

Wounds UK Pressure Care Newsletter – March 2008 References

This month's pressure ulcer references cover all new (2007 and 2008) publications listed on MEDLINE, over this fifteen month period over 250 new publications on pressure ulcers have been added to the world literature – how many of these have you read? And how can any of us truly keep fully up-to-date upon this one aspect of wound prevention and management?

Agam, L. and A. Gefen (2007). "Pressure ulcers and deep tissue injury: a bioengineering perspective." *Journal of Wound Care* 16(8): 336-42.

Wheelchair users are highly susceptible to deep tissue injury. Interface pressures are unlikely to predict this, and an alternative assessment approach is needed that can easily monitor internal mechanical stresses and deformations. [References: 108]

Ahmad, R., R. A. Cherry, et al. (2007). "Increased hospital morbidity among trauma patients with diabetes mellitus compared with age- and injury severity score-matched control subjects." *Archives of Surgery* 142(7): 613-8.

HYPOTHESIS: We hypothesized that patients with diabetes mellitus (DM) have worse outcomes following trauma compared with patients without a history of DM. **DESIGN:** Retrospective data analysis of the Pennsylvania Trauma Systems Foundation database that compiles data from 27 accredited trauma centers in Pennsylvania. **SETTING:** We used the Pennsylvania Trauma Systems Foundation database of 295 561 patients to compare outcomes in patients with DM vs those in patients who did not have DM. **PATIENTS:** A total of 12 489 patients with DM from January 1984 to December 2002 were matched by sex, age, and Injury Severity Score with 12 489 patients who did not have DM. **MAIN OUTCOME MEASURES:** Differences in the length of hospital stay, intensive care unit stay, ventilatory assistance days, complications, and mortality rates. **RESULTS:** Patients with DM spent more days in the intensive care unit and receiving ventilator support. They were more likely to have a complication (23.0% in the DM group vs 14.0% in the non-DM group [odds ratio, 1.80; 95% confidence interval, 1.69-1.92]). No difference in mortality rates or length of hospital stay was noted. **CONCLUSION:** Patients with DM exposed to trauma have greater hospital morbidity resulting from longer intensive care unit stay, increased ventilator support, and more complications.

Akimoto, M., T. Oka, et al. (2007). "Finite element analysis of effect of softness of cushion pads on stress concentration due to an oblique load on pressure sores." *Journal of Nippon Medical School = Nihon Ika Daigaku Zasshi* 74(3): 230-5.

The concentration of mechanical stress in soft tissue can cause or worsen pressure sores. We have previously reported the results of analysis of stress concentration in soft tissue using a finite element model. In the present study, we hypothesized that even if a cushion pad was thin, it would effectively reduce horizontal loads that can increase stress concentration in soft tissue. To our knowledge, there have been no previous reports describing stress distribution in soft tissue attached to a thin cushion pad with a horizontal load. In the present study, we performed mechanical analysis of a model of a human seated on a thin cushion pad with a range of hardness values (i.e., Young's module). Two-dimensional finite element models were used to perform this analysis. Loads were applied at the upper edge of the model as oblique compulsory displacement. In all of the cushion pad models, the peak value of effective stress was less than that of the control model without a cushion pad. Also, the peak value of effective stress decreased as Young's module of the cushion pad decreased. These results suggest that use of a thin cushion pad is an effective way to prevent the development of pressure sores.

Alvarez, O. M., C. Kalinski, et al. (2007). "Incorporating wound healing strategies to improve palliation (symptom management) in patients with chronic wounds." *Journal of Palliative Medicine* 10(5): 1161-89.

BACKGROUND: Palliative wound care should be centered on symptom management and is a viable option for patients whose chronic wounds do not respond to standard interventions, or when the demands of treatment are beyond the patient's tolerance or stamina. Palliative wound care is the incorporation of strategies that prioritize symptomatic relief and wound improvement ahead of wound healing (total closure). Palliative wound care strategies must also work in conjunction with curative treatment objectives as wounds often heal completely in spite of serious illness and advanced disease. Palliative wound care is much more than pain, exudate and odor management. Common curative treatment goals such as physical correction of the underlying pathology, addressing nutrition and other supportive aspects of care, and sensible (nonharmful) local wound treatments should never be ignored. **OBJECTIVE:** (1) To provide a fresh and effective approach to palliative wound care by integrating individual clinical expertise with clinical and laboratory evidence from the (curative) wound healing literature and (2) to share our (Calvary Hospital) experience and approach to palliative wound care in an inpatient, home, and outpatient setting. This

approach can be summarized with the mnemonic S-P-E-C-I-A-L (S = stabilizing the wound, P = preventing new wounds, E = eliminate odor, C = control pain, I = infection prophylaxis, A = advanced, absorbent wound dressings, L = lessen dressing changes). Throughout this paper we will offer rationale, principles and recipes, for each of the steps of the "SPECIAL" approach in an effort to facilitate the caring for chronic wounds in palliative medicine. CONCLUSIONS: A practical marriage of wound palliation (symptom management) with current wound healing concepts to provide options for the palliative care provider and improve the practice of palliative medicine. [References: 187]

Appleby, S. L., M. H. Eberhard, et al. (2007). "A home care wound care challenge: its rewards, inspiration, and positive outcomes." *Home Healthcare Nurse* 25(6): 362-8.

Quite often, home health team members are presented with a challenge to provide management for a patient who has undergone a complex gastrointestinal surgery. An appropriate plan of care includes the incision, wound, and colostomy care, as well as the psychosocial support, time management, and cost issues. Many times this requires ingenuity and flexibility on the part of the home care team. Comorbidities often increase the acuity of the nursing care as well. In any case and no matter how difficult the circumstances, the goal for the patient's plan of care is to achieve an optimal outcome that will encourage independence and a feeling of self-worth.

Arora, V. M., M. Johnson, et al. (2007). "Using assessing care of vulnerable elders quality indicators to measure quality of hospital care for vulnerable elders." *Journal of the American Geriatrics Society* 55(11): 1705-11.

OBJECTIVES: To assess the quality of care for hospitalized vulnerable elders using measures based on Assessing Care of Vulnerable Elders (ACOVE) quality indicators (QIs). DESIGN: Prospective cohort study. SETTING: Single academic medical center. PARTICIPANTS: Subjects aged 65 and older hospitalized on the University of Chicago general medicine inpatient service who were defined as vulnerable using the Vulnerable Elder Survey-13 (VES-13), a validated tool based on age, self-reported health, and functional status. MEASUREMENTS: Inpatient interview and chart review using ACOVE-based process-of-care measures referring to 16 QIs in general hospital care and geriatric-prevalent conditions (e.g., pressure ulcers, dementia, and delirium); adherence rates calculated for type of care process (screening, diagnosis, and treatment) and type of

provider (doctor, nurse). RESULTS: Six hundred of 845 (71%) older patients participated. Of these, 349 (58%) were deemed vulnerable based on VES-13 score. Three hundred twenty-eight (94%) charts were available for review. QIs for general medical care were met at a significantly higher rate than for pressure ulcer care (81.5%, 95% confidence interval (CI)=79.3-83.7% vs 75.8%, 95% CI=70.5-81.1%, P=.04) and for delirium and dementia care (81.5%, 95% CI=79.3-83.7 vs 31.4% 95% CI=27.5-35.2%, P<.01). According to standard nursing assessment forms, nurses were responsible for high rates of adherence to certain screening indicators (pain, nutrition, functional status, pressure ulcer risk; P<.001 when compared with physicians), although in patients with functional limitations, nurse admission assessments of functional limitations often did not agree with reports of limitations by patients on admission. CONCLUSION: Adherence to geriatric-specific QIs is lower than adherence to general hospital care QIs. Hospital care QIs that focus on screening may overestimate performance by detecting standard nursing or protocol-driven care.

Ayello, E. A. and C. H. Lyder (2007). "Protecting patients from harm: preventing pressure ulcers in hospital patients." *Nursing* 37(10): 36-40; quiz 40-1.

Baharestani, M. M. "An overview of neonatal and pediatric wound care knowledge and considerations." *Ostomy Wound Management* 53(6): 34-6.

Despite significant technological advances in the care of premature neonates and chronically ill children, the knowledge and evidence base for the management of this population's wound care lag far behind its adult counterpart. Updating antiquated care regimens is an uphill battle. This review of the literature seeks to illuminate key anatomical/structural differences in neonatal skin with particular attention paid to percutaneous absorption and tolerance of adhesives. The article also presents anatomically and physiologically based recommendations for the selection of prevention and treatment modalities, including specific dressing types, appropriate dressing change and securement procedures, and pain management. Commonly encountered wound types (epidermal stripping; surgical wounds; extravasation and thermal injuries; chemical burns; pressure ulcers; diaper dermatitis; and wounds secondary to congenital conditions) are discussed. Opportunities for research abound and are considered. [References: 72]

Baldwin, K. M. (2007). "A case for using evidence-based assessment scales.[comment]." *American Journal of Critical Care* 16(4): 394-5.

Balzer, K., C. Pohl, et al. (2007). "The Norton, Waterlow, Braden, and Care Dependency Scales: comparing their validity when identifying patients' pressure sore risk." *Journal of Wound, Ostomy, & Continence Nursing* 34(4): 389-98.

OBJECTIVES: We compared the sensitivity and specificity of the Norton, Waterlow, and Braden Scales in identifying patients at pressure sore risk. An additional goal was to determine whether or not the Care Dependency Scale (CDS) is able to detect patients at risk for pressure sore development. **METHODS:** The investigation was part of a prevalence study involving 754 patients in 3 Berlin hospitals. A questionnaire was used containing the subscales of the 3 risk calculators (Norton, Waterlow, and Braden), and the CDS. On the specified day nurses filled in the questionnaire using data obtained from the patients' charts and direct visualization of the patients' skin. **RESULTS:** Thirty-four out of 754 patients had at least 1 pressure ulcer. Comparing the 3 risk assessment tools, the Waterlow scale demonstrated the highest sensitivity (0.86) and the Norton scale demonstrated the highest specificity (0.75). Individuals with pressure sores were more likely to be care dependent (t-test: $P < .01$); 27 of them had a CDS score lower than 55. Using the score of 55 as the cut-off point, the CDS demonstrated a sensitivity of 0.74 and a specificity of 0.83. **SUMMARY:** This study demonstrated remarkable differences among the 3 commonly used risk assessment tools, in regards to sensitivity and specificity. Moreover, the CDS seems to have a diagnostic value similar to the 3 commonly used risk assessment calculators.

