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Wound Care ADVISOR

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PRACTICAL ISSUES IN WOUND, SKIN, AND OSTOMY MANAGEMENT

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Understanding therapeutic support surfaces

Hidden complications:
A case study in peripheral
arterial disease

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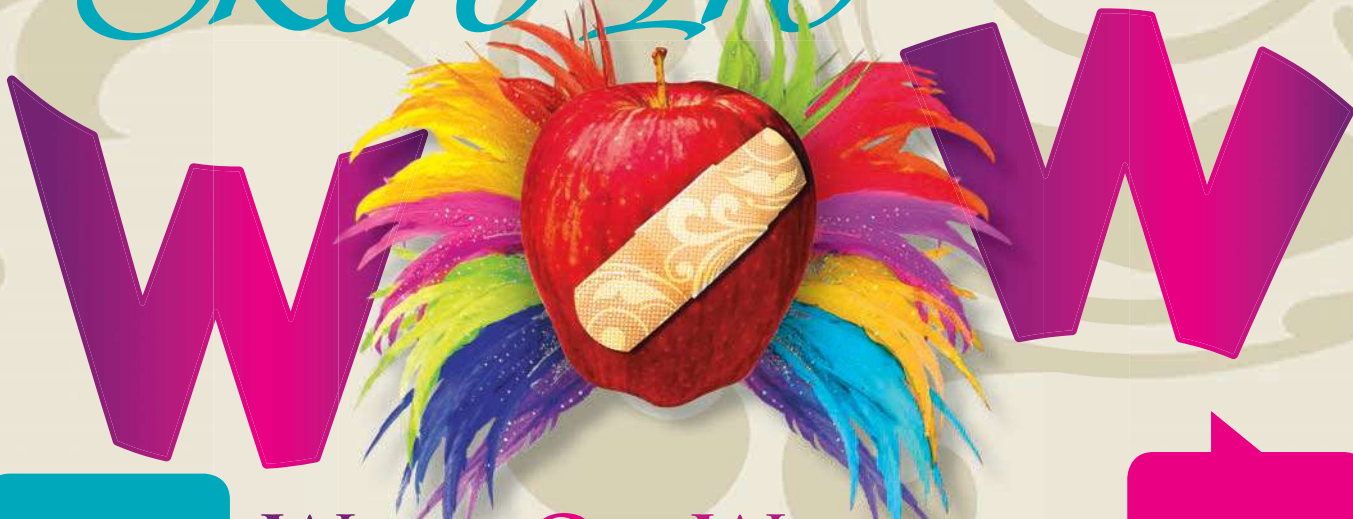
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BSN, RN, MBA, WCC

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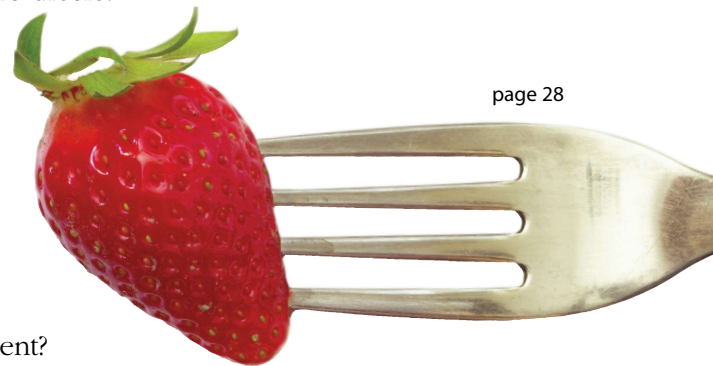
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I'm going to conference!

Years ago, when I first started out in the wound care specialty, the only way to learn about new products and what was going on in the field was to “go to conference” (wound care conference). All year long, planning and excitement continued to build for our big trip. *Not* going wasn't an option; our facility, patients, and administrators needed us to attend. If we didn't, we'd be way behind our competition in regard to cutting-edge, hot-off-the-press wound care treatments and techniques.

Besides being a forum for displaying new wound care products, conference is an opportunity to network, to see what others are doing—what's working and what isn't— and to hear firsthand from researchers.

Living in the digital age has changed things for us. We're blessed to have innovative information at our fingertips whenever we connect to the Web via computer, smartphone, or tablet. Manufacturers' websites, government guidelines, and social media sites can keep us informed of what's hot and happening if we just take the time to check them.

But as glorious as the Web is, I still believe in the power of attending conference. Some things are just meant to be seen, touched, and experienced—live and in person. Being in a convention hall with hundreds or even thousands of clinicians who love the same icky, yucky, stinky, and sometimes-nauseating challenge of wound management is something you just can't experience on the Web. The power

of passion, excitement, and inspiration from others is so contagious.

It's understandable that money and time constraints play a big part in decisions to attend conference. Nonetheless, I believe all wound and ostomy experts should figure out a way to go to conference every year, or at least every other year. Here are some creative **ideas for funding your conference expenses:**

- Educational grants from suppliers
- State or local educational grants
- Employer's tuition-reimbursement program
- Combining your annual family vacation with the conference trip
- Holiday or birthday gift from your family
- Simple negotiation with your employer.

Currently in the United States, we can choose from several wound conferences, including the National Alliance of Wound Care and Ostomy cosponsored event **Wild on Wounds (WOW)**. I encourage all wound and ostomy experts to support and advance our specialty by continually educating and updating ourselves—and one way to do this is to go to conference.

A handwritten signature in black ink that reads "Donna Sardina". The script is fluid and cursive.

Donna Sardina, RN, MHA, WCC, CWCMS,
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Diabetes increases pressure-ulcer risk more than other comorbidities

Diabetes is linked to pressure ulcers in nursing home, hospital, perioperative, rehabilitation, and home settings, according to a meta-analysis in the *International Journal of Dermatology & Research*. Half or more of the studies found that diabetes had a “close association” with pressure-ulcer development in all of the settings.

The authors of “**The association between pressure ulcer development and patient comorbidities in varied care settings: A review of the literature**” found that cardiac, renal, and respiratory diseases were associated with pressure-ulcer development in many of the settings.

Incidence density best measure of pressure-ulcer prevention program

According to the National Pressure Ulcer Advisory Panel (NPUAP), incidence density is the best quality measure of pressure-ulcer prevention programs. **Pressure-ulcer incidence density** is calculated by dividing the number of inpatients who develop a new pressure ulcer by 1,000 patient days. Using the larger denominator of patient days allows fair comparisons between institutions of all sizes.

NPUAP notes that incidence density is typically determined by counting the number of patients with newly acquired pressure ulcers and dividing that number by the number of patients examined for pressure ulcers over a given period of time. This technique means that smaller facilities can appear to have a higher percentage of patients with ulcers because there are fewer patients in the denominator. For example, 5 patients with ulcers out of 100 patients assessed equals a 5% incidence. The same number of patients with ulcers (5) among 500 patients assessed is only 1%. Using patient days as the denominator stabilizes the result.



LIV may improve wound healing

A study in *PLOS One* has found that whole body low-intensity vibration (LIV) improves wound healing in mice with diabetes. The mice received excisional cutaneous wounds and either LIV or a nonvibrated sham treatment. Wound tissue was collected 7 and 15 days after the wound.

The authors of “**Low-intensity vibration improves angiogenesis and wound healing in diabetic mice**” conclude that, “LIV may exert beneficial effects on wound healing by enhancing angiogenesis and granulation tissue formation, and these changes are associated with increases in pro-angiogenic growth factors.”

Lymphedema after SLN dissection more frequent than thought



Lymphedema after sentinel lymph node (SLN) dissection in women with early-stage clinically node-negative breast cancer occurs more often than clinically suspected, and the incidence of lymphedema increases over time, according to an abstract presented at the Society of Surgical Oncology 67th Annual Cancer Symposium, March 12-15, 2014, and published in *Annals of Surgical Oncology*.

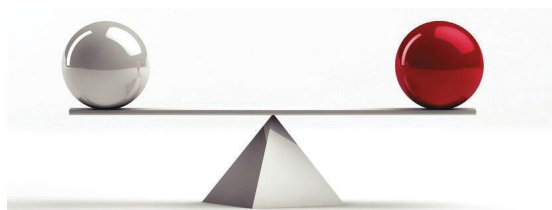
The authors of “**Long-term incidence of lymphedema after sentinel lymph node dissection for early stage breast cancer: ACOSOG Z0010**” found that the cumulative incidence of lymphedema after SLN dissection was 3.7% at 1 year, 8.9% at 3 years, and 11.9% at 5 years by subjective assessment ($n = 3,993$) and 10.5% at 1 year, 17.4% at 3 years, and 24.1% at 5 years by objective arm measurements ($n = 3,918$).

Barriers to MRSA prevention identified

“**Preventing transmission of MRSA: A qualitative study of health care workers’ attitudes and suggestions**” reports that healthcare workers identified the following as barriers to

eliminating MRSA (methicillin-resistant *Staphylococcus aureus*): patient care demands, equipment availability, environmental issues, practices of other healthcare workers, and lack of sufficient signage indicating which patients need contact precautions.

The study in the *American Journal of Infection Control*, which included 26 acute-care healthcare workers, found that most participants felt responsible for preventing transmission and feel they have the knowledge and desire to do so.



Exercise improves balance in older adults with diabetes

“**Exercise improves gait, reaction time and postural stability in older adults with type 2 diabetes and neuropathy**,” according to a study in the *Journal of Diabetes and Its Complications*.

The study included 37 adults (21 without neuropathy and 16 with neuropathy). Adults participated in either moderate or intense supervised exercise training three times a week for 12 weeks.

Patients with lymphedema should be referred to specialist

“**Management of primary and secondary lym-**



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lymphedema: Analysis of 225 referrals to a center”

concludes that patients with suspected lymphedema should be referred to specialists who focus on the disease.

The study in *Annals of Plastic Surgery* notes that 25% of the patients with “lymphedema” who were referred to the center had another condition. In addition, 34% of patients with lymphedema received tests that aren’t diagnostic for the condition and 8% received a diuretic, which doesn’t improve lymphedema.



Hospital stays involving surgery are costly

In 2011, hospitalizations that involved operating room (OR) procedures constituted 29% of the total 38.6 million hospital stays in the United States and 48% of the total \$387 billion in hospital costs, according to a **2014 statistical brief** from the Agency for Healthcare Research and Quality.

