurse who focuses on preventing injuries to the skin and underlying tissues, facilitating healing in wounds with delayed healing, and communicating information about prevention and healing to other healthcare professionals. **Role:** Assess and diagnose patients; measure, prescribe, fit and explain the use and care of compression hosiery; communicate information about care to other members of the MDT.

#### Vascular nurse

Clinical nurse specialist who acts as a central member of the vascular team, assessing and diagnosing patient conditions, and commu-

nicating about and coordinating services and care between the hospital and the community.

**Role:** Assess and diagnose patients; measure, prescribe, fit and explain the use and care of compression hosiery; communicate information about care to other members of the MDT.

### Vascular surgeon

A specialist physician focusing on medical and surgical interventions for the treatment of diseases affecting the vascular system, including diseases of arteries, veins and lymphatic vessels. **Role:** Treat the underlying disease via surgical intervention. Direct patients to relevant practitioner if oedema increases or skin changes in the limb.

## ROLES AND DEFINED LEVELS OF COMPETENCY AND SKILL

A competent person is someone with enough training and experience or knowledge and other qualities to be able to implement these measures properly. Keep in mind that this diagram provides only general guidance, and that actual competency levels and roles will vary by specialty, area and practice (Figure 1).

Specialist

Advanced

Generalist

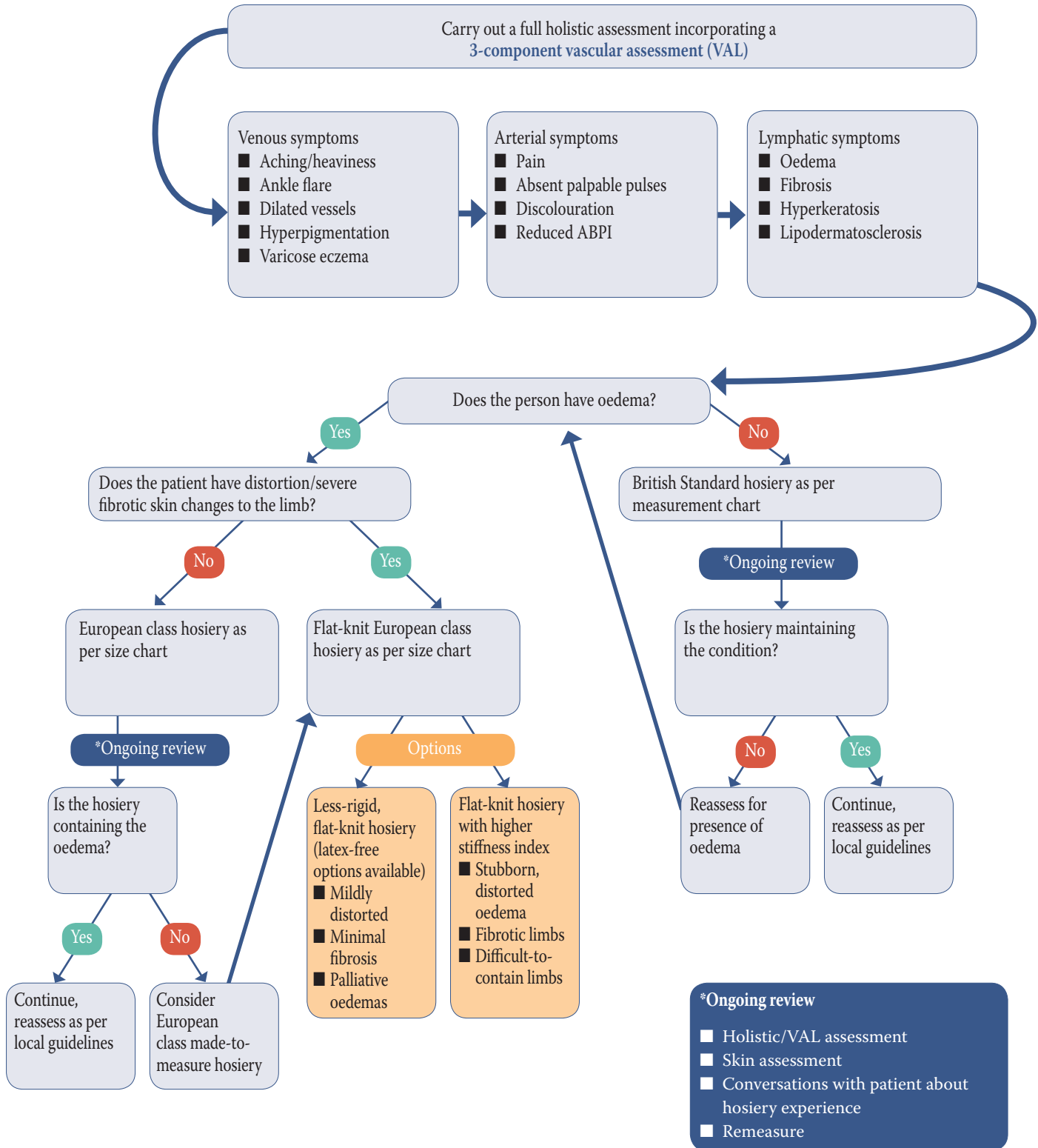
Figure 1. Skills framework

Task	Note	Practitioner
Assessment and diagnosis	Requires specialist skills, understanding of venous or lymphatic diseases	GP, lymphoedema specialist, tissue viability nurse, vascular nurse, community nurse/practice nurse with specialist skills
Reassessment	Requires competency in reassessment skills	Dermatologist, district nurse, GP, lymphoedema specialist, pharmacist, podiatrist, practice nurse, rheumatologist, tissue viability nurse, vascular nurse, vascular surgeon
Compression hosiery measurement	Requires training in measurement and fitting	District nurse, GP, lymphoedema specialist, pharmacist, tissue viability nurse, vascular nurse, pharmacy technician
Compression hosiery product selection and prescription	Requires understanding of different types of compression and levels of pressure applied	GP, lymphoedema specialist, pharmacist (typically 14–17mmHg), practice nurse (typically 14–17mmHg), tissue viability nurse, vascular nurse
First application of new hosiery and instruction in use of aids	Requires training in application of compression	GP, lymphoedema specialist, pharmacist, practice nurse, tissue viability nurse, vascular nurse
Referral for assessment and diagnosis	Requires understanding of triggers for referral and ability to make referrals	Dietitian, district nurse, GP, lymphoedema specialist, pharmacist, physiotherapist, podiatrist, practice nurse, rheumatologist
Ongoing care	Requires skills according to each practitioner's role in the multidisciplinary team	All members of the multidisciplinary team
Communication regarding care and concordance	Requires interaction between roles and between practitioners and patients	All members of the multidisciplinary team

### Regardless of job function, the practitioner should:

- Carry out care in a consultation room, to respect patient dignity, or collectively if in a social care-model setting
- Communicate with the patient about what's going to happen
- Have general knowledge of measuring systems and hosiery used
- Follow accepted compression hosiery guidance.

## APPENDIX 2: DECISION-MAKING ALGORITHM FOR COMPRESSION HOSIERY



Adapted from Stephen-Haynes and Sykes, 2013

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Wounds<sub>UK</sub>