

## SUMMARY

## DECISION SUPPORT

## PATIENT EDUCATION/SELF MANAGEMENT

## Goals

- Accurately assess wounds
  - Partial vs. full-thickness
  - Colonization
  - Exudates
- Properly select and apply wound dressings
- Prevent complications or deterioration of existing wounds
- Recognize patients at risk for ulcer development
- Prevent ulcers in patients at risk

## Alerts

- Redness over pressure points, purple discoloration on dark skin
- Limited mobility
- Chronic edema
- Nonhealing wounds
- Incontinence
- Malnutrition

## Diagnostic Criteria/Evaluation

Breakdowns in the skin can result from a number of causes, most commonly injuries or pressure. Most breakdowns in the skin will heal within 7-10 days. Breakdowns in the skin that do not or are not expected to heal within 7-10 days should be considered for wound care as described in this Care Guide. Management of lacerations is not covered in this Care Guide.

## Wound classification

Determine etiology of wound. Etiologies to consider include:

- Pressure ulcers
- Venous stasis/insufficiency
- Arterial insufficiency (ischemic ulcers)
- Neuropathic (diabetic)
- Traumatic (includes surgery)

**Wound Assessment:** All wounds should be assessed and documented for the following

1. Location, size, stage: including length, width, depth, shape, edges;
  - Partial thickness: Stage 1 (epidermis only, includes abrasions), Stage 2 (into dermal layer)
  - Full thickness: Stage 3 (involving subcutaneous tissue), Stage 4 (subcutaneous tissue and underlying structures)
2. Periwound skin (within 4 cm of wound edges) edema, induration, erythema, pain, maceration, rash, absence of hair, dry, foreign bodies (drains, sutures, etc.)
3. Wound base appearance and color—Healthy tissue: granulation (red/pink and beefy); epithelialization; epithelial bridging  
Necrotic tissue: slough (yellow, tan); eschar (black, brown)
4. Evidence of *tunneling* (a passage under the skin extending in any direction through soft tissue creating dead space with potential for abscess formation) or *undermining* (area of tissue destruction along wound margins underlying intact skin)
5. Exudate: amount, color, type (serous, serosanguinous, sanguinous, fibrinous, purulent)

## Treatment Options

## General Wound Care

- Cleanse gently with wound cleanser with surfactant, avoid scrubbing. [Normal saline is an acceptable alternative if skin is intact or wound cleanser with surfactant is not available].
- Debride devitalized tissue if needed
- Prep skin in periwound area to promote dressing adherence and protect healthy skin
- Select proper primary and secondary dressings: dressing selections based on wound depth (partial vs. full-thickness), condition of the skin around the wound bed, degree of colonization, and amount of exudates, wound size, other features [e.g. for large or full thickness wounds, fill dead space with antimicrobial dressing (AMD) gauze]

## Monitoring

- **For all inpatients:** Inspect and monitor skin (at least daily) and as clinically indicated
- **In outpatients** with limited mobility, incontinence, vascular disease, diabetes or other conditions increasing risk for skin ulcer: Educate patients to monitor for skin breakdown.
- Change dressings as indicated by type of wound and dressing type.
- Determine if pressure ulcer preventive measures are necessary (See Prevention/Evaluation Algorithm page 11 and Braden page 12)

## TABLE OF CONTENTS

SUMMARY	PAGE 1
WOUND MANAGEMENT	PAGE 2-4
WOUND DRESSING ALGORITHM	PAGE 5
WOUND DRESSING PRODUCTS	PAGE 6-7
NEGATIVE PRESSURE	
WOUND THERAPY	PAGE 8
WOUND CLASSIFICATION	PAGE 9
INFECTION	PAGE 10
PRESSURE ULCER	PAGE 11-14
VENOUS ULCER	PAGE 15
ISCHEMIC/ARTERIAL ULCER	PAGE 16
WOUND CARE PHYSICIAN ORDER	PAGE 17
PATIENT EDUCATION	PAGE PE-1-4

Information contained in the Care Guide is not a substitute for a health care professional's clinical judgment. Evaluation and treatment should be tailored to the individual patient and the clinical circumstances. Furthermore, using this information will not guarantee a specific outcome for each patient. Refer to "Disclaimer Regarding Care Guides" for further clarification.

## SUMMARY

## DECISION SUPPORT

## PATIENT EDUCATION/SELF MANAGEMENT

### WOUND MANAGEMENT

The guiding principle in wound care is to keep wounds moist.  
Wet to dry dressings are no longer recommended as dry wounds heal more slowly.

<b>Assess wound</b>	<ul style="list-style-type: none"> <li>Determine location, size (including depth), and stage of wound</li> <li>Examine periwound skin</li> <li>Determine nature of wound bed (granulation, epithelial tissue, necrotic tissue, eschar)</li> <li>Identify tunneling or undermining</li> <li>Identify and quantify exudates</li> <li>Identify underlying cause of wound</li> </ul>
<b>Cleanse</b>	<ul style="list-style-type: none"> <li>Gently cleanse wound and surrounding skin (do not scrub) at the time of each dressing change using wound cleanser with surfactant. [Normal saline is an acceptable alternative if skin is intact or wound cleanser with surfactant unavailable]</li> <li>Apply sufficient pressure to cleanse the wound without damaging tissue or driving bacteria into the wound</li> <li>Irrigation pressure between 4 and 15 pounds per square inch (psi) is generally adequate to clean the wound surface without causing trauma to the wound bed. A 35 ml syringe with 19 gauge Angiocath creates an 8 psi irrigation pressure stream, which may be used to remove adherent material in the wound bed</li> </ul>
<b>Debride</b>	<ul style="list-style-type: none"> <li>Types of debridement:               <ul style="list-style-type: none"> <li><b>Sharp</b>-with scissors and/or scalpel, performed by knowledgeable physician, nurse practitioner, or physician assistant. Remove as much necrotic tissue as possible. <b>Sharp/surgical debridement must be performed by specially trained, competent, qualified, and licensed healthcare professionals consistent with local legal and regulatory statutes</b></li> <li><b>Enzymatic</b>-chemical breakdown of necrotic tissue: apply representative product Santyl<sup>®</sup> to base, fill dead space with AMD, cover with Tegaderm<sup>®</sup>. Change wound dressing daily.</li> <li><b>Autolytic</b>-the body's attempt to debride necrotic tissue using its own enzymes. The autolytic process can be facilitated with moisturizing dressing such as hydrogel and hydrocolloid dressings. This can be accomplished by applying representative product IntraSite Gel<sup>®</sup>, and covering with representative product Duoderm<sup>®</sup>, with dressing changes every one to two weeks</li> </ul> </li> <li>Debride devitalized tissue within the wound bed or edge of ulcers when appropriate to the individual's condition and consistent with overall goals of care.</li> <li>Use autolytic or enzymatic methods of debridement when there is no urgent clinical need for drainage or removal of necrotic tissue</li> <li>Perform debridement in the presence of advancing cellulitis, crepitus, fluctuance, and/or sepsis secondary to ulcer-related infection. Eschar and slough are both necrotic tissue and should be removed with debridement except in special circumstances such as a stable heel pressure ulcer. Do not debride stable, hard, dry eschar in ischemic limbs.</li> <li>Manage pain associated with debridement.</li> </ul>
<b>Periwound Care</b>	<ul style="list-style-type: none"> <li>Apply skin prep to periwound area to protect periwound skin</li> <li>Periwound skin prep reduces maceration, keeps skin dry, and facilitates application of dressings. Representative products Coloplast Shield Skin<sup>®</sup> skin prep, (similar to benzoin), and acrylate (representative product Cavilon<sup>®</sup> No Sting Barrier Film)</li> <li>Zinc oxide and petrolatum can be applied to periwound skin at risk for maceration when dressings do not need to be applied, such as in the diaper region in patients with incontinence</li> </ul>
<b>Dress Wound</b>	<p><b>General Recommendations:</b></p> <ol style="list-style-type: none"> <li>1. Dressing selection is based on the wound characteristics: type of tissue in the wound bed, amount/type of exudates, depth, the condition of the skin around the wound bed, etc., and the goals of the person with the wound.</li> <li>2. Maintaining a clean moist wound bed is the goal as this promotes granulation, healing, and closure. Several moisture-retentive dressings are available, including hydrocolloids and transparent films. Use hydrogel such as IntraSite Gel<sup>®</sup>, if needed, to add moisture to wound base.</li> <li>3. Assess wound at every dressing change to confirm the appropriateness of the current dressing regimen</li> <li>4. Follow manufacturer recommendations, especially related to frequency of dressing changes</li> <li>5. The plan of care should guide usual dressing wear times and give plan for changes as needed due to soilage, etc</li> <li>6. If wound is not healing within two weeks, consider over-colonization and re-evaluate dressing selection.</li> </ol> <p><b>Dressing Selection:</b> (see pages 5-7)</p>

SUMMARY	DECISION SUPPORT	PATIENT EDUCATION/SELF MANAGEMENT
---------	------------------	-----------------------------------