Barrois, B., M. Carles, et al. (2007). "Efficacy and tolerability of hyaluronan (ialuset) in the treatment of pressure ulcers: a multicentre, non-randomised, pilot study." *Drugs in R & D* 8(5): 267-73.

BACKGROUND: Pressure ulcers are complex chronic wounds and a frequent cause of morbidity in elderly subjects in hospitals and nursing homes. Local treatment is based on the use of dressings that protect the wound and provide a favourable environment for healing to occur. ialuset, a treatment based on hyaluronan (hyaluronic acid), is already available on the market and known to be an effective treatment for venous leg ulcers. However, no clinical trials of hyaluronan as a treatment option for pressure ulcers have been reported as yet. **METHODS:** The purpose of this review was to investigate the efficacy and

tolerability of ialuset in the treatment of pressure ulcers. To this end, this article reports data from 21 predominantly elderly patients with National Pressure Ulcer Advisory Panel grade II, III or IV pressure ulcers treated with ialuset cream or gauze pads over a 3-week period in ten hospitals in France. RESULTS: A significant median decrease of 4cm² in the surface area of treated wounds was observed after 3 weeks of ialuset use ($p < 0.05$ vs baseline). A $\geq 50\%$ reduction in pressure ulcer surface area was seen in 65.0% of patients (95% CI 44.8, 84.3). Nine patients (45%) showed a $\geq 50\%$ increase in epithelial surface compared with the initial lesion. Patient-reported pain appeared to decrease during the 3-week treatment period, although this decrease did not quite reach statistical significance ($p = 0.07$). Additionally, a significant decrease in the mean percentage of fibrous tissue in the wound was observed ($p = 0.02$), as was a non-significant increase in granulation tissue ($p = 0.1$). General efficacy was considered as good or very good for nearly all patients on review of the data (19/20 patients as assessed by clinicians). Overall tolerability was also considered good or very good in 12/15 assessments by patients at day 21. CONCLUSION: These preliminary findings suggest that ialuset is a promising option in the treatment of pressure ulcers; however, further investigation in the form of large, randomised clinical trials is required before firm conclusions can be drawn regarding the efficacy and tolerability of this treatment in this context.

Bates-Jensen, B. M. and C. H. MacLean (2007). "Quality indicators for the care of pressure ulcers in vulnerable elders." *Journal of the American Geriatrics Society* 55 Suppl 2: S409-16.

Bates-Jensen, B. M., H. E. McCreath, et al. (2007). "Subepidermal moisture predicts erythema and stage 1 pressure ulcers in nursing home residents: a pilot study." *Journal of the American Geriatrics Society* 55(8): 1199-205.

OBJECTIVES: To examine the relationship between a measure of subepidermal moisture (SEM) and visual skin assessment (VSA) of erythema and Stage 1 pressure ulcers (PUs) performed a week later in nursing home (NH) residents. DESIGN: Descriptive, cohort study. SETTING: Two NHs. PARTICIPANTS: Thirty-five residents. METHODS: Concurrent VSAs and SEM readings were obtained at the sacrum, right and left trochanters, buttocks, and ischial tuberosities weekly for 52 weeks. SEM was measured using a handheld dermal phase meter, with higher readings indicating greater SEM (range 0-999 dermal phase units [DPUs]). VSA was rated as normal, erythema/Stage 1 PU, or Stage 2+PU. SEM was modeled as a predictor of VSA of erythema and PUs 1 week later (controlling for clustering),

with concurrent moisture, Braden Scale PU risk status, anatomic site, and ethnicity as covariates. RESULTS: Participants had a mean age of 84.7, 83% were female, and 80% were non-Hispanic white. SEM measures were lowest for normal skin (97+/-122 DPU), higher for erythema/Stage 1 PUs (192+/-188 DPU), and highest for Stage 2+PUs (569+/-320 DPU) across all sites (all $P < .001$). SEM was responsive to changes in VSA, and higher SEM predicted greater likelihood of erythema/Stage 1 PU the next week (odds ratio=1.26 for every 100-DPU increase in SEM, $P = .04$). CONCLUSION: SEM measures are associated with concurrent erythema and PUs and future (1 week later) development of erythema/Stage 1 PUs. SEM may assist in predicting early PU damage, allowing for earlier intervention to prevent skin damage.

Bauer, J. and L. G. Phillips (2008). "MOC-PSSM CME article: Pressure sores." *Plastic & Reconstructive Surgery* 121(1 Suppl): 1-10.

LEARNING OBJECTIVES: After studying this article, the participant should be able to: 1. Understand and describe the physiology of pressure sore development. 2. Understand and describe population risk factors. 3. Understand and describe examination and classification. 4. Understand and describe common surgical treatment algorithms. 5. Understand and describe strategies for prevention and postoperative recurrence.

SUMMARY: Pressure sores are ischemic damage to soft tissues resulting from unrelieved pressure, usually over a bony prominence. In both acute and chronic circumstances, a careful, structured multidisciplinary strategy is required from initial diagnosis to resolution. Mechanical issues, such as the relief of pressure, adequate surgical debridement, and flap coverage, are of little value if educational, nutritional, social, and resource-based issues are not in place. The authors discuss a range of topics, including etiology, physiology, classification, operative options, and strategies to prevent recurrence. [References: 24]

Berlowitz, D. R. and D. M. Brienza (2007). "Are all pressure ulcers the result of deep tissue injury? A review of the literature." *Ostomy Wound Management* 53(10): 34-8.

Pressure ulcers are a common problem that significantly contributes to morbidity and mortality. To elucidate the confusion surrounding the origin of pressure ulcers, the question of whether pressure ulcers are caused exclusively by deep tissue injury is addressed. A review of the literature relevant to the pathophysiology and pathogenesis of pressure ulcers is presented and focuses on studies that examine the relationship between mechanical

stresses and deep and superficial tissue injury. The studies suggest that deep tissue is more susceptible than superficial tissue to injury caused by externally applied pressure; clinically superficial skin injuries induced by pressure tend to be associated with deep tissue damage; and superficial injuries appear to be caused by factors other than pressure. Based on these observations, pressure ulcers are believed to be the result of deep tissue damage, implying that prevention and treatment of superficial lesions need not necessarily conform to pressure ulcer management that makes eliminating pressure the highest priority. Conversely, the treatment of pressure ulcers should account for the likelihood, even if not visually noted, that deep tissue is involved. [References: 27]

Bielecki, M. and J. Skowronski (2007). "[Applying the posterior fasciocutaneous thigh flap in bed sores treatment]." *Chirurgia Narzadow Ruchu i Ortopedia Polska* 72(1): 51-4.

The paper presents the possibilities of applying the posterior thigh flap in the treatment of ischial pressure sores. Between 2000 and 2004 the flap was used in three cases treated in the Orthopaedics and Traumatology Department of the Medical University in Bialystok. The indications, contraindications, operative technique and advantages of the posterior thigh flap are described. In all three cases the ischial bed sores healed well without recurrences. The posterior fasciocutaneous pedicled flap is a good method of treatment for not too extensive bed sores in the ischial region. This flap can be applied in recurrences found after primary bed sore treatment with another method. However the fasciocutaneous flap has a limited range of transposition as compared with cutaneous flaps.

Black, J., M. Baharestani, et al. (2007). "National Pressure Ulcer Advisory Panel's updated pressure ulcer staging system." *Dermatology Nursing* 19(4): 343-9; quiz 350.

The National Pressure Ulcer Advisory Panel has updated the definition of a pressure ulcer and the stages of pressure ulcers based on current research and expert opinion solicited from hundreds of clinicians, educators, and researchers across the country. The amount of anatomical tissue loss described with each stage has not changed. New definitions were drafted to achieve accuracy, clarity, succinctness, clinical utility, and discrimination between and among the definitions of other pressure ulcer stages and other types of wounds. Deep tissue injury was also added as a distinct pressure ulcer in this updated system. [References: 28]

Bloemen-Vrencken, J. H. A., L. P. de Witte, et al. (2007). "Comparison of two Dutch follow-up care models for spinal cord-injured patients and their impact on health problems, re-admissions and quality of care." *Clinical Rehabilitation* 21(11): 997-1006.

OBJECTIVE: To evaluate whether transmural care for people with spinal cord injury living in the community has more impact on health outcomes than traditional follow-up care within the Netherlands. **DESIGN:** Quasi-experiment with 12 months of follow-up. **SETTING:** Eight Dutch rehabilitation centres. **Subjects:** Thirty-one patients who received transmural care in two 'experimental' rehabilitation centres were compared with a matched sample of 31 patients having received 'usual follow-up care' in six other rehabilitation centres. **INTERVENTION:** The core component of the transmural care consists of a transmural nurse, who 'liaises' between former patients living in the community, primary care professionals and the rehabilitation team. The transmural care model provides activities to support patients and their family/partners and activities to promote continuity of care. **MAIN MEASURES:** The prevalence of pressure sores and urinary tract infections; the number and duration of re-admissions to hospital and rehabilitation centre due to pressure sores, bladder and bowel problems; and the experienced quality of follow-up care. **RESULTS:** The transmural care, as implemented, did not influence the health outcomes. The prevalence of pressure sores, urinary tract infections and the number of re-admissions (due to pressure sores, bladder and bowel problems) was respectively 13, 13 and 4 in the intervention group versus 14, 15 and 6 in the usual follow-up care group. Since the transmural care had been incompletely implemented and there were methodological and practical limitations, we formulated no final conclusions regarding its effectiveness. **CONCLUSION:** Implementing the transmural care model strictly according to protocol may improve its effectiveness.

Bocchi, A., M. M. Dominici, et al. (2007). "[Clinical and nursing protocol in the treatment of the decubital ulcers]." *Annali Italiani di Chirurgia* 78(2): 119-24.

The decubital ulcers treatment needs a complex clinical approach. The ulcer healing and the absence of recurrences are not only the result of a correct surgical operation. The purpose of this work is to identify all the clinical and nursing parameters that can provide long lasting healing. We treated 105 decubital ulcers in various body areas (sacralis, ischiatic, trochanteric and calcaneal regions) and we defined a clinical protocol that starts from prevention, to the admission, till the convalescence. We obtained satisfactory results with few post-operative complications and recurrences. Our protocol is widely confirmed by various authors (the radical toilette, the use of fasciocutaneous and musculocutaneous flaps and the importance of nutrition. In particular, the use of easier flaps (cutaneous,

fasciocutaneous), is preferred in the first surgical option to leave other more complex techniques (musculocutaneous flap) for the recurrences treatment. Our protocol follows the patient from the first visit till several months after dismissal during convalescence. The pre-operative measures (nutritional state correction, infection care, detersion improvement) as well the post-operating ones (use of circulating fluid beds, rest in bed for at least one month) result to be mandatory for a successful outcome.

