Prevention and Treatment Of Pressure Ulcers 2014 International Guidelines Review (PART 2)

Nancy Morgan RN, BSN, MBA, WOC, WCC, DWC, OMS
Wound Care Education Institute
The information in this handout reflects the state of knowledge, current at time of publication; however, the authors do not take responsibility for data, information, and significant findings related to the topics discussed that became known to the general public following publication.

The recommendations contained herein may not be appropriate for use in all circumstances. Decisions to adopt any particular recommendation must be made by the practitioner in light of available resources and circumstances presented by individual patients.

Acknowledgements: This handout and presentation was prepared using information generally acknowledged to be consistent with current industry standards. The authors whose works are cited in the Bibliography Section of this manual are hereby recognized and appreciated.

All product names, logos and trademarks used in this presentation are the property of the respective trademark owners. ® and ™ denote registered trademarks in the United States and other countries.

"The use of NPUAP/EPUAP/PPPIA material does not imply endorsement of products or programs associated with the use of the material."

Wound Care Education Institute (WCEI)
25828 Pastoral Dr.
Plainfield, IL 60585

Fax: 877-649-6021
Phone: 877-462-9234
Email: Info@wcei.net
Website’s: www.wcei.net www.woundcentral.com

Want to stay up to date?
Find us on:

Copyright © 2015 by Wound Care Education Institute
All Rights Reserved.

WCEI grants permission for photocopying for limited personal or educational use only. This consent does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale.
1. Five types of recommendations in the guidelines
   a. Do it (Strong recommendation for using an intervention)
      1) For health professionals—most people should receive the intervention. If health professionals choose not to follow the recommendation, they should document their rationale.
      2) For quality monitors—Adherence to this recommendation could be used as a quality criterion or performance indicator.
   b. Probably do it (Weak recommendation for using an intervention)
   c. Probably don’t do it (Weak recommendation against using an intervention)
   d. Don’t do it (Strong recommendation against using an intervention)
   e. No specific recommendation
2. CLINICAL PRACTICE GUIDELINE
   a. 280 pages
   b. 575 explicit evidence-based recommendations related to pressure ulcers; Assessment, Prevention, Treatment
   c. Includes summary of the research supporting each recommendation
   d. Order at www.npuap.org
3. QUICK REFERENCE GUIDE
   a. 60-page document provides quick listing of all the evidence-based recommendations from the full guideline
   b. Summary of research not included with this guide
   c. Order hard copy at www.npuap.org
VI. Nutrition In Pressure Ulcer Prevention and Treatment (Adults)

A. Malnutrition (nutritional imbalance) results in impaired wound healing and a 4x increased risk for pressure ulcer development.\(^{25}\)

B. Nutrition Screening

1. Screen nutritional status for each individual at risk of or with a pressure ulcer:\(^{1,11}\)
   a. At admission to a health care setting
   b. With each significant change of clinical condition
   c. When progress toward pressure ulcer closure is not observed
2. Used to identify individuals who require a comprehensive nutrition assessment due to characteristics that put them at potential nutritional risk. \(^1\)
3. Any qualified member of the health care team may complete nutrition screening. \(^1\)
4. Use a valid and reliable nutrition screening tool. \(^{1,11}\)
   b. MUST (Malnutrition Universal Screening Tool) [http://www.bapen.org.uk/screening-for-malnutrition/must/introducing-must](http://www.bapen.org.uk/screening-for-malnutrition/must/introducing-must)
   c. SNAQ (Short Nutritional Assessment Questionnaire) [http://www.fightmalnutrition.eu/fight-malnutrition/screening-tools/](http://www.fightmalnutrition.eu/fight-malnutrition/screening-tools/)
5. Refer individuals screened to be at risk of malnutrition and individuals with an existing pressure ulcer to a registered dietitian for a comprehensive nutrition assessment. \(^{1,11}\)

C. Comprehensive Nutrition Assessment

1. The focus of nutrition assessment should be on evaluating energy intake, unintended weight change and the effect of psychological stress or neuropsychological problems. Additionally, assessment should include a determination of the individual’s caloric, protein and fluid requirements.
2. Assess the weight status of each individual to determine weight history and identify significant weight loss (≥ 5% in 30 days or ≥ 10% in 180 days).
3. Assess the individual’s ability to eat independently. \(^1\)
4. Assess the adequacy of total nutrient intake (e.g., food, fluid, oral supplements and enteral/parenteral feeds). \(^1\)
5. Bio-chemical Assessment (Labs)
   a. Serum albumin is not considered a good indicator of nutritional status or need for supplemental nutrition in patients with pressure ulcers.\(^{27,28}\) Current research show the hepatic proteins (albumin, transthyretin and transferrin) correlate with the severity of an underlying disease rather than nutritional status. \(^{26-28}\)
   b. Total lymphocyte count (TLC) reflects a decline in the immune system and has therefore been proposed as a useful indicator of nutritional status. \(^{28}\)
      1) A normal TLC is >1800 mm\(^3\). Less than 900 mm\(^3\) indicates PEM.\(^{28,29}\)
      2) A decrease to less than 800 mm\(^3\) reflects severe malnutrition.\(^{28,30}\)
      3) TLC may be a useful indicator of malnutrition. \(^{28}\)
6. A registered dietitian, in consultation with the interprofessional team (including, but not limited to, a physician, nurse, speech pathologist, occupational therapist, physical therapist and dentist) should develop and document an individualized nutrition intervention plan based on the individual’s nutritional needs, feeding route and goals of care, as determined by the nutrition assessment. \(^1\)
   a. Follow relevant and evidence-based guidelines on nutrition and hydration for individuals who exhibit nutritional risk and who are at risk of pressure ulcers or have an existing pressure ulcer. \(^1\)

D. Nutritional Interventions

1. Provide 30 to 35 kcalories/kg body weight for adults at risk or have a pressure ulcer who are assessed as being at risk of malnutrition.\(^{1,10}\)
   a. Adjust energy intake based on weight change or level of obesity. \(^1\)
b. Revise and modify/liberalize dietary restrictions when limitations result in decreased food and fluid intake.¹

c. Offer fortified foods and/or high calorie, high protein oral nutritional supplements between meals if nutritional requirements cannot be achieved by dietary intake.¹,10

d. If oral intake is inadequate, enteral or parenteral nutrition may be recommended if consistent with the individual’s wishes.¹,10 Enteral (tube) feeding is the preferred route if the gastrointestinal tract is functioning.

2. Offer 1.25 to 1.5 grams protein/kg body weight daily for adults with an existing pressure ulcer or at risk of a pressure ulcer who are assessed to be at risk of malnutrition when compatible with goals of care, and reassess as condition changes.¹,10

   a. Offer high calorie, high protein nutritional supplements in addition to the usual diet if nutritional requirements cannot be achieved by dietary intake.¹,10
      1) Oral nutritional supplements (ONS), enhanced foods, and food fortifiers can be used to combat unintended weight loss and malnutrition.¹

   b. Assess renal function to ensure that high levels of protein are appropriate.¹,10

   c. Supplement with high protein, arginine and micronutrients for adults with a pressure ulcer Category/Stage III or IV or multiple pressure ulcers when nutritional requirements cannot be met with traditional high calorie and protein supplements.¹,10

3. Provide and encourage adequate daily fluid intake for hydration.

   a. Monitor individuals for signs and symptoms of dehydration including change in weight, skin turgor, urine output, elevated serum sodium, and/or calculated serum osmolality.¹,10
      1) Serum sodium Normal Range 135-145 mEq/L; Dehydration >145 mEq/L²⁷,³¹
      2) Serum Osmolality Normal Range 280-303 mOsm/kg; Dehydration >303mOsm/kg; Critical dehydration >320 mOsm/kg²⁷,³¹

   b. Provide additional fluid for individuals with dehydration, elevated temperature, vomiting, profuse sweating, diarrhea, or heavily exuding wounds.¹,10

4. Provide/encourage individuals with an existing pressure ulcer or at risk of pressure ulcers to consume a balanced diet that includes good sources of vitamins and minerals.¹,10

   a. Offer vitamin and mineral supplements when dietary intake is poor or deficiencies are confirmed or suspected.¹,10

   b. Micronutrients that are “hypothesized” to be related to pressure ulcer healing include vitamin C, zinc and copper.

   c. There is no research to justify the administration of vitamin/mineral supplements that are above the U.S. Recommended Dietary Intake.¹,10,²⁷,³²
      1) Daily US RDA Vitamin C - 19+ years old; Male: 90 mg, Female: 75 mg, Smokers require 35 mg/day more vitamin C than nonsmokers.³³
      2) Daily US RDA Zinc - 19+ years old; Male:11 mg, Female: 8 mg³³
      3) Daily US RDA Copper - 19+ years old; 700 μg/d³³

VII. Prevention

A. Skin Care

1. Keep the skin clean and dry.¹,6
   a. Use a pH balanced skin cleanser.¹,6
   b. pH of skin is 4 to 5.5 (slightly acidic) Harsh detergents can increase risk of skin breakdown.
   c. Use skin cleansers that:⁹⁸
      1) Have pH range 4-7. Although the packaging on most products does not note the pH, it can be ascertained by checking the Material Safety Data Sheet or checking with the manufacturer.⁷³
      2) Loosen soil without need of aggressive scrubbing
      3) No-rinse skin cleansers are preferable to soap and water for incontinent care⁷⁰,⁷¹,⁷²,⁷³

2. Do not massage or vigorously rub skin that is at risk of pressure ulcers.¹,10
   a. As well as being painful, friction massage can cause mild tissue destruction or provoke inflammatory reactions, particularly in frail older adults.

3. Develop and implement an individualized continence management plan.¹,6
   a. Cleanse the skin promptly following episodes of incontinence.¹,6
   b. Protect the skin from exposure to excessive moisture with a barrier product in order to reduce the risk of pressure damage.¹,10
      1) When fecal incontinence is present, application of a product that is effective against stool penetration, such as zinc oxide or liquid skin sealant is recommended.⁷²,⁷³
2) It is important to note that skin damage from moisture is not a pressure ulcer, but that presence of skin damage from moisture leaves the skin’s integrity more susceptible to the forces of shear, pressure and, especially, friction.  

4. Consider using a skin moisturizer to hydrate dry skin in order to reduce risk of skin damage.  
   a. Excessively dry skin results in skin flaking and reduces the water level of the stratum corneum, making it less flexible and more vulnerable to damage.  
   b. Dry skin can be managed by the use of routine moisturizing using a combination of humectants with occlusive moisturizers.  
      1) Contrary to popular belief, moisturizer does not add moisture to the skin. Moisturizer traps existing water in the skin, preventing the water from evaporating.  
         To trap water from a bath or shower in the skin, moisturizer must be applied within 3 minutes of bathing. Applied regularly, this helps decrease dryness and itching.  
      2) Occlusives: These work by forming a thin film on the surface of the skin to prevent loss of moisture. Examples: Petrolatum, cocoa butter, cyclomedithicone, lanolin, mineral oil, shea butter, waxes  
      3) Humectants attract water when applied to the skin and theoretically improve hydration of the stratum corneum. Humectants typically draw water to the skin from two different places; they can draw water from a humid environment, and they enhance water absorption from the outer layer of skin (transdermal water). Examples: Glycerol, hyaluronic acid, panthenol, propylene glycol, sodium lactate and/or ammonium lactate, pyrrolidine carboxylic acid, sorbitol, urea  
      c. Brand Name Examples: CeraVe® cream, ammonium lactate topical - Amlacitin® XL, Kerasal® AL, Lac-Hydrin®, Lac-Hydrin® S, Laclotion®, Nivea® body Rich Care Body Moisturizer, Aveeno® moisturizing range, Vaseline® Intensive Rescue, etc…  

5. Do not apply heating devices (e.g., hot water bottles, heating pads, built-in bed warmers) directly on skin surfaces or pressure ulcers. Heat increases the metabolic rate, induces sweating and decreases the tolerance of the tissue for pressure.  

6. Consider using silk-like fabrics rather than cotton or cotton-blend fabrics to reduce shear and friction.  
   a. Bedding, booties, undergarments, neonatal; Parafricta®  
   b. Bedding, underpads, gowns; DermaTherapy®  

B. Prevention Medical Device Related Pressure Ulcers  
1. Review and select medical devices available in the facility based on the devices’ ability to induce the least degree of damage from the forces of pressure and/or shear.  
   a. Facilities, with the input of the health professional, should provide medical devices that will minimize skin damage. This may include selection of softer, more flexible devices.  
2. Ensure that medical devices are correctly sized and fit appropriately to avoid excessive pressure.  
3. Apply all medical devices following manufacturer’s specifications.  
   a. Failure to follow the manufacturer’s application instruction can result in harm (e.g., skin damage) to the individual and can be a source of liability.  
4. Ensure that medical devices are sufficiently secured to prevent dislodgement without creating additional pressure.  
   a. In situations in which simple repositioning does not relieve pressure, it is important not to create additional pressure by placing excessive dressings beneath tight devices.  
   b. Regardless of insertion technique or purpose, all tubes should be stabilized at the skin level to prevent migration. Unrestricted movement will cause enlargement of the insertion site, with subsequent skin erosion and leakage.  
   c. Examples external tube stabilizing devices  
      1) Hollister – www.hollister.com - Feeding Tube Attachment Device (FTAD), Horizontal Tube Attachment Device (HTAD), Vertical Tube Attachment Device (VTAD)  
      4) Nasogastric Securement Device by Centurion www.centurionmp.com  
      5) Tracheostomy: Silicone stoma pad (cushion between the flange and the tracheostomy site) for pressure redistribution. Sil.Flex™ Stoma Pad - http://www.respiralogics.com/  
7) Tape - If must use tape Use gentle, hypoallergenic tape. 3M™ Kind Removal Silicone Tape http://solutions.3m.com; Mepitac® Silicone Tape http://www.molnlycke.com

5. Remove medical devices that are potential sources of pressure as soon as medically feasible.  

6. Keep skin clean and dry under medical devices.  
   a. Moisture underneath a medical device creates an environment in which the skin is more vulnerable to alterations in skin integrity, including irritant dermatitis and ulceration. 

7. Do not position the individual directly on a medical device unless it cannot be avoided. 

8. Reposition the individual to redistribute pressure and shear forces created by the medical device. 
   a. Rotate or reposition medical devices when possible. Caution: always validate that the depth of an ET tube does not change with tube manipulation.

9. Consider using a prophylactic dressing for preventing medical device related pressure ulcers. 
   a. Thin hydrocolloids, film dressings, silicone based pads, skin sealant, or barrier products underneath the device to reduce moisture, friction and shear.

10. Tips for Medical Device Respiratory Equipment 
   a. Thoroughly inspect the skin beneath and around oxygen administration devices at least every 8-12 hours with close attention to the back of the ears, bridge of nose and nares if applicable.
   b. Oxygen mask - Replace masks with straps that have lost elasticity. Do not tie knots in the straps.
   c. Oxygen tubing protectors (e.g. Oxyears™; E-Z Wrap Cannula Ear Cushions)
   d. Some foam tracheostomy straps can be used to hold oxygen cannula in place and away from the ears.
   e. Tracheostomy foam/collar-type adjustable straps are preferable to tape/twill ties for comfort, easy adjustment, and prevention of accidental tube displacement. 

11. Educate the individual with a medical device in the community setting and his/her caregivers to perform regular skin inspections. 

C. Repositioning & Mobilization 
1. Pressure ulcers cannot form without loading or pressure on the tissues. 
   a. Repositioning – involves a change in position of the lying/seat individual undertaken at regular intervals for the purpose of relieving or redistributing pressure and enhancing comfort.
   b. Mobilization – involves assisting or encouraging a person to move or shift into a new position.

2. Reposition all individuals at risk of, or with existing pressure ulcers, unless contra-indicated. 
   a. Repositioning of an individual is undertaken to reduce the duration and magnitude of pressure over at risk areas and to contribute to comfort, hygiene, dignity, and functional ability.
   b. Despite consistent clinical recommendations that repositioning is an effective intervention for PU prevention and treatment, the optimal technique for repositioning has not been completely determined. However, this does not mean these interventions are ineffective. 
   c. Determine repositioning frequency in bed or in the chair with consideration to the individual’s: 
      a. Pressure redistribution support surface in use 
         1) Clinical evidence supports reducing this frequency to every 4 hours if the patient is on a pressure redistribution surface.
      b. Tissue tolerance -the ability of the skin to withstand the effects of unrelieved pressure 
         1) Not one size fits all, each individual can tolerate a different amount and duration of pressure before injury develops.
      c. Level of activity and mobility 
      d. General medical condition 
      e. Overall treatment objectives 
      f. Skin condition 
      g. Comfort 

3. Tissue Tolerance Test 
   a. Testing by documenting the time to erythema [TTE] over bony prominences 
   b. Phase 1-To check for tissue tolerance, position the patient in chair or bed (note position on side or
back) for a 1-hour interval. After the 1-hour interval, reposition the patient off the area exposed to pressure and observe/document any areas of redness. Recheck the area after 30-45 minutes.

1) If redness has persisted, stop the test. Consider the area to be a Stage I pressure ulcer. The patient requires repositioning at an interval shorter than 1 hour. DO NOT Position patient back onto the stage I area.

2) If the redness is resolved, proceed to phase 2.

c. Phase 2-Position the patient in chair or bed (same location as used in #1) for a 1 ½-hour interval. After the 1 ½-hour interval, reposition the patient off the area exposed to pressure and observe/document any areas of redness. Recheck the area after 30-45 minutes.

1) If redness has persisted, stop the test! Consider the area to be a Stage I pressure ulcer. The patient requires repositioning at an interval of no more than every 1 hour.

2) If there is no persistent redness, proceed to phase 3.

d. Phase 3-Position the patient in chair or bed (same location as used in #1 & #2) for a 2-hour interval. After the 2-hour interval, reposition the patient off the area exposed to pressure and observe/document any areas of redness. Recheck the area after 30-45 minutes. Did any redness resolve or is there persistent redness?

1) If redness has persisted, consider the area to be a Stage I pressure ulcer. The patient requires repositioning at an interval of no more than every 1 ½-hour.

2) If there is no persistent redness, the test is complete and the patient requires repositioning at an interval of every two hours.

e. Document findings.

5. Establish pressure relief schedules that prescribe the frequency and duration of weight shifts. If the individual is not responding as expected to the repositioning regime, re-evaluate frequency and method of repositioning.  

6. Tips for positioning

a. Continue to turn and reposition the individual regardless of the support surface in use. Establish turning frequency based on the characteristics of the support surface and the individual's response.

b. Avoid positioning directly on skin breakdown, pressure ulcers, or medical devices.

1) Pressure reduces perfusion to injured tissues. Continued pressure on an existing pressure ulcer will delay healing and may cause additional deterioration.

2) Erythema indicates that the body has not recovered from the previous loading and requires further rest from repeated loading.

3) Non-blanchable erythema is an indication of the early signs of pressure ulcer damage. If an individual is positioned directly onto bony prominences with pre-existing non-blanchable erythema, the pressure and/or shearing forces sustained will further occlude blood supply to the skin, thereby worsening the damage and resulting in more severe pressure ulceration.

Use manual handling aids to reduce friction and shear. Lift — don’t drag — the individual while repositioning.

1) Lift sheets

2) Split leg sling mechanical lift when available to transfer an dependent individual into a wheelchair or bedside chair (Remove the sling immediately after transfer unless the equipment is specifically designed to stay in place)

3) Inspect the skin for new or additional damage each time the individual is turned or repositioned. If changes in skin condition should occur, the repositioning care plan needs to be re-evaluated.

4) Do not leave the individual on a bedpan longer than necessary.

5) Consider pressure applied to toes and lower limbs from bedding, medical devices and surgical stockings (e.g. anti-embolic stockings).

7. Bed Positioning

a. Reduce pressure over bony prominences by positioning patients using the “Rule of 30”.

1) The Rule of 30 means the head of the bed is elevated at no more than 30 degrees from horizontal level and the body is placed in a 30 degree laterally inclined position, when repositioned to either side (unless contraindicated by medical condition or feeding and digestive considerations). If the head of the bed is raised higher than 30 degrees for eating, watching television, etc., the head should be returned to the original 30 degrees as soon as possible.

2) In the 30 degree laterally inclined position, the individual’s hips and shoulders are tilted 30 degrees from supine and pillows or foam wedges are used to keep the resident properly positioned without pressure over the trochanter or sacrum. If tolerated, the prone position may
also be used.

b. Encourage individuals who can reposition themselves to sleep in a 30° to 40° side-lying position or flat in bed if not contraindicated.¹

c. Avoid lying postures that increase pressure, such as the 90° side-lying position, or the semi-recumbent position (45° head elevation).¹

d. Utilize trapeze bars to facilitate the patient who is able to assist with moving up in bed.

e. Individuals should be positioned and supported to prevent sliding down in bed and creating shear forces.¹

1) Use auto-contour (a knee gatch that rises automatically and simultaneously as the HOB rises) to reduce migration by up to 2.5 cm (1”). ³⁵

2) If the bed doesn’t have auto-contour, raise the knee gatch before raising the HOB.³⁵

3) Positioning with pillows under arms may prevent sliding down in bed.¹

f. Prone Position

1) Use a pressure redistribution surface to offload pressure points on the face and body while in the prone position.¹ ²

2) At each rotation, assess other body areas (e.g., face, breast region, knees, toes, penis, clavicles, iliac crest, and symphysis pubis) that may be at risk when individuals are in the prone position.¹

8. Heel Positioning

a. Inspect the skin of the heels regularly.¹ ² ³

1) The incidence of heel pressure ulcers in patients, with or without Diabetes, ranges from 19% to 32%.⁹⁹,⁹⁰

2) Incidence data reveal that the heel is the most common site of facility-acquired pressure ulcers.⁹¹

3) 60% of heel pressure ulcers develop in the acute care setting.⁹²

4) The annual cost of treating heel pressure ulcers is a staggering $2.2 to $3.6 billion.⁹³

b. Ensure that the heels are free of the surface of the bed. Ideally, heels should be free of all pressure—a state sometimes called ‘floating heels’.¹ ² ³

1) One can verify if the heels are actually floating by slipping a sheet of paper between the heel and bed surface without it touching the heel or by slipping the clinician’s hand between the heel and the bed surface.⁹⁴

2) Problem with pillows: The heels tend to rapidly slip off the pillow to the bed or the lower extremities move so that the heels rest directly on the pillow, which increases rather than relieving tissue interface pressure.⁹⁵ No support for a neutral angle for the foot, resulting in an increased risk for foot-drop.⁹⁵

3) Pillows placed under the full length of the calves to elevate heels may be appropriate for short-term use in alert and cooperative individuals. The knee should be in slight flexion (5° to 10°) to prevent obstruction of the popliteal vein & DVT and caution should be taken to place no pressure on the Achilles tendon.¹ ²

c. Option 1 for floating heels - Ordinary Pillow

1) Ordinary pillow placed under the calves to elevate and float heels, free from any pressure.

2) Problem with pillows: The heels tend to rapidly slip off the pillow to the bed or the lower extremities move so that the heels rest directly on the pillow, which increases rather than relieving tissue interface pressure.⁹⁵ No support for a neutral angle for the foot, resulting in an increased risk for foot-drop.⁹⁵

3) Pillows placed under the full length of the calves to elevate heels may be appropriate for short-term use in alert and cooperative individuals. The knee should be in slight flexion (5° to 10°) to prevent obstruction of the popliteal vein & DVT and caution should be taken to place no pressure on the Achilles tendon.¹ ²

d. Heel Suspension Devices

1) Use heel suspension devices that elevate and offload the heel completely in such a way as to distribute the weight of the leg along the calf without placing pressure on the Achilles tendon.¹ ² ³

2) Heel suspension devices are preferable for long term use, or for individuals who are not likely to keep their legs on the pillows.¹ Heel offloading devices are easier to manage than pillows but it is critically important to completely relieve pressure from the heels without causing pressure in other areas.⁹⁶

3) Key Points

- Apply heel suspension devices according to the manufacturer’s instructions.¹ ² ³

- Remove the heel suspension device periodically to assess skin integrity.¹ ² Check device placement more frequently in individuals with neuropathy, peripheral arterial disease, lower-extremity edema; or who are likely to develop edema.¹,¹¹

4) Considerations for selecting an optimal heel protection device include:⁹⁹,⁹⁵

- Elevate the heel off the underlying support surface

- Prevent foot-drop and rotation of the leg
- Wick away temperature
- Cleaning option’s
- Allow patient ambulation
- Remain in place despite patient movement
- Prevent pressure to other surfaces of the foot
- Separate and protect the ankles

5) Brand Name Product Examples
- Heelift® Standard Suspension Boot  www.heelift.com
- Multi Podus® System   www.rcai.com
- PRAFO® www.anatomicalconceptsinc.com
- WAFFLE® Heel Elevator www.ehob.com
- Posey® PRO-heeLx®  www.posey.com
- ROHO® Heal Pads  http://www.therohogroup.com
- Skil-Care™ Heels-Off   http://www.skil-care.com
- Gelbodies http://www.medlogics.com
- Prevalon® Heel Protector  http://www.sageproducts.com

e. Heel protection for individuals with existing heel ulcer
1) Relieve pressure under the heel(s) with Category/Stage I or II pressure ulcers by placing legs on a pillow to ‘float the heels’ off the bed or by using heel suspension devices.
2) For Category/Stage III, IV and unstageable pressure ulcers, place the leg in a device that elevates the heel from the surface of the bed, completely offloading the pressure ulcer. Consider a device that also prevents footdrop. Elevation of the heel on a pillow is usually inadequate.

9. Seated Re-positioning
a. Limit the time an individual spends seated in a chair without pressure relief.

b. Little evidence is available for “specific” recommendations for performing pressure-redistributing movements while seated. There isn’t evidence that momentary pressure relief followed by return to the same position (that is a “microshift” of five or 10 degrees or a 10-15 second lift from a seated position) is beneficial. This approach does not allow sufficient capillary refill and tissue perfusion for a resident at risk of developing pressure ulcers.
1) To return tissue oxygenation to unloaded levels, however, a pressure-relieving movement must be at least 1 to 2 minutes in duration.

c. A change in position in a chair may involve
1) Standing the individual and re-sitting in the chair
2) Elevating the feet and reclining the chair 30°
3) Tilting back in wheelchair to ≥ 65°
4) Shifts in weight can also be accomplished by positioning. For instance, foam wedges or pillows, used to position the individual on his or her side, can be altered slightly every 15 minutes. Pulling them out gradually over 1 to 1½ hours shifts the weight slightly.

d. Teach individuals to do ‘pressure relief lifts’ or other pressure relieving maneuvers as appropriate.
1) Leaning forward in wheelchair >45° from wheelchair backrest or leaning forward with elbows, or chest on knees for 120 seconds.

e. Positioning Resources
2) Movinsense Nurses Patient repositioning alarm - MovinSense sends a message to the nurses station when: (1) A bedridden patient has been lying in the same position for a set period of time (2) A bedridden patient has turned themselves and is now lying on an existing pressure ulcer. http://www.accesshealth.com.au/hospital-nursing-home/patient-handling/3872/movinsense-nurses-patient-repositioning-alarm/

f. Position the individual so as to maintain stability and his or her full range of activities.
1) Minimize the pressure and shear exerted on the skin and soft tissues.
2) Provide adequate seat tilt to prevent sliding forward in the wheelchair or chair, and adjust footrests and armrests to maintain proper posture and pressure redistribution.

g. Ensure that the feet are properly supported either directly on the floor, on a footstool, or on footrests when sitting (upright) in a bedside chair or wheelchair.
1) To avoid shear and friction select a seat with an appropriate seat-to-floor height for the individual. If the individual’s feet cannot be positioned directly on the ground, footrest height should be adjusted so as to slightly tilt the pelvis forward by positioning the thighs slightly lower than horizontally.

2) Avoid the use of elevating leg rests if the individual has inadequate hamstring length.

h. Resources for Proper Wheelchair fit and Posture support (Free forms & instructions)
1) World Health Organization (WHO) Wheelchair Service Training Package - Basic level
   http://www.who.int/disabilities/technology/wheelchairpackage/en/
2) WHO Wheelchair Service Training Package – Intermediate Level
   http://www.who.int/disabilities/technology/wheelchairpackage/wstpintermediate/en/

i. Sitting is important to reducing the hazards of immobility, facilitating eating and breathing, and promoting rehabilitation. While sitting is important for overall health, every effort should be made to avoid or minimize pressure on the ulcer.
1) Weigh the risks and benefits of supported sitting against benefits to both physical and emotional health.
2) Consider periods of bed rest to promote ischial and sacral ulcer healing.
3) If sitting in a chair is necessary for individuals with pressure ulcers on the sacrum/coccyx or ischia, limit sitting to three times a day in periods of 60 minutes or less.

j. Consult a seating specialist to prescribe an appropriate seating surface and/or positioning techniques to avoid or minimize pressure on the ulcer.
1) Consult a seating specialist if pressure ulcers worsen on the seating surface selected.

k. Avoid seating an individual with an ischial ulcer in a fully erect posture (in chair or bed).
1) Modify sitting time schedules and re-evaluate the seating surface and the individual’s posture if the ulcer worsens or fails to improve.

10. Positioning Devices

a. Positioning devices such as pillows or foam wedges can be used to maintain position. These devices are also used to prevent bony prominences from direct contact with one another. Five pillow rule:
1) Pillow 1 under legs to elevate the heels
2) Pillow 2 between ankles
3) Pillow 3 between the knees
4) Pillow 4 behind the back
5) Pillow 5 under the head

b. Do not use ring or donut-shaped devices. The edges of these devices create areas of high pressure that may damage tissue.

c. Natural sheepskin pads might assist in preventing pressure ulcers.
1) Australian Medical-grade sheepskin: Sheepskin that conforms to Australian Standard AS 4480.1–1997 for size; performance criteria (e.g., laundering temperature range up to 60° or 80°C); urine resistance; wool type, wool length (30mm), and final finish; and labeling.

d. Heel protectors/Heel pads protect against friction NOT pressure.

e. The following ‘devices’ should not be used to elevate heels:
1) synthetic sheepskin pads
2) cutout, ring, or donut-type devices
3) intravenous fluid bags
4) water-filled gloves

11. Mobilization

a. Individuals on bedrest should progress to sitting and ambulation as rapidly as they can tolerate. Ambulation schedules may help offset the clinical deterioration often seen in individuals subjected to prolonged bedrest.

b. Develop a schedule for progressive sitting according to the individual’s tolerance and pressure ulcer response.
1) Testing by documenting the time to erythema [TTE] over bony prominences
2) Increase activity as rapidly as tolerated.

12. Record repositioning care plans, specifying frequency and position and include an evaluation of the outcome of the repositioning plan.

a. Documentation provides a written record of care delivery and, as such, serves as evidence that repositioning has occurred.

D. Emerging Therapies For Prevention
1. Microclimate Control
   a. Micro-climate - temperature (of the skin or the soft tissues) and humidity or skin surface moisture at the interface between the skin and the support surface.\textsuperscript{1,11,100,102}
      1) Skin temperature is highly variable and influenced by a very wide range of environmental, physiological and pathological factors, including ambient humidity and temperature and disease processes.\textsuperscript{13}
   b. How micro-climate effects the skin
      1) The body constantly produces a certain amount of heat and moisture that normally flows from the skin to the environment.\textsuperscript{101,102}
      2) If the free flow of heat from the body is not removed, the skin becomes warm.\textsuperscript{100}
      3) Warm skin requires a greater supply of blood-borne nutrients.\textsuperscript{100,102}
      4) Warm skin in combination with unrelieved external pressure or shear forces reduces blood flow.\textsuperscript{98,99,100}
      5) If the skin is deprived of oxygen and nutrients for too long, the tissue dies and a pressure ulcer forms.
      6) The accumulation of heat leads to perspiration. Prolonged, high levels of moisture weaken the skin, making it more susceptible to the damaging effects of pressure and shear forces.\textsuperscript{100,102}
         - Excessive skin moisture and high relative humidity weaken skin and increase the coefficient of friction of skin, increasing the likelihood of damage from pressure, shear and friction.\textsuperscript{13}
         - Dry skin is weakened and more vulnerable to damage, e.g. by pressure, shear stresses and friction.\textsuperscript{13}
   c. The initial approach to the management of extremes of microclimate should involve addressing the cause of excess temperature or altered skin moisture e.g. treating pyrexia, managing incontinence effectively\textsuperscript{13}
   d. Using specialized support surfaces that come into contact with the skin may be able to alter the microclimate by changing the rate of evaporation of moisture and the rate at which heat dissipates from the skin.\textsuperscript{1,12}
      1) Low air loss (LAL) overlays/mattresses and air-fluidized support surfaces both act in ways that may draw moisture and heat away from patients.\textsuperscript{1,12}
      2) Consider the need for moisture and temperature control when selecting a support surface cover.\textsuperscript{1}
   e. Encouraging the patient to move in the bed or through turning regimens. Movement will allow moisture to evaporate from areas previously in contact with the support surface.\textsuperscript{12}
   f. Control of skin moisture may be assisted by regular changing of gowns and bed linen.\textsuperscript{12}
   g. Bariatric patients in particular may benefit from frequent washing and changing of clothes.\textsuperscript{12}

2. Prophylactic Dressings
   a. Several studies have demonstrated that prophylactic dressings assist in decreasing friction and localized shear forces.\textsuperscript{1,14-17}
   b. Consider applying a polyurethane foam dressing to bony prominences (e.g., heels, sacrum) for the prevention of pressure ulcers in anatomical areas frequently subjected to friction and shear.\textsuperscript{1}
   c. Consider using a prophylactic dressing for preventing medical device related pressure ulcers.\textsuperscript{1}
      1) Caution: Avoid excessive layering of prophylactic dressings that may increase pressure at the skin device interface.\textsuperscript{1}
      2) Consider applying dressings that demonstrate pressure redistribution and absorb moisture from body areas in contact with medical devices, tubing and fixators.\textsuperscript{16}
      3) When dressings applied beneath medical devices, continue to lift and/or move the medical device to examine the skin beneath it and reposition for pressure relief.\textsuperscript{16}
      4) It is important not to create more pressure by placing dressings beneath tight devices.\textsuperscript{16}
   d. A dressing will never be capable of reducing pressure to the level of redistribution found in a specialty mattress; but in order for a dressing to be an additional preventive measure, the dressing construction should:
      1) Be capable of reducing and redistributing load as this subsequently impacts shear.\textsuperscript{17}
      2) Manage moisture and microclimate, especially when used with a medical device that may be in contact with bodily fluids/drainage (e.g. percutaneous endoscopic gastrostomy tube).\textsuperscript{1,16}
      3) Easy application and removal
      4) Ability to regularly assess skin condition\textsuperscript{16}
      5) The dressing needs to be larger than the bony prominence it means to protect \textsuperscript{16-19}
e. Frequency of Change

1) Based upon facility policy. 
2) General rule, change the dressing every 72 hours and inspect the skin. 
3) However, if there is any concern over skin integrity following a change in patient condition or after a long OR procedure, clinicians are encouraged to perform a peel-and-peak technique. (e.g., soft silicone borders that are easy to lift for routine skin checks without creating tape burns or other skin injuries). 
4) Assess the skin for signs of pressure ulcer development at each dressing change or at least daily, and confirm the appropriateness of the current prophylactic dressing regimen. 

f. When not to use prophylactic dressing

1) If the dressing needs to be changed more than twice in a 24-hour period, due to moisture or incontinence it should be discontinued and begin alternative skin protection, such as barrier creams/ointments. 
2) Ambulatory patients and those capable of independent turning and repositioning without sensory perception deficits. 

g. Continue to use all other preventive measures necessary when using prophylactic dressings. 

3. Electrical Stimulation of the Muscles for Prevention of Pressure Ulcers

a. Electrical stimulation therapy in wounds is defined as the application of an electrical current through electrodes placed either within the wound itself or on the periwound skin. 
b. There is emerging evidence that electrical stimulation (ES) induces intermittent tetanic muscle contractions and reduces the risk of pressure ulcer development in at risk body parts, especially in individuals with spinal cord injury (SCI). 
c. Consider the use of electrical stimulation for anatomical locations at risk of pressure ulcer development in spinal cord injury (SCI) patients. 

1) Three studies concluded: that ES induced tetanic contractions of the gluteal and hamstring muscles in sitting individuals with SCI causes a temporary decrease in peak sitting pressure under the ischial tuberosities and an improved pressure distribution. 
2) ES procedures should be applied for 1-3 hours/day with a 50 pps current in an intermittent cycle: 3 min of stimulation (including 1-second on: 4-seconds off) and 17 minutes of rest. Stimulating gluteal and hamstring muscles appears to be more effective than stimulating only the gluteal muscles. 

VIII. Support Surfaces

A. Definitions

1. Support Surface - “A specialized device for pressure redistribution designed for management of tissue loads, microclimate, and/or other therapeutic functions (e.g., any mattresses, integrated bed system, mattress replacement, overlay, or seat cushion or seat cushion overlay).” 
2. Mattress overlay is a general term to describe a support surface that is placed on top of a mattress. 
3. Mattress replacement – is a general term to describe a support surface that totally replaces the standard mattress. 
4. Integrated Bed System - is a general term to describe a bed frame and support surface that is combined into a single unit whereby the surface is unable to function separately. 
5. Pressure Redistribution - The ability of a support surface to distribute load over the contact areas of load (human body/mannequin) resulting in the therapeutic benefit of preventing and/or managing pressure ulcers. (NOTE: The terms pressure relief and/or pressure reduction are no longer used) 
6. Micro-climate - temperature (of the skin or the soft tissues) and humidity or skin surface moisture at the interface between the skin and the support surface. 

B. Types of Support Surfaces

1. Reactive Support Surface - AKA Constant low pressure (CLP) support surface; “a powered or non-powered support surface with the capability to change its load distribution properties only in response to applied load.” In other words, distributes interface pressure over a wider body area through immersing and enveloping the patient in response to a patient lying or sitting on it. 

a. Two concepts are key in determining the extent to which a reactive support surface will provide pressure redistribution: 
1) Immersion: the possibility for the body to 'sink' into the support surface, thus increasing the contact area between it and the body and thereby distributing body weight over a larger area 
2) Envelopment: the ability of the support surface to conform to the body thereby bringing the maximum possible body area into contact with it.
b. Examples: Foam, Air or Gel filled, Low air loss, Air-fluidized

2. Active Support Surface - A powered support surface that produces alternating pressure through mechanical means “with the capability to change its load distribution properties, with or without applied load.” 1,11,107,111; periodically shifts the areas of support from between anatomical locations so that deformation is not sustained over any one area, achieved by cycling air into and out of bladders with the support surface (aka alternating pressure)1
   a. Examples: Alternating pressure surfaces

C. Features of Support Surfaces
1. Air fluidized - contain sand-like particles, such as silica beads, through which air is forced. As the air is forced through the particles, they take on the properties of a liquid (e.g. become fluidized). The porous cover allows air to escape out of the mattress and body fluids to flow down into the support surface. 1,11,108
2. Alternating pressure - cyclical inflation and deflation of sections of the support surface so that pressure is removed from parts of the patient and then reapplied as other parts are relieved. 1,11,108
3. Lateral rotation - provides rotation about a longitudinal axis as characterized by degree of patient turn, duration, and frequency. 1,11,108
   a. Minimize shear strain when lateral rotation features are used. 1
   b. Secure the individual with bolster pads (provided by the manufacturer) to prevent sacral shearing when lateral rotation features are selected for individuals without existing pressure ulcers. The individual should be aligned properly in the center of the surface. 1
   c. Assess skin frequently for shear injury. 1
   d. Continue to repose the individual when using lateral rotation features. 1
   e. Consider alternative methods of pressure redistribution (or avoid lateral rotation beds) in individuals with sacral or buttock pressure ulcers. 1
4. Low air loss - provides a flow of air to assist in managing the heat and humidity of the skin. 1,11,108
5. Zone - a segment with single pressure redistribution capability 1,11,108
6. Multi zoned surfaces – a surface in which different segments can have different pressure redistribution capabilities 1,11,108

D. General Support Surface Guidelines
1. “Support surfaces alone can neither prevent nor heal pressure ulcers.” Use as part of a total program of prevention and treatment. 1,11
2. In all cases, the manufacturer’s recommendations for the use and maintenance should be followed. 1
3. Do not use small cell alternating pressure air mattresses or overlays.
   a. Alternating pressure air mattresses with small air cells (diameter < 10 cm) cannot be sufficiently inflated to ensure pressure relief over the deflated air cells. 120,121
4. Select a support surface that meets the individual’s needs. Consider the individual’s need for pressure redistribution based on following factors: 1
   a. Level of immobility and inactivity
   b. Need for microclimate control and shear reduction
   c. Size and weight of the individual
   d. Risk for development of new pressure ulcers
   e. Number, severity, and location of existing pressure ulcer(s).
5. Choose a support surface that is compatible with the care setting. 1
   a. Consider the weight of the bed, the structure of the building, the width of doors, the availability of uninterrupted electrical power, and safe location for the pump/motor, including its ventilation.
   b. Plans should be in place for the contingency of power failure.
6. Examine the appropriateness and functionality of the support surface on every encounter with the individual. 1
   a. Monitor and document that device is functioning
   b. Check all air devices for adequate inflation
   c. Check the pump settings for any alternating air equipment to ensure that it is set for the correct weight of the patient and that users/carers understand the static mode, (the static mode function must not be left on for any longer than is absolutely necessary, as this prevents the cells from alternating).
   d. If powered, be sure it is plugged in and working correctly.
   e. Be sure it is the right size for the patient (especially important for larger persons whose weight may be centered in one area)
f. Follow manufacturer’s directions for pressure settings
   1) Alarm lights on low air loss mattresses
      - Check air hose connections
      - Check pump function

g. Wheelchair cushions
   1) Open the cover and check components of cushion
   2) Check for wear or deterioration of foam and gel
   3) Ensure proper inflation if air cushion

7. Identify and prevent potential complications of support surface use. Proper selection and operation of support surfaces is the key to preventing complications.
   a. Ensure that the mattress or cushion does not elevate the patient to an unsafe height in relation to patient mobility, bed rails or chair arms.
   b. Allows immersion without “bottoming out” Bottoming out occurs when the depth of penetration or sinking is excessive, allowing increased pressure to concentrate over one area or boney prominence.114
      1) Follow manufacturer’s recommendations for frequency and method of assessing support surface for bottoming-out.
      2) Many mattresses and integrated bed systems in use today include self-diagnostic features that indicate proper protective function.
      3) Pressure mapping
      4) To check for “bottoming out”: place your hand palm up with fingers outstretched, between the support surface and underlying surface or frame.114,115 The support surface should have about 1 inch of un-compressed support surface between the clinicians hand and the patients’ body.113,114,115
         Check at different head elevations.114,115
      5) To check for bottoming out: Active (alternating pressure) mattress: slide the hand between the deflated air cell directly under the patient. If there is sufficient support minimal contact should be felt.111

8. Verify that the support surface is being used within its functional life span, as indicated by the manufacturer’s recommended test method (or other industry recognized test method) before use of the support surface.1
   a. Foam mattresses and chair cushions should be dated when put into use. Age and integrity need to be monitored based on manufactures recommendations and replaced as needed.

9. Continue to reposition individuals placed on a pressure redistribution support surface.1
   a. Repositioning is still required for pressure relief and comfort when a support surface is in use.
      However, the frequency of repositioning may alter as a result of using a support surface.

10. Choose positioning devices and incontinence pads, clothing and bed linen that are compatible with the support surface. Limit the amount of linen and pads placed on the bed.1
    a. Adding layers of linens under the patient will inhibit the surface’s ability to redistribute pressure and maintain an optimal skin microclimate.
    b. Study results indicated that each incontinence pad, transfer sheet, or combination of linens significantly increased the mean peak sacral pressure when compared to a single fitted sheet on both the low-air-loss surface and the foam surface, regardless of the head-of-bed angle.102
    c. Less is Best

E. Mattress and Bed Support Surfaces for Pressure Ulcer Prevention

1. Use a high specification reactive foam mattress or consider using other reactive support surfaces for all individuals assessed as being at risk for pressure ulcer development.1
   a. There is no evidence of the superiority of one higher specification foam mattress over any other higher specification foam mattresses.1,118,119

2. Review the characteristics of foam mattresses used in the facility for pressure ulcer prevention to ensure they are high specification according to Clinical Practice Guideline consensus opinion.1
   a. Guideline consensus opinion on the minimum characteristics for a product to be considered a high specification foam mattress.1,111
      1) Classification - Type H/HR46 (H - conventional resilience, HR - heavy duty high resilience)1,111,116
      2) Density – 35 kg/m³ or 2.18 PCF
      3) Support Factor – IFD 1.75 - 2.4
      4) Depth – 150mm (5.9 inches); increase for bariatric load
      5) Mattress cover – MVTR: minimum 300 g/m²/24hrs (equivalent to normal TEWL); often two-way
6) Other considerations
- Multi-layering of various grades/types of foam alters the design features\(^1\)
- Low resilience/slow recovery/memory foam/viscoelastic: increases the surface area contact, redistributes pressure, reduces peak pressures and allows immersion of boney prominences.\(^3\) Has potential to increase skin surface temperature.\(^1,116\)
- Castellated foam: partial thickness cuts made in a regular block pattern on the top section of the foam increases surface contact area potentially reducing friction and shear.\(^1,111\)
- Side walls: a border or stiffener along the edge increases firmness and assists mobility and transfers\(^1,111\)
- Safety sides (concave shape): may reduce risk of falls but may also reduce bed mobility, need to consider facility restraint policy.\(^1,111\)
- Hinging system: wedges removed on the inner border to allow for folding or bending of mattress to accommodate back rest and upper and lower leg sections to conform to profiling beds.\(^1,111\)

3. Use an active (AP) support surface (overlay or mattress) for individuals at higher risk of pressure ulcer development when frequent manual repositioning is not possible.\(^1\)
   a. Overlays and mattresses with alternating pressure (AP) features demonstrate similar efficacy in reducing pressure ulcer incidence.\(^41,110,119\)

F. Mattress and Bed Support Surfaces for Individuals with Existing Pressure Ulcers
1. Consider replacing the mattress with a support surface that provides more effective pressure redistribution, shear reduction, and microclimate control for the individual if he or she: \(^1\)
   a. Cannot be positioned off the existing pressure ulcer
   b. Has pressure ulcers on two or more turning surfaces (e.g. The sacrum and trochanter) that limit turning options
   c. Fails to heal or demonstrates ulcer deterioration despite appropriate comprehensive care
   d. Is at high risk for additional pressure ulcers
   e. ‘Bottoms out’ on the existing support surface.
2. Before replacing the existing mattress: \(^1\)
   a. Evaluate the effectiveness of previous and current prevention and treatment plans; and
   b. Set treatment goals consistent with the individual’s goals, values, and lifestyle.
3. Stage I and II pressure ulcers
   a. Consider using a high specification reactive foam mattress or non-powered pressure redistribution support surface \(^1\)
4. Stage III, IV, unstageable pressure ulcers & deep tissue injury
   a. Select a support surface that provides enhanced pressure redistribution, shear reduction, and microclimate control \(^1\)
   b. Evolving deep tissue injury should be provided the same level of pressure redistribution as a Category/Stage III or IV pressure ulcer.\(^4\) Offloading and pressure redistribution may allow reperfusion of ischemic and injured tissue, limiting the extent of infarcted or dead tissue. Once the ulcer has fully evolved, support surface needs can be re-evaluated.
   c. There is insufficient and limited guidance from studies supported by high-level evidence on which to base definitive recommendations for using one surface over another.\(^1,41,110,119\) The studies cited below represent the best available evidence for treatment of pressure ulcers.\(^1\)
   1) Beds with air fluidized feature
      - Produced better healing outcomes for Stage III & IV pressure ulcers than standard beds\(^122\), alternating air with foam pad\(^123\) and variety of non-air fluidized support surfaces\(^124,125\) in addition better weekly healing rates reported with air fluidized beds.\(^126\)
   2) Beds with low air-loss feature
      - Resulted in better healing outcomes for Stage III & IV pressure ulcers than foam mattresses with 2.5 fold improvement in healing on the low air-loss.\(^127\)
   3) Mattresses and overlays with alternating pressure features
      - No published studies demonstrating better healing outcomes for Stage III or IV pressure ulcers in comparison to other types of support surfaces.\(^4\)
   4) Other powered and non-powered support surfaces
      - Pressure ulcers have healed on non-powered and powered support surfaces, however no published studies available for statistically significant effect of these surfaces on healing of
5. Support Surface Companies
   a. ArjoHuntleigh www.arjohuntleigh.us/usah/
   b. Hill-Rom www.hill-rom.com
   c. Invacare www.invacare.com
   d. Joerns www.joerns.com
   e. Recovercare www.recovercare.com
   f. Sizewise www.sizewise.net
   g. SpanAmerica www.spanamerica.com
   h. Stryker Medical www.stryker.com

G. Seating Support Surfaces
1. Seating Support Surfaces to Prevent Pressure Ulcers
   a. Use a pressure redistributing seat cushion for individuals sitting in a chair whose mobility is reduced.
   b. Ensure that selection of a pressure redistributing seat cushion is appropriate to the individual.

2. Individualize the selection and periodic re-evaluation of a seating support surface and associated equipment for posture and pressure redistribution with consideration to:
   a. Body size and configuration
   b. The effects of posture and deformity on pressure distribution
   c. Mobility and lifestyle needs

3. Select a stretchable/breathable cushion cover that fits loosely on the top surface of the cushion and is capable of conforming to the body contours.
   a. A tight, non-stretch cover will adversely affect cushion performance.
   b. Assess the cushion and cover for heat dissipation. Select a cushion and cover that permit air exchange to minimize temperature and moisture at the buttock interface.

4. Inspect and maintain all aspects of a seating support surface to ensure proper functioning and meeting of the individual’s needs.
   a. Seating cushions should be inspected for signs of wear on a daily basis. The support surface (chairs and wheelchairs) should be inspected according to the manufacturer’s recommendations.
   b. Wheelchairs - observe for “hammock effect” in the seat
      1) The seat material tends to sag in the middle, especially in older and less expensive wheelchairs.
      2) Once the seat begins to sag, the thighs tend to roll inward, exposing the trochanters to pressure from the sides of the wheelchair.
      3) Spine begins to slouch causing patient to slide forward resulting in increasing pressure on the ischial tuberosities and a constant shear force on the skin of the buttocks, thighs, and thoracic spine.
      4) Placing a foam or gel cushion on a sagging wheelchair seat will not solve the problem. The answer is to replace the sagging seat with a solid seat and cover it with the appropriate pressure-reducing or pressure-relief cushion.

5. Provide complete and accurate training on use and maintenance of a seating support surface (including wheelchairs) and cushion devices delivered to the individual.

6. Seating Support Surfaces for Individuals with Existing Pressure Ulcers
   a. Refer individuals to a specialist seating professional (e.g. occupational therapist, physical therapist, physiotherapist) for evaluation if sitting is unavoidable.
   c. Select a cushion that effectively redistributes the pressure away from the pressure ulcer.
      1) Cushion construction achieves pressure redistribution in one of two basic methods: immersion/envelopment or redirection/off-loading.
         - Immersion/envelopment – cushion deforms around and encompass the contour of the body; they deflect and deform to immerse the buttocks in the material; flat cushions must deflect more than contoured cushions.
         - Redirection/offloading – cushions redirect loads via relief areas in the cushion; require that the individual sit on the cushion in a specific, consistent manner.
   d. Use alternating pressure seating devices judiciously for individuals with existing pressure ulcers. Weigh the benefits of off-loading against the potential for instability and shear based on the construction and operation of the cushion.
7. Wheelchair cushion Manufacturers
   a. Sunrise Medical: http://www.sunrisemedical.com
   b. Varilite: http://www.varilite.com/
   c. Span America: http://www.spanamerica.com
   d. Supracore: http://www.supracor.com
   e. Roho Medical Products: http://www.therohogroup.com
   g. Otto Bock Rehab: http://www.ottobockus.com/
   h. Skil-Care: http://www.skil-care.com
   i. Invacare http://www.invacare.com
   j. Waffle Cushion: http://www.ehob.com/

H. Documentation
1. Documentation of interventions relating to the support surface, evaluations of effectiveness and changes to the patient’s management plan is required.
2. Document annual equipment audits.
References

All product names, logos, and trademarks used in this outline and corresponding presentation are the property of the respective trademark owners. *and † denote registered trademarks in the United States and other countries.


63. Sardina D. Wound and Skin Care Pocket Guide. Wound Care Education Institute, Lake Geneva WI, 2011.


68. Sardina D. Skin and Wound Management Course Workbook. Wound Care Education Institute, Lake Geneva, WI. May, 2011.


76. Lazare J. Careful Attention to Aging Skin. Aging Well, Vol. 5 No. 5 P. 18.


2. Drennan DB. Heel pressure ulcers are preventable. Ext Care Product News 2003;87(3):4-5.