## WOUND MANAGEMENT (CONT'D)

Wound Stages	<u>Primary Dressings</u>	<u>Secondary Dressings</u>
	<p>Applied to wound bed (contacts wound surface). Examples include:</p> <ul style="list-style-type: none"> <li>• Semipermeable transparent film dressing- can be used as primary or secondary dressing. Consider for partial thickness wounds including acute abrasions. Preferred secondary dressing in many circumstances. Representative product-Tegaderm®</li> <li>• Calcium Alginate- preferred for clean wounds, generally change every three days, becomes gel. Representative product- Aquacel®</li> <li>• Hydrocolloid- both primary and secondary dressing. Good for partial thickness wounds. Consider for wounds at increased risk of contamination. Representative product-Duoderm®</li> </ul>	<p>Used to cover, pad, or attach the primary dressing, to eliminate dead space, to reduce contamination and protect wound site.</p> <ul style="list-style-type: none"> <li>• Representative examples Tegaderm®, Duoderm®, or Kerlix® bulky dressings</li> <li>• Fill dead space with AMD gauze (impregnated with antimicrobial polyhexamethylene biguanide)</li> </ul>
<b>Stage 1</b>	<ul style="list-style-type: none"> <li>▪ No dressing</li> <li>▪ Moisture barrier</li> <li>▪ Transparent film</li> <li>▪ Hydrocolloid</li> </ul>	<ul style="list-style-type: none"> <li>▪ None</li> </ul>
<b>Stage 2 Partial thickness</b> Intact blister	<ul style="list-style-type: none"> <li>▪ No dressing</li> <li>▪ Moisture barrier</li> <li>▪ Transparent film</li> <li>▪ Hydrocolloid</li> </ul>	<ul style="list-style-type: none"> <li>▪ None</li> </ul>
<b>Stage 2 Partial thickness</b> Superficial ulcer	<ul style="list-style-type: none"> <li>▪ Hydrogel</li> <li>▪ Transparent film</li> <li>▪ Alginate</li> <li>▪ Hydrocolloid</li> </ul>	<ul style="list-style-type: none"> <li>▪ Gauze</li> <li>▪ Foam</li> <li>▪ Hydrocolloid</li> <li>▪ Transparent film</li> </ul>
<b>Stage 3/4 Full thickness</b> None to light drainage	<ul style="list-style-type: none"> <li>▪ Hydrogel</li> <li>▪ Moist AMD</li> <li>▪ Alginate</li> <li>▪ Hydrocolloid</li> <li>▪ Foam</li> <li>▪ Alginate with silver</li> </ul>	<ul style="list-style-type: none"> <li>▪ Foam</li> <li>▪ AMD gauze</li> <li>▪ Transparent film</li> <li>▪ Hydrocolloid</li> </ul>
<b>Stage 3/4 Full thickness</b> Moderate drainage	<ul style="list-style-type: none"> <li>▪ Hydrogel</li> <li>▪ Alginate</li> <li>▪ Alginate with silver</li> <li>▪ Moist AMD [Use to fill dead space]</li> <li>▪ Exudate absorber</li> <li>▪ Foam</li> <li>▪ Hydrocolloid</li> <li>▪ Consider negative pressure wound therapy</li> </ul>	<ul style="list-style-type: none"> <li>▪ Absorptive pad</li> <li>▪ Foam</li> <li>▪ AMD gauze</li> <li>▪ Transparent film</li> <li>▪ Hydrocolloid</li> </ul>
<b>Stage 3/4 Full thickness</b> Heavy drainage	<ul style="list-style-type: none"> <li>▪ Alginate with silver</li> <li>▪ Alginate</li> <li>▪ Moist AMD</li> <li>▪ Calcium sodium alginate</li> <li>▪ Hydrogel</li> <li>▪ Hydrocolloid</li> <li>▪ Foam</li> <li>▪ Consider negative pressure wound therapy</li> </ul>	<ul style="list-style-type: none"> <li>▪ Absorptive pad</li> <li>▪ Foam</li> <li>▪ AMD gauze</li> </ul>

## WOUND MANAGEMENT (CONT'D)

## Wound Dressings

**SPECIAL DRESSINGS**◆ **Gauze**

- Gauze dressings are no longer recommended as primary dressings. In particular, wet to dry dressings are not indicated for open chronic wounds (including pressure ulcers) because of increased infection rates, retained dressing particles, drying of the wound bed, pain, and the amount of labor required for multiple daily dressing changes which are required to keep the wound moist.
- Gauze may be considered when other moisture-retentive primary dressings recommended for application to the wound bed are not available. Continually moist gauze is preferable to dry gauze.
- Use gauze dressings as a secondary dressing to reduce evaporation when the tissue interface layer is moist if other secondary dressings such as transparent film are not available.

◆ **Packing dead space**—deep wounds (full thickness or stage 3 and 4 ulcers), tunneling wounds, undermined wounds

- Ensure wound bed is moist, use hydrogel (representative product IntraSite Gel®) if needed
- Apply alginate (representative product Aquacel®) to wound bed
- Use loosely packed, saline-moistened AMD gauze to fill tissue defects and dead space. The dead space should not be tightly packed to avoid creating pressure on the wound bed
- A single AMD gauze strip/roll is recommended to fill deep wounds because single gauze dressings may be left in the wound and retained gauze in the wound bed can serve as a source of infection. When multiple single AMD gauze pads are used, carefully inspect the wound bed to ensure there are no retained pads
- If overcolonization is suspected or if the wound does not respond within two weeks, use dressing with antimicrobial properties such as calcium alginate impregnated with silver (representative product Aquacel Ag®) and fill dead space as described above
- Cover with secondary dressing, usually transparent film (representative product Tegaderm®)
- Dressing can remain in place for up to seven days if no signs of infection or heavy exudate

◆ **Heavily exudating wounds**

- Heavily exudating wounds should also be loosely packed with AMD gauze
- Changing AMD gauze packing promotes absorption of exudates
- Monitor heavily exudative wounds every one to three days. If the periwound skin is moist, the dressing should be changed at that time and at least once every three days.
- If AMD gauze packing is not effective in controlling exudates, consider highly absorptive dressings such as foam or calcium sodium alginate (representative product Kaltostat®)
  - Does not physically inhibit wound contraction as does gauze
  - Caution; these products may be too drying if wound has low volume exudate

◆ **Burns**

- First degree burn/scalds - By definition, skin is intact.
  - Keep wound moisturized with petrolatum gauze (representative product Xeroform®) wrapped with bulk dressing, change every one to three days.
- Second and third degree (with blistering)
  - Primary dressing-apply calcium alginate with silver (representative product Aquacel AG®) after applying hydrogel (representative product IntraSite®)- secondary dressing Xeroform®, wrap with bulky dressing (representative product Kerlix®), change every two to three days.
  - Silvadene® was used extensively in past but not currently recommended as first line agent, because it requires twice daily dressing changes, and is difficult to remove at dressing change.
  - **Remember to check tetanus status in all burn patients with skin blistering**

◆ **Negative Pressure Wound Therapy**

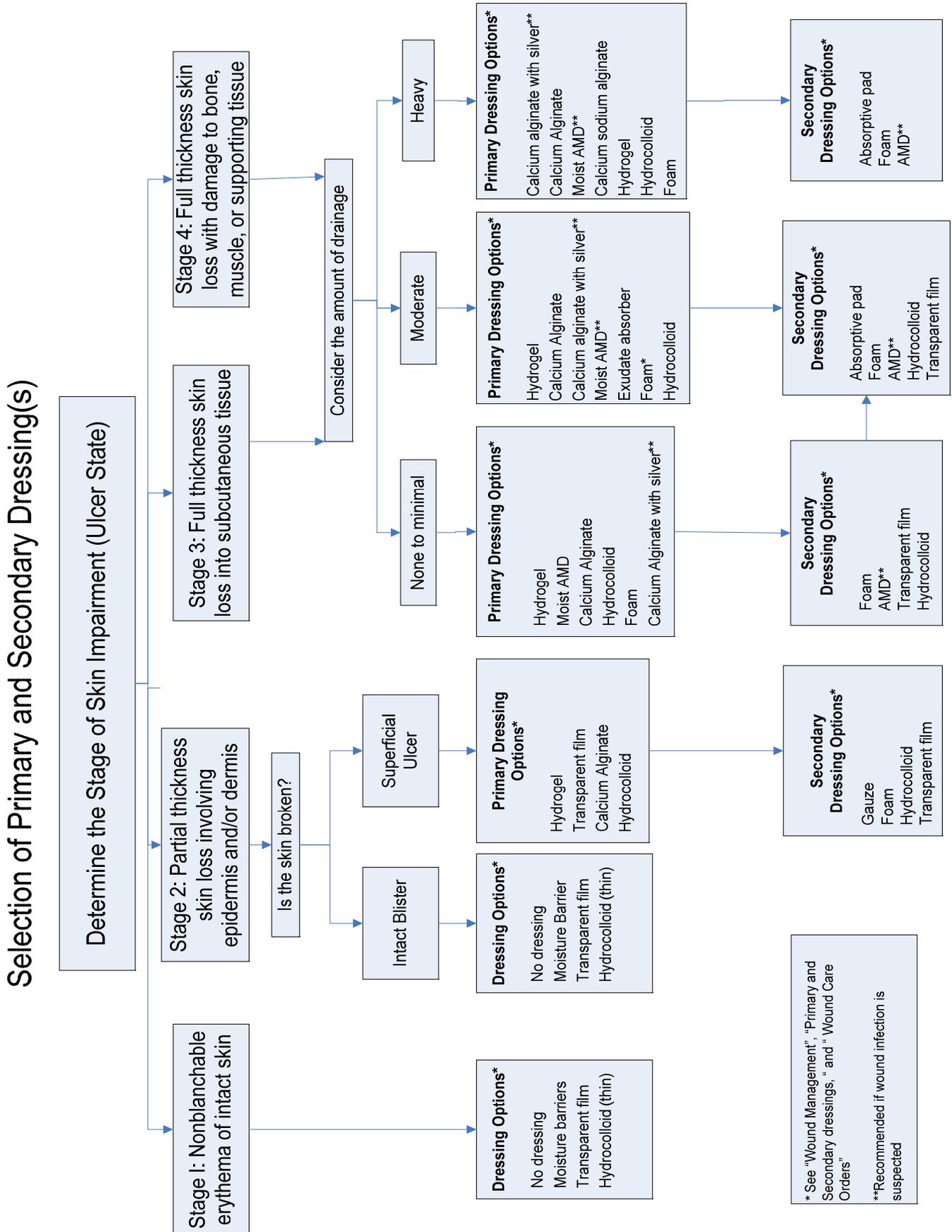
Indication: Negative pressure wound therapy (NPWT) may be indicated for wounds:

- where quick healing is important (large or deep full thickness wounds at high risk for secondary or systemic infection)
- with large amounts of drainage

Application: NPWT (Wound Vac) Application

- Place suction tubing into base of wound, no primary dressing required.
- Fill dead space with AMD
- Cover with transparent film dressing (e.g. Tegaderm®)
- Hook tubing to suction generally 40-80 mmHg, continuous or intermittent/alternating

SELECTION OF WOUND DRESSINGS:



## SUMMARY

## DECISION SUPPORT

## PATIENT EDUCATION/SELF MANAGEMENT

**PRIMARY AND SECONDARY DRESSINGS:**

Most dressings are characterized as either; Primary-the layer of dressing that contacts the wound; or Secondary- the outer layer or dressing used to cover, pad, or attach the primary dressing

TYPE	HYDROGELS	ALGINATES		ANTIMICROBIAL DRESSINGS							
<b>Characteristics/ Functions</b>	<ul style="list-style-type: none"> <li>Primary dressing</li> <li>Wound gels are excellent for helping create or maintain a moist environment</li> <li>Also available as hydrogel sheets which are cross-linked polymer gels in sheet form</li> </ul>	<ul style="list-style-type: none"> <li>Primary dressing</li> <li>Derived from seaweed– formed into pads or ropes/ribbons</li> <li>Absorb wound exudate and form a gel-like covering over the wound, maintaining a moist wound environment</li> <li>Most alginates absorb many times their own weight</li> <li>Promote moist wound healing</li> </ul>		<ul style="list-style-type: none"> <li>Primary dressing</li> <li>Will not support bacterial growth within the dressing for 72 hours</li> </ul>							
<b>Best Uses</b>	<ul style="list-style-type: none"> <li>Consider the use of hydrogel dressings on shallow, minimally exuding pressure ulcers</li> <li>Helps provide and maintain a moist wound environment</li> <li>By increasing moisture content, hydrogels have the ability to help clean and debride necrotic tissue</li> <li>For wounds with minimal or no exudate</li> <li>Consider using amorphous hydrogel for pressure ulcers that are not infected and are granulating</li> </ul>	<ul style="list-style-type: none"> <li>Used for packing of wounds with moderate to heavy exudate</li> <li>Absorbs drainage and turns to a gel to maintain a moist wound bed</li> <li>Consider lengthening dressing change interval or discontinuing if dressing is still dry at scheduled dressing change</li> <li>Can be impregnated with silver for antibacterial action in patients with overcolonization</li> </ul>		<ul style="list-style-type: none"> <li>Packing of all wounds that have dead space</li> <li>Use with negative pressure wound therapy</li> <li>Exuding wounds</li> </ul>							
<b>Advantages</b>	<ul style="list-style-type: none"> <li>Effective in hydrating wound surfaces and liquefying necrotic tissue on the wound surface</li> <li>Non-adherent can be removed without trauma to wound bed</li> <li>“Soothing” effect promotes patient acceptance</li> <li>Comes in multi-use containers that can be used for up to 30 days</li> </ul>	<ul style="list-style-type: none"> <li>Especially useful for packing exuding wounds</li> <li>Highly absorbent</li> <li>They do not physically inhibit wound contraction as would gauze</li> <li>Can use in infected pressure ulcers when there is proper concurrent treatment of infection</li> </ul>		<ul style="list-style-type: none"> <li>Secondary dressing not required</li> <li>No bacterial growth within dressing for 72 hours</li> <li>Allows dressings to remain intact for 72 hours without changes</li> <li>Readily available and inexpensive</li> </ul>							
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>Requires a secondary dressing</li> <li>Not too absorptive, therefore, hydrogels or hydrogel sheets may not be appropriate choices for moderate to highly exuding wounds</li> </ul>	<ul style="list-style-type: none"> <li>Requires a secondary dressing</li> <li>Can be too drying if wound has a low volume of exudate</li> <li>Some can leave fibers in wound if not irrigated well</li> </ul>		<ul style="list-style-type: none"> <li>Does not eradicate bacteria present in wound</li> </ul>							
<b>Frequency of Dressing Change</b>	<ul style="list-style-type: none"> <li>Change when other dressings are changed</li> </ul>	<ul style="list-style-type: none"> <li>One to two times a week</li> <li>If silver impregnated-weekly</li> </ul>		<ul style="list-style-type: none"> <li>Every 72 hours</li> </ul>							
<b>Examples/ Representative Products</b>	<ul style="list-style-type: none"> <li>IntraSite Gel®</li> <li>Generic hydrogel</li> </ul>	<table border="1"> <thead> <tr> <th>Generic</th> <th>Brand Name</th> </tr> </thead> <tbody> <tr> <td>calcium alginate</td> <td> <ul style="list-style-type: none"> <li>AlgiSite®</li> <li>Aquacel®</li> <li>Sorbsan®</li> </ul> </td> </tr> <tr> <td>calcium alginate w/silver</td> <td> <ul style="list-style-type: none"> <li>Aquacel Ag® (silver impregnated for over-colonization)</li> </ul> </td> </tr> <tr> <td>calcium-sodium alginate (for highly exudative wounds)</td> <td> <ul style="list-style-type: none"> <li>Kaltostat®</li> </ul> </td> </tr> </tbody> </table>	Generic	Brand Name	calcium alginate	<ul style="list-style-type: none"> <li>AlgiSite®</li> <li>Aquacel®</li> <li>Sorbsan®</li> </ul>	calcium alginate w/silver	<ul style="list-style-type: none"> <li>Aquacel Ag® (silver impregnated for over-colonization)</li> </ul>	calcium-sodium alginate (for highly exudative wounds)	<ul style="list-style-type: none"> <li>Kaltostat®</li> </ul>	<ul style="list-style-type: none"> <li>Gauze (Kendall Curity AMD®)</li> <li>Alginate (Calcium Alginate with Silver, Aquacel Ag®)</li> <li>Foam (Kendall AMD®, Optifoam®)</li> </ul>
Generic	Brand Name										
calcium alginate	<ul style="list-style-type: none"> <li>AlgiSite®</li> <li>Aquacel®</li> <li>Sorbsan®</li> </ul>										
calcium alginate w/silver	<ul style="list-style-type: none"> <li>Aquacel Ag® (silver impregnated for over-colonization)</li> </ul>										
calcium-sodium alginate (for highly exudative wounds)	<ul style="list-style-type: none"> <li>Kaltostat®</li> </ul>										

## SUMMARY

## DECISION SUPPORT

## PATIENT EDUCATION/SELF MANAGEMENT

**PRIMARY AND SECONDARY DRESSINGS:**

TYPE	TRANSPARENT FILM	HYDROCOLLOIDS	FOAMS
<b>Characteristics/ Functions</b>	<ul style="list-style-type: none"> <li>▪ Primary or Secondary dressing</li> <li>▪ Semi-permeable membrane dressings that are waterproof yet permeable to oxygen and water vapor</li> <li>▪ Help prevent bacterial contamination</li> <li>▪ Help maintain a moist wound environment, facilitate cellular migration and promote autolysis of necrotic tissue by trapping moisture at the wound surface</li> <li>▪ Some newer films are designed to keep IV sites dry. These films have a higher Moisture Vapor Permeability (MVP) and should not be used for wounds</li> </ul>	<ul style="list-style-type: none"> <li>▪ Primary or secondary dressing</li> <li>▪ Occlusive and adhesive to help manage light to moderate amounts of wound exudate</li> <li>▪ Contains gel-forming covering which protects the wound bed and maintains a moist wound environment.</li> <li>▪ Hydrocolloid powders and pastes are also available with increased absorptive capacity</li> </ul>	<ul style="list-style-type: none"> <li>▪ Primary dressing</li> <li>▪ Highly absorbent dressings generally made from a hydrophilic polyurethane foam</li> <li>▪ Some have adhesive tapes surrounding an 'island' of foam</li> <li>▪ Highly absorbent foams may allow less frequent dressings changes</li> <li>▪ Foams that absorb exudate and keep it off the wound will decrease maceration to the surrounding tissue</li> </ul>
<b>Best Uses</b>	<ul style="list-style-type: none"> <li>▪ Superficial wounds</li> <li>▪ Wounds with light exudate</li> <li>▪ For prevention of friction injuries when at high risk for ulceration such as on bony prominences, diabetic feet, and blisters</li> <li>▪ Consider using film dressings for autolytic debridement when the individual is not immunocompromised</li> <li>▪ Often the preferred secondary dressing</li> </ul>	<ul style="list-style-type: none"> <li>▪ Epithelializing and granulating wounds that are draining low to moderate amounts of exudate</li> <li>▪ Hydrocolloid sheets help promote autolytic debridement by keeping wound exudate in contact with necrotic tissue (slough and eschar)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Heavily exuding wounds (often following debridement when drainage is at its peak)</li> <li>▪ Deep cavity wounds - as packing to prevent premature closure while absorbing exudate and maintaining a moist environment</li> <li>▪ Weeping ulcers, such as venous stasis</li> <li>▪ Can be applied directly to fragile wound beds such as diabetic foot ulcers</li> </ul>
<b>Advantages</b>	<ul style="list-style-type: none"> <li>▪ Permit evaluation of wound progress without removal of the product</li> <li>▪ They are usually waterproof and gas permeable</li> <li>▪ They help maintain a moist wound environment</li> <li>▪ Can be used as secondary dressing and be kept in place up to seven days</li> </ul>	<ul style="list-style-type: none"> <li>▪ Conformable for easy application and help reduce pain at the wound site</li> <li>▪ May be left in place several days</li> <li>▪ Consider using hydrocolloid dressings to protect body areas at risk for friction injury or risk of injury from tape</li> </ul>	<ul style="list-style-type: none"> <li>▪ Very absorbent, can frequently be left undisturbed for three to four days</li> <li>▪ Comfortable and conformable</li> <li>▪ Consider using foam dressings on painful pressure ulcers</li> <li>▪ Consider placing foam dressings on body areas and pressure ulcers at risk for shear injury</li> </ul>
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>▪ Have the potential of causing skin tears if removed improperly</li> <li>▪ Non-absorptive and will be overwhelmed by moderately exuding wounds</li> <li>▪ Tend to roll up in high friction areas such as the coccyx</li> <li>▪ Not recommended for infected wounds</li> </ul>	<ul style="list-style-type: none"> <li>▪ Never use in infected wounds</li> <li>▪ Moderate to heavily exuding wounds may overwhelm the hydrocolloid dressing, usually within a few days</li> <li>▪ Break down of the product may produce a residue of varying colors and possible foul odor. This should not be confused with an infectious process</li> </ul>	<ul style="list-style-type: none"> <li>▪ Usually requires secondary dressing</li> <li>▪ Can cause a drying effect on the wound if there is too little drainage</li> </ul>
<b>Frequency of Dressing Change</b>	<ul style="list-style-type: none"> <li>▪ Every 7-10 days</li> </ul>	<ul style="list-style-type: none"> <li>▪ Every seven days</li> </ul>	<ul style="list-style-type: none"> <li>▪ Variable</li> <li>▪ If silver impregnated, up to seven days</li> </ul>
<b>Examples/ Representative Products</b>	<ul style="list-style-type: none"> <li>▪ Generic transparent gauze</li> <li>▪ Tegaderm®</li> <li>▪ Opsite®</li> </ul>	<ul style="list-style-type: none"> <li>▪ Generic hydrocolloids</li> <li>▪ Duoderm®</li> </ul>	<ul style="list-style-type: none"> <li>▪ Generic foam</li> <li>▪ Polymem®</li> <li>▪ Foam with AMD</li> </ul>

## NEGATIVE PRESSURE WOUND THERAPY

### What is Negative Pressure Wound Therapy?

Negative Pressure Wound Therapy (NPWT) uses a computerized vacuum device to apply continuous or intermittent negative or sub-atmospheric pressure to the surface of a wound. This therapy accelerates wound healing and reduces the time to wound closure through direct and indirect effects on the wound environment

### How Does it Work?

- Suction tubing is placed in the wound bed with AMD gauze or AMD foam to fill dead space and sealed with an occlusive dressing.
- Suction tubing is connected to a pump and local negative pressure results when the pump is turned on.
- The pump provides suction. Different manufacturers will recommend different settings. Also, experienced clinicians have been able to tweak those settings for specific wound types or patients. Pumps are usually set from 40-80 mmHg.
- This therapy usually needs to be left on for most of the day, every day that treatment is prescribed.
- When everything is in place, the pump is turned on and contraction of the wound dressing material can be observed.
- Some patients and clinicians describe pain or discomfort when the device is first turned on. Slowly increasing pressure can reduce discomfort.
- NPWT dressings should be changed within 72 hours

### What are the indications for use of NPWT?

Superiority of NPWT over conventional wound therapy for all wound types has not been proven in available studies to date.

- Utility is suggested for traumatic acute wounds especially with skin grafts or skin flaps, open amputations, lower extremity fasciotomy, open abdomen, etc.
- Appears to increase burn wound perfusion and limit burn wound progression
- Management of diabetic foot ulcers and wounds from diabetic foot surgery (important to establish adequate perfusion prior to use of NPWT.)
- Not indicated for venous ulcer management, contraindicated for arterial insufficiency ulcers

### Advantages

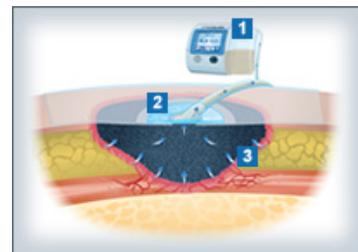
- Less frequent dressing changes
- Easier to tailor and maintain in position
- Significant reduction in time to wound closure in diabetic patients
- Reduce complexity of subsequent reconstructive surgery with more rapid wound closure

### What are the contraindications for use of NPWT?

- Do not use if necrotic tissue (slough) is evident in >30% of the wound
- Do not use in untreated osteomyelitis (may initiate NPWT 24 hours after initiation of systemic antibiotic therapy) or other wound infections
- Do not use if there is cancer within the wound bed or its margins
- Do not use on unexplored non enteric fistulas
- DO NOT place suction catheter dressing directly over exposed veins or arteries, vital organs or vascular grafts
- Do not use in wounds with inadequate perfusion

### What are the precautions for use of NPWT?

- \* Uncontrolled active bleeding
- \* Difficult hemostasis of wound
- \* When anticoagulants are being administered
- \* Enteric fistula
- \* Irradiated vessels and tissue
- \* Bony fragments
- \* Untreated malnutrition
- \* Close proximity of blood vessels, organs, muscle, and fascia requiring adequate protection
- \* Nonadherent patient



NOTE: The Federal Drug Administration (FDA) has received reports of serious complications, including death, associated with the use of negative pressure wound therapy systems. The FDA advises health care professionals to carefully select patients for negative pressure wound therapy after reviewing the most recent device labeling and instructions. Patients should be monitored frequently in an appropriate care setting by a trained practitioner. Practitioners should be vigilant for potentially life threatening complications, such as bleeding, and be prepared to take prompt action if they occur.

To see full alert, refer to the FDA alert (02/24/2011) addressing negative pressure wound therapy at <http://www.fda.gov/MedicalDevices/Safety/AlertsandNotices/ucm244211.htm>.

## SUMMARY

## DECISION SUPPORT

## PATIENT EDUCATION/SELF MANAGEMENT

## WOUND / SKIN ULCER CLASSIFICATION:

Type of Ulcer	Pressure Ulcer*	Venous Stasis*	Arterial Insufficiency/ Ischemic Ulcers*	Neuropathic/Diabetic
<b>Location on Body</b>	<ul style="list-style-type: none"> <li>▪ Tailbone</li> <li>▪ Buttock</li> <li>▪ Heel</li> <li>▪ Shoulder blade</li> <li>▪ Elbow</li> <li>▪ Back of the head</li> </ul>	<ul style="list-style-type: none"> <li>▪ Medial lower leg</li> <li>▪ Ankle-malleolar area</li> </ul>	<ul style="list-style-type: none"> <li>▪ Between toes or tips of toes</li> <li>▪ Over phalangeal heads</li> <li>▪ Lateral malleolus</li> <li>▪ Areas subjected to trauma, rubbing footwear</li> </ul>	<ul style="list-style-type: none"> <li>▪ Plantar aspect of the foot</li> <li>▪ Under metatarsal heads</li> <li>▪ Under heel</li> <li>▪ Toes</li> </ul>
<b>Appearance</b>	<ul style="list-style-type: none"> <li>▪ Four stages based on depth of ulcer and tissue damage</li> </ul> <p>See page 13</p>	<ul style="list-style-type: none"> <li>▪ Irregular wound margins</li> <li>▪ Surrounding skin is often discolored and swollen</li> <li>▪ May feel warm or hot</li> <li>▪ Painless to moderate pain</li> <li>▪ Exudates moderate to heavy</li> <li>▪ Surrounding skin scaling/weepy or thin and dry</li> <li>▪ Firm edema</li> <li>▪ Hemosiderin staining</li> <li>▪ Woody induration</li> <li>▪ Usually history of multiple healed ulcers</li> </ul>	<ul style="list-style-type: none"> <li>▪ Even wound margins</li> <li>▪ Punched out appearance</li> <li>▪ Pale, deep wound bed</li> <li>▪ Blanched periwound tissue</li> <li>▪ Extreme pain</li> <li>▪ Minimal exudate</li> <li>▪ Gangrene, necrosis</li> <li>▪ Leg thin, skin shiny, hair loss</li> <li>▪ Cool, cyanotic feet with thickened nails</li> <li>▪ Dependent rubor and elevational pallor</li> <li>▪ Pain with elevation of the leg commonly noticed at night</li> </ul>	<ul style="list-style-type: none"> <li>▪ Even wound margins</li> <li>▪ Rounded or oblong shape over bony prominence</li> <li>▪ Painless</li> <li>▪ Deep</li> <li>▪ Surrounding callus</li> <li>▪ Cellulitis or osteomyelitis</li> </ul>
<b>Who is affected/ Risk Factors</b>	<ul style="list-style-type: none"> <li>▪ Immobility</li> <li>▪ Decreased sensation</li> <li>▪ Incontinence</li> <li>▪ Older age/ confusion</li> <li>▪ Smoking</li> <li>▪ DM, anemia, or CV disorders</li> </ul>	<ul style="list-style-type: none"> <li>▪ DVT</li> <li>▪ Varicose veins</li> <li>▪ Obesity</li> <li>▪ Heart Failure</li> <li>▪ Age, family history</li> <li>▪ Venous ulcers account for 80-90% of all leg ulcers.</li> </ul>	<ul style="list-style-type: none"> <li>▪ PVD, atherosclerosis</li> <li>▪ Diabetes</li> <li>▪ Smoking</li> <li>▪ HTN</li> <li>▪ Age</li> <li>▪ Obesity</li> <li>▪ Cardiovascular disease</li> <li>▪ Ankle-brachial index &gt;1.0 (See page 16)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Diabetes</li> <li>▪ Can affect anyone who has impaired sensation of the feet</li> </ul>
<b>Treatment</b>	Refer to: Wound Care Instructions and algorithm pages 2-5	<ul style="list-style-type: none"> <li>▪ <b>CORE:</b></li> <li>▪ Compression of the leg</li> <li>▪ Optimize wound environment</li> <li>▪ Review contributing factors</li> <li>▪ Establish maintenance plan to minimize edema or swelling (Compression stockings or multi-layer compression wraps, from the toes or foot to the knee.)</li> <li>▪ Measure ankle-brachial index if considering compression dressing (see page 15)</li> <li>▪ The type of dressing prescribed is determined by the type of ulcer and the appearance at the base of the ulcer</li> <li>▪ <b>Types of dressings include:</b> <ul style="list-style-type: none"> <li>▪ Moist to moist dressings</li> <li>▪ Hydrogels/hydrocolloids</li> <li>▪ Alginate dressings</li> <li>▪ Collagen wound dressings</li> <li>▪ Debriding agents</li> <li>▪ Antimicrobial dressings</li> <li>▪ Composite dressings</li> <li>▪ Synthetic skin substitutes</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ Wound healing will not occur unless underlying ischemia is corrected</li> <li>▪ Treatment will depend on patient's prognosis, functional status, risk of proposed procedure</li> <li>▪ Revascularization: bypass</li> <li>▪ Angioplasty-stent</li> <li>▪ <b>The goals for arterial ulcer treatment include:</b> <ul style="list-style-type: none"> <li>▪ Providing adequate protection of the surface of the skin</li> <li>▪ Generally keep dry, no debridement, can paint with povidone iodine</li> <li>▪ Preventing new ulcers</li> <li>▪ Removing contact irritation to the existing ulcer</li> <li>▪ Manage pain</li> <li>▪ Quit smoking</li> <li>▪ Avoid cold, caffeine, constrictive garments</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ Offloading: avoid all mechanical stress on the injured area</li> <li>▪ Shoe wear adjustments</li> <li>▪ Orthotics</li> <li>▪ Cane for walking</li> <li>▪ Debridement of all nonviable tissue and surrounding callus done by clinician with skills in debridement</li> <li>▪ May need weekly re-assessments with PCP</li> <li>▪ Dry stable eschar may be left intact</li> <li>▪ Granulating wound bed– moist wound therapy (no occlusive dressing because of high risk of infection)</li> <li>▪ Control glucose</li> </ul>

\*Special considerations for Pressure Ulcers see page 14, Venous Stasis see page 15, and Arterial Insufficiency see page 16

Traumatic or surgical wounds represent a fifth category of wound or skin ulcers. Management should follow general principles of wound management outlined in this Care Guide.

## INFECTIONS IN WOUNDS\*

## ASSESSMENT AND TREATMENT

**General:**

- The number of bacteria and their effect on the host are a continuum from:
  - Contamination-host factors maintain microbial control
  - Colonization-established microbial population, host and microbial factors in balance
  - Overcolonization-established microbial population, wound not healing, microbial forces overcoming host controls, no overt signs of infection
- Infection-microbial forces overwhelm host controls, signs of active infection evident
- Infection is not common in Stage 1 or 2 ulcers, and assessment of infection should focus on Stage 3 and 4 ulcers
- Infection may spread beyond the pressure ulcer, resulting in serious systemic infections such as cellulitis, fasciitis, osteomyelitis, or sepsis

**Assessment of High-Risk Individuals and Wounds**

Have a high index of suspicion for the likelihood of infection in wounds:

- that have necrotic tissue or a foreign body present; have been present for a long period of time; are large in size or deep; and/or are likely to be repetitively contaminated (e.g., near the anus)
- in individuals with diabetes mellitus, protein-calorie undernutrition, hypoxia or poor tissue perfusion, autoimmune disease, or immunosuppression
- when there are no signs of healing for two weeks, friable granulation tissue, foul odor, increased pain in the ulcer, increased drainage from the wound, change in the nature of the wound drainage (e.g., new onset of bloody drainage, purulent drainage), or increased necrotic tissue in the wound bed

**Diagnosis**

1. Consider a diagnosis of spreading acute infection if the pressure ulcer has signs of acute infection, such as erythema extending from the ulcer edge, induration, new or increasing pain, warmth, or purulent drainage. The acutely infected ulcer may also be increasing in size or have crepitus, fluctuance, or discoloration in the surrounding skin. The individual may also have systemic signs of infection such as fever, malaise, and lymph node enlargement. Elderly individuals may develop confusion/delirium and anorexia.
2. Determine the bacterial bioburden of the pressure ulcer by tissue biopsy or quantitative swab technique.
 

The gold standard method for examining microbial load is quantitative culture of viable wound tissue. Surface swabs will only reveal the colonizing organism, and may not reflect deeper tissue infection. Consider obtaining tissue sample with a punch biopsy, especially with chronic non-healing wounds and/or wounds that do not demonstrate progressive wound healing.

An acceptable alternative to quantitative tissue culture is the Levine quantitative swab technique:

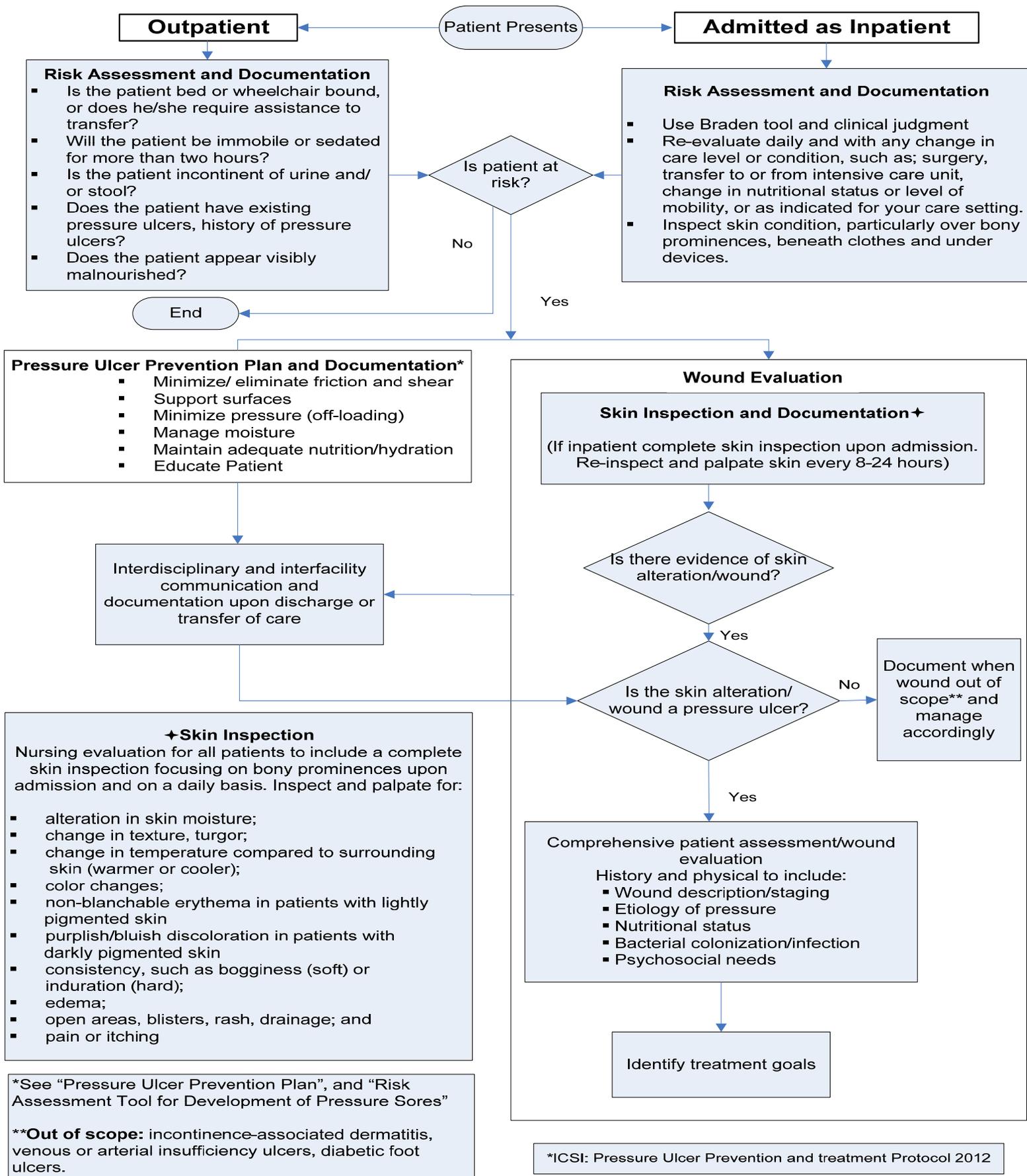
  - Cleanse wound with normal saline. Blot dry with sterile gauze
  - Culture the healthiest-looking tissue in the wound bed
  - Do not culture exudate, pus, eschar, or heavily fibrous tissue
  - Rotate the end of a sterile alginate-tipped applicator over a 1 cm x 1 cm area for five seconds
  - Apply sufficient pressure to swab to cause tissue fluid to be expressed
  - Use sterile technique to break tip of swab into a collection device designed for quantitative cultures
3. Consider a diagnosis of pressure ulcer infection if the culture results indicate bacterial bioburden of >10<sup>5</sup> CFU/g of tissue and/or the presence of beta hemolytic streptococci.

**Management**

1. Optimize the host response
2. Prevent contamination of the pressure ulcer
3. For full thickness (stage 3 and 4 ulcers) follow wound management steps described on pages 2-4
4. Reduce the bacterial load in the pressure ulcer (see recommendations on cleansing and debridement)
5. Consider the use of topical antiseptics for wounds that are not expected to heal and are critically colonized
6. Limit the use of topical antibiotics on infected wounds, except in special situations. In general, topical antibiotics are not recommended for wounds unless there is evidence of critical colonization. Reasons for this include inadequate penetration for deep skin infections, development of antibiotic resistance, hypersensitivity reactions, systemic absorption when applied to large wounds, and local irritant effects, all of which can lead to further delay in wound healing
7. Use systemic antibiotics for individuals with clinical evidence of systemic infection, such as positive blood cultures, cellulitis, fasciitis, osteomyelitis, or sepsis, if consistent with the individual's goals. (Refer to Skin and Soft Tissue Care Guide)
8. Drain local abscesses
9. Evaluate the individual for osteomyelitis if exposed bone is present, the bone feels rough or soft, or the ulcer has failed to heal with prior therapy

\*Based upon The European Pressure Ulcer Advisory Panel (EPUAP) and National Pressure Ulcer Advisory Panel (NPUAP) 2009

## PRESSURE ULCERS: PREVENTION AND EVALUATION ALGORITHM\*



## PRESSURE ULCERS: RISK ASSESSMENT TOOL FOR DEVELOPMENT OF PRESSURE SORES

### Instructions:

Use the Braden Scale to assess the patient's level of risk for development of pressure ulcers. The evaluation is based on six indicators: sensory perception, moisture, activity, mobility, nutrition, and friction or shear. The Braden is most applicable in evaluating patients requiring skilled nursing care. It is not used to determine what type of dressing to apply.

### Scoring:

The Braden Scale is a summated rating scale made up of six subscales scored from 1-3 or 4, for total scores that range from 6-23. A lower Braden Scale Score indicates a lower level of functioning and, therefore, a higher level of risk for pressure ulcer development. A score of 19 or higher, for instance, would indicate that the patient is at low risk, with no need for treatment at this time. The assessment can also be used to evaluate the course of a particular treatment.

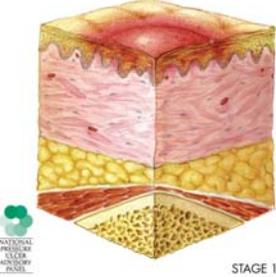
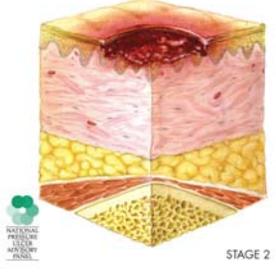
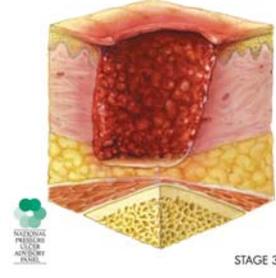
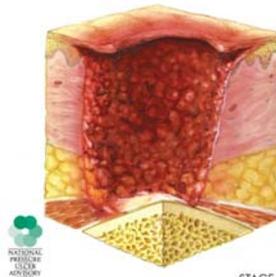
### BRADEN SCALE FOR PREDICTING PRESSURE SORE RISK

Patient's Name \_\_\_\_\_ Evaluator's Name \_\_\_\_\_ Date of Assessment \_\_\_\_\_

<b>SENSORY PERCEPTION</b> ability to respond meaningfully to pressure-related discomfort	<b>1. Completely Limited</b> Unresponsive (does not moan, flinch, or grasp) to painful stimuli, due to diminished level of consciousness or sedation OR limited ability to feel pain over most of body.	<b>2. Very Limited</b> Responds only to painful stimuli. Cannot communicate discomfort except by moaning or restlessness OR has a sensory impairment which limits the ability to feel pain or discomfort over ½ of body.	<b>3. Slightly Limited</b> Responds to verbal commands, but cannot always communicate discomfort or the need to be turned OR has some sensory impairment which limits ability to feel pain or discomfort in 1 or 2 extremities.	<b>4. No Impairment</b> Responds to verbal commands. Has no sensory deficit which would limit ability to feel or voice pain or discomfort.
<b>MOISTURE</b> degree to which skin is exposed to moisture	<b>1. Constantly Moist</b> Skin is kept moist almost constantly by perspiration, urine, etc. Dampness is detected every time patient is moved or turned.	<b>2. Very Moist</b> Skin is often, but not always moist. Linen must be changed at least once a shift.	<b>3. Occasionally Moist</b> Skin is occasionally moist, requiring an extra linen change approximately once a day.	<b>4. Rarely Moist</b> Skin is usually dry, linen only requires changing at routine intervals.
<b>ACTIVITY</b> degree of physical activity	<b>1. Bedfast</b> Confined to bed.	<b>2. Chairfast</b> Ability to walk severely limited or non-existent. Cannot bear own weight and/or must be assisted into chair or wheelchair.	<b>3. Walks Occasionally</b> Walks occasionally during day, but for very short distances, with or without assistance. Spends majority of each shift in bed or chair.	<b>4. Walks Frequently</b> Walks outside room at least twice a day and inside room at least once every two hours during waking hours.
<b>MOBILITY</b> ability to change and control body position	<b>1. Completely Immobile</b> Does not make even slight changes in body or extremity position without assistance.	<b>2. Very Limited</b> Makes occasional slight changes in body or extremity position but unable to make frequent or significant changes independently.	<b>3. Slightly Limited</b> Makes frequent though slight changes in body or extremity position independently.	<b>4. No Limitation</b> Makes major and frequent changes in position without assistance.
<b>NUTRITION</b> usual food intake pattern	<b>1. Very Poor</b> Never eats a complete meal. Rarely eats more than ½ of any food offered. Eats 2 servings or less of protein (meat or dairy products) per day. Takes fluids poorly. Does not take a liquid dietary supplement OR is NPO and/or maintained on clear liquids or IVs for more than 5 days.	<b>2. Probably Inadequate</b> Rarely eats a complete meal and generally eats only about ½ of any food offered. Protein intake includes only 3 servings of meat or dairy products per day. Occasionally will take a dietary supplement OR receives less than optimum amount of liquid diet or tube feeding.	<b>3. Adequate</b> Eats over half of most meals. Eats a total of 4 servings of protein (meat, dairy products) per day. Occasionally will refuse a meal, but will usually take a supplement when offered OR is on a tube feeding or TPN regimen which probably meets most of nutritional needs.	<b>4. Excellent</b> Eats most of every meal. Never refuses a meal. Usually eats a total of 4 or more servings of meat and dairy products. Occasionally eats between meals. Does not require supplementation.
<b>FRICION &amp; SHEAR</b>	<b>1. Problem</b> Requires moderate to maximum assistance in moving. Complete lifting without sliding against sheets is impossible. Frequently slides down in bed or chair, requiring frequent repositioning with maximum assistance. Spasticity, contractures or agitation leads to almost constant friction.	<b>2. Potential Problem</b> Moves feebly or requires minimum assistance. During a move skin probably slides to some extent against sheets, chair, restraints or other devices. Maintains relatively good position in chair or bed most of the time but occasionally slides down.	<b>3. No Apparent Problem</b> Moves in bed and in chair independently and has sufficient muscle strength to lift up completely during move. Maintains good position in bed or chair.	

## PRESSURE ULCERS: STAGING\*

The 2011 Cochrane Collaboration updated evidence review states there is "no good evidence to support use of any particular wound cleansing solution or technique for pressure ulcers"

<p><b>Stage 1</b></p>  <p>STAGE 1</p>	<p><b>Skin is intact with an area of nonblanching erythema. This is usually over a bony prominence.</b></p> <p>(Area of persistent redness in light pigmented skin - in darker tones the ulcer might appear as a persistent red, blue, or purple color.)</p> <p>The area may be painful, firm, soft, warmer or cooler as compared to adjacent tissue</p>
<p><b>Stage 2</b></p>  <p>STAGE 2</p>	<p><b>Partial-thickness skin loss with loss of the epidermis and some of the dermis.</b></p> <p>Wound appears as a shallow ulcer with a red-pink color. No slough or necrotic tissue is present in the base. It may also be an enclosed or open serum-filled blister.</p> <p>Presents as a shiny or dry shallow ulcer without slough or bruising. This stage should not be used to describe skin tears, tape burns, incontinence associated dermatitis, maceration or excoriation.</p>
<p><b>Stage 3</b></p>  <p>STAGE 3</p>	<p><b>Full-thickness loss of skin with the epidermis and dermis gone and damage to or necrosis of subcutaneous tissues.</b></p> <p>Damage extends down to, but not through, the underlying fascia. Subcutaneous fat may be visible, but muscle, tendon, or bone is not seen. Slough may be present but does not hinder estimation of the extent of tissue loss. Tunneling or undermining may be present. Bone/tendon is not visible or directly palpable.</p>
<p><b>Stage 4</b></p>  <p>STAGE 4</p>	<p><b>Full-thickness loss of skin with extensive destruction, tissue necrosis, and damage to bone, muscle, or other supporting structures that are exposed.</b></p> <p>Stage 4 ulcers can extend into muscle and/or supporting structures (e.g., fascia, tendon, or joint capsule) making osteomyelitis likely. Exposed bone/muscle is visible or directly palpable.</p>

\*National Pressure Ulcer Advisory Panel

## PRESSURE ULCERS: PREVENTION

### MINIMIZE OR ELIMINATE FRICTION AND SHEAR

- Lift the body off the bed/chair rather than dragging as the patient is moved up in the bed/chair
- Avoid elevating head of the bed more than 30 degrees unless contraindicated
- Use transfer devices such as mechanical lifts, surgical mattress and surgical slip sheets
- Pad between skin-to-skin contact, or skin-to-equipment contact that may rub together
- Use transparent film, hydrocolloid dressings or skin sealants on bony prominences (such as elbows) to decrease friction
- Keep skin well hydrated and moisturized
- Protect skin from excessive moisture which weakens dermal integrity

### MINIMIZE PRESSURE (OFF-LOADING)

- Immobility is the most significant risk factor for pressure ulcer development
- Patients have greater intensity of pressure over the bony prominences when sitting in a chair compared to supine position (includes sitting in bed with head elevation greater than 30 degrees)

### MANAGE MOISTURE

- Manage moisture from perspiration, wound drainage, and incontinence
- Manage incontinence (fecal is more problematic than urine for skin )
  - Cleanse skin gently after each incontinent episode with water or pH-balanced cleanser.
  - Avoid excessive friction and scrubbing, which can further traumatize the skin
  - Use moisture barrier protectant on skin (e.g., creams, ointments, film-forming skin protectants) as needed to protect and maintain intact skin, or to treat non-intact skin. Select absorbent underpads and briefs to wick incontinence moisture away from the skin versus trapping moisture against the skin, causing maceration
- Separate skin folds, use a skin sealant, and change dressings frequently

### SUPPORT SURFACES

For all patients at risk for developing pressure ulcers

- Minimize/eliminate pressure from medical devices, e.g., oxygen masks and tubing, catheters, casts, NG tubes, G-tubes, and restraints
- Limit the number of linen layers between the treatment support surface and patient
- Maintain or enhance patient's level of activity
- Use pressure support surfaces as indicated. Free-float heels by elevating calves on pillows and keeping heels free of all surfaces

Note: Egg crate mattresses are **NOT** recommended because they do not provide adequate support, they are prone to breakdown, and they are a safety/fire hazard. Although medical grade sheepskins are associated with a decrease in pressure ulcer development- they are also not recommended for use within CCHCS and are not used in many other settings because they are difficult to keep clean.

Patients in bed:

- Encourage patients to make frequent, small position changes
- Use pillows or wedges to reduce pressure on bony prominences
- At a minimum, patient should be turned every two hours
- When the patient is lying on one side, do not position directly on trochanter (hip)
- Use pressure redistribution mattresses/surfaces
  - Standard of care for stage 1 and 2 pressure ulcers on the trunk or pelvis; high density foam or gel-foam mattresses
  - Standard of care for stage 3 and 4 pressure ulcers on trunk or pelvis; powered mattresses either alternating pressure or low air-loss mattress systems
  - Mattress overlays are not recommended for any pressure ulcers because they do not provide adequate therapeutic support for normal sized adults

Patients in sitting position:

- Encourage patients to weight shift every 15 minutes (e.g., chair push-ups, stand and re-seat self if able; shift position by elevating legs)
- Reposition the patient every hour if the patient is unable to reposition him/herself
- Utilize chair cushions for pressure redistribution for at risk patients. Avoid use of "donuts"
- Gel-foam seat cushions preferred over inflatable systems (no pump required)

### MAINTAIN ADEQUATE NUTRITION/HYDRATION

- Inadequate nutrition may be a reversible risk factor for pressure ulcers
- Screen individuals at risk for inadequate nutrition at admission to a health care facility or with a significant change in condition
- Provide multivitamin and mineral supplement if intake poor or nutritional deficiency is suspected/indicated by lab values. CBC, CMP, and pre-albumin can guide nutritional assessment

### EDUCATE PATIENT/CAREGIVERS

- Causes of pressure ulcers
- Prevention methods
- Dietary needs
- Positioning

**VENOUS STASIS ULCERS****Lower Extremity Venous Stasis Ulcers**

- Chronic venous insufficiency (CVI) is the most common cause of lower extremity ulceration
- Compression is used not only to heal the ulcer, but can be used indefinitely to prevent CVI
- Wound care usually includes absorptive dressings, or a wound contact layer over the ulcer base with wrap placed directly over it with no other dressing. This type of dressing passes exudates through to the outside of the dressing to evaporate
- Approximately 20% of lower extremity ulcers are of mixed venous and arterial origin, therefore, confirmation of a purely venous etiology for the ulcer is essential prior to initiating compression therapy
- An Ankle Brachial Index (ABI) should be obtained prior to applying a compression dressing (see page 16)

**Compression**

Compression therapy is the key component of therapy for patients with venous ulceration. Other therapies include exercise and limb elevation.

Compression dressings and bandages provide compression not so much in the dressings and bandage itself but by creating a firm barrier against which the calf muscles press during ambulation thereby supporting calf pump action. They are not intended for patients with arterial insufficiency.

**TYPES OF COMPRESSION**

**Compression Bandages**— May be indicated for CVI with associated severe edema, weeping, eczema, or ulceration. These may be elastic or non elastic, single or multilayer. They must be applied by trained personnel and changed as required based on drainage, bandage integrity, etc. The International Leg Ulcer Advisory Board identified multi-layer, elastic compression as the first line of therapy for chronic venous insufficiency in active patients and for those who are immobile or exhibit limited mobility.

Generally include non-stick layer next to skin, padding, and compression material. Can be used with other wound care products including hydrogel and primary dressings. See manufacturer product insert for specific instructions on applying multi-layer wraps. Characteristics include: high working pressure and low resting pressure (tourniquet effects are prevented)

Representative product- PROFORE<sup>®</sup> + ProGuide<sup>®</sup>

Note: Unna boots (a rigid special gauze bandage impregnated with zinc oxide and calamine) are not recommended. Unna boots do not give graduated consistent compression. There are now better, more effective therapies.

- **Graduated compression stockings** (Representative product-Jobst<sup>®</sup> stockings)

Stockings help to control edema. Generally recommended after ulcer resolution, but can consider with active ulcers if no pressure applied to ulcer bed such as from bulky dressings under the stocking. Recommended pressure is a minimum of 20-30 mm Hg at the ankle for efficacy. Measurement of patient required. Various lengths of these stockings are available, knee high stockings are adequate and preferred for most patients. Regarding compression stockings:

- They should be laundered daily.
- Two pairs should be issued at one time to permit washing
- Replacement every six months is recommended if worn daily
- They are best applied upon arising, if there is a delay elevation of the legs for 20-30 minutes before applying is recommended.
- Open toe stockings may be used for foot deformities
- 20-30 mm Hg pressure stockings indicated for moderate to severe edema or phlebitis
- 30-40 mm Hg pressure stockings are indicated for severe swelling, management of active ulceration

NOTE: Antiembolism or TED hose stockings exert only 8-10 mm Hg at the ankle which is not adequate for treatment of venous insufficiency. Antiembolism and other low compression bandages (such as elastic or "Ace" bandages) are not effective in ambulatory patients.

- **Intermittent Pneumatic Compression Pump**

May be useful when compression stockings are ineffective or are not tolerated. Avoid in patients with CHF related edema, peripheral arterial disease, cellulitis. Generally pump use is prescribed four hours per day, efficacy in ulcer healing not clear, especially when used with compression bandaging.

**OTHER THERAPIES**

Systemic agents may be useful in those patients refractory to, or intolerant of, compression therapy. Diuretics are indicated only for those whose lower extremity edema may be partly due to another cause (heart failure, renal disease).

- Aspirin 300 mg enteric coated per day was demonstrated to improve ulcer healing or reduction in ulcer size at 4 months compared with placebo in 20 patients. (All patients in this study were also treated with compression).
- Systemic antibiotics: indicated only for those with acute cellulitis or an infected ulcer.
- Pentoxifylline: Many studies have been performed, of varying quality. The consensus is that pentoxifylline with compression is more effective than the medication without compression. The medication used without compression was more effective than placebo.

Emollients help reduce dryness, itching, and subsequent skin fissuring. Best applied when skin is damp. Petrolatum and mineral oil are effective.

1. REF: <http://www.podiatrytoday.com/guide>

2. UpToDate: Compression Bandaging for Chronic Venous Insufficiency, May 7, 2012

3. UpToDate: Medical Management of Lower Extremity Chronic Venous Disease, Oct 5, 2011

## ISCHEMIC ULCERS (ARTERIAL INSUFFICIENCY ULCERS)

### Components of Care Lower Extremity Arterial Ulcers

- Compression usually contraindicated unless there is concomitant venous insufficiency and/or edema, and a favorable risk-benefit assessment
- Vascular consult if appropriate
- For dry stable eschars with no evidence of infection, do not debride
- Ensure good podiatric care and good footwear including protection that offloads pressure points
- Palliative care rather than healing is often a more appropriate goal

### Ankle Brachial Index

#### Ankle Brachial Index (ABI)

- The ABI is a reliable bedside test that determines arterial blood flow in the lower extremity and generally correlates with signs and symptoms of arterial insufficiency
- ABI should be determined prior to use of compression dressings in patients with venous insufficiency or venous stasis ulcers
- A Doppler ultrasound is required for the measurement and it is calculated by dividing the systolic pressure in the dorsalis pedis or posterior tibial artery by the brachial artery systolic pressure.
- The test is also used to assess for peripheral arterial disease (PAD) in patients:
  - With abnormal or absent pedal pulses
  - Age  $\geq$  70 years
  - Age 50-69 years with history of smoking or diabetes

#### Steps for Performing an ABI

1. Place patient in a supine position for at least ten minutes before the test
2. Obtain the brachial pressure in each arm using Doppler probe. Record the highest brachial pressure
3. Place an appropriately-sized cuff around the lower leg 2.5 cm above the malleolus
4. Apply acoustic gel over the dorsalis pedis pulse location
5. Hold the Doppler probe over the pedal pulse according to manufacturer guidelines (e.g. "pen-style" Dopplers should be held at a 45-degree angle). Be careful not to occlude the artery with excessive pressure; hold the probe lightly!
6. Inflate the cuff to a level 20 to 30 mm Hg above the point that the pulse is no longer audible by Doppler
7. Slowly deflate the cuff while monitoring for the return of the pulse signal. The point at which the arterial signal returns is recorded as the dorsalis pedis pressure
8. Apply acoustic gel over the posterior tibial pulse location and repeat this procedure. The higher of the two values is used to determine the ABI. Perform test in both legs.
9. Calculate the ABI by dividing the higher of the two ankle pressures by the higher of the two brachial pressures

#### Significance of Ankle-Brachial Index Values

**ABI  $\leq$  0.9** Refer to vascular specialist. Indicates peripheral arterial disease (PAD). (compression therapy contraindicated)

**ABI = 0.91-1.3\*** Normal ABI.

**ABI  $>$  1.3** Refer to vascular specialist. Indicates calcified vessels if diabetic.

\*Falsely elevated (normal) ABI values may occur in patients with diabetes or end stage renal disease due to arterial calcification. These patients may require additional testing (toe-brachial index may be more accurate) if clinical findings are inconsistent with the ABI recorded.

SUMMARY

DECISION SUPPORT

PATIENT EDUCATION/SELF MANAGEMENT

## WOUND CARE ORDERS

Order Date	Time	Problem	Physician's Order and Medication (Orders must be dated, timed, and signed.)
			<b>Wound location:</b>
			___ Gently cleanse wound with wound cleanser
			___ Apply skin prep to periwound area
			___ Add moisturizing agent (e.g. IntraSite Gel <sup>®</sup> ) to wound base, if needed
			<b>Apply to wound</b>
			___ Calcium alginate
			___ Calcium alginate with silver [e.g. Aquacel Ag <sup>®</sup> ]
			___ Hydrocolloid
			___ Foam [e.g. Polymem <sup>®</sup> ]
			___ Calcium-sodium alginate [e.g. Kaltostat <sup>®</sup> ]
			___ Other
			___ Fill "dead space" with gauze [e.g. AMD Gauze], foam, other suitable dressing , if needed
			<b>Cover wound with:</b>
			___ Gauze
			___ Roll Gauze
			___ Transparent film [e.g. Tegaderm <sup>®</sup> ]
			___ Secure dressings with tape [e.g. Micropore <sup>®</sup> ]
			<b>Change dressing and assess wound every _____ days (or prn dressing dislodgement) for two weeks</b>
			<b>PCP signature</b>
			<b>PCP printed name</b>

ALLERGIES:

INSTITUTION:

ROOM/WING:

CDCR NUMBER, NAME (LAST, FIRST, MI) AND DATE OF BIRTH

Confidential client information  
See W & I Code, Sections 4514 and 5328

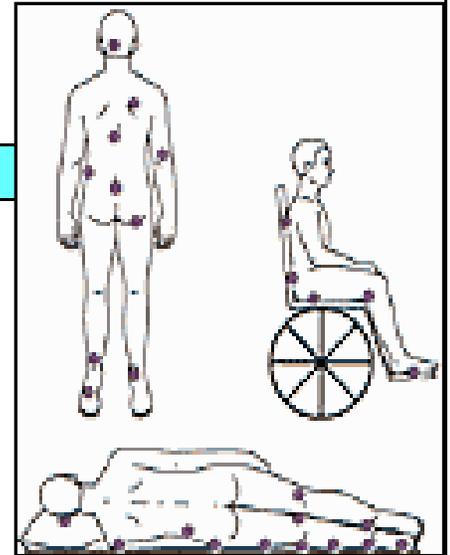
### PHYSICIAN'S ORDERS

## PATIENT EDUCATION/SELF MANAGEMENT

## “BED SORES” (PRESSURE ULCERS): WHAT YOU SHOULD KNOW

### WHAT IS A PRESSURE ULCER?

- A pressure ulcer or bedsore is an injury to the skin (and sometimes muscle or fat under the skin) that is caused by sitting or lying down in one place for too long.
- Pressure sores are given a “grade” (called Stage) of 1 to 4 depending on how deep they are.
- The skin that is over bony areas like the heel, ankles, hips, or buttocks are the most common places to find pressure ulcers.
- Other things that cause pressure ulcers include the skin getting rubbed in one area for too long.



### WHO CAN GET PRESSURE ULCERS?

- Pressure ulcers are common in people who have medical problems and cannot walk, are in bed most of the time, have trouble with blood circulation, need to use diapers or are very thin.
- Pressure ulcers are common in older people, especially those with dementia.
- Pressure ulcers (bedsores) can happen fast and are often hard to treat so it is best to try to prevent them.

### HOW ARE PRESSURE ULCERS PREVENTED?

- Do not lay or sit on the same place for a long time. Reposition yourself several times a day.
- Eat and drink regularly and include protein (meat, fish, beans, and dairy products) with your meals.
- Check your skin regularly for red or sore spots. If you are in a hospital or other medical unit (such as OHU, CTC, or GACH) the nurses will check your skin at least once a day.
- If you use a wheelchair all the time, you should check your skin regularly and tell the medical team right away if you notice any change in your skin. Look for red spots or sore spots (you might not get a sore spot if you have no feeling because of a spinal cord injury).

### HOW ARE PRESSURE ULCERS TREATED?

- The most important thing is to keep pressure off the problem area. (Do not sit or lay on that area)
- Your medical team will treat the ulcer with different medicines or bandages depending on how deep the ulcer is.
- Sometimes dead tissue will need to be removed from the ulcer to let it heal.
- These ulcers take a long time to heal.

## PATIENT EDUCATION/SELF MANAGEMENT

# VENOUS LEG ULCERS: WHAT YOU SHOULD KNOW

## What is a venous (vee-nus) leg ulcer?

- A sore in the skin of the leg caused by leg swelling and problems with your veins.
- It may start with a small injury to your skin.
- In people with bad veins or a lot of leg swelling the skin wound will not heal and the sore can get bigger. This is a chronic venous leg ulcer.

## What Causes Venous Leg Ulcers?

- Stretched out or damaged leg veins from an injury, a blood clot in the leg (deep vein thrombosis "DVT"), or pregnancy.
- The stretched out veins do not carry blood out of the leg which increases the stretching of the veins.
- In time, the veins become so stretched out that fluid leaks out of the veins into the leg tissue causing swelling of the legs, and skin damage.

## What are the symptoms?

- A leg ulcer is usually found just above the ankle, often on the inside of the lower leg.
- The leg is usually swollen and may feel slightly warm to touch.
- Skin changes around the ulcer: feels dry and itchy possibly with red brown freckles.
- Sometimes these ulcers are painful, others do not hurt much.
- Ulcers may have liquid drainage that can be clear or yellowish and can run down the leg.



## What is the treatment?

The exact treatment will be different for each person but for most venous ulcers, treatment will include:

- **Keeping the leg up:** When your leg is up it takes some pressure off the stretched veins. Raising your feet above the level of your heart is best. Put your legs up whenever you can.
- **Bandages:** Often the nurse will bandage the ulcer to keep it clean, and to help keep the area from swelling more so it can heal.
- **Lessen the swelling in the leg:** Your doctor will try to reduce the swelling in your leg to help the ulcer heal and to keep it from coming back. Using special bandages or stockings can help keep pressure in the leg veins low.



## How long will it take the ulcer to heal?

- Most chronic venous ulcers will heal in 3-4 months but sometimes they can take much longer.
- Treatment can be harder in patients who are overweight or have leg swelling that will not go away.
- It is very rare for venous ulcers to get so bad that the leg must be amputated.

## How can I help myself?

- ◆ **Stop smoking**
- ◆ **Get regular exercise.** Using your foot and leg muscles helps the blood flow in your legs to reduce the swelling and helps you control your weight. Try not to stand or sit in one position for a long time. Walk around as much as possible or when you are sitting move your feet around and up and down.
- ◆ **Keep your legs up as much as possible.** Even after your ulcer heals it can help to keep your legs up to reduce leg swelling. Also do not cross your legs when sitting and do not let the edge of a chair press into the backs of your legs.
- ◆ **Wear support stockings if they are recommended.** The stockings help keep your legs from swelling. They can be hard to put on but if your doctor recommends them you should wear them as much as possible.
- ◆ **Wear comfortable, well-fitting shoes.**
- ◆ **Protect your skin and legs.** Keep your skin clean and try not to let your skin get too dry. Take care not to bang your feet or legs on sharp corners or objects.
- ◆ **Check your feet and legs regularly.** Look for sores or changes in color – use a mirror if needed. Let your health care team know right away if you think you are getting an ulcer.
- ◆ **Eat and drink regularly.** Include protein (meat, fish, beans, and dairy products) with your meals

## PATIENT EDUCATION/SELF MANAGEMENT

## ISCHEMIC (ARTERIAL) ULCERS: WHAT YOU SHOULD KNOW

### What causes ischemic (is-kee-mic) ulcers?

- Ischemic ulcers can happen when blood flow to your leg is limited. This is called ischemic disease.
- Being cold, smoking, and high blood pressure can slow the blood flow to your lower legs.
- Raising your legs can slow the blood flow to your lower legs.

### What is ischemic disease?

Ischemic disease is when you have restricted blood flow to your legs

You may have all or some of these symptoms:

- Pain in the lower leg with walking that is relieved by rest
- Pain in the lower leg while lying in bed
- Loss of hair on the leg and foot
- Cold feet



### What will increase the risk of getting ischemic ulcers?

- Diabetes
- High blood pressure
- Hardening of the arteries
- Smoking



### When should I see my health care provider?

If you have:

- Numbness in one or both of your feet
- Loss of movement in your legs or feet
- Color change in your lower legs
- Redness, blisters or sores on either foot

If you have an ulcer, you should see your health care provider if there is:

- Increased pain at your ulcer site
- Bad smell coming from the wound
- Change in color or amount of drainage from wound
- Fever or chills
- You feel sick to your stomach or are vomiting



### What can I do to help prevent ischemic ulcers?

- Do not walk barefoot
- Wear shoes and socks that protect your feet from the cold
- Protect your legs and feet from injury
- Inspect your lower legs and feet daily to find problems early
- Don't smoke
- Exercise as directed
- Follow recommended diet



## PATIENT EDUCATION/SELF MANAGEMENT

**DIABETIC FOOT ULCERS: WHAT YOU SHOULD KNOW****What is a foot ulcer?**

- A foot ulcer is a sore, usually on the bottom of the foot, that does not heal well.
- These “sores” can be deep and go into the tendon and bone of the foot.

**Why do some people with diabetes get foot ulcers?**

- **People with diabetes may not have normal feeling in their feet:** High blood sugar can cause damage to some of the nerves in the feet. This is called neuropathy (noo-rop-uh-thee). If you cannot feel parts of your feet, you may not know if you step on something sharp or get a blister from wearing a tight shoe.
- **People with diabetes may get clogged arteries going to the feet:** There is more risk of getting “hardening of the arteries” in your legs and feet if you have diabetes (peripheral vascular disease). When this happens, the blood vessels (arteries) become clogged and blood does not travel well to the legs and feet. If there is not much blood flowing to the feet even a small cut may not heal well and may turn into a foot ulcer.

**What increases the risk of getting foot ulcers?**

- Poor control of your blood sugars.
- Smoking, high cholesterol, high blood pressure, or not enough exercise.
- Having kidney or eye problems from diabetes can mean you have clogged arteries.
- Foot problems such as bunions that put more pressure on some areas of the foot.
- Badly fitting footwear.



Picture shows where most foot ulcers are found

**Can foot ulcers be treated?**

- Yes, but they can take a long time to heal, especially if your diabetes is not in good control and you have clogged arteries in your feet.
- Treatment may include covering the ulcer with a bandage to keep it clean and protecting the ulcer from more pressure by wearing pads in your shoes or by wearing special shoes or a cast.
- You may need antibiotics if the ulcer gets infected. Sometimes ulcers get worse and surgery is needed.
- People with diabetes may need to have toes or part of their foot removed (amputation) if the ulcer will not heal. It is very important to follow instructions to help your ulcer heal and to avoid problems.

**What can I do to help prevent diabetic foot ulcers?**

- **Have your feet checked regularly:** Your health care provider should look at your feet at least once a year.
- **Take care of your diabetes:** Control your blood sugars. If you smoke - stop. If you have high blood pressure or high cholesterol you should get these under control.
- **Take care of your feet by:**
  - Looking carefully at your feet each day, even between the toes. If you cannot do this yourself ask someone for help.
  - Seeing your health care provider if you see anything new (such as a cut, bruise, blister, redness or bleeding).
  - Not taking care of corns, calluses, warts, athletes' foot or other foot problems by yourself.
  - Trying to avoid dry skin. If you use lotion, do not put it between your toes (this can make the skin too moist).
  - Cutting your toenails correctly. Do not cut down the sides of the nails, or cut them too short. If you cannot see properly, do not try to cut your nails yourself because you may cut your skin. You should ask someone else to do it.
  - Washing your feet regularly and drying them carefully, especially between the toes.
  - Not walking barefoot. You might step on something and cause a sore.
  - Always wearing socks with shoes or other footwear. (But don't wear socks that are too tight around the ankle)
  - Not wearing tight shoes that rub any area of the foot. If your feet are an abnormal shape, or if you have bunions or other foot problems, you may need specially fitted shoes to stop your feet from rubbing.