Bogie, K. M. and C. H. Ho (2007). "Multidisciplinary approaches to the pressure ulcer problem." *Ostomy Wound Management* 53(10): 26-32.

Multiple factors affect the specific condition and overall clinical profile of individuals at risk for chronic wounds. The complexity of the pressure ulcer problem lends itself to the application of the National Institute of Health Roadmap Initiative that encourages interdisciplinary research and new organizational models. An overview of research studies relevant to telemedicine and neuromuscular electrical stimulation in the care and prevention of pressure ulcers as well as preliminary results of an innovative multidisciplinary skin care team approach to the primary and tertiary prevention of pressure ulcers are encouraging. The team's pilot study results indicate that patients are satisfied with telehealth provision of care; however, literature and experience also suggest that discrepancies in the inter-rater assessment of wounds using digital photography remain, particularly with regard to wound dimension variables assessed ($P < 0.01$). In another endeavor, the skin care team developed a Longitudinal Analysis with Self-Registration statistical algorithm to assess the effects of electrical stimulation; in a preliminary study, this tool documented improvement in gluteus maximus health and resultant ability to withstand pressure. As the number of groups pursuing multidisciplinary research and care increases, so, too, will the evidence base required to address these common, and complex, chronic wounds. [References: 18]

Bollero, D., R. Carnino, et al. (2007). "Acute complex traumas of the lower limbs: a modern reconstructive approach with negative pressure therapy.[see comment]." *Wound Repair & Regeneration* 15(4): 589-94.

Acute traumas of the lower limbs cause complex functional damage for the association of skin loss with exposed tendons, bones, and/or vessels, requiring a multidisciplinary approach. Once bone fixation and vascular repair have been carried out, the surgical treatment for skin damage is usually based on early coverage with conventional

or microsurgical flaps. Negative pressure therapy can play a primary role in the management of the elderly or intensive care patients, where wounds are secondary to life-threatening problems. A total of 35 patients with 37 acute traumatic wounds of the lower limbs were treated with vacuum-assisted closure (VAC) therapy for an average of 22 days (range 3-46 days). The sponge was applied the day after bone fixation, vascular repair, and surgical debridement of nonviable tissues, so as to obtain a better control of bleeding. After VAC treatment, all patients quickly developed healthy granulation tissue and a significant reduction in both extent and depth of wounds. Split-thickness skin grafts were used to cover granulation tissue in most of the cases (66% -- 24 cases), and then local flaps (13% -- five cases) or direct sutures (8% -- three cases). The wounds healed spontaneously without surgical management in four patients. One patient died during the treatment period for concomitant diseases. No relevant complications directly related to VAC therapy were observed other than one case of severe pain in an amputated stump. The average follow-up duration was 265 days (range 33-874 days). No further tegumentary reconstruction was required. VAC therapy may represent a valid alternative to immediate reconstruction in selected cases of acute complex traumas of the lower limb and allows for a stable functional result, using a minimally invasive approach.

Bolton, L. (2007). "Which pressure ulcer risk assessment scales are valid for use in the clinical setting?" *Journal of Wound, Ostomy, & Continence Nursing* 34(4): 368-81.

Bronneberg, D., S. W. Spiekstra, et al. (2007). "Cytokine and chemokine release upon prolonged mechanical loading of the epidermis." *Experimental Dermatology* 16(7): 567-73.

At this moment, pressure ulcer risk assessment is dominated by subjective measures and does not predict pressure ulcer development satisfactorily. Objective measures are, therefore, needed for an early detection of these ulcers. The current in vitro study evaluates cytokines and chemokines [interleukin 1alpha (IL-1alpha), interleukin 1 receptor antagonist (IL-1RA), tumor necrosis factor alpha (TNF-alpha) and interleukin 8 (CXCL8/IL-8)] as early markers for mechanically-induced epidermal damage. Various degrees of epidermal damage were induced by subjecting commercially available epidermal equivalents (EpiDerm) to increasing pressures (0, 50, 75, 100, 150, and 200 mmHg) for 24 h, using a loading device. At the end of the loading experiment, tissue damage was assessed by histological examination and by evaluation of the cell membrane integrity. Cytokines and chemokines were determined in the culture supernatant. Sustained epidermal loading resulted in an

increased release of IL-1alpha, IL-1RA, TNF-alpha and CXCL8/IL-8. This was first observed at 75 mmHg, when the tissue was only slightly damaged. Swollen cells, vacuoles, necrosis and affected cell membranes were observed at pressures higher than 75 mmHg. Furthermore, at 150 and 200 mmHg, the cells in the lower part of the epidermis were severely compressed. In conclusion, IL-1alpha, IL-1RA, TNF-alpha and CXCL8/IL-8 are released in vitro as a result of sustained mechanical loading of the epidermis. The first increase in cytokines and chemokines was observed when the epidermal tissue was only slightly damaged. Therefore, these cytokines and chemokines are potential markers for the objective, early detection of mechanically-induced skin damage, such as pressure ulcers.

Buckland, R. (2007). "Evaluating two dynamic mattresses in a nursing home setting." *British Journal of Nursing* 16(11): S28-32.

A formal, ethically approved, prospective product evaluation was undertaken in a nursing home setting. The aim of the study was to generate patient-focused clinical outcome data in a 'real world' setting to support use of the dynamic Sidhil Plus (mattress replacement) and Solo (mattress overlay) for patients who were at an elevated risk of pressure ulcers. The primary outcome was for patients to remain free from additional pressure damage while the products were in use. Secondary outcomes of interest included patient and carer views of the product. The results reported here indicate that for this client group these 'low tech' products perform well. Of the 22 residents taking part, two developed pressure damage during the trial, however the position of the pressure damage indicated that the cause was most likely not the mattress.

Burritt, J. E., P. Wallace, et al. (2007). "Achieving quality and fiscal outcomes in patient care: the clinical mentor care delivery model." *Journal of Nursing Administration* 37(12): 558-63.

Contemporary patient care requires sophisticated clinical judgment and reasoning in all nurses. However, the level of development regarding these abilities varies within a staff. Traditional care models lack the structure and process to close the expertise gap creating potential patient safety risks. In an innovative model, senior, experienced nurses were relieved of direct patient care assignments to oversee nursing care delivery. Evaluation of the model showed significant impact on quality and fiscal outcomes.

Calianno, C. "Quality improvement strategies to prevent pressure ulcers." *Nurse Practitioner* 32(7): 10.

Carlson, A. H. "Relieving pressure." *Rehab Management* 20(8): 28.

Caron-Mazet, J., B. Roth, et al. (2007). "[Prevalence and management of chronic wounds in 14 geriatric institutions of the Haut-Rhin].[see comment]." *Annales de Dermatologie et de Venereologie* 134(8-9): 645-51.

BACKGROUND: We carried out a survey to assess the prevalence of various therapeutic approaches for chronic wounds in 14 primary care and rehabilitation units (SSR) and long-term care units (SLD) in the Haut-Rhin department of France, and we attempted to gauge the interest of doctors and nursing staff in the creation of a Mobile Wound and Healing Unit (EMPC). **METHODS:** Our anonymous transversal survey was based on the results of two questionnaires, one concerning patients and the other concerning medical and nursing staff. **RESULTS:** 96 of the 1 163 patients hospitalised at the time of our survey met the inclusion criteria. The global prevalence of sores was 8.3%, while that of bedsores was 6.4% and that of leg ulcers was 1.6%. There were no cases of wounds on diabetic feet. The study population was characterised by a M/F sex-ratio of 0.37, with mean age of 86 years for women and 76 years for men. The mean duration of bedsores was 6 months, compared with 14 months for leg ulcers and a relapse rate of 36% for bedsores and 52.6% for leg ulcers. In more than half of all cases the aetiology of the ulcers was not stated. Bacteriological samples were obtained in 7 cases. Wounds were generally cleansed using soap and physiological saline, with mechanical debridement being used in 4 cases. Hydrocolloids were the dressings used most widely for bedsores, while interfaces were most commonly used in leg ulcers. No topical antibiotics were prescribed. A pain evaluation scale was used in only 18 cases and topical anaesthetics were administered in one case prior to debridement of a leg ulcer. A bedsore risk evaluation scale was completed for 27 of the 75 of the patients presenting bedsores and special preventive mattresses were used for two-thirds of these patients. Twelve of 19 patients with leg ulcers had compression bandaging that was changed daily. Most doctors considered their knowledge of chronic wounds to be good, in contrast with nursing staff, 72% of whom judged their knowledge mediocre or insufficient. All the nursing staff and 11 of the 13 doctors expressed interest in the use of a specialised team for difficult cases. **DISCUSSION:** The main practices consistent with the recommendations were use of modern dressings, although the latter appeared to be changed too frequently,

anecdotal use of antiseptic solutions, abandonment of use of topical antibiotics and nutrition management plans. Two-thirds of patients with leg ulcers wore compression bandages. However, improvements remain to be made concerning the use of topical anaesthetics, manual debridement, use of pain evaluation and bedsore risk scales, and assessment of the aetiology of leg ulcers. CONCLUSION: This survey, conducted prior to the creation of a mobile wound and healing unit based at the Colmar General Hospital, showed that doctors and nursing staff are extremely keen on the idea of specific training and practical advice concerning chronic wound management. It provided a clearer vision of the training requirements of SSR and SLD establishments in terms of chronic wound management.

Carpenter, D. "'Never' land." *Hospitals & Health Networks* 81(11): 34-8.

It's a whole new era for patient safety and payment. The Centers for Medicare & Medicaid Services says it will soon halt Medicare payments for treating eight so-called preventable medical errors, ranging from pressure ulcers to falls. Private insurers are likely to follow that lead and CMS is expected to expand its no-pay list, possibly to include more of the National Quality Forum's 28 "never events." However, knowing whether patients have certain conditions upon admission can be tricky, requiring a slew of additional tests. And that's not all that worries hospitals.

Cavicchioli, A. and G. Carella (2007). "Clinical effectiveness of a low-tech versus high-tech pressure-redistributing mattress." *Journal of Wound Care* 16(7): 285-9.

OBJECTIVE: To compare the effectiveness of a high-specification foam mattress (control) with a high-tech (Duo2, Hill Rom) alternating/continuous low-pressure mattress (treatment) in the prevention of pressure ulceration. The study also evaluated if there is a difference in performance between the two working modalities (alternating and continuous low pressure) of the high-tech mattress in a comparable sample of patients. Method: Thirty-three patients were observed for two weeks in the control group. In the treatment group, 86 patients were randomised to receive alternating low pressure and 84 continuous low pressure. Incidence of pressure ulcers in both arms was recorded. Student's t-test was used to compare all Braden scores, and the chi-square test and Fisher's exact test to evaluate differences between groups. RESULTS: There was a high difference in the number of new pressure ulcers in the control group when compared with the treatment group. There was no difference in performance between the alternating and continuous low-pressure modes.

