**Definition(s)**
- **Lymphedema**: is a condition in which protein-rich fluid accumulates in the tissues due to a failure of the lymphatic system. In cancer care, it is most often associated with lymph node dissection and radiation therapy to lymph nodes. It can develop at any time between a few months and up to twenty years after treatment.
- **Lymphorrhea**: Weeping of straw-colored lymph fluid which may lead to maceration and increase risk of infection (bacterial, yeast, fungal).
- **Cellulitis**: Inflammation of tissue around a lesion that indicates an acute spreading infection of the skin, characterized by tenderness, swelling, redness.

### Appendix A: Assessment and Management of Cellulitis and Lymphorrhea

#### FOCUSED HEALTH ASSESSMENT

<table>
<thead>
<tr>
<th>PHYSICAL ASSESSMENT</th>
<th>SYMPTOM ASSESSMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vital Signs</strong></td>
<td><strong>Normal</strong></td>
</tr>
<tr>
<td>As clinically indicated</td>
<td>• Have you had any previous difficulties with limb swelling? Changes in sensation? Decreased flexibility</td>
</tr>
<tr>
<td><strong>Observe patient’s general appearance</strong></td>
<td>• Usual activity level prior to cancer diagnosis?</td>
</tr>
<tr>
<td><strong>Inspection</strong></td>
<td><strong>Onset</strong></td>
</tr>
<tr>
<td>• Observe posture: rounded shoulders, guarding or cradling of extremity</td>
<td>• When did it start? (i.e. suddenly or gradually over the last few days?)</td>
</tr>
<tr>
<td>• Accessory muscles use, chest wall movement, shape/abnormalities</td>
<td>• How long did previous episodes last, if any?</td>
</tr>
<tr>
<td>• Mobility, range of motion of nearest joint (i.e. limb, head, neck)</td>
<td>• How often does it occur?</td>
</tr>
<tr>
<td>• Observe skin color, pallor, redness, wounds, discoloration, shininess. Shiny appearance associated with more advanced lymphedema</td>
<td>• Has the swelling been intermittent or continuous? Has there been progression over time?</td>
</tr>
<tr>
<td>• Inspect for asymmetry, tautness, loss of normal skin folds</td>
<td>• Does clothing or jewelry feel tighter or leave marks on the skin of the affected limb?</td>
</tr>
<tr>
<td>• Peripheral edema – bilateral or unilateral</td>
<td><strong>Provoking / Palliating</strong></td>
</tr>
<tr>
<td>• Pitting or non-pitting edema-to test for pitting edema apply firm pressure to edematous tissue for a minimum of 5 seconds)</td>
<td>• What triggered swelling? What makes it worse? What makes it better? Is it reduced in the morning? Any recent trauma, puncture wounds, burns, bites? Any heavy lifting, unusual or repetitive activity?</td>
</tr>
<tr>
<td>• Generalized edema</td>
<td>• Any exposure to extreme heat?</td>
</tr>
<tr>
<td>• Head, neck and truncal edema</td>
<td>• Any recent prolonged travel? (flying or driving)</td>
</tr>
<tr>
<td>• Breast edema</td>
<td>• Previous episodes of cellulitis, erysipelas or lymphangitis?</td>
</tr>
<tr>
<td>• Abdominal ascites</td>
<td>• Previous history of blood clots or DVT?</td>
</tr>
<tr>
<td>• Vein distention</td>
<td><strong>Quality</strong></td>
</tr>
<tr>
<td>• Marks left on skin from jewelry or clothing (e.g. bra straps, socks) and compare bilaterally</td>
<td>• Changes in comfort or sensation? Any pain, tightness, fullness, aching, heaviness, numbness, burning sensation? Itching?</td>
</tr>
<tr>
<td><strong>Palpation</strong></td>
<td><strong>Region / Radiation</strong></td>
</tr>
<tr>
<td>• Turgor, warmth, texture of underlying tissues, presence of pitting</td>
<td>• Pattern of development and progression (proximal-distal)</td>
</tr>
<tr>
<td>• Peripheral pulses</td>
<td><strong>Severity</strong></td>
</tr>
<tr>
<td>• Check for <strong>Stemmer's sign</strong>: In the advanced lymphedematous limb, a fold of skin cannot be pinched and lifted</td>
<td>• How bothersome is this symptom to you? (on a scale of 0 – 10, with 0 not at all and 10 being the worst imaginable)</td>
</tr>
<tr>
<td><strong>Measurements</strong></td>
<td><strong>Treatment</strong></td>
</tr>
<tr>
<td>• Height and Weight</td>
<td>• What do you do/ have you done when you notice upper/ lower limb swelling?</td>
</tr>
<tr>
<td>• Edema measurements (i.e. limb, head, neck, trunk)</td>
<td>• What medications or other strategies (i.e. exercise, physiotherapy, elevation compression sleeves, etc.) have you tried in the past?</td>
</tr>
<tr>
<td>• Perform measurements to establish early onset and / or treatment effectiveness</td>
<td></td>
</tr>
<tr>
<td>• Use non-stretch measuring tape</td>
<td></td>
</tr>
</tbody>
</table>

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**Understanding / Impact on You**
- What have you been told about lymphedema?
- How does the presence of lymphedema affect you?
- How has this condition affected your activity?
- How does this affect your family?

**Value**
- What is your comfort goal or acceptable level for this symptom? (0 – 10 scale)
- Are you interested in receiving assistance in managing this condition?

### PHYSICAL ASSESSMENT CONT.

#### Limb Edema Measurement
- Measure both limbs at predetermined intervals; start with unaffected side to establish baseline.
- Difference of 2.0 cm between affected and unaffected limb is considered clinically significant and indicative of lymphedema. Lymphedema starts before this difference is evident; many secondary and sometimes irreversible changes have already occurred by this time.

#### Upper extremity limb measurement
- With limb in supported position. Palm down and arm straight measure:
  - Circumference starting at mid hand, wrist, mid fore-arm, elbow, mid upper arm, under the axilla
- Assess for truncal edema (lateral to breast and often extends to lateral border of scapula)
- Assess for breast edema (most easily identified by marks from bra, skin pallor and fullness compared to non-affected side)

#### Lower extremity limb measurement
- Patient to be supine, standing or sitting with foot flexed to 90 degrees measure:
  - Circumference starting at heel, mid calf, knee, along the leg until 2 cm below the popliteal fossa. If swelling exists above the knee, continue measurements to 2 cm below the gluteal crease

### LYMPHEDEMA GRADING SCALE

<table>
<thead>
<tr>
<th>NCI CTCAE (Version 4.03)</th>
<th>Normal</th>
<th>GRADE 1 (Mild)</th>
<th>GRADE 2 (Moderate)</th>
<th>GRADE 3 (Severe)</th>
<th>GRADE 4 (Life threatening; disabling)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asymptomatic</td>
<td>Trace thickening or faint discoloration</td>
<td>Marked discoloration; leathery skin texture; papillary formation; limiting instrumental ADLs (e.g. preparing meals, shopping, managing money)</td>
<td>Severe symptoms; limiting self care ADLs (e.g. bathing, dressing, feeding self, using the toilet, taking medications)</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

*For Further Grading See Appendix C: International Society of Lymphology (ISL) Lymphedema Scale*
**Step-Up Approach to Symptom Management:**
Interventions Should Be Based On Current Grade Level and Include Lower Level Grade Interventions As Appropriate

### NORMAL – GRADE 1

### NON – URGENT:
Prevention, Support, teaching & follow-up care as required

Prior to any treatment the presence of DVT, infection, cancer recurrence, or superior vena cava obstruction must be ruled out by a physician

| Patient Care and Assessment | - The risk of lymphedema is greatest within 3 years of lymph involving surgery or radiation therapy, although ongoing assessment are necessary as the risk persists indefinitely
- Early intervention improves control of lymphedema
- Patient education is key in early detection |
| Patient Education | - Ideal time to introduce lymphedema education would be pre and post surgery and post radiation therapy
- To limit severity of condition, encourage early recognition and reporting of signs of lymphedema and infection including: heaviness, tightness, discomfort, swelling, stiffness, change in sensation, redness, temperature, rash and flu-like symptoms. If experiencing these symptoms seek medical attention promptly.
- At risk individuals should perform self-assessments and report changes in size, sensation, color, temperature or skin condition
- Avoid the following on affected side or site(s):
  - Carrying heavy items
  - Extreme temperatures (i.e. hot tubs) and application of heat to affected limb
  - Blood pressure, venipuncture, glucose monitoring or injections
  - Constrictive pressure (e.g. tight-fitting clothes, jewelry)
  - Prolonged sitting, crossing legs and standing if lower extremity lymphedema
  - Movements that cause repetitive strain
- Air Travel Precautions:
  - Encourage: Exercise, deep breathing, standing and moving every 30 minutes. Patients with upper extremity lymphedema may periodically squeeze a small ball in hand
  - Maintain adequate fluid intake
  - Avoid carrying or moving heavy luggage
  - Individuals at risk and/or have experienced swelling, should wear an arm sleeve before, during and for several hours after travel to promote maximum lymphatic drainage. Patients with lower extremity lymphedema may wear compression garments at least to knee |
| Healthy Lifestyle Promotion | - Dietary Management
  - Encourage healthy body weight
  - Encourage low fat and salt-restricted diet
  - No indication for restriction of oral fluids or protein intake to control lymphedema
  - Consult with a Registered Dietician for help with attaining a healthy BMI
- Therapeutic Exercise
  - Prophylactic/early exercise and physiotherapy offer additional benefit and are generally recommended
  - Deep breathing and regular activity enhances normal physiological processes involved in lymphatic transportation
  - Encourage post-operative stretching, range of motion and strengthening exercises as directed by surgical team
  - Encourage slowly progressive exercises (ie. Resistance and strength training) including to the affected limb with careful monitoring
  - If patient has compression garment, encourage that it be worn during exercise |
### Infection Prevention
- **Skin and Nail Care**
  - Thorough skin and nail care is recommended to prevent an entry port for infection
  - Treat abrasion or small tears (i.e. paper cuts) immediately with a topical antibiotic
  - Use mirror to examine hard to see areas with careful examination if neuropathy present
  - Wash limb daily using pH neutral soap. Dry carefully, especially between fingers and toes
  - Moisturize with unscented, water-based, low pH lotion. To prevent folliculitis, apply lotions using longitudinal strokes in a proximal to distal direction (follow direction of hair growth).
  - Do not apply lotions directly before applying compression garment
  - Avoid abrasive and perfumed products, adhesive bandages, and chemical hair removers
  - Protect affected limb from sunburn, insect bites, pet scratches, injury
  - Wear gloves during gardening, cooking, housework; avoid going barefoot
  - Use only electric razors
- **Recognize the signs and symptoms of infection**
  - Fever
  - Inspect skin daily for dermatitis, breakdown, redness, lymphorrhea, pain and warmth; report symptoms to healthcare providers as early intervention is required

### Independent Care Techniques
- **Limb elevation**
  - Elevation of limbs above heart level may decrease swelling in the early stage
- **Simple lymphatic drainage**
  - Self-directed and self-performed massage techniques may help facilitate lymphatic drainage

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**URGENT – GRADE 2**

**URGENT:** Requires medical attention within 24 hours

Any sudden and/or new unilateral swelling must be assessed within 24 hours

*Prior to any treatment the presence of DVT, infection, cancer recurrence, or superior vena cava obstruction must be ruled out by a physician*

<table>
<thead>
<tr>
<th>Patient Care and Assessment</th>
<th>Collaborate with physician to rule out other causes or concomitant causes of lymphedema and to determine if further investigation warranted</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tests that may be ordered: CT scan, MRI, venous doppler, blood cultures, CBC</td>
</tr>
<tr>
<td>Manual Lymphatic Drainage (MLD)</td>
<td>A massage technique that uses light, superficial, and gentle strokes to mobilize edema fluid and encourage its recirculation back to the blood circulatory system</td>
</tr>
<tr>
<td></td>
<td>Initially done by a Registered Massage Therapist, but techniques can be taught for patient to perform to self at home</td>
</tr>
<tr>
<td>Compression Bandaging</td>
<td>Multilayered padding and short-stretch bandages are applied to the affected limb which helps increase lymphatic flow</td>
</tr>
<tr>
<td></td>
<td>Generally applied after manual lymphedema drainage is performed</td>
</tr>
</tbody>
</table>
### Compression Garments
- Should be assessed and prescribed by a trained therapist
- Compression garments (e.g. lymphedema compression sleeve or stocking) promotes mobilization of edema fluid
- Recommended at first signs of swelling once assessment completed
- Should have high stiffness, but tolerable resting pressure to ensure a comfortable fit and increase adherence. Prescription indicating amount of pressure is required (often done by trained therapist)
- Should be accompanied with adequate skin care, exercise and MLD
- Improper application can compress nerves or blood vessels and cause complications; pharmacies specializing in medical equipment with certified fitters recommended
- For best results, encourage use of garment during day and removal at night. Option to wear breast pad and/or purpose designed night garments overnight as prescribed to prevent tissue fibrosis.
- Replace garment every 3-6 months or when elasticity decreased
- Wash daily
- Custom garments are available for head, trunk and genital edema
- Supportive bras and compression tops for truncal edema
- Should be accompanied and prescribed by a trained therapist
- Compression garments (e.g. lymphedema compression sleeve or stocking) promotes mobilization of edema fluid
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- Replace garment every 3-6 months or when elasticity decreased
- Wash daily
- Custom garments are available for head, trunk and genital edema
- Supportive bras and compression tops for truncal edema

### Intermittent Pneumatic Compression
- An electrical air compression pump is attached to a plastic sleeve or stocking that is intermittently inflated over the affected limb
- May be beneficial in addition to complex decongestive therapy

### Complex Decongestive Therapy
- Is a multimodality technique usually delivered in a two-phase program
- Phase I (Treatment/Active Phase) includes: Skin and nail care, therapeutic exercise, manual intensive lymphatic drainage and limb compression with multi-layer compression bandaging with varying degree of compression, additional materials and support materials (e.g. foam, wool).
  - Phase I is done with specially lymphedema trained physical or occupational therapists
  - Lasts 2-12 weeks depending on the amount of swelling and tissue firmness
  - Compression is maintained for 21-23 hours per day in this phase
- Phase II (Maintenance Phase) includes: Compression garments, continued skin care and therapeutic exercise, self-administered lymphatic massage. Night garments indicated if fibrosis is present
  - Phase II is at home care with self-directed continuation of the exercises and should only be implemented after phase I is complete

### Subcutaneous Drainage
- [H:\EVERYONE\nursing\REFERENCES AND GUIDELINES\BCCA Nursing Practice Reference Manual](S-60 Subcutaneous Drainage for the Management of Lower Extremity Edema)

### Pharmacologic Management
- Diuretics are not usually prescribed for lymphedema as edematous fluid is not easily shifted into the vascular space
- Antibiotic use for cellulitis. IV antibiotics may be required for severe cellulitis, lymphangitis or sepsis
- Antimicrobial dressings for wounds/lymphorrea and weeping
- Prompt topical antibacterial ointment (i.e. Polysporin) for small cut or skin abrasions
### Referrals
- Emergency department or physician if suspected cellulitis
- Home Health Nursing
- GP
- Infectious disease specialists
- Wound care specialists
- Pain and Symptom Management/Palliative Care Program (PSMPC)
- Patient Support Centre or Telephone Care Management
- Patient and Family Counseling
- Physiotherapy and Occupational therapy
- Lymphedema specialist
- Certified fitters

### Patient Education Resources
- [www.bclymph.org/](http://www.bclymph.org/)
- [www.bcphysio.org](http://www.bcphysio.org)
- [www.massagetherapy.bc.ca](http://www.massagetherapy.bc.ca)
- [www.canadalymph.ca](http://www.canadalymph.ca)
- http://www.bccancer.bc.ca/health-info/types-of-cancer/breast-cancer/lymphedema

For compression garment fitters: [https://bclymph.org/Professional-Directory](https://bclymph.org/Professional-Directory)

For therapists: [https://bclymph.org/Professional-Directory](https://bclymph.org/Professional-Directory)

For a list of Certified RMT’s for MLD and CDT: [https://vodderschool.com/contacts/search](https://vodderschool.com/contacts/search)


Pharmacare coverage for upper extremity lymphedema: [https://www2.gov.bc.ca/gov/content/health/health-drug-coverage/pharmacare-for-bc-residents/what-we-cover/medical-supplies-coverage/prostheses?keyword=lymphedema](https://www2.gov.bc.ca/gov/content/health/health-drug-coverage/pharmacare-for-bc-residents/what-we-cover/medical-supplies-coverage/prostheses?keyword=lymphedema)

E.g. Fair Pharmacare; BC Palliative Benefits. Can be found in “Other Sources of Drug Funding Section” [http://www.bccancer.bc.ca/health-professionals/professional-resources/pharmacy/drug-funding](http://www.bccancer.bc.ca/health-professionals/professional-resources/pharmacy/drug-funding)

### Contributing Factors

#### Cancer-Related
- Tumor causing obstruction of lymphatic channels or nodes (e.g. intrapelvic or intra-abdominal)
- Breast cancer can cause upper-extremity lymphedema and breast and truncal edema
- Gynecological Cancers, Genitourinary Cancers, Lymphoma, Melanoma often associated with lower-extremity edema
- Sarcoma
- Head and Neck Cancers
- Colorectal Cancers
- All tumors have potential to cause lymphedema

#### Non-Cancer Related
- Congenital and/or inherited abnormalities
- Trauma, surgery, filariasis (parasitic infection)
  - Recurrent skin infections (e.g. cellulitis)

#### Cancer Treatment
- Radiation therapy to lymph nodes (i.e. axillary, inguinal, pelvic, or supraclavicular areas)
### Appendix A: Assessment and Management of Cellulitis and Lymphorrhea

**Cellulitis**

*Prompt treatment is critical to avoid the development of tissue damage that predisposes patient to repeated episodes of infection and worsening lymphedema*

**Assessment:**
- Onset may be over minutes to weeks with systemic symptoms:
  - Swelling, skin red, warm or hot, tender to touch
  - More severe cases: fevers, chills, rigor, high fever, headache, vomiting malaise, decreased appetite
  - Skin rashes may be present

**Management:**
- Prior to prescribed antibiotic treatment:
  - Mark and date the edge of erythema
  - Establish presence and location of enlarged, tender lymph nodes
- Appropriate antibiotic treatment

*If episodes of cellulitis occur more than twice per year, patient may require prophylactic antibiotics

**Lymphorrhea**

- If seepage of lymph fluid occurs, layers of absorbent dressings are required to prevent skin maceration and breakdown
- Protect surrounding skin with lotion and apply a non-adherent, absorbent dressing
- Use a sterile thick dressing for 24-48 hours until leakage is resolved
- Dressings may require changing up to four or more times per day to prevent maceration

---

### Appendix B: Complications of Lymphedema

<table>
<thead>
<tr>
<th>Complication</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic Dermatitis</td>
<td>Inflammation of the epidermis and dermis of the skin</td>
</tr>
<tr>
<td>Hyperkeratosis</td>
<td>Patches of hard, reptile-like, thickened skin</td>
</tr>
<tr>
<td>Fibrosis</td>
<td>Thickened, brawny, leathery appearance due to connective tissue scarring</td>
</tr>
<tr>
<td>Cracks/ Fissures</td>
<td>Portal for staph/ strep infections as lymph vessels cannot drain away microbes that colonize or penetrate skin</td>
</tr>
</tbody>
</table>

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### Lymphangitis
Inflammation of the lymphatic channels resulting from infection at a site distal to the channel

### Lymphangiectasia
Blister-like lesions caused by dilatation of upper dermal lymphatic vessels - occur anywhere on lymphedematous limb, most commonly in areas of subcutaneous fibrosis (i.e. radiation treatment site). May progress to papillomatosis

### Papillomatosis
Skin has rough, cobblestone appearance and texture- engorged, raised lymph vessels on surface

### Reflex sympathetic dystrophy
A progressive and potentially disabling and extremely painful condition affecting nerves, skin, muscles, blood vessels and bones. Hallmarks include unexplained edema, burning pain, and temperature changes. Dystrophy may occur later.

### Secondary Malignancies
Squamous cell, lymphoma, melanoma and malignant fibrous histiocytoma have been associated with lymphedema (Lymphangiosarcoma-most common). Impaired local immunosurveillance is thought to be a causative factor.

### Lymphangiosarcoma (Stewart-Treves Syndrome)
This potentially fatal, rare consequence of uncontrolled lymphedema for > 10 years, and chronic tissue infections presents as purple-red patches and bumps on the skin of the lymphedematous area. All lesions should be biopsied.

### Delayed Wound Healing
Lymphedema causes pressure on blood vessels, decreasing circulation to the affected area. This causes a degree of ischemia, reduces the delivery of oxygen and nutrients and also inhibits the removal of cellular waste products. Increase in the colloidal proteins leads to stagnation of fluids and proteins and eventually fibrosis of connective tissues. This in turn predisposes the individual to infections which also contributes to fibrosis in the edematous limb.

---

**Appendix C: International Society of Lymphology (ISL) Lymphedema Scale**

<table>
<thead>
<tr>
<th>Stage 0 (Sub-clinical)</th>
<th>Stage 1 (Early/Mild)</th>
<th>Stage 2 (Moderate; requiring compression)</th>
<th>Stage 3 (Severe; limiting function)</th>
<th>Stage 4 (Severe; limiting function with ulceration)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Impaired lymph transport</td>
<td>• Edema may be present intermittently, resolve without treatment.</td>
<td><strong>Early:</strong></td>
<td>• Greater than 5 cm difference in limb circumference</td>
<td>• Massive distortion</td>
</tr>
<tr>
<td>• Asymptomatic</td>
<td>• Little or no pitting or limb distortion</td>
<td>• Skin may be shiny, stretched, fragile</td>
<td>• No pitting, poor skin turgor- feels firm (fibrosis)</td>
<td>• Very high risk for cellulitis</td>
</tr>
<tr>
<td>• Can remain in this stage for many years</td>
<td>• 2-3 cm difference in limb circumference, complaints of feeling of tightness, heaviness, fullness, stiffness.</td>
<td>• Significant limb distortion;</td>
<td>• Skin thickening</td>
<td></td>
</tr>
<tr>
<td>* Edema is usually not detectable until interstitial volume is approximately 30% above normal</td>
<td>• Able to tolerate compression garments</td>
<td>• May have difficulty buttoning sleeves, fitting into shoes. Unable to tolerate compression garment.</td>
<td>• Increased skin folds, fat deposits</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Pitting of tissue for up to twenty minutes following gentle pressure</td>
<td>• May be discolored-purple or brownish</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Positive Stemmer’s sign</td>
<td>• Peau d’orange</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Late:</strong></td>
<td></td>
<td>• Indurosis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Swelling not relieved by elevation</td>
<td></td>
<td>• Distortion of limb-may swell to 1.5-2.0 times normal size</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Non-pitting, brawny edema may also be present- due to chronic inflammation, tissue fibrosis</td>
<td></td>
<td>• Lymphorrhea (weeping) maybe present</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Hyperkeratosis, papillomatosis</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Lymphorrhea may also be present.

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