“Characteristics of operating room procedures in U.S. hospitals, 2011” also found that hospital stays involving an OR procedure were about twice as costly as stays with no OR procedure, but were half as likely to result in patient deaths. Other findings include:

- The 20 most common procedures accounted for more than half of all OR procedures. (Cesarean section and circumcision were the most frequent OR procedures.)

- Twenty procedures accounted for more than half of all costs for stays involving OR procedures.

Spinal fusion, knee arthroplasty, and percutaneous coronary angioplasty were the procedures with the highest aggregate hospital costs.

Weekly applications of allografts more effective in healing DFUs

Diabetic foot ulcers (DFUs) that receive weekly rather than biweekly applications of allografts heal more rapidly, according to a study in *International Wound Journal*. Application of the allograft was followed by a nonadherent, moist dressing with compressive wrapping, and all wounds were offloaded.

“**A prospective, randomised comparative study of weekly versus biweekly application of dehydrated human amnion/chorion membrane allograft in the management of diabetic foot ulcers**” reports that over the 12-week study period, 92.5% of ulcers completely healed, confirming the value of allografts as an effective treatment.



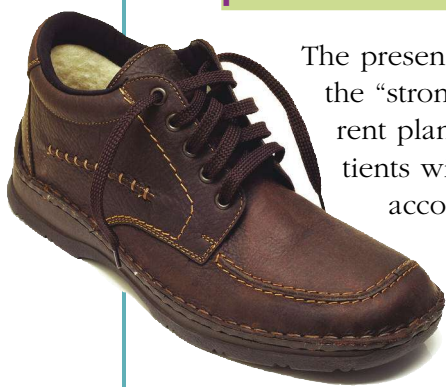
Ostomy lowers QOL in survivors of rectal cancer

Patients who survive rectal cancer but have an ostomy experience a lower quality of life (QOL), worse illness perceptions, and a higher consumption of health care, compared to those without an ostomy 1 to 10 years after diagnosis.

“Living with the physical and mental consequences of an ostomy: A study among 1- 10-year rectal cancer survivors from the population-based PROFILES registry” was published in *Psycho-oncology*. A total of 1,019 (76%) of patients in the registry who had colon cancer responded to the survey, and 43% of those had an ostomy.

The study also found that survivors with an ostomy believed that their illness has “significantly more serious” consequences and will last longer and that survivors with an ostomy were more concerned about their illness compared with those without an ostomy.

Minor lesions predict recurrent plantar foot ulcers



The presence of a minor lesion is the “strongest predictor” of recurrent plantar foot ulcers in patients with diabetic neuropathy, according to a study in *Diabetes Care*. The study also found that use of adequately offloading footwear helps protect against recurrence from unrecognized repetitive trauma.

“Risk factors for plantar foot ulcer recurrence in neuropathic diabetic patients” included 171 patients, 71 of whom had a recurrent ulcer. Other predictors of recurrence included day-to-day variation in stride count and cumulative duration of past ulcers.

Patient education after stoma creation may reduce healthcare costs

A study in the *Danish Medical Journal* reports that patient education for those who

have had a stoma created increases quality of life and doesn’t result in significant increase in overall healthcare costs. In fact, the authors of **“Patient education after stoma creation may reduce health-care costs”** found a significant reduction in costs related to unplanned readmissions and in visits to the general practitioner.

Exercise improves PAD outcomes

“Community-based walking exercise for patients with peripheral artery disease: A pilot study” reports that the program, which included training, monitoring, and coaching components, improved exercise performance and patient-reported outcomes.

The study abstract, published in *Vascular Medicine*, notes that patients with peripheral artery disease (PAD) were randomized either to the program, which lasted 14 weeks, or to standard treatment, which consisted of clinical advice to walk. A total of 19 patients completed the study.



Braden scale may not be valid in ICU

The Braden scale has insufficient predictive validity and poor accuracy for determining which intensive care unit (ICU) patients are at risk for pressure ulcers, according to a study in the *American Journal of Critical Care*.

The authors of **“Predictive validity of the Braden scale for patients in intensive care units,”** which included 7,790 ICU patients in the analysis, write, “The Braden scale may not sufficiently reflect characteristics of intensive care patients.”

What is a comprehensive risk assessment?

By Jeri Lundgren, BSN, RN, PHN, CWS, CWCN

Prevention of pressure ulcers and skin breakdown begins with a comprehensive risk assessment. Most providers use a skin risk assessment tool, such as the **Braden** or **Norton** scale. While these tools have been validated to predict pressure ulcer development, their use alone isn't considered a comprehensive assessment, and frequently the individual risk factors they identify aren't carried through to the plan of care.

A comprehensive assessment

A comprehensive assessment for risk of skin breakdown should include a validated tool such as the Braden scale, but clinicians should also look for risk factors not included on the tool. For example, if your staff uses the Braden scale, you would also want them to consider other risk factors, including diagnoses, medications such as steroids, history of skin breakdown, cognition, the patient's choice to follow the interventions, and the use of

medical devices. (See *Prevention points*.)

In addition, staff should evaluate the validated tool's scale subscores to help identify what is putting the patient at risk (for example, a person scored poorly under mobility and nutrition, so these areas should be addressed in the plan of care).

After completing the comprehensive risk assessment, the next step is creating the plan of care. All individual risk factors must be reviewed as the interdisciplinary team develops individualized interventions to help modify, stabilize, or remove the factors that are putting the patient at risk for skin breakdown.

A valuable tool

Managers should audit the current system to ensure it prompts staff to conduct a comprehensive risk assessment, not just complete the validated tool. Audit patient health records to ensure that everything that was identified on the comprehensive risk assessment has correlating interventions. The goal is to move away from paper compliance of filling out a risk assessment to truly developing a plan of care that will prevent skin breakdown. ■

Jeri Lundgren is vice president of clinical consulting at Joerns in Charlotte, North Carolina. She has been specializing in wound prevention and management since 1990.

Prevention points

The National Pressure Ulcer Advisory Panel lists the following pressure ulcer prevention points:

Risk assessment

- Consider all bedbound and chairbound persons, or those whose ability to reposition is impaired, to be at risk for pressure ulcers.
- Use a valid, reliable, and age-appropriate method of risk assessment that ensures systematic evaluation of individual risk factors.
- Assess all at-risk patients/residents at the time of admission to healthcare facilities, at regular

(continued on page 12)



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intervals thereafter, and with a change in condition. A schedule is helpful and should be based on individual acuity and the patient-care setting.

- **Acute care:** Assess on admission; reassess at least every 24 hours or sooner if the patient's condition changes.
- **Long-term care:** Assess on admission, weekly for 4 weeks, then quarterly and whenever the resident's condition changes.
- **Home care:** Assess on admission and at every nurse visit.
- Identify all individual risk factors (decreased mental status, exposure to moisture, incontinence, device-related pressure, friction, shear, immobility, inactivity, nutritional deficits) to guide specific preventive treatments. Modify care according to the individual factors.
- Document risk assessment subscale scores and total scores and implement a risk-based prevention plan.

Skin care

- Perform a head-to-toe skin assessment at least daily, especially checking pressure points, such as sacrum, ischium, trochanters, heels, elbows, and the back of the head.
- Individualize bathing frequency. Use a mild cleansing agent. Avoid hot water and excessive rubbing. Use lotion after bathing. For neonates and infants, follow evidence-based institutional protocols.
- Establish a bowel and bladder program for patients/residents with incontinence. When incontinence can't be controlled, clean skin at time of soiling, and use a topical barrier to protect the skin. Select underpads or briefs that are absorbent and provide a quick drying surface to the skin. Consider a pouching system or collection device to contain stool and to protect the skin.
- Use moisturizers for dry skin. Minimize environmental factors leading to dry skin, such as low humidity and cold air. For neonates and infants, follow evidence-based institutional protocols.
- Avoid massage over bony prominences.

Nutrition

- Identify and correct factors compromising protein/calorie intake consistent with overall goals of care.
- Consider nutritional supplementation/support for nutritionally compromised persons consistent with overall goals of care.
- If appropriate, offer a glass of water when turning to keep the patient/resident hydrated.
- Administer multivitamins with minerals as prescribed.

Mechanical loading and support surfaces

- Reposition bedbound persons at least every 2 hours and chairbound persons every hour consistent with overall goals of care.
- Consider postural alignment, distribution of weight, balance and stability, and pressure redistribution when positioning persons in chairs or wheelchairs.
- Teach chairbound persons who are able, to shift weight every 15 minutes.
- Use a written repositioning schedule.
- Place at-risk persons on pressure-redistributing mattresses and chair cushions.
- Avoid using donut-type devices and sheepskin for pressure redistribution.
- Use pressure-redistributing devices in the operating room for patients at high risk for pressure ulcer development.
- Use lifting devices (such as a trapeze or bed linen) to move patients/residents rather than drag them during transfers and position changes.

- Use pillows or foam wedges to keep bony prominences, such as knees and ankles, from direct contact with each other. Pad skin subjected to device-related pressure and inspect regularly.
- Use devices that eliminate pressure on the heels. For short-term use with cooperative patients, place pillows under the calf to raise the heels off the bed. Place heel suspension boots for long-term use.
- Avoid positioning directly on the trochanter when using the side-lying position; use the 30-degree lateral inclined position.
- Maintain the head of the bed at or below 30 degrees or at the lowest degree of elevation consistent with the patient's/resident's medical condition.
- Institute a rehabilitation program to maintain or improve mobility/activity status.

Nutrition

- Implement pressure ulcer prevention educational programs that are structured, organized, comprehensive, and directed at all levels of healthcare providers, patients, families, and caregivers.
- Include mechanisms to evaluate program effectiveness in preventing pressure ulcers.

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The DIME approach to peristomal skin care

By Catherine R. Ratliff, PhD, APRN-BC, CWOCN, CFCN

It's estimated that about 70% of the 1 million ostomates in the United States and Canada will experience or have experienced stomal or peristomal complications. Peristomal complications are more common, although stomal complications (for example, retraction, stenosis, and mucocutaneous separation) can often contribute to peristomal problems by making it difficult to obtain a secure pouch seal. This article will help you differentiate types of peristomal complications, including how to prevent and manage them.

The basics

Peristomal (or *parastomal*) is the term used to describe the skin around a stoma. In the immediate postoperative period, the peristomal skin may be ecchymotic or erythematous as a result of trauma from the surgical creation of the stoma. However, after this immediate postoperative period, the peristomal skin should be free from erythema, ulcerations, blisters, or rashes.

To more easily remember and educate others on the types of peristomal complications, you can divide them into four ba-

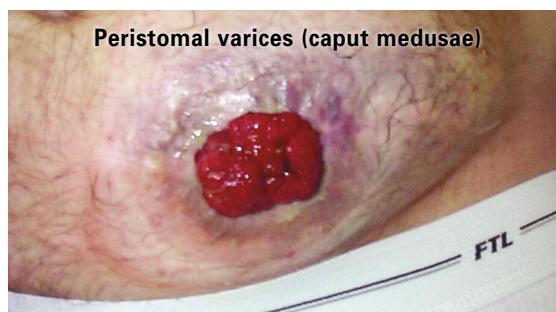
sic categories using the mnemonic DIME. D is disease-related complications, I is infection-related complications, M is mechanical-related complications, and E is exposure of the peristomal skin to effluent or chemical preparations. Here's a closer look at each category.

D: Disease-related complications

Disease-related peristomal complications include peristomal varices, pyoderma gangrenosum, and mucosal transplantation. *Peristomal varices* (caput medusae) are dilated veins due to portal hypertension that occur at the mucocutaneous junction on the peristomal skin. The peristomal skin appears as a purplish blue discoloration and, as the name "caput medusae" suggests, the dilated veins are similar in appearance to the snake-haired Medusa in Greek mythology. Peristomal varices are frequently associated with sclerosing cholangitis, liver cancer, and cirrhosis.

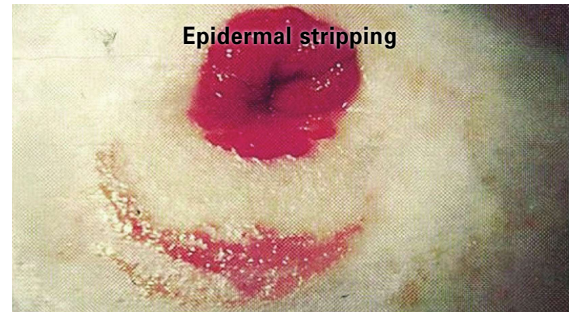
Gentle pouch removal and peristomal skin care are important since pulling and rubbing can increase the risk of traumatizing the skin, with resultant bleeding. Two-piece systems are generally avoided since the flange can rub against the varices, increasing the chance of bleeding.

Assessment of peristomal bleeding followed by such management techniques as applying pressure and cauterizing bleed-





Candidiasis



Epidermal stripping

ing areas with silver nitrate can help control this peristomal complication; the mainstay of therapy is to treat the underlying systemic disease. Advise patients with portal hypertension that they are at increased risk for GI bleeding. If bleeding occurs, patients should use conservative measures, such as applying cold compresses and pressure to the peristomal area. If bleeding persists after pressure has been applied, patients should seek immediate medical attention.

Pyoderma gangrenosum (PG) is a rare inflammatory disease believed to start as one or more pustules that become indurated and form painful full-thickness ulcers on the peristomal skin. The ulcers may appear raised, with dusty red to purplish, irregularly shaped wound margins. Diseases associated with PG include ulcerative colitis and Crohn disease. Once the systemic disease improves, PG usually improves as well.

Peristomal management should include decreasing peristomal inflammation with topical preparations, such as steroids and absorptive powders and dressings, to avoid effluent coming in contact with PG peristomal ulcers.

Mucosal transplantation (also known as seeding) occurs when intestinal mucosa is transplanted to the peristomal skin during the formation of the stoma, usually

by suturing the bowel to the epidermis instead of the dermis. Mucosal transformation may result in persistent mucus secretion and friable intestinal mucosa, and patients may experience a burning sensation when the mucosa comes in contact with some adhesive ostomy products. Conservative management includes the use of absorptive powders to maintain an effective pouch seal.

Other diseases that affect the peristomal skin include malignancy, herpes virus infections, psoriasis, and pemphigus.

I: Infection-related complications

Infection-related peristomal complications include candidiasis and folliculitis. *Peristomal candidiasis* is an overgrowth of *Candida* organisms, with *Candida albicans* being the most common. Exposure to urine or fecal effluent provides a moist environment, which promotes the overgrowth of *Candida* organisms. The condition starts as pustules, which are abraded during pouch changes. Patients may complain of burning and itching. Treatment is aimed at keeping the peristomal skin dry and applying antifungal powder.

Folliculitis in the peristomal area is an inflammation of the hair follicles commonly due to shaving of the peristomal skin; it's usually caused by *Staphylococcus au-*

reus. Prevention is key and involves clipping rather than shaving the skin, using antibacterial soap to cleanse the peristomal skin, gently removing the pouch, and using adhesive pouch-removal products to decrease the pulling of peristomal skin hairs when the pouch is removed.

M: Mechanical-related complications

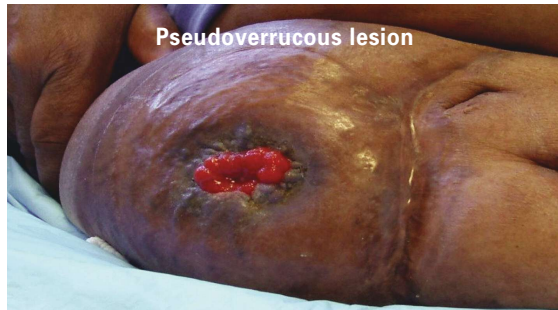
Mechanical peristomal injuries can be related to pressure, friction, and epidermal stripping caused by the pouching system being too tight and rubbing against the peristomal skin. Other possible causes include traumatic removal of the pouch and too-aggressive cleansing of the peristomal skin during pouch changes. The peristomal skin may be erythematous or denuded or, in the case of pressure-related injuries, there may be a circumscribed ulcer.

Preventive measures include careful removal of the pouch, with gentle cleansing of the peristomal skin, or the use of a more flexible pouch if the pouching system rubs against the peristomal skin.

Once the injury has occurred, skin barrier powders may be applied over the denuded skin with a skin sealant. It's important to reevaluate the pouching system to prevent mechanical injury from recurring.

E: Exposure of the peristomal skin to effluent

Exposure to effluent on the peristomal skin such as from an ileostomy can cause the skin to become erythematous in less than an hour, with skin breakdown in several hours. Urine can also cause problems because of the irritating effects of alkaline urine containing ammonium phosphates. *Pseudoverrucous* wartlike lesions may appear around urostomies that are chronic-

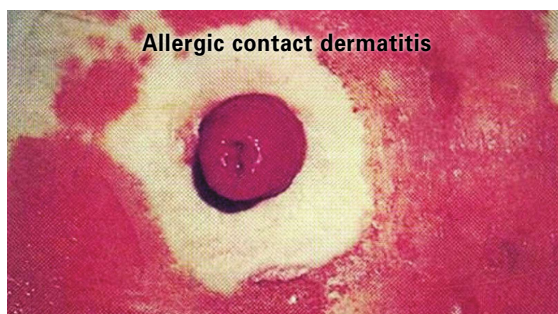


ly exposed to urine effluent, leading to thickening of the epidermis.

Use of chemical preparations (such as cleansers, liquid skin barriers, soaps, and adhesives) can also break down the peristomal skin. This type of skin breakdown



is referred to as an *irritant contact dermatitis*; for example, if the soap used to clean the peristomal skin hadn't been completely removed before the ostomy pouch was applied, the peristomal skin at the next pouch change may be erythema-



tous due to the soap residue irritating the peristomal skin.

Some ostomates may develop an allergic *contact dermatitis* from hypersensitivity to certain chemicals in the ostomy products. Patch testing to determine which product is causing the allergen, then discontinuing the product, usually resolves the allergic dermatitis.

Treatment of exposure problems is aimed at finding the cause of the problem and establishing a secure pouching system that protects the peristomal skin from contact with the effluent or chemical preparation.

Be proactive

Unfortunately, many ostomates will experience peristomal skin complications. To proactively treat the signs of peristomal skin complications, clinicians and patients must be able to recognize them. Accurately describing the peristomal skin complication is important to determining which treatment works best for the ostomate and benchmarking treatment interventions that can be applied globally. Mnemonics such as DIME will help ensure that complications are caught early and patients receive the treatment they need.

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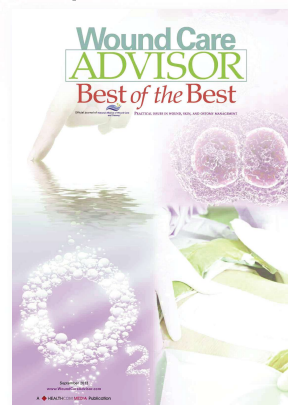
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Hidden complications: A case study in peripheral arterial disease

Follow the patient over the years, from her initial diagnosis of PAD through multiple complications and treatments.

By Pamela Anderson, MS, RN, APN-BC, CCRN, and Terri Townsend, MA, RN, CCRN-CMC, CVRN-BC

Jan Smith, age 59, is admitted to the coronary intensive care unit with an acute inferior myocardial infarction (MI). Recently diagnosed with hypertension and hyperlipidemia, she smokes a pack and a half of cigarettes daily. She reports she has always been healthy and can't believe she has had a heart attack. (Note: Name is fictitious.)

On physical exam, the cardiologist finds decreased femoral pulses bilaterally and recommends immediate cardiac catheterization. Fortunately, primary percutaneous coronary intervention (PCI) is readily available at this hospital. PCI is the preferred reperfusion method when it can be provided by skilled cardiologists in a timely manner.

After Jan undergoes catheterization and stent placement in the right coronary artery, the nurse performs hourly neurovascular checks, evaluating her legs for the five Ps—pallor, pulselessness, pain, paralysis, and paresthesia. This is especially important because the femoral artery was accessed for catheterization. The nurse monitors the femoral access site for bleeding and hematomas.

Because of Jan's decreased femoral pulses, the cardiologist orders a peripheral vascular consultation by a nurse practitioner (NP), who obtains a history and performs a physical exam. The NP's findings are similar to the cardiologist's. Jan tells the



NP she has had hip, thigh, and buttock cramps when walking for the past 18 months. She says she has limited her activities because of these symptoms, which she attributes to aging. The NP obtains arterial Doppler and ankle-brachial index measurements and diagnoses peripheral arterial disease (PAD) with claudication.

Jan asks the NP, "What's PAD? Are my

symptoms related to my heart attack?” The NP tells her PAD stands for peripheral arterial disease and that atherosclerosis of her leg arteries is causing her cramping. The nurse informs her that atherosclerosis is a systemic process, and that having the disease in one vascular bed (such as the coronary arteries) raises the risk of disease in another vascular bed, such as the limbs or cerebral arteries.

A systemic disease affecting more than 8 million Americans, PAD is an independent risk factor for cardiovascular death. People with symptomatic PAD have a 30% mortality from cerebrovascular or cardiovascular disease within 5 years and at least a 50% mortality over 10 years. About 50% of symptomatic patients such as Jan have concomitant coronary artery disease.

PAD affects the noncoronary arterial circulation, causing changes in the structure and function of the arteries that perfuse the visceral organs, limbs, and brain. PAD encompasses a diverse group of disorders that cause either aneurysmal dilation or progressive stenosis or occlusion of the aorta and its noncoronary branch arteries (carotid, upper extremity, visceral, and lower extremity arterial beds).

Atherosclerosis, the most common cause of PAD, is linked to such risk factors as smoking, diabetes mellitus, hypertension, hyperlipidemia, family history, and postmenopausal status. Recently, elevated levels of homocysteine and C-reactive protein have been identified as risk factors. (See *Preventing atherosclerotic cardiovascular disease*.)

Signs and symptoms

Signs and symptoms of PAD run the gamut from none to those of critical limb ischemia—ischemic rest pain (pain occurring with leg elevation); dry gangrene of the legs, feet, or toes; nonhealing wounds or ulcers of the feet or legs; and pain or numbness of the feet or legs. Ischemic rest

Preventing atherosclerotic cardiovascular disease

The American College of Cardiology and the American Heart Association recently updated the guideline for hypercholesterolemia treatment in adults to reduce atherosclerotic cardiac and cerebrovascular events. The revised guideline identifies four groups of people likely to benefit from statin therapy, and recommends a statin dosage dependent on a person’s risk of developing subsequent cardiovascular disease. People with known atherosclerotic cardiovascular disease need high-intensity statin therapy to reduce the risk of atherosclerotic events.

The guideline stresses the importance of heart-healthy habits in preventing atherosclerotic cardiovascular disease. Dietary counseling in the physician’s office or with a registered dietitian should be offered to all at-risk patients. The importance of regular physical activity should be stressed. Tobacco use should be evaluated at all office visits and subsequent hospitalizations. All health team members need to discuss smoking cessation with the patient at every office visit.

pain commonly occurs at night and causes severe pain that awakens the person.

The most common PAD symptom is intermittent claudication—pain, muscle aches, or fatigue arising with activity and subsiding with rest. Claudication can be reproduced by walking at defined distances.

Symptomatic PAD reduces quality of life. As the disease progresses, the patient may experience limb pain at rest, ischemic ulcers, and gangrene.

Complications

PAD is a major contributor to certain acute and chronic diseases. Acute conditions linked to PAD include a sudden episode of acute limb ischemia caused by in situ thrombosis, brought on by atherosclerosis. Chronic conditions include coronary artery disease or carotid disease.

PAD itself is a chronic illness that commonly progresses over time if risk factors aren’t controlled. It increases cardiovascular and all-cause mortality, reduces quality

of life and functional ability, and may necessitate amputation. Because PAD is systemic, atherosclerosis commonly develops in the coronary and cerebral arteries, increasing the risk of a myocardial or cerebrovascular event leading to death.

Mesenteric ischemia is another vascular complication. Atherosclerotic plaque can build up in the superior or inferior mesenteric artery and celiac artery, decreasing blood flow to the intestines. Signs and

PAD can affect a patient's ability to continue living independently at home.

symptoms include abdominal pain after eating (usually in the epigastric or periumbilical region), nausea, vomiting, and diarrhea. Patients may develop “food fear” and eventually become malnourished.

Independent functioning at home and in the community hinges on the patient's ability to ambulate without assistance. Ultimately, PAD can affect a patient's ability to continue living independently at home.

Management

Primary goals of PAD management are to reduce the risk of cardiovascular complications and relieve claudication. Non-pharmacologic interventions such as exercise help reduce pain and increase the ability to walk longer distances without symptoms. Other lifestyle modifications, such as a heart-healthy diet and smoking cessation, can reduce the incidence of cardiovascular complications (MI, stroke, and renal disease) and reduce long-term

mortality risk. The American College of Cardiology/American Heart Association guideline recommends asking patients about their tobacco use at every physician visit and offering behavioral and pharmacologic treatments to stop smoking.

Hypertension control is important, especially in patients with diabetes or preexisting renal disease. Angiotensin-converting enzyme inhibitors or beta blockers commonly are used, with diuretics added when necessary. Controlling the blood glucose level with a glycosylated hemoglobin (HbA1c) value below 7% reduces microvascular complications commonly linked to diabetes. For patients with clinical atherosclerotic cardiovascular disease (ASCVD), aggressive lipid management with high intensity statin therapy is recommended to reduce low-density lipoprotein levels by greater than or equal to 50%. Research shows statin therapy can reduce both fatal and nonfatal ASCVD events.

Pharmacologic management includes antiplatelet therapy using aspirin. If needed, clopidogrel can be used instead of aspirin or added to the regimen. For patients with intermittent claudication, cilostazol has been widely used to increase walking distance and improve symptoms; it also reduces triglyceride levels and increases levels of high-density lipoproteins (the “good” cholesterol). Pentoxifylline is a second-line drug used to improve walking distance in patients with claudication. However, trials comparing pentoxifylline to placebo found no significant improvement in walking distance or pain-free walking in patients taking this drug.

Jan's nurse tailors her education and treatment plan to reduce her cardiovascular risk factors. The cardiologist recommends a heart-healthy diet, dual antiplatelet therapy with aspirin and clopidogrel, lisinopril continuation for adequate hypertension control, atorvastatin for lipid management, and total smoking cessation.

A week after Jan's discharge, she sees the peripheral vascular specialist, who reviews with her the signs, symptoms, and risk factors for PAD. The specialist tells her she must stop smoking completely and adhere to a low-fat diet, and prescribes cilostazol to help relieve intermittent claudication symptoms.

Jan eventually begins to feel better and is able to participate in the outpatient cardiac exercise program. However, she continues to smoke, and 1 year after her MI, requires an aortobifemoral bypass to treat lifestyle-limiting claudication.

Other treatments

Endovascular treatments (minimally invasive nonsurgical therapies such as percutaneous transluminal angioplasty [PTA]) are recommended when lifestyle changes and medications don't relieve symptoms, especially when isolated areas of stenosis occur in the femoral, femoropopliteal, and iliac arteries. If a residual stenosis is present after PTA, a bare metal stent or balloon-expandable stent may be used.

Surgery is reserved for patients whose claudication symptoms significantly limit their daily activities or put them at risk for limb loss. Aortobifemoral, iliofemoral, axillofemoral-femoral, or femoropopliteal artery bypass can restore function to patients who previously would have required amputation. Bypass grafts may involve autogenous vein or synthetic grafts.

After Jan's aortobifemoral bypass, she returns to the vascular surgeon for her 1-month postoperative checkup. But after this, she is lost to follow-up for 3 years until she schedules an appointment with her primary care physician complaining of abdominal pain and weight loss. She states that the pain occurs 15 to 30 minutes after eating, and says she is worried she might have an ulcer. She admits she hasn't stopped smoking, although she did cut down to three-quarters of a pack per day.

She also reports she didn't refill her cilostazol and clopidogrel prescriptions because they were expensive and she had unexpected bills to pay. In addition, she says her claudication symptoms have returned.

The physician orders a right upper quadrant ultrasound. When the results come back negative, he refers Jan to a gastroenterologist for an upper endoscopy, which is negative as well.

Finally, Jan follows up with the vascular

**PAD has a 50%
mortality over 10 years.**

surgeon for her claudication symptoms. She tells him she has lost significant weight and is having abdominal pain. She states, "My abdominal pain has gotten so bad that I'm afraid to eat." ("Food fear" is a common complaint in patients with chronic mesenteric ischemia.)

Jan undergoes a mesenteric duplex ultrasound exam, which reveals chronic occlusion of the superior mesenteric artery and critical stenosis of the celiac artery. She is scheduled for an abdominal aortogram with run-off (an arteriogram of the lower abdominal aorta and leg arteries). This test confirms chronic occlusion of the superior mesenteric artery and critical stenosis of the proximal celiac artery, with no visualization of the inferior mesenteric artery.

The surgeon determines Jan needs an aorta-to-celiac artery bypass. Because she also has occlusions of the bilateral superficial femoral arteries, she will need bilateral femoral-to-popliteal bypasses as well. Jan's chronic mesenteric ischemia is deemed urgent, so she is referred to a cardiologist for cardiovascular clearance. She undergoes a supraceliac-to-celiac artery bypass (performed above the celiac artery

at the aorta to the celiac artery) with polytetrafluoroethylene (a synthetic material used for bypass grafts).

Chronic mesenteric ischemia (also called intestinal angina) most often stems from atherosclerosis. Signs and symptoms are nonspecific, which can result in delayed diagnosis, as with Jan. Approximately 70% of patients are female. After eating a meal, perfusion to the splanchnic circulation normally increases—but not in a patient with mesenteric ischemia. As a result, abdominal pain occurs, usually in the periumbilical or epigastric region. Treatments for chronic mesenteric ischemia include stent placement, surgical revascularization, or both.

Fortunately for Jan, her last surgical intervention relieves her symptoms. She finally decides to stop smoking and continue taking prescribed medications. She is able to resume her favorite activities and maintains a healthy weight. Over the next year, she makes slow, steady progress. Her appetite increases gradually over several months and she begins walking regularly with her husband. Her claudication symptoms remain stable and don't limit her lifestyle.

Jan is aware that she needs to have regular follow-up visits with the vascular surgeon to evaluate her mesenteric circulation and lower-extremity perfusion. At these visits, an ultrasound exam and physical examination of her feet, in conjunction with clinical questions, can help determine whether her PAD has remained stable or advanced.

Understanding the mechanism of PAD and its effect on systemic circulation can lead to more-timely diagnosis and effective treatment. As Jan's case illustrates, stopping smoking and adhering to prescribed dietary and medication regimens can go a long way toward relieving symptoms and increasing quality of life. ■

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Understanding the crusting procedure

By Nancy Morgan, RN, BSN, MBA, WOC, WCC,
DWC, OMS

Each issue, *Apple Bites* brings you a tool you can apply in your daily practice.

The crusting procedure produces a dry surface and absorbs moisture from broken skin through an artificial scab that's created by using skin barrier powder (stoma powder) and liquid polymer skin barrier. The crusting procedure is most frequently used on denuded peristomal skin to create a dry surface for adherence of an ostomy pouching system while protecting the peristomal skin from effluent and adhesives. Crusting can increase pouching-system wear time, resulting in fewer pouch changes and less disruption to irritated peristomal skin. The crusting procedure can also be used for other denuded partial-thickness weeping wounds caused by moisture.

Here's an overview of the procedure.

Indications

- Denuded or weeping peristomal skin
- Need for absorption of moisture from broken skin around the stoma

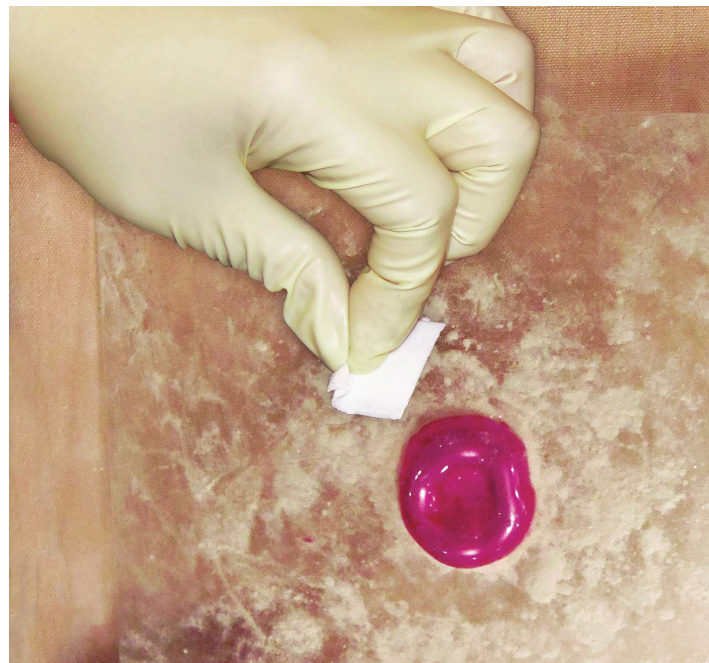
Contraindications

- Allergy to products used to create the artificial scab

- Not indicated for prevention of skin problems

Equipment

- Skin barrier powder (antifungal powder may be substituted)
- Alcohol-free polymer skin barrier wipes or spray
- Clean 4" × 4" gauze pads or tissue for dusting excess powder



Steps

- 1 Clean the peristomal skin with water (avoid soap) and pat the area dry.
- 2 Sprinkle skin barrier powder onto the denuded skin.
- 3 Allow the powder to adhere to the moist skin.
- 4 Dust excess powder from the skin using a gauze pad or soft tissue. The powder

should stick only to the raw area and should be removed from dry, intact skin.

- 5 Using a blotting or dabbing motion, apply the polymer skin barrier over the powdered area, or lightly spray the area if you're using a polymer skin barrier spray.
- 6 Allow the area to dry for a few seconds; a whitish crust will appear. You can test for dryness of the crust by gently brushing your finger over it; it should feel rough but dry.
- 7 Repeat steps 2 through 6 two to four times to achieve a crust.
- 8 You may apply a pouching system over the crusted area.
- 9 Stop using the crusting procedure when

the skin has healed and is no longer moist to the touch.

- 10 Watch a **video** of the crusting procedure.

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Nancy Morgan, cofounder of the Wound Care Education Institute, combines her expertise as a Certified Wound Care Nurse with an extensive background in wound care education and program development as a nurse entrepreneur. Information in Apple Bites is courtesy of the **Wound Care Education Institute (WCEI)**, copyright 2014.

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Successful documentation of wound care

By Cheryl Ericson, MS, RN, CCDS, CDIP

Providers are often surprised at how pages upon pages of documentation in a patient's health record can result in few reportable diagnosis and/or procedure codes, which often fail to capture the complexity of the patient's condition. However, providers need to be aware of the implications of coding. As healthcare data become increasingly digital through initiatives such as **meaningful use**, coded data not only impact reimbursement but also are increasingly used to represent the quality of care provided. Here's a closer look at how documentation and coding work in the context of wound care.

Coding 101

The Health Insurance Portability and Accountability Act of 1996 includes a provision referred to as *administrative simplification*, which establishes a standard for the reporting of healthcare data by healthcare setting. The inpatient hospital setting, which bills to Medicare Part A, must use the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) under direction of the U.S. Department of Health and Human Services for the reporting of both diagnoses and medical interventions (procedures). The outpatient setting, which includes hospitals, physician offices, and clinics, uses Volumes I and II of ICD-9-CM to report diagnoses, but uses Current Procedural Terminology codes, Fourth Edition (CPT-4), to



report medical interventions. Consequently, the documentation for accurately reporting a *diagnosis code* is the same for both inpatient and outpatient settings, but the documentation to support *wound care treatment* will vary by setting because the two different code sets have different documentation requirements.

ICD-9-CM codes are in place until October 1, 2015, when the code set changes to ICD-10-CM, which is the 10th revision of the International Classification of Diseases code set developed by the World Health Organization that was clinically modified for use in the United States. Several different types of wounds can be captured within both code sets, so documentation should clearly reflect the type of wound being evaluated or treated.

Documentation and HACs

Hospital-acquired conditions (HACs) are conditions that the Centers for Medicare & Medicaid Services (CMS) has deemed avoidable. CMS and most other insurers won't reimburse hospitals for these conditions when they develop after admission, so it's vital that providers perform extensive skin-integrity assessments on admission to identify any and all pressure ulcers, regardless of the stage. Frequently, a provider doesn't document a pressure ulcer unless it requires treatment, so it isn't uncommon for documentation of a pressure ulcer to occur on day 3 or later when it has progressed from stage I or II to a later stage. In this situation, reimbursement would be denied. By documenting the presence of the pressure ulcer on admission, providers can ensure that hospitals receive reimbursement because CMS doesn't penalize organizations when a pressure ulcer progresses from a stage I to a stage III or IV after admission.

Coding a wound

One of the first distinctions to be made when classifying the type of wound is whether it's traumatic or nontraumatic. (Traumatic wounds aren't covered in this article because they are less vulnerable to denials compared to other types of wounds.)

A chronic wound can be further categorized as a pressure ulcer, nonhealing chronic ulcer, or nonhealing surgical wound. In the case of a nonhealing surgical wound, the provider must document a cause-and-effect relationship between the medical intervention (surgery) and the wound; for example, "abdominal wound status post gallbladder surgery."

The ICD-9-CM code set captures the stage of a pressure ulcer, and the ICD-10-CM code set captures both the stage of a pressure ulcer and the status of other nonhealing chronic ulcers. The following descriptions can be used to differentiate types of nonhealing chronic ulcers:

- Limited to skin breakdown
- With fat layer exposed
- With necrosis of muscle
- With necrosis of bone.

It's important to note that staging isn't used to describe these types of nonhealing chronic ulcers, even though the descriptions are similar to pressure ulcer stages. For accurate code assignment, the best practice is for the provider to identify the cause of the nonhealing chronic ulcer, such as diabetes or peripheral vascular disease.

For the purpose of coding, the provider is an independent licensed practitioner, who can be a physician, nurse practitioner or a physician assistant. The provider must document the diagnosis of a wound and its location, including laterality (distinguishing wounds on the left side of the

body from those on the right side; required by ICD-10-CM), specifying the type of wound and its cause when applicable. As long as the diagnosis of a pressure ulcer is made by the provider, its associated stage can be obtained from the documentation of other clinicians, such as a bedside nurse, wound care nurse, or physical therapist. Common descriptions such as "pressure ulcer with blister" or "pressure ulcer with full-thickness skin loss" can be translated into the applicable stage. A diagnosis code is reported only once on a claim, so the coded stage of a pressure ulcer is based on its highest stage while the patient is in the hospital. For example, if a patient was admitted with a stage I pressure ulcer that evolved into a stage III pressure ulcer during hospitalization, the stage of the pressure ulcer should be coded as a stage III.

Hospitals can be penalized with de-

creased reimbursement and poor quality scores when a pressure ulcer develops after admission to the hospital. In particular, pressure ulcers classified as stage III or IV can increase hospital inpatient reimbursement because they are considered major complication conditions (MCCs), but only if the patient already had a pressure ulcer in the same location regardless of its stage when admitted. Stage III and stage IV pressure ulcers are considered by Medicare to be hospital-acquired conditions (HACs) when they develop during a hospital stay. (See *Documentation and HACs*.) Some pressure ulcers can't be staged because the depth of the wound is obscured. Frequently, these types of wounds will require debridement to facilitate healing, and it's important to update the stage of the ulcer after debridement. Although some wound care staging guidelines may suggest an unstageable wound is synonymous with a stage III pressure ulcer, this suggestion could increase the risk of audit vulnerability because the code set allows classification as "unstageable."

Debridement and coding

Inpatient coding (both ICD-9 and ICD-10) differentiates between excisional and nonexcisional debridement. Excisional debridement results in higher reimbursement because it's considered a surgical procedure, thereby increasing reimbursement, regardless of where the procedure is performed during the hospital admission (for instance, at the bedside, in the emergency department, in the operating room). It's important to note that "sharp" debridement, which is the outpatient terminology, isn't synonymous with "excisional" debridement. For an excisional debridement

to be coded as such, it must be specifically described by the person performing the procedure as "excisional," not "sharp," and include the type of instrumentation used (such as scalpel or scissors) as well as the technique, which must be cutting or snipping of devitalized or necrotic tissue.

The documentation should describe the size of the wound both before and after excisional debridement because the procedure should result in an increased wound margin and the presence of revitalized tissue. Lastly, the documentation should clearly describe the depth of the excisional debridement using such terms as "down to and including" to the applicable layer of tissue.

A team approach

The ability of an organization to obtain reimbursement is essential for its financial success. By ensuring proper documentation, providers can work as a team with coders so that organizations receive the reimbursement they deserve. ■

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Cheryl Ericson is an AHIMA-approved ICD-10-CM/PCS Trainer and Clinical Documentation Improvement (CDI) education director for HCPro in Danvers, Massachusetts.

Eating better to help manage chronic stress

Building a nutrient-rich lifestyle can help you ward off the effects of stress.

By Debra Rose Wilson, PhD, MSN, RN, IBCLC, AHN-BC, and Dana Marie Dillard, MS, HSMI

Like many clinicians, you may experience stress frequently, both on and off the job. Chronic stress can alter your equilibrium (homeostasis), activating physiologic reactive pathways that cause your body to shift its priorities. Physiologic effects of stress may include:

- slowed digestion
- delay in reproductive and repair processes
- priming of survival mechanisms (respiratory, cardiovascular, and muscular) for immediate use
- depletion of the body's nutrients.

If you're under extreme stress, such as an immediate threat to survival (think of a close encounter with a bear), physiologic effects of stress help you survive. But when the threat is less imminent (for instance, when a recertification exam is looming), these reactive pathways can become dysregulated, leading to chronic disease, disability, and pathology.

To activate and resolve threats to homeostasis, your body needs fuel in the form of vital nutrients. If you ignore the demand for high-quality nutrients, you may find yourself engaging in stress-related



eating behaviors, which compromise your long-term health and quality of life. Understanding the role of key nutrients and building a nutrient-rich lifestyle are stress-management techniques you can incorporate into your daily self-care routine.

Why is a proper diet so important?

Your body can function at an optimal level only when you consume required nutrients on a consistent basis. Current guidelines for healthy eating, which are based on the latest research, emphasize the need to eat a variety of foods from each food group. Choose foods low in saturated fats and cholesterol; consume only moderate amounts of sugar, salt, and alcohol; and handle food safely.

Why are whole foods better than supplements?

Whole, unprocessed foods provide readily available nutrients the body can absorb and metabolize easily. They also reduce exposure to potentially allergenic or toxic



food additives. Nutritional supplements are appropriate for people who have, or expect to have, dietary deficiencies (such as during pregnancy or breastfeeding). But supplement use can cause side effects and interactions. Whole, unprocessed foods are a healthier option.

Stress reduces digestive effectiveness by shunting blood to more vital organs, which promotes poor digestion and reduces nutrient absorption. So eating a nutrient-dense diet of high-quality whole foods is even more vital during stressful periods. An easy way to obtain key nutrients is to eat a whole-foods “rainbow” that incorporates fresh fruits and vegetables of every color.

Key vitamins, phytonutrients, and minerals

The nutrients described below help the body restore homeostasis and replenish nutrient stores during times of stress.

Vitamin A

Also called retinol, vitamin A is a key antioxidant. Stress leads to formation of free radicals, which can cause oxidative stress. In this condition, the body can't neutralize cellular metabolism byproducts, leading to an immunologic and inflammatory response. Vitamin A helps neutralize free radicals by adhering to the empty molecule in oxidizing agents, preventing free radicals from attaching to and attacking DNA and body tissue. Good vitamin A sources include liver, egg yolks, dairy products, orange pro-

duce (such as carrots and sweet potatoes), and green leafy vegetables.

B-complex vitamins

As a group, the B vitamins help metabolize carbohydrates, fats, and proteins and help maintain cellular health and brain function. These water-soluble vitamins are readily eliminated by the body and need to be replenished regularly.

Thiamine (also called vitamin B1) boosts immunity by supporting immune cells. It can become depleted quickly during stress. Crucial to nervous-system functioning and carbohydrate metabolism, thiamine is found in fortified whole grains, enriched breads and cereals, pork, beef, duck, peas, and legumes (including dried beans, green beans, and seeds).

Riboflavin (vitamin B2) aids metabolism and antibody formation. Dietary sources include dairy products, meat, mushrooms, tomatoes, green leafy vegetables (such as beet greens and spinach), and whole and enriched grains. Make sure you store these foods properly because light breaks down riboflavin.

Pyridoxine (vitamin B6) synthesizes neurotransmitters, promotes antibody formation, and breaks down homocysteine. It's found in fish, poultry, lean meats, whole grains, chickpeas, garbanzo beans, bananas, and prunes.

Biotin (vitamin B7) helps the body use B-complex vitamins and aids metabolism of fats, proteins, and carbohydrates. It's readily available in egg yolks, organ meats, and dark green vegetables.



Folate (folic acid or vitamin B9) breaks down homocysteine (an amino acid linked to cardiovascular disease), repairs oxidative damage, and aids red blood cell (RBC) formation and cellular growth and division. Dietary sources include green leafy vegetables, legumes, asparagus, and fortified grains and cereals.

Cobalamin (vitamin B12) reduces high levels of homocysteine. It also promotes RBC formation and protein metabolism and restores homeostasis after periods of stress. Cobalamin is found in eggs, seafood, dairy products, and fortified cereals and grains.

Vitamin C

Vitamin C (ascorbic acid or ascorbate) is another key antioxidant. During stress, the body increases the rate and amount of vitamin C it uses. This water-soluble vitamin tends to become depleted quickly unless replenished. Dietary sources include citrus fruits, berries, melons, sweet peppers, broccoli, kohlrabi, peas, Brussels sprouts, kiwi, kale, cauliflower, and many other foods.

Vitamin E

Also called tocopherol, vitamin E is a powerful antioxidant that helps maintain cellular health and protects against vitamin A oxidation. It's found in fortified cereals, nuts, seed oils, spinach, and other leafy greens.

Phytonutrients

Chemical compounds derived from whole foods, phytonutrients have recognized

health-supporting properties. Although thousands of phytonutrients have been identified, their interactions in the body are poorly understood except in a few cases. They include carotenoids, flavonoids, and fiber.

Carotenoids

Carotenoids are pigments that lend red, orange, and yellow hues to fruits and vegetables. They're thought to have an antioxidant effect. *Beta-carotene*, a dietary retinol precursor, is found in orange fruits and vegetables, including sweet potatoes, carrots, cantaloupe, squash, pumpkins, apricots, and mangoes. Be aware that beta-carotene supplements have been linked to a greater lung cancer risk in smokers—but this risk hasn't been seen with whole-food sources.

Lycopene, also an antioxidant, may protect against some cancers and heart disease. Dietary sources include raw and canned tomatoes (including tomato paste, tomato sauce, diced or stewed tomatoes, and ketchup), watermelon, and papaya.

Lutein may help reduce the aging effects of oxidative stress on the eye and thus help guard against cataracts and age-related macular degeneration. It's found in leafy greens, peas, squash, corn, and Brussels sprouts.

Flavonoids

Flavonoids are phytochemicals that regulate gene expression and may inhibit tumor growth by modulating cell-signaling pathways. Different flavonoid classes can be

found in red, blue, and purple berries, as well as in grapes, teas, chocolate, apples, citrus fruits, onions, parsley, thyme, celery, hot peppers, soy products, and legumes.

Fiber

Digestion-resistant compounds, fibers may be classified in several ways. Dietary fiber is naturally occurring, plant-based fiber, whereas functional fiber is isolated or synthetic fiber found in supplements.

The Food and Drug Administration differentiates soluble fiber from insoluble fiber based on viscosity, fermentability, and physiologic effects.

- *Soluble fiber* helps in lowering cholesterol, reducing the risk for some cancers, preventing cardiovascular disease and diabetes, and promoting weight control. Good food sources include legumes and oat products, such as oat bran.
- *Insoluble fiber* helps support bowel health. Good sources include wheat bran and whole grains.

A good mix of fruits and vegetables can help ensure adequate fiber intake because these foods contain both soluble and insoluble fiber.

Minerals

Several minerals are essential for cell-signaling pathways and energy production in stress regulation.

- *Magnesium* is important in cellular and immune functioning. Dietary sources include dark-green leafy vegetables, whole grains, nuts, seeds, legumes, and bananas.
- *Calcium*, needed for vascular health, is found in dairy products, legumes, and green leafy vegetables.

Fighting stress the holistic way

Chronic stress has systemic effects, and the approach to fighting them should be holistic. Adequate intake of key nutrients through a diet rich in whole foods gives you valuable resources to fight the effects of chronic stress. ■

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- Debra Rose Wilson is a professor and health psychologist at Walden University in Minneapolis, Minnesota, and at Middle Tennessee State University in Murfreesboro. Dana Marie Dillard is a PhD student at Walden University in Minneapolis, Minnesota.

Understanding therapeutic support surfaces

Correct use of pads, mattresses, and cushions can reduce shear, friction, moisture, and heat that lead to pressure ulcers.

By Rosalyn S. Jordan, BSN, RN, MSc, CWOCN, WCC, and Sandra Phipps, BSN, RN, MBA, WCC

Pressure-ulcer prevention and management guidelines recommend support-surface therapy to help prevent and treat pressure ulcers. Support surfaces include pads, mattresses, and cushions that redistribute pressure. Full cushions and cushion pads are considered therapeutic support surfaces if used to redistribute a patient's pressure in a chair or wheelchair.

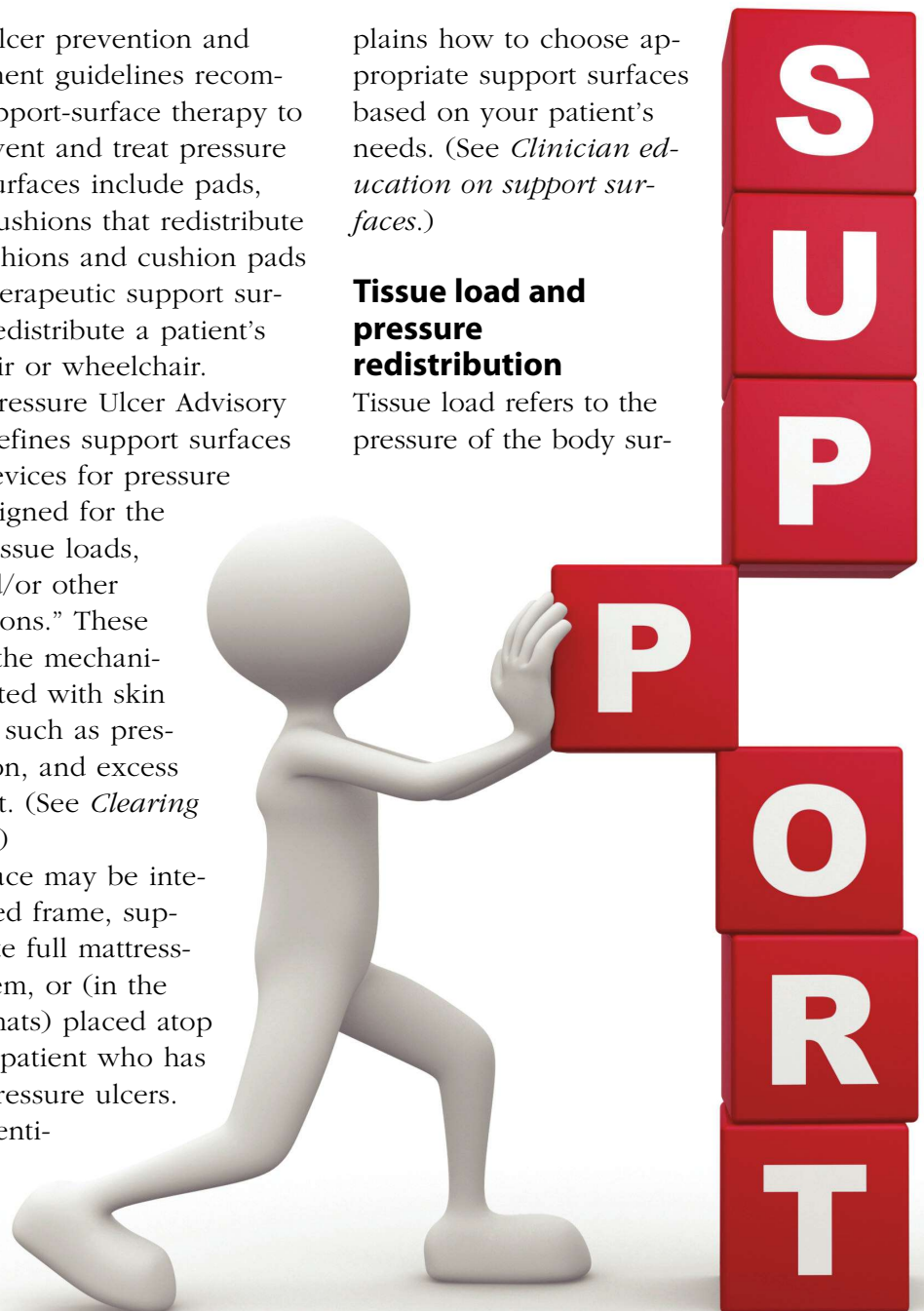
The National Pressure Ulcer Advisory Panel (NPUAP) defines support surfaces as “specialized devices for pressure redistribution designed for the management of tissue loads, microclimate, and/or other therapeutic functions.” These surfaces address the mechanical forces associated with skin and tissue injury, such as pressure, shear, friction, and excess moisture and heat. (See *Clearing up the confusion.*)

A support surface may be integrated into the bed frame, supplied as a separate full mattress-replacement system, or (in the case of pads or mats) placed atop the mattress of a patient who has or is at risk for pressure ulcers. This article differentiates reactive and nonreactive support surfaces and ex-

plains how to choose appropriate support surfaces based on your patient's needs. (See *Clinician education on support surfaces.*)

Tissue load and pressure redistribution

Tissue load refers to the pressure of the body sur-



Clearing up the confusion

In 2001, the National Pressure Ulcer Advisory Panel (NPUAP) recognized that many of the terms and definitions used to describe support surfaces were confusing and inconsistent, and that clinicians lacked data for comparing and contrasting support-surface designs and technology. What's more, no standardized consistent laboratory or technical test protocols were available.

Developing standard terms and definitions became a priority for NPUAP, which formed

the Support Surface Standards Initiative (S3I) and a standards committee. In 2007, the committee published a list of revised support-surface terms and definitions. NPUAP also is developing standardized test methods and reporting standards for support surfaces to provide an objective way to evaluate and compare characteristics of support surfaces and improve product selection. Although test results will help clinicians compare and contrast the various support-surface de-

signs, they will still have to use their best judgment when choosing appropriate support surfaces for individual patients.

S3I terms and definitions, along with three test methods, were submitted to the International Organization for Standardization for voting, which was in progress when this article was written. For more information on the NPUAP S3I, visit www.npuap.org/resources/educational-and-clinical-resources/support-surface-standards-initiative-s3i.

face and underlying tissue that come in contact with the support surface. It encompasses not just the patient's weight but also body composition.

Immersion and envelopment properties

Immersion and envelopment properties of a support surface are crucial. *Immersion* refers to depth of penetration into the support surface by the load (patient's body). *Envelopment* is the ability of the support surface to conform around the body. As the body's contact area with the support material increases, pressure decreases.

Clinicians must ensure the support surface meets the patient's specific needs. If the patient has some mobility, support-surface immersion and envelopment shouldn't impede independent mobility.

Reactive vs active support surface

A support surface is categorized as reactive or nonreactive based on how it interacts with the skin and tissue.

Reactive support surface

A reactive support surface changes its load-redistribution properties only in re-

sponse to an applied load (such as the patient's body). The load sinks into the support surface and is enveloped by it. A reactive support surface accommodates the load by conforming to the body. It may be powered or nonpowered.

Active support surface

An active support surface is a powered surface capable of changing its load-distribution properties with or without an applied load. Areas or specific cells within the support surface change constantly with inflation or deflation of specific air bladders, based on preset cycles. Changes in pressure within individual cells over a



Clinician education on support surfaces

A recent survey compared clinicians' knowledge of support-surface design and technology with their knowledge of pressure-ulcer prevention and treatment. Results showed they knew more about pressure-ulcer prevention and treatment than support surfaces. When respondents were asked if they'd like additional educational programs on support surfaces, 93% said yes. Clinicians' knowledge of support-surface therapy can promote optimal patient care and clinical outcomes.

preset interval alter pressure on the skin and tissue periodically.

Addressing the skin's microclimate

The microclimate is the skin's heat and humidity (temperature and moisture level). Moist skin can result from sensible water loss (as with urinary incontinence) or insensible water loss (perspiration). Moist skin is a risk factor for pressure-ulcer development. Research shows that as the skin warms, moisture increases, weakening the skin. Other influences

blood flow and tissue oxygenation. Forces that alter the skin's blood flow and tissue perfusion are major risk factors for pressure ulcers.

Always consider shear forces when choosing a support surface for a patient. Shear causes a strain on tissues, leading to deformation where blood vessels are located. Most support surfaces have a cover that interfaces with the skin and reduces shear force. Usually, this material promotes sliding or gliding of the body or holds the patient in place to reduce shear.

If the patient has some mobility, support-surface immersion and envelopment shouldn't impede independent mobility.



added to fragile skin, such as the mechanical forces of shear and friction, further increase pressure-ulcer risk.

Low-air-loss support surfaces help correct the skin's microclimate. They maintain the skin's heat and relative humidity by providing a flow of air that cools the skin and wicks away moisture. Managing the pressure along with the skin's microclimate is important in preventing and healing pressure ulcers.

Addressing shear

Shear is the force per unit area exerted parallel to the plane of interest. Shear forces cause tissue distortion and impede blood flow to the tissues, decreasing

Addressing friction

Friction is resistance to motion in a parallel direction relative to the common boundary of two surfaces. Sliding one surface across another surface promotes friction. Friction usually occurs in conjunction with shear forces. The sliding motion may increase skin temperature. If moisture and heat have already weakened the patient's skin, friction may contribute to superficial pressure ulcers. The cover of the support surface may help protect against the effects of friction, as can a turning sheet, turning device, and powered mechanical lifting and movement equipment.

Clinical application

When caring for a patient who has pressure ulcers or is at risk for developing them, consider the following NPUAP guidelines on selecting support-surface therapy:

- Choose a support-surface therapy that corresponds correctly to the patient's condition.
- While the patient is receiving support-surface therapy, be sure to turn and reposition him or her based on individual needs.
- If pressure ulcers don't heal, reevaluate the situation as needed and change or replace the support-surface therapy as required.

(continued on page 36)

Clinician RESOURCES

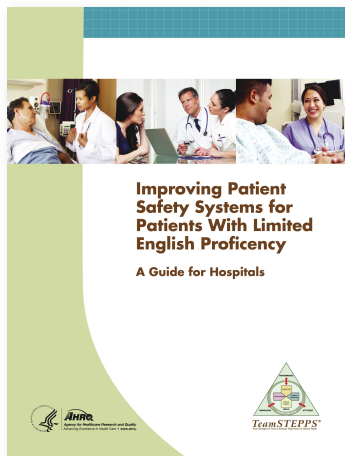
This issue's resources include patient tools and new guidelines.

Improving patient safety

Research suggests that adverse events affect patients with limited English proficiency (LEP) more frequently, are commonly caused by communication problems, and are more likely to result in serious harm compared to adverse events affecting English-speaking patients. Your hospital can take steps to reduce risks of adverse events for patients with LEP with “**Improving patient safety systems for patients with limited english proficiency: a guide for hospitals,**” from The Disparities Solutions Center, Mongan Institute for Health Policy at Massachusetts General Hospital, Boston, and Abt Associates, Cambridge, Massachusetts.

The guide includes five key recommendations for improving patient safety for patients with LEP:

- Foster a supportive culture for safety of diverse patient populations.
- Adapt current systems to better identify medical errors among patients with LEP.
- Improve reporting of medical errors for patients with LEP.
- Routinely monitor patient safety for patients with LEP.
- Address root causes to prevent medical errors among patients with LEP.

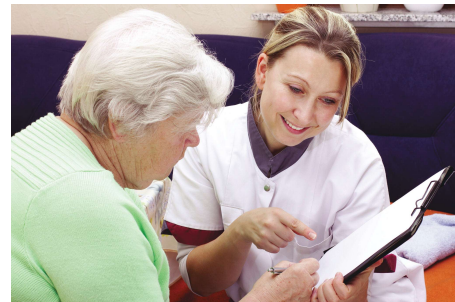


Ostomy information and care guides

Tap into multiple patient resources at the website for the United Ostomy Associations of America, Inc., where you can

access **general information**, such as frequently asked questions, ostomy supply manufacturers and distributors, ostomate bill of rights, ostomy travel tips, and swimming and aquatic therapy for ostomates.

You can also **download guides** for patients who have a colostomy, ileostomy, or urostomy and guides covering sexuality and nutrition. Most information is available in English and Spanish.



Cost-effective wound management

A 2014 issue of *Wounds International* includes

“**International consensus: Making the case for cost-effective wound management.**” The report recognizes that with

economic constraints on healthcare budgets, in addition to challenges to prove efficacy, budget holders and payers are increasingly asking for financial justification for the provision of treatment.

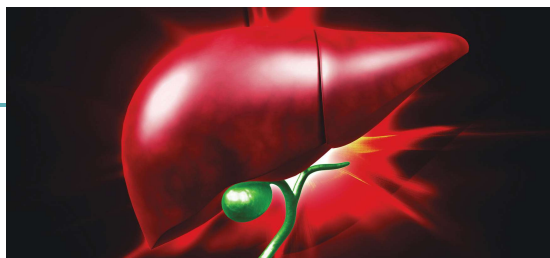
The report aims to help clinicians, healthcare budget holders and payers, and other stakeholders to:

- understand what is meant by “cost-effective wound management”
- appreciate the different types of eco-



- conomic analysis used in health care to determine cost-effectiveness
- interpret information on the cost and cost-effectiveness of wound-management modalities and protocols
 - make an appropriate case for cost-effective wound management in their locality
 - set up systems to collect the data needed for the analysis of the cost and cost-effectiveness of wound management.

Sections include demystifying cost-effectiveness, interpreting cost studies, and data collection for economic analysis. The section on making a case for cost-effective wound management walks readers through this complex process and provides practical tips.



WHO guidelines for hepatitis C

About **130 to 150 million people** worldwide have chronic hepatitis C infection. For information on handling this global chronic condition, access “**Guidelines for the screening, care and treatment of persons with hepatitis C infection**” from the World Health Organization (WHO).

The guidelines contain nine key **recommendations**, including approaches to increase the number of people screened for hepatitis C infection, advice on how to mitigate liver damage for those who are infected, and how to select and provide appropriate treatments for chronic hepatitis C infection. ■

(continued from page 34)

Call for clinical outcome data

NPUAP encourages clinicians and researchers to provide clinical outcome data on the specific design, therapies, features, and benefits of specific support surfaces. Collection and publication of such data, in conjunction with clinician education on support surfaces, could advance the clinical effectiveness of support-surface therapy. ■

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The authors work at RecoverCare, LLC, in Louisville, Kentucky. Rosalyn S. Jordan is the senior director of post-acute clinical programs and services. Sandra Phipps is the director of clinical services.

A note from the NAWCO Executive Director

Thank you for the warm welcome and heartfelt congratulations. I'm touched by the reception I received. Although I'll miss my role as a clinical instructor because teaching is in my blood, I'm excited to take on this new endeavor as executive director for the National Alliance of Wound Care and Ostomy

(NAWCO). I've always believed that every clinician better himself or herself with advanced knowledge.

I'm proud to say that I've helped thousands of healthcare professionals over the years attain their certification in wound care.

It's gratifying for me to know that those who take the time to acquire

the specialty training in wound care and ostomy care will be those clinicians providing a higher level of care to our patients. Certification in wound care and ostomy care sets those clinicians apart from the rest. It shows we're more knowledgeable in these specialty areas and it puts us in demand, as evidenced by the ever-growing number of job opportunities in the field of wound care and ostomy care that require certification.

— Cynthia (Cindy) Broadus, RN, BSHA, LNHA, CLNC, CHRM, WCC, DWC, OMS

NPUAP announces productive winter meeting

The National Pressure Ulcer Advisory Panel (NPUAP) met February 28 to March 1, 2014, in Baltimore, after the successful "The Unavoidable Outcome: A Pressure Injury Consensus Conference," held on February 27. More than 65 members participated in the panel meet-



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ing, representing all facets of patient care and advocacy. Attendees were hopeful but guarded about the present healthcare environment.

NPUAP reviewed the organization's strategic plan and the reports and recent accomplishments of its three mission committees (education, public policy, and research), including increased collaboration with the Centers for Medicare & Medicaid Services and the National Quality Forum and a well-attended Biennial Conference in Houston, Texas.

Looking to the future, the panel reported many initiatives, including

- the 2015 Biennial Conference, which will be held February 21-22, 2015, at the Buena Vista Palace in Orlando, Florida
- more webinars, because past ones have been successful
- white papers on recidivism, friction, and clinical relevance support surface standards, which are being prepared for publication
- World Wide Pressure Ulcer Prevention Day, November 20, 2014, for which a taskforce has been formed to develop a creative plan for success.

NPUAP is an independent, not-for-profit professional organization dedicated to preventing and managing pressure ulcers. Formed in 1987, the NPUAP has a board of directors that includes leading experts from different healthcare disciplines. NPUAP serves as a resource to healthcare professionals, government agencies, the public, and healthcare agencies. It welcomes and encourages the participation of those interested in pressure-ulcer issues through the use of NPUAP educational materials, participation at national conferences, and support of public policy, education, and research efforts. Learn more about NPUAP's goals and activities at its [web-site](http://www.npuap.org) or e-mail NPUAP at npuap@npuap.org.

Thank you from NAWCO

As part of our continuing effort to improve our WCC® certification examination, we evaluate test questions for possible inclusion in the exam. NAWCO would like to acknowledge and thank the following WCCs who submitted exam questions:

Betty Wiley, RN, WCC, COS-C, HCS-D; Beverley Witter, RN, WCC; Brenda Davies, RN, BSN, WCC; Cara Harris, RN, LNHA, WCC; Carmen Oguz, PT, DPT, MBA, CWS, FCCWS, WCC; Catherine Chung, PhD, RN, CNE, WCC; Catherine Wortmann, RN, WCC; Cheryl Carver, RN, WCC; Chris Shulman, BSN, RN, BCHH-C, COS-C, WCC; David Smith, LVN, WCC; Dawn Strecker, RN, WCC; Deborah Badawi, RN, WCC, FACCWS; Deborah Hillyard, LPN, WCC, OMS; Diane Curren, RN, WCC; Jamie Spence, RN, MS, WCC, WOCN; Karen Mowers, RN, MHA, WCC; Kyle Defrain, LPN, WCC; Latoya Billups, RN, BSN, WCC; Libby Ziegler, RN, WCC; Linda Kluth, RN, WCC; Lisa Hasenbank, RN, WCC; Lona Gless, RN, WCC; Lorraine Poliey, RN, WCC; Megan Torpey, LPN, WCC; Merri Jo Guattery, RN, WCC; Michael M. Lawenko, MD, FPCS, FPSGS, FPALES, WCC; Noreen Merkel, LPN, WCC; Rikki Van Dyk, RN, WCC; Roxanne Martin, RN, WCC; Susan Holibaugh, DPM, FAPWCA, WCC; Teresa Mota, BSN, RN, CALA, WCC, CPEHR; Terri Chesser, RN, WCC; Terry Miles, RN, WCC; Thomas J. Rhodes, RN, WCC; Tina Edmonds, RN, WCC; Tracy Wilson RN, LNHA, CLTC-DON, WCC; Wendy Cirimele, RN, WCC

It's never too late! If you would like to contribute an item or two, please send them to: Debbie Hecker, Director of Accreditation, via email: debra@nawccb.org.

New certificants

Below are WCC, DWC, and OMS certificants who were certified in February and March 2014.

Magdalena Abeyta	Kaylah Bishop
Laraba Adejo	Sherri Blanchette
Shannon Aguayo	Kiley Bogart
Terrigene Allen	Jamie Boley
Helen Allums	Barbara Bonstaff
Nadarron	Jane Bowen
Amritanand-Fort	Erin Bower
Nicole Anderson	Roseann Brandt
Dale Andrew	Tanya Brasil Cesar
Jennifer Aponte	Kim Brimer
Elsamma Arackal	Diana Brink
Shreen Arora	Shelia Brock
Olufunmilola	Susan Brockman
Atandeyi	Maureen Brohmer
Chantal Aube	Susan Brooks
Marie Avril	LeeAnn Brown
Isabel Baker	Steven Butcher
Mary Beth Balas	Valerie Cadwell
Thomas Balcazar	Cynthia Cameron
Genine Bardinas	Joan Campion
Johana Barralaga	Guadalupe Carrasco
Moran	Markus Carter
Carol Barth	Kim Cartwright
Peggy Bauer	Caroline Caspe
Sally Beavers	Patricia Castillo
David Beccue	Justine Cesari
Patricia Beemer	Ashley Chambers
Alicia Belknap	Sue Chang
Sarah Bell	Sheila Chapman
Jared Bell	Tara Chapman
Janet Belles	Sirena Chapman
Norman Bennett, MD	Bu-Hong Chen
Rogelio Bernaldez, Jr.	Hyun Ja Choi
Charlotte Besong	Leroy Cisneros
Doug Beynon	Jeannine Clark
Joseph Binfet, MD	Angie Clark
	Katrina Cleveland

Dawn Closson
Ashley Coker
Kari Cook
Marcia Corzine
Nancy Crandall
Joselyn Crespo
Matthew Cromwell
Michelle Crouch
Teresa Crow
Nellye Dankov
Brittany Davenport
Phyllis Davis
Tiffany Davis
Angela De Feo
Arlene De La Cruz
Michelle Dela Pena
Lawrence DeLaCosta
Lorna Domahowski-
Knight
Nola Douglas
Darcie Dressler
Zainab During
Sarah Eccleston
Ann Ehrich
Ophelia Empleo-
Frazier
Cynthia Englert
Mary Engstrom
Everol Ennis, Jr.
Mary Lou Ensminger
Rosa Ethier
Pamela Evans
Dasha Eyers
Blaise Faxigue
Dawn Ferguson
Alma Fernandez
Cheryl Feyder
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Nina Yerger
Heather York
Tiffani Young
Terry Zakosky
Jaime Zalewski
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Jessica Zorowski

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Below are WCC
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Phyllis Adjei
Carolyn Amazeen
Nancy Amorosi
Celena Arriaga
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Gayle Audenried
Cindy Bailey
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Patricia Barcia
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Tamela Blevins
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Lynelle Bowman
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Jorge Bringas
Angela Brown
Debra Bryan
Linda Buchholtz
Marlene Burch
Donna Cameron
Jacque Campbell
Marlith Cardona
Tina Carlson
Wendy Carlson-
Quirk
Francine Carpenter
Denise Carrington
Melva Castillo

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Sandy Conn
Leslie Coons
Marianne Coscia
Engracia Cristi
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Doritha Davis
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