However, the sample size is too small to prove or disprove a statistically significant difference between the two modalities. CONCLUSION: The high-tech mattress was markedly more effective than the high-specification foam mattress in preventing the onset of pressure ulcers. Initial data suggest that the use of alternating or continuous low pressure made little or no difference to the results.

Chan, D. C. W., D. H. F. Fong, et al. (2007). "Maggot debridement therapy in chronic wound care." *Hong Kong Medical Journal* 13(5): 382-6.

OBJECTIVE: To review the current evidence on the mechanism of actions and clinical applications of maggot debridement therapy. DATA SOURCES: Literature search of PubMed and Medline was performed up to January 2007. STUDY SELECTION: Original and major review articles related to maggot debridement therapy were reviewed. Key words used in the literature search were 'maggot debridement therapy', 'wound healing', and 'chronic wound management'. DATA EXTRACTION: All relevant English and Chinese articles. DATA SYNTHESIS: The mechanism of such maggot therapy was shown to be due to the debridement, disinfection, and wound healing enhancement actions of maggot excretions/secretions. The efficacy of maggot debridement therapy in chronic wound management has been demonstrated in chronic venous ulcers, pressure ulcers, and diabetic ulcers. There is also a new delivery system for the excretions/secretions, which has been shown to be as effective as using live maggots. CONCLUSIONS: Maggot debridement therapy has been shown to be a safe and effective means of chronic wound management. However, there are a number of limitations when considering its local applicability. Future development of the delivery system may help to overcome some of these limitations and improve its acceptability. [References: 42]

Chang, S. H. (2007). "Anterolateral thigh island pedicled flap in trochanteric pressure sore reconstruction." *Journal of Plastic, Reconstructive & Aesthetic Surgery: JPRAS* 60(9): 1074-5.

Compher, C., B. P. Kinosian, et al. (2007). "Obesity reduces the risk of pressure ulcers in elderly hospitalized patients." *Journals of Gerontology Series A-Biological Sciences & Medical Sciences* 62(11): 1310-2.

BACKGROUND: Both underweight and obesity have been suggested as risk factors for pressure ulcers (PU) development, although data are limited. Our aim was to evaluate the odds of PU in underweight and obese, relative to optimal weight patients. **METHODS:** Secondary data analysis of a prospective cohort study of risk factors for PU on admission or by hospital day 3 in 3214 elderly patients admitted during 1998-2001 to two hospitals in Philadelphia, Pennsylvania. **RESULTS:** Patients who were underweight had greater odds of developing PU (adjusted odds ratio [OR] = 1.8, 95% confidence interval [CI], 1.2-2.6). Patients who were obese had reduced odds (adjusted OR = 0.7, 95% CI, 0.4-1.0), and those with severe obesity had the lowest odds of PU (adjusted OR = 0.1, 95% CI, 0.01-0.6). **CONCLUSIONS:** These data suggest that extra body fat reduces the risk of PU in elderly hospitalized patients.

Davies, A. L., K. C. Hayes, et al. (2007). "Clinical correlates of elevated serum concentrations of cytokines and autoantibodies in patients with spinal cord injury." *Archives of Physical Medicine & Rehabilitation* 88(11): 1384-93.

OBJECTIVE: To determine the serum cytokine profiles of patients with spinal cord injury (SCI) and varying clinical presentations relative to healthy, able-bodied, age-matched control subjects. **DESIGN:** Cross-sectional study. **SETTING:** Clinical research unit. **PARTICIPANTS:** People with SCI (N=56) and different clinical presentations, and healthy, able-bodied, age-matched control subjects (N=35). **INTERVENTIONS:** Not applicable. **MAIN OUTCOME MEASURES:** Serum levels of the proinflammatory cytokines interleukin (IL) 1beta, IL-6, tumor necrosis factor alpha (TNF-alpha), the anti-inflammatory cytokines IL-4 and IL-10, the regulatory cytokine IL-2, the IL-1 receptor antagonist (IL-1RA), and autoantibodies against myelin-associated glycoprotein and GM(1) ganglioside (anti-GM(1)) immunoglobulin (IgG and IgM), as determined by enzyme-linked immunosorbent assay. The relationship between elevated serum cytokine levels and clinical variables was also studied. **RESULTS:** SCI subjects exhibited serum concentrations of IL-6, TNF-alpha, IL-1RA, and anti-GM(1) (IgG) that were greater ($P < .05$) than control group values. Elevated cytokine concentrations were not associated with high white blood cell counts, level of injury, or American Spinal Injury Association classification; they were evident in SCI subjects who were asymptomatic for medical complications, but were further elevated in subjects with pain, urinary tract infection (UTI), and pressure ulcers. **CONCLUSIONS:** Elevated levels of circulating proinflammatory cytokines and autoantibodies are present in the serum of SCI subjects without medical complications, and are further elevated in SCI subjects with neuropathic pain, UTI, or pressure ulcers, relative to healthy, able-bodied control subjects.

These findings may be indicative of a protective autoimmunity, simply a consequence of occult or evident infection, or evidence of cytokine dysregulation that may contribute to an immune-mediated impairment of axonal conduction.

de Luis, D. and R. Aller (2007). "[Systematic review of nutritional support in pressure ulcer]." *Anales de Medicina Interna* 24(7): 342-5.

Pressure ulcer is an area of localised damage to the skin and underlying tissue caused by pressure, shear, friction and/or combination of these things. Prevalence of this entity is between 3 and 66%, depending of the patients and the pathology. Pressure ulcer is associated with an increased risk of morbidity and mortality. One of the most important risk factors to develop a pressure ulcer is nutritional status. We can use different interventional strategies, first of all (primary intervention) before the patient has developed a ulcer and secondly, the treatment of a established ulcer (secondary prevention). In the most important primary prevention study with 662 patients, two oral nutritional supplements per day were given to the patients. The incidence of pressure ulcer was 40% (118/295) in the interventional group and 48% (181/377) in control group. A relative risk to develop a pressure ulcer with supplementation of 0.83 (CI95%: 0.70 a 0.99). In the studies with secondary prevention, when we analyze in an individual way the different nutrients, zinc has not demonstrated the utility in an independent way. Vitamin C shows contradictory data in two randomized clinical trial with the same dose (500 mg each 12 hours). Recently, some randomized clinical trials have demonstrated an improvement in healing rates with enhanced enteral formulas (zinc, arginine, vitamin C). Oral supplementation without taking account micronutrients decreases risk of pressure ulcer. However, studies of secondary prevention due to heterogeneity have not let clear conclusions. However, enteral enhanced formula could improve ulcer healing. [References: 28]

de Paiva, S. M. A. and E. L. R. Gomes (2007). "Hospital care: assessment of users' satisfaction during hospital stay." *Revista Latino-Americana de Enfermagem* 15(5): 973-9.

Health care teams have followed the National Health System's (SUS) principles to ensure quality improvement in healthcare, and patient satisfaction is one of the instruments used to evaluate quality. This study aimed to evaluate patient satisfaction regarding the assistance to their needs during hospitalization, in a general hospital of a city in the interior of Sao Paulo. Data were collected through participant observation and use of focal group

techniques in this qualitative research. A theme guide was used and a total of 20 subjects participated in the study. Data were analyzed through content analysis and interpreted through triangulation. Study results demonstrate that patients were satisfied with the care rendered. However, the researcher concluded that the institution's work organization is not directed to the attainment of quality.

de Souza, D. M. S. T. and V. L. C. d. G. Santos (2007). "Risk factors for pressure ulcer development in institutionalized elderly." *Revista Latino-Americana de Enfermagem* 15(5): 958-64.

This study aimed to analyze the risk factors for the development of Pressure Ulcers (PU) in old people living in Long Staying Institutions. It is a prospective and cohort study carried out in four Institutions. A total of 94 old people composed the sample and were assessed during three consecutive months. The total scores of the Braden Scale were different between the groups with and without PU, at the first ($p=0.030$) and last assessments ($p=0.001$); humidity, nutrition and friction/shearing were significantly different between those with and without PU, and were always worst among the first. Female gender and previous PU were confirmed as predictive for the development of PU ($r(2)=0.311$).

Dinsdale, P. (2007). "Under pressure." *Nursing Older People* 19(6): 18-9.

Doyle, M. (2007). "It's Your Turn to get involved in this pressure ulcer campaign." *Journal of Wound Care* 16(8): 344.

Duimel-Peeters, I. G. P., R. J G Halfens, et al. (2007). "The effectiveness of massage with and without dimethyl sulfoxide in preventing pressure ulcers: a randomized, double-blind cross-over trial in patients prone to pressure ulcers." *International Journal of Nursing Studies* 44(8): 1285-95.

BACKGROUND: Although guidelines advise against massage, it is one of the methods widely regarded and used by nurses to prevent pressure ulcers (PU).

OBJECTIVES: The purpose of this study was to examine the effectiveness of different variations of massage in preventing pressure ulcers.

METHODS: A randomized, double-

blind cross-over design, in which patients of nursing homes who are prone to PU underwent two of the three possible interventions; 'position changes only', 'massaging with an indifferent cream' and 'massaging with a dimethyl sulfoxide (DMSO) cream'. RESULTS: The results of three interventions did not differ significantly. DMSO did not fulfil the expectations raised by literature and a previous pilot-study.

Duncan, K. D. (2007). "Preventing pressure ulcers: the goal is zero." *Joint Commission Journal on Quality & Patient Safety* 33(10): 605-10.

BACKGROUND: One of the 12 interventions that the Institute for Healthcare Improvement (IHI) recommends for its 5 Million Lives Campaign is "Prevent Pressure Ulcers ... by reliably using science-based guidelines for their prevention." Pressure ulcers cause considerable harm to patients, hindering functional recovery, frequently causing pain, and often serving as vehicles for the development of serious infections. Although the goal for health care facilities to reduce pressure ulcers is admirable, the goal for pressure ulcer incidence should be zero. **THE CASE FOR PREVENTION:** Pressure ulcer prevention entails two major steps: identifying patients at risk and reliably implementing prevention strategies for all patients identified as at risk. Prevention strategies include six key elements (elements 3-6 address patients at risk): (1) conduct a pressure ulcer admission assessment for all patients, (2) reassess risk for all patients daily, (3) inspect skin daily, (4) manage moisture, (5) optimize nutrition and hydration, and (6) minimize pressure. Facilities may wish to form a multidisciplinary team to develop a pressure ulcer prevention program. **CONCLUSION:** The development of pressure ulcers is a painful, expensive, and unnecessary harm event that is all too prevalent in American hospitals. The prevention of pressure ulcers is a key intervention that is not new, not expensive, and has the potential to save thousands of patients from unnecessary harm.

Edsberg, L. E. (2007). "Pressure ulcer tissue histology: an appraisal of current knowledge." *Ostomy Wound Management* 53(10): 40-9.

Although it is well accepted that pressure ulcers occur as a result of mechanical loading of tissue, their specific etiology of development remains unknown. Knowledge of tissue response to pressure is critical to understanding and elucidating the specific mechanism of pressure ulcer development. A literature review to appraise the histology of pressure ulcer tissue shows that numerous in vitro and in vivo studies examining tissue

changes in response to pressure have been conducted. In vitro findings indicate that relatively small loads cause structural changes to the dermal component of tissue. Studies examining tissue from humans with pressure ulcers have shown that changes visible at the surface are often minor compared to the damage seen in deeper tissue layers. In vivo animal studies evaluating the changes in tissue histology following application of various loads support findings related to human pressure ulcer tissue and further elucidate the tissue changes seen in response to load. Studies to evaluate whether the visible changes in human and animal tissue are precursors to ulcer development or remodeling responses to loading are needed to increase understanding of pressure ulcer formation. [References: 16]

Evans, M. (2007). "Nurses take up quality mantle. New initiatives move them into quality reporting." *Modern Healthcare* 37(42): 12.

Even-Schneider, A., E. Chartier-Kastler, et al. (2007). "[Clinical specificities of spinal cord injury patients (pressure ulcers, autonomic hyperreflexia, spasticity)]." *Progres en Urologie* 17(3): 454-6.

The management of spinal cord injury patients requires a knowledge of several non-urological aspects associated with a risk of particular complications in these patients: pressure ulcers, spasticity and autonomic hyperreflexia. Spinal cord injury patients present a high risk of pressure ulcer, as almost all patients develop at least one pressure ulcer during their lifetime. During a stay in hospital, the medical team must be particularly attentive to prevent these problems, as, once they develop, they can take several months or even years to heal. Autonomic hyperreflexia and spasticity can be due to a urological cause. These two diseases can cause major discomfort for the patient and, in these patients, must be considered to be equivalent to the pain that they can no longer feel due to sensory disorders. The management of spinal cord injury patients must take into account these three particular risk factors: pressure ulcers, spasticity and autonomic hyperreflexia.

Faguer, S., N. Kamar, et al. (2007). "Linezolid-related pancytopenia in organ-transplant patients: report of two cases." *Infection* 35(4): 275-7.

Linezolid is a recent oral antibiotic used in drug-resistant Gram-positive cocci infection. We herein report on the first two cases of linezolid-related pancytopenia in organ-

transplant patients. Both patients had methicillin-resistant *Staphylococcus aureus* infections. Pancytopenia, i.e. aregenerative anemia, neutropenia and thrombopenia, developed 3 weeks and 5 weeks after initiating linezolid therapy at a conventional dosage (600 mg bid). There were no other confounding causes of pancytopenia, which resolved promptly after withdrawing linezolid. Because of the potential hazards of pancytopenia in immunosuppressed organ-transplant patients, we advocate the cautious use of linezolid for transplant patients.

Farage, M. A., K. W. Miller, et al. (2007). "Incontinence in the aged: contact dermatitis and other cutaneous consequences." *Contact Dermatitis* 57(4): 211-7.

Urinary and faecal incontinence affects a significant portion of the elderly population. The increase in the incidence of incontinence is not only dependent on age but also on the onset of concomitant ageing issues such as infection, polypharmacy, and decreased cognitive function. If incontinence is left untreated, a host of dermatological complications can occur, including incontinence dermatitis, dermatological infections, intertrigo, vulvar folliculitis, and pruritus ani. The presence of chronic incontinence can produce a vicious cycle of skin damage and inflammation because of the loss of cutaneous integrity. Minimizing skin damage caused by incontinence is dependent on successful control of excess hydration, maintenance of proper pH, minimization of interaction between urine and faeces, and prevention of secondary infection. Even though incontinence is common in the aged, it is not an inevitable consequence of ageing but a disorder that can and should be treated. Appropriate clinical management of incontinence can help seniors continue to lead vital active lives as well as avoid the cutaneous sequelae of incontinence. [References: 60]

Feuchtinger, J., R. Halfens, et al. (2007). "Pressure ulcer risk assessment immediately after cardiac surgery--does it make a difference? A comparison of three pressure ulcer risk assessment instruments within a cardiac surgery population." *Nursing in Critical Care* 12(1): 42-9.

The intensive care unit (ICU) population has a high risk of developing pressure ulcers. According to several national expert guidelines for pressure ulcer prevention, a risk assessment for every situation in which the patient's condition is changing should be performed using a standardized risk assessment instrument. The aims of this study were to (a) assess the number of patients who are 'at risk' for the development of pressure ulcer

according to three commonly used risk assessment instruments in the intermediate period after cardiac surgery procedures, (b) assess which instrument best fits the situation of the ICU patients and c) decide if 'static' risk assessment with an instrument should be recommended. The modified Norton scale, the Braden scale and the 4-factor model were used in a convenience sample of 53 patients to assess the risk for development of pressure ulcer in the first 5 days (in ICU) after cardiac surgery procedures. The number of patients at risk were >60% by the 4-factor model, >70% by the modified Norton scale and >80% by the Braden scale. Sensitivity and specificity in all scales were not satisfactory. Forty-nine per cent (n= 26) of the patients developed a pressure ulcer in the operating room, 13% (n= 7) up to day 5 in the cardiac surgery ICU. Only 1.9% (n= 1) of the pressure ulcers were stage 2. The study concluded that the patients in the cardiac surgery ICU can be identified as at risk during the first 5 days after surgical procedure without continuously using a standardized risk assessment instrument in every changing condition. Individual risk assessment by a standardized risk assessment instrument is only recommended to enable initiation of preventive measures based on patient-specific risk factors.

Fisher, K. "Sitting pretty." *Rehab Management* 20(6): 38.

Fleck, C. A. (2007). "Suspected deep tissue injury." *Advances in Skin & Wound Care* 20(7): 413-5.

Francis Godschalk, M. (2007). "Pressure ulcers: a role for thymosin beta4." *Annals of the New York Academy of Sciences* 1112: 413-7.

Pressure ulcers occur in up to 14% of acute hospitalizations. They cause pain, decreased quality of life, increased morbidity, and prolonged hospitalizations. Treatment includes pain control, nutritional support, relieving pressure, removing devitalized tissue, and by using dressings and medications, providing an environment in which healing can occur. Even with optimal treatment, pressure ulcers may take months to heal. Thymosin beta4 is being investigated as a treatment for pressure ulcers. Thymosin beta4 has wound healing and anti-inflammatory properties. It is thought to exert its therapeutic effect through promotion of keratinocyte and endothelial cell migration, increased collagen deposition, and stimulation of angiogenesis. A study in a rat full-thickness wound model showed that treatment with thymosin beta4 increased collagen deposition and angiogenesis and

stimulated keratinocyte migration and reepithelialization. If thymosin beta4 decreases healing time, this would represent a significant advance in the treatment of pressure ulcers.

Frankel, H., J. Sperry, et al. (2007). "Risk factors for pressure ulcer development in a best practice surgical intensive care unit." *American Surgeon* 73(12): 1215-7.

We describe the incidence of and define risk factors for pressure ulcers (PU) in the surgical intensive care unit (ICU). Twelve months of data were collected on all patients admitted to the intensivist-run surgical ICU of a university hospital. PU patients were those who developed a new stage II or greater lesion during or after a surgical ICU stay as identified in Project Impact, ICD9 discharge, or ICU complications databases. Patients were nursed in pressure-relieving beds with nutrition initiated by 72 hours. Chi2, t test, and logistic regression statistics were used. Three percent (25/820) developed PU. Age, ICU length of stay, Acute Physiology and Chronic Health Evaluation Score (APACHE), and gender were not different between those with and without PU. Patients with PU had a higher blood urea nitrogen/creatinine (30.5/2.2 mg/dL vs 22.0/1.6 mg/dL) and were more frequently vascular patients (28 vs 14.1%), diabetics (40 vs 17.2%), paraplegics (8 vs 0.2%) (all $P < 0.01$), and patients on pressors (28.0 vs 11.8%, $P < 0.02$). Multivariate analysis revealed that diabetes (odds ratio [OR] 2.7, 95% confidence interval [CI] 1.1-6.4), spinal cord injury (OR 16.8, 95% CI 1.5-183), age > 60 years (OR 2.9, 95% CI 1.2-7.1), and a creatinine >3 mg/dL (OR 3.7, 95% CI 1.2-9.3) were independent predictors of PU. Despite universal use of specialty beds and early nutrition, pressure ulcers developed in 3 per cent. Independent risk factors include age greater than 60 years, diabetes, spinal cord injury, and renal insufficiency. Additional modalities, such as aggressive early mobilization, might be warranted in this cohort.

Fromantin, I. and M.-C. Falcou (2007). "[Nursing research in wounds and scarring]." *Soins; La Revue de Reference Infirmiere*(718): 47-50.

Fulmer, T. (2007). "How to try this: Fulmer SPICES." *American Journal of Nursing* 107(10): 40-8; quiz 48-9.

Fulmer SPICES is a framework for assessing older adults that focuses on six common "marker conditions": sleep problems, problems with eating and feeding, incontinence, confusion, evidence of falls, and skin breakdown. These conditions provide a

snapshot of a patient's overall health and the quality of care. The SPICES assessment, done regularly, can signal the need for more specific assessment and lead to the prevention and treatment of these common conditions. For a free online video demonstrating the use of SPICES, go to <http://links.lww.com/A100>. [References: 27]

Funkesson, K. H., E.-M. Anbacken, et al. (2007). "Nurses' reasoning process during care planning taking pressure ulcer prevention as an example. A think-aloud study." *International Journal of Nursing Studies* 44(7): 1109-19.

BACKGROUND: Nurses' clinical reasoning is of great importance for the delivery of safe and efficient care. Pressure ulcer prevention allows a variety of aspects within nursing to be viewed. **OBJECTIVE:** The aim of this study was to describe both the process and the content of nurses' reasoning during care planning at different nursing homes, using pressure ulcer prevention as an example. **DESIGN:** A qualitative research design was chosen. **SETTINGS:** Seven different nursing homes within one community were included. **PARTICIPANTS:** Eleven registered nurses were interviewed. **METHOD:** The methods used were think-aloud technique, protocol analysis and qualitative content analysis. Client simulation illustrating transition was used. The case used for care planning was in three parts covering the transition from hospital until 3 weeks in the nursing home. **RESULT:** Most nurses in this study conducted direct and indirect reasoning in a wide range of areas in connection with pressure ulcer prevention. The reasoning focused different parts of the nursing process depending on part of the case. Complex assertions as well as strategies aiming to reduce cognitive strain were rare. Nurses involved in direct nursing care held a broader reasoning than consultant nurses. Both explanations and actions based on older ideas and traditions occurred. **CONCLUSIONS:** Reasoning concerning pressure ulcer prevention while care planning was dominated by routine thinking. Knowing the person over a period of time made a more complex reasoning possible. The nurses' experience, knowledge together with how close to the elderly the nurses work seem to be important factors that affect the content of reasoning.

Gajewski, B. J., S. Hart, et al. (2007). "Inter-rater reliability of pressure ulcer staging: ordinal probit Bayesian hierarchical model that allows for uncertain rater response." *Statistics in Medicine* 26(25): 4602-18.

This article describes a method for estimating the inter-rater reliability of pressure ulcer (PU) staging (stages I-IV) from raters in National Database of Nursing Quality Indicators (NDNQI) participating hospitals. The method models ordinal spanning data utilizing an ordinal probit Bayesian hierarchical model (BHM) across several hospitals in which raters monitor patient's PUs. An ulcer that cannot be accurately assessed because the base of the wound cannot be seen is defined as unstageable. Our novel approach allows for an unstageable PU rating to be included in the analysis. We compare the ordinal probit BHM to an approximate random-effects (standard approach in the literature) model that assumes that the raw ordinal data are continuous. Copyright 2007 John Wiley & Sons, Ltd.

Garcia-Verdugo, M. F. A., M. T. Garrido Hernandez, et al. (2007). "[Integral treatment for bedridden patients]." *Revista de Enfermeria* 30(5): 31-9.

Spinal cord injuries are one of the traumatic injuries which produce the greatest number of patients who are bedridden or incapacitated. Physical effects acquire such importance that one can not forget to attend to aspects as basic as hygiene, correct posture during their bedridden stay or the daily task to transfer patients to the various support elements they need to utilize. Nursing care for patients suffering spinal cord injuries comprise the fundamental axis on which a correct recuperation rotates. At the same time, proper treatment care will lead to a future improvement in a patient's quality of life.

Gawlitta, D., C. W. J. Oomens, et al. (2007). "Temporal differences in the influence of ischemic factors and deformation on the metabolism of engineered skeletal muscle." *Journal of Applied Physiology* 103(2): 464-73.

Prolonged periods of tissue compression may lead to the development of pressure ulcers, some of which may originate in, for example, skeletal muscle tissue and progress underneath intact skin, representing deep tissue injury. Their etiology is multifactorial and the interaction between individual causal factors and their relative importance remain unknown. The present study addressed the relative contributions of deformation and ischemic factors to altered metabolism and viability. Engineered muscle tissue was prepared as previously detailed (14) and subjected to a combination of factors including 0% oxygen, lactic acid concentrations resulting in pH from 5.3 to 7.4, 34% compression, and low glucose levels. Deformation had an immediate effect on tissue viability {[3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide] (MTT) assay}, which increased with time. By contrast, hypoxia

evoked metabolic responses (glucose and lactate levels) within 24 h, but viability was only reduced after 48 h. In addition, lactic acidification downregulated tissue metabolism up to an acid concentration (approximately 23 mM) where metabolism was arrested and cell death enhanced. A similar tissue response was observed during glucose deprivation, which, at negligible concentration, resulted in both a cessation of metabolic activity and a reduction in cell viability. The combination of results suggests that in a short-term (<24 h) deformation, extreme acidification and glucose deprivation increased the level of cell death. By contrast, nonextreme acidification and hypoxia influenced tissue metabolism, but not the development of cell death. These data provide more insight into how compression-induced factors can lead to the onset of deep tissue injury.

Gefen, A. (2007). "The biomechanics of sitting-acquired pressure ulcers in patients with spinal cord injury or lesions." *International Wound Journal* 4(3): 222-31.

Sitting-acquired pressure ulcers (SAPU) in permanent wheelchair users with traumatic or non traumatic disorders of the central nervous system (CNS) are a great medical challenge. The purpose of this review is to summarise what is currently known concerning the aetiology of SAPU, particularly in its severe form, which may now be classified as a 'deep tissue injury' according to the US National Pressure Ulcer Advisory Panel. Specifically, this review focuses on biomechanical aspects of deep SAPU and describes the relevant bioengineering methodologies and research evidence. It discusses the unique biomechanical conditions in deep tissues, which are caused by chronic sitting associated with CNS disorders, and overall, the present review indicates that avoiding interface pressures above 32 mmHg in such patients is not necessarily a 'pressure relief.' [References: 57]

Gefen, A. and J. Levine (2007). "The false premise in measuring body-support interface pressures for preventing serious pressure ulcers." *Journal of Medical Engineering & Technology* 31(5): 375-80.

Presently, commercial cushioning products for pressure ulcer prevention are being evaluated for their protective effect exclusively based on interfacial pressures between the cushion/mattress and the patient. However, interface pressures cannot predict elevated mechanical stresses in deep tissues adjacent to bony prominences. Such deep tissue stress concentrations are associated with local ischaemia and hypoxia, which over time result in

deep tissue necrosis, particularly of muscle tissue. In order to demonstrate this phenomenon, a physical phantom of the mechanical interaction between the ischial tuberosities (IT) and gluteus muscles of the buttocks was built, incorporating geometric replica of the human IT and real (bovine) muscle tissue. Internal muscle stresses directly under the IT were five to 11-fold greater than stresses at more distal locations, and a Pearson correlation test showed that they could not have been predicted from the interface pressures in the phantom. Accordingly, though pressure ulcer prevention clinics which utilize routine sitting pressure measurements report effective outcomes, the present results highlight a problem in using body-support pressure measurements to predict the risk for pressure-related deep tissue injury.

Giordani, M. (2007). "[Research and practice. Learning from the results of a study on problems that elicit nursing surveillance]." *Assistenza Infermieristica e Ricerca*:Air 26(3): 120-2.

Gray, M. (2007). "Context for WOC Practice. Pressure ulcer risk assessment, negative pressure wound therapy, and suprapubic catheters." *Journal of Wound, Ostomy, & Continence Nursing* 34(4): 356-8.

Gray, M. (2007). "Incontinence-related skin damage: essential knowledge." *Ostomy Wound Management* 53(12): 28-32.

Incontinence-associated dermatitis, a clinical manifestation of moisture-associated skin damage, is a common consideration in patients with fecal and/or urinary incontinence. Among hospitalized patients, the prevalence rate has been found to be as high as 27%. Exposure to skin surface irritants may be a predictor and the condition, in turn, may be a factor in pressure ulcer risk because skin integrity is compromised. Differential diagnosis, usually based on visual examination, can help determine whether incontinence-associated dermatitis or a pressure ulcer is present. Prevention comprises following a structured skin care regimen that includes gentle cleansing, moisturization, and application of a skin protectant or moisture barrier. Treatment goals include protecting the skin from further exposure to irritants, establishing a healing environment, and eradicating any cutaneous infection. This concise review of relevant literature underscores the scant amount of evidence-based information available and highlights the need for further studies that involve

comparing protocol and product efficacy to determine best practice for this oft-encountered condition. [References: 21]

Griffin, B., H. Cooper, et al. "Best-practice protocols: reducing harm from pressure ulcers." *Nursing Management* 38(9): 29-31.

The Institute for Healthcare Improvement challenges clinicians and administrators to raise care quality through its 5 Million Lives Campaign, a sequel to the 100,000 Lives Campaign. Here, learn how one facility decreased hospital-acquired pressure ulcers, a constant nursing challenge.

Guihan, M., S. L. Garber, et al. (2007). "Lessons learned while conducting research on prevention of pressure ulcers in veterans with spinal cord injury." *Archives of Physical Medicine & Rehabilitation* 88(7): 858-61.

OBJECTIVE: To describe the challenges of conducting a large randomized controlled trial (RCT) to assess the effectiveness of an intervention to prevent recurrent pressure ulcers among a high-risk population of subjects with spinal cord injury (SCI). **DESIGN:** Prospective multisite, randomized design comparing outcomes of patients who received individualized education and structured telephone counseling follow-up with those of patients receiving customary care. This study was stopped early because of unanticipated recruitment problems. **SETTING:** Six Veterans Affairs SCI specialty centers. **PARTICIPANTS:** Veterans (N=150) treated for stage III or IV pelvic pressure ulcers. **INTERVENTIONS:** Not applicable. **MAIN OUTCOME MEASURE:** Recurrence (defined as new skin breakdown in the pelvic area) and time to recurrence. The study was stopped early because of slow recruitment, so the focus of this study is lessons learned, not the main planned outcome measures. **RESULTS:** Subject recruitment did not meet original expectations because almost 50% of those enrolled left the hospital with the study ulcer unhealed (having a healed ulcer was a requirement for participation). No significant differences were observed between groups on rate of or time to recurrence at the time the study was stopped. Among the 6 sites, variability in ulcer management (eg, length of stay, receipt of medical vs surgical treatment, sitting tolerance before discharge) and time to recurrence (median, 4mo) were observed. **CONCLUSIONS:** RCTs in real-world settings are the most robust method of assessing the effectiveness of prevention strategies. However, in complex, rapidly changing health care organizations, blinding is infeasible, it may be impractical to control for every variable that

influences a study's outcome, and any assumptions that usual care is static are probably mistaken. Investigators must be prepared to use innovative approaches to maintain the integrity of the study design, including flexibility in inclusion and exclusion criteria to support accrual, obtaining a better understanding of the important aspects of usual care that may need to be standardized, continuous improvement within the intervention arm, and anticipation and minimization of risks from organizational changes. With attention to these delivery system issues and the usual design features of randomized trials, we believe real-world care settings can serve as important laboratories to test pressure ulcer prevention strategies in this population.

Gupta, N., J. Solomon, et al. (2007). "Paraplegia: a postal survey of morbidity trends in India." *Spinal Cord* 45(10): 664-70.

STUDY DESIGN: Postal survey from August 2004 to May 2006. OBJECTIVE: To ascertain the morbidity trends in individuals with paraplegia in India and to find its association with demographic characteristics. SETTINGS: India. METHODS: The questionnaire was mailed to the identified individuals (n=600) whose addresses were obtained from the medical records section of our hospital and by contacting non-government organizations (NGOs), working for individuals with paraplegia in various cities. The causes of morbidities surveyed were respiratory complications, use of catheter, pressure sores, spasticity, postural hypotension, pain and fractures. Data were analysed using nonparametric test of association (Goodman Kruskal Tau). RESULTS: A total of 276 (46%) individuals responded. Of all the morbidities studied, pain was the leading cause (57.2%) followed by spasticity (39.1%), pressure sore (28.3%), postural hypotension (10.1%), respiratory complications, and fractures (5.8%). We found significant associations between various morbidities and demographics and between morbidities themselves. CONCLUSION: The most common cause for morbidity was pain. Ambulation reduced the incidence of secondary complications.

Hallouet, P., J. Eggers, et al. (2007). "[Care of decubitus ulcers]." *Soins Gerontologie*.(67): 45-7.

Hardy, A., D. Harrell, et al. "Exploring the effects of wound dressings and patient positioning on skin integrity in a pediatric burn facility." *Ostomy Wound Management* 53(6): 67-72.

Although literature on the subject is scant, in practice, pressure ulcers in the pediatric burn population remain a challenge. An interdisciplinary team at an urban pediatric burn institution treats a population (average age 8 years, range 1 month to 21 years) that includes children too young or unable to articulate pressure-related pain from dressings or positioning techniques. After pressure ulcer data collection procedures were instituted, it was observed that elastic bandages, wet operating room dressings, and positioning appeared to contribute to pressure ulcer occurrence. To better understand the patient's experience and educate staff, an informal study was conducted by an interdisciplinary committee of clinicians to assess the amount of pressure in mm Hg created on bony prominences by care procedures. Three staff members volunteered and were placed in elastic dressings and various commonly used positions for several minutes and three pressure measurements were obtained. Pressure readings of 40 and 56 mm Hg were common, causing pain and placing a person at risk for skin ulceration. The information was used to educate staff on how to maintain therapeutic efficacy without compromising skin integrity and causing pain. Lectures and hands-on demonstrations elucidated correct dressing application. The committee continues to provide education to all staff members on methods to prevent pressure ulcers from occurring in the high-risk burn patient population and ways to reduce the use of elastic wraps and improve patient positioning.

Hayashi, T., Y. Narita, et al. (2007). "Pressure ulcers in ALS patients on admission at a university hospital in Japan." *Amyotrophic Lateral Sclerosis* 8(5): 310-3.

We aimed to review the incidence of pressure ulcers in patients with amyotrophic lateral sclerosis (ALS) on admission at a teaching hospital in Mie, Japan. 592 patients admitted to the neurological ward of Mie University Hospital from 1 April 2004 to 31 March 2006 were reviewed. A retrospective analysis was conducted based on medical and nursing records about pressure ulcers among patients with ALS, parkinsonism (Parkinson's disease, multisystem atrophy, corticobasal degeneration and progressive supranuclear palsy) and other neurological diseases. 16 patients (12 males and four females) aged 36 to 87 years, 71.2 +/- 14.2 years old (mean +/- SD), were identified as having one or more pressure ulcers on admission. No patients developed a new pressure ulcer after admission. The number of patients with pressure ulcers on admission was two in 41 ALS patients, five in 126 parkinsonism patients and nine in 425 patients with other neurological diseases. A proportional analysis by chi2 test for the groups did not show a lower incidence of pressure ulcers in ALS patients. In conclusion, no differences were found in the incidence of pressure ulcers on admission among three neurological groups at a teaching hospital in Mie, Japan.

Hengstermann, S., A. Fischer, et al. (2007). "Nutrition status and pressure ulcer: what we need for nutrition screening." *Jpen: Journal of Parenteral & Enteral Nutrition* 31(4): 288-94.

BACKGROUND: Pressure ulcers (PU) and malnutrition exist in elderly hospitalized patients as a significant and costly problem. The aim of the study was to compare different screening tools to assess nutrition status and to verify them for usage in clinical routine.

METHODS: Nutrition status (body mass index [BMI], Mini Nutritional Assessment [MNA], weight loss) was determined in 484 (326 female/158 male) multimorbid elderly patients with mean age of 79.6 +/- 7.6 (80.9 +/- 7.4 female/76.9 +/- 7.4 male) years. Bioelectrical impedance analysis (BIA; Nutrigard 2,000-M) was used for evaluation of body composition. Activities of daily living (ADL) were measured with the Barthel Index. PUs were divided into stages I-IV (European Pressure Ulcer Advisory Panel [EPUAP]) and were assessed by the Norton scale.

RESULTS: The prevalence of PU was 16.7%, with a median Norton scale of 20 (range, 17-24). According to MNA, 39.5% of the PU patients were malnourished, and 2.5% were well nourished. By contrast, 16.6% of the non-PU patients were malnourished, and 23.6% were well nourished. BMI decreased significantly in PU patients ($p < .008$). BIA resulted in no significant resistance and reactance but in a significant reduction of phase angle in PU. According to a significantly reduced body cell mass and lean body mass in PU patients, the ADL decreased in these patients, too. Furthermore, we analyzed a significant effect of age, ADL, MNA, BMI, phase angle, and body cell mass on the Norton scale.

CONCLUSIONS: The MNA as a screening and assessment tool is easy to use to determine the nutrition status in multimorbid geriatric patients with PU. Further studies are needed to show an improved outcome of PU healing if evaluation of nutrition status is part of routine clinical practice in multimorbid elderly risk patients within the first day after admission.

Hess, C. T. and L. J. Rook (2007). "Understanding recent regulatory guidelines for hospital-acquired catheter-related urinary tract infections and pressure ulcers." *Ostomy Wound Management* 53(12): 34-42.

The Centers for Medicare and Medicaid Services issued a final rule to update the hospital inpatient prospective payment system for fiscal year 2008. Included in this new ruling is the need to identify conditions present on admission as well as guidelines underscoring that payment will not be rendered for certain conditions determined to be hospital-acquired. Two of the eight conditions affect patients with incontinence: catheter-associated urinary tract infections and pressure ulcers. These conditions, if present on

admission to an acute care facility, must be identified by the clinical staff and the attending physician. For patients admitted without these conditions, evidence-based, preventive protocols of care must be implemented in order to provide optimal care and prevent costly complications. [References: 21]

Highsmith, J. T. and M. J. Highsmith "Common skin pathology in LE prosthesis users." JAAPA 20(11): 33-6.

Ho, C. H. and K. M. Bogie (2007). "Integrating wound care research into clinical practice." Ostomy Wound Management 53(10): 18-25.

The process of integrating wound care research into clinical practice incorporates research methodology--i.e., the standardized practices, procedures, and rules by which research is performed--and an evidence-based approach. Using examples from the literature and clinician experience treating pressure ulcers in a 32-bed regional spinal cord injury unit in a tertiary referral center in Cleveland, Ohio, the authors describe this process and review the challenges faced by an interdisciplinary skin care team tasked with implementing evidence-based care. Additional considerations include determining the amount of current wound care that is evidence-based and whether wound prevention and care outcomes are improved through the use of evidence-based medicine. Five years after establishing the skin care team and implementing evidence-based care, improvements in care processes and short-term outcomes--specifically, pressure ulcer prevention and treatment protocols including documentation--have been realized. Studies to ascertain the effects of these changes on long-term outcomes are planned. [References: 34]

Holmes, A. and T. Edelstein "Pressure ulcer success story." Provider 33(12): 37-9.

Hommel, A., K. B. Bjorkelund, et al. (2007). "Nutritional status among patients with hip fracture in relation to pressure ulcers." Clinical Nutrition 26(5): 589-96.

BACKGROUND & AIMS: Patients with a hip fracture often have a poor nutritional status that is associated with increased risk of complications, morbidity and mortality. The aim of this study was to investigate the effects of an improved care intervention in relation to

nutritional status and pressure ulcers. An intervention of best practices for patients with hip fracture was introduced, using the available resources effectively and efficiently with a not too complicated or expensive intervention. METHODS: A quasi-experimental study of 478 patients consecutively included between April 1, 2003 and March 31, 2004. A new evidence-based clinical pathway was introduced on October 1, 2003. The results from the first 210 patients in the control group and the last 210 patients in the intervention group are presented in this article. RESULTS: The total number of patients with a hospital-acquired pressure ulcer was in the intervention group, 19 patients, and in the control group, 39 patients ($p = 0.007$). No patient younger than 65 years developed a pressure ulcer. There were no statistical significant differences between the groups with respect to blood biochemical variables at inclusion. Patients in the control group had higher arm muscle circumference (AMC) ($p = 0.05$), calf circumference (CC) ($p = 0.038$) and body mass index (BMI) ($p = 0.043$) values. Abnormal anthropometrical tests of BMI, triceps skin fold (TSF) <10th percentile and AMC <10th percentile were found in 12 patients in the control group and in 4 patients in the intervention group. None of the 4 patients in the intervention group developed pressure ulcers. However, 2 of the 12 patients in the control group were affected. CONCLUSIONS: It is possible to reduce the development of hospital-acquired pressure ulcers among elderly patients with a hip fracture even though they have poor prefracture nutritional status. Results in this study indicate the value of the new clinical pathway, as number of patients who have developed pressure ulcers during their stay in hospital has been reduced by 50%.

Horn, S. D. and J. Gassaway (2007). "Practice-based evidence study design for comparative effectiveness research." *Medical Care* 45(10 Supl 2): S50-7.

OBJECTIVES: To describe a new, rigorous, comprehensive practice-based evidence for clinical practice improvement (PBE-CPI) study methodology, and compare its features, advantages, and disadvantages to those of randomized controlled trials and sophisticated statistical methods for comparative effectiveness research. RESEARCH DESIGN: PBE-CPI incorporates natural variation within data from routine clinical practice to determine what works, for whom, when, and at what cost. It uses the knowledge of front-line caregivers, who develop study questions and define variables as part of a transdisciplinary team. Its comprehensive measurement framework provides a basis for analyses of significant bivariate and multivariate associations between treatments and outcomes, controlling for patient differences, such as severity of illness. RESULTS: PBE-CPI studies can uncover better practices more quickly than randomized controlled trials or sophisticated statistical

methods, while achieving many of the same advantages. We present examples of actionable findings from PBE-CPI studies in postacute care settings related to comparative effectiveness of medications, nutritional support approaches, incontinence products, physical therapy activities, and other services. CONCLUSIONS: Outcomes improved when practices associated with better outcomes in PBE-CPI analyses were adopted in practice.

[References: 34]

Hunstein, D. (2007). "[The patient with decubitus ulcer is neglected for a long time]." *Pflege* 20(3): 126-8.

Ichioka, S., K. Okabe, et al. (2007). "Versatility of the Limberg flap and the V-Y flap (based on a distal perforator) for covering sacral ulcers." *Scandinavian Journal of Plastic & Reconstructive Surgery & Hand Surgery* 41(2): 65-9.

Our simple criteria for selection of two efficient flaps achieves consistently good results for most sacral ulcers. One hundred and ten patients had their sacral ulcers reconstructed with the Limberg flap (n = 48) or the distal-perforator-based V-Y (DPVY) flap (n = 62). The criteria for selection were based on pinching of the donor skin to estimate the feasibility of the Limberg flap. Overall, 101/110 (92%) of the flaps healed primarily, 43/48 (90%) in the Limberg flap group, and 58/62 (94%) in the DPVY flap group. The advantages of reconstruction using our two flaps include simple and consistent design of, and procedure for, both flaps, wide excursion of the DPVY flap, and consistency of the surgeons' skill because they used only two flaps.

Ichioka, S., N. Sekiya, et al. (2007). "AlphaV beta3 (alphavbeta3) integrin inhibition reduces leukocyte-endothelium interaction in a pressure-induced reperfusion model." *Wound Repair & Regeneration* 15(4): 572-6.

The leukocyte-endothelium interaction is known to contribute to reperfusion injury, which is considered to participate in the pathophysiology of pressure ulcers, and integrin alphaV beta3 (alphavbeta3) has been shown to mediate the processes of cellular adhesion in various types of cells. This study aims to clarify leukocyte behavior in our original microcirculatory pressure-induced reperfusion model, which can visualize the microcirculation in vivo. We also estimated the effect of alphavbeta3 integrin inhibition on the

reduction of the leukocyte-endothelium interaction. Mice with dorsal skinfold chambers were divided into three groups: the baseline group (n=6), in which animals received no compression; the compression-reperfusion group (n=6), in which animals underwent 2-hour compression of the dorsal skin, followed by release, and the inhibitor-treated group (n=7), in which an alphavbeta3 inhibitor, CP4715, was administered in addition to the compression-release procedure. Staining with rhodamine 6G quantitatively visualized leukocyte behavior under the intravital fluorescent microscope. Compression-reperfusion induced a significant increase in rolling, sticking, and extravasation of the leukocytes. Treatment with the inhibitor strikingly reduced leukocyte sticking and extravasation. The present experiment has provided evidence that alphavbeta3 inhibition reduces leukocyte-endothelium interaction in our original pressure-induced reperfusion model.

Jan, Y.-K., D. M. Brienza, et al. (2008). "Wavelet-based spectrum analysis of sacral skin blood flow response to alternating pressure." *Archives of Physical Medicine & Rehabilitation* 89(1): 137-45.

OBJECTIVES: To provide insight into the physiologic mechanisms associated with alternating pressure, using wavelet analysis of skin blood flow (SBF) oscillations, and to determine whether the application of alternating pressure induces myogenic responses, thereby enhancing SBF as compared with constant loading. **DESIGN:** Repeated-measures design. **SETTING:** University research laboratory. **PARTICIPANTS:** Healthy, young adults (N=10; 5 men, 5 women; mean age +/- standard deviation, 30.0+/-3.1 y). **INTERVENTION:** Alternating pressure for 20 minutes (four 5-min cycles with either 60 mmHg or 3 mmHg) and constant loading for 20 minutes at 30 mmHg on the skin over the sacrum. **MAIN OUTCOME MEASURES:** A laser Doppler flowmeter was used to measure sacral SBF response to both alternating pressure and constant loading. Wavelet-based spectrum analysis of SBF oscillations was used to assess underlying physiologic mechanisms including endothelium-related metabolic (.008-.02 Hz), neurogenic (.02-.05 Hz), and myogenic (.05-.15 Hz) controls. **RESULTS:** Alternating pressure stimulated an increase in sacral SBF of compressed soft tissues as compared with constant loading (P<.01). SBF during the high-pressure phase of 4 alternating pressure cycles showed an increasing trend. An increase in power in metabolic frequency range and a decrease in power in the myogenic frequency range during alternating pressure were observed compared with SBF prior to loading. Power increased in the myogenic frequency range during the low-pressure phase of alternating pressure and decreased during the high-pressure phase. **CONCLUSIONS:** SBF control mechanisms, as assessed by the characteristic frequencies embedded in SBF oscillations,

show different responses to 2 loading pressures with the same average pressure but different patterns. Our study suggests that optimization of operating parameters and configurations of alternating pressure support surfaces to compensate for impaired SBF control mechanisms in pathologic populations may be possible using wavelet analysis of blood flow oscillations.

Jones, K. R. and K. Fennie (2007). "Factors influencing pressure ulcer healing in adults over 50: an exploratory study.[see comment]." *Journal of the American Medical Directors Association* 8(6): 378-87.

OBJECTIVE: The purpose of this study was to determine which demographic, clinical, and treatment factors influenced chronic pressure ulcer healing, and to identify the implications for pressure ulcer care being delivered in skilled nursing facilities. **DESIGN:** A multisite retrospective chart review was conducted using a structured data abstraction form and protocol. **SETTING:** Data collection took place in 3 geographically disperse areas of the country, with subjects having received wound care in hospitals, clinics, nursing homes, and home care. **PARTICIPANTS:** Subjects whose charts were reviewed were 50 years of age or older, had at least 1 diagnosed chronic pressure ulcer, and had 3 to 6 months of data available for abstraction. Stage I ulcers were excluded from the analysis. **MEASURES:** The structured data collection form included demographics, clinical variables, wound characteristics, and outcomes. The variables ulcer size, exudate type and amount, and necrotic tissue type were combined into a single wound severity score. **RESULTS:** Bivariate analyses showed that insurance type, secondary diagnoses of cardiovascular disease and pulmonary disease, initial ulcer size and stage, dressing type changes, use of topical antiseptics, type of debridement, category of dressing, use of hydrocolloid or wet-to-dry dressings, antibiotic administration, and appropriateness of selected dressing and management of necrosis were all significantly associated with healing within 6 months. Logistic regression models identified the following as the most significant predictors of healing: Medicaid, secondary diagnosis of cardiovascular disease, dressing type changed, topical antiseptics, antibiotic administration, pressure relief device, lack of exudate management dressing for moderate or large exudate wound, and lack of debridement of wounds with yellow slough, all decreased the odds of healing; use of exudate management dressings on wounds with no documented exudate increased the odds of healing. **CONCLUSION:** Pressure ulcer healing rates overall could be improved if clinicians better matched the characteristics of the wound with the decision to debride and the selection of the optimal dressing. Healing within nursing homes might be improved with less use of

enzymatic debridement and antibiotics and more frequent application of hydrocolloid dressings.

Jones, K. R., K. Fennie, et al. (2007). "Evidence-based management of chronic wounds." *Advances in Skin & Wound Care* 20(11): 591-600.

OBJECTIVE: Identify the consistency of current chronic wound care practices with evidence-based recommendations for wound management. **DESIGN:** A retrospective study based on 400 subject records (venous ulcers, 183; diabetic ulcers, 103; and pressure ulcers, 114). Study records were located at hospitals, wound care centers and clinics, home health agencies, and nursing homes in 4 diverse geographic locations. **METHODS:** Chronic wound assessment and evidence-based treatment practices were identified by extensive review of the literature, professional Web sites, and the Agency for Healthcare Research and Quality National Guideline Clearinghouse. Actual delivery of wound care practices was obtained from retrospective chart reviews and a structured data abstraction protocol. Collected data were then compared with recommended practices for consistency, adherence variations, and wound healing across data collection sites. **RESULTS:** Significant variations occurred in adherence to evidence-based recommendations across sites of care delivery, with selection and application of appropriate dressings showing the greatest need for improvement. **CONCLUSIONS:** Current chronic wound care practices are inconsistent with evidence-based recommendations for wound management. Further studies are needed to determine the best method for translating this information to multiple settings. [References: 42]

Jones, M. L. (2007). "E-learning in wound care: developing pressure ulcer prevention education." *British Journal of Nursing* 16(15): S26-31.

Patients with pressure ulcers suffer pain and distress from wounds that can require treatment for many months following discharge from hospital (Havard, 2007). This initial and ongoing treatment accounts for around four per cent of the NHS annual budget (Bennett et al, 2004), therefore pressure ulcer prevention and management is beneficial not only to patients but also the NHS. Education for healthcare professionals is an important factor in the prevention and management of pressure ulcers; however, in the current climate releasing staff to attend study days is becoming difficult. In some locations staff have to travel long distances in order to attend while locally-based study days are poorly attended.

Developing e-based learning was seen as a realistic option for nurses working in Trust within a large geographical area.

Kahn, J. M., H. Brake, et al. (2007). "Intensivist physician staffing and the process of care in academic medical centres." *Quality & Safety in Health Care* 16(5): 329-33.

BACKGROUND: Although intensivist physician staffing is associated with improved outcomes in critical care, little is known about the mechanism leading to this observation. **OBJECTIVE:** To determine the relationship between intensivist staffing and select process-based quality indicators in the intensive care unit. **RESEARCH DESIGN:** Retrospective cohort study in 29 academic hospitals participating in the University HealthSystem Consortium Mechanically Ventilated Patient Bundle Benchmarking Project. **Patients:** 861 adult patients receiving prolonged mechanical ventilation in an intensive care unit. **RESULTS:** Patient-level information on physician staffing and process-of-care quality indicators were collected on day 4 of mechanical ventilation. By day 4, 668 patients received care under a high intensity staffing model (primary intensivist care or mandatory consult) and 193 patients received care under a low intensity staffing model (optional consultation or no intensivist). Among eligible patients, those receiving care under a high intensity staffing model were more likely to receive prophylaxis for deep vein thrombosis (risk ratio 1.08, 95% CI 1.00 to 1.17), stress ulcer prophylaxis (risk ratio 1.10, 95% CI 1.03 to 1.18), a spontaneous breathing trial (risk ratio 1.37, 95% CI 0.97 to 1.94), interruption of sedation (risk ratio 1.64, 95% CI 1.13 to 2.38) and intensive insulin treatment (risk ratio 1.40, 95% CI 1.18 to 1.79) on day 4 of mechanical ventilation. Models accounting for clustering by hospital produced similar estimates of the staffing effect, except for prophylaxis against thrombosis and stress ulcers. **CONCLUSIONS:** High intensity physician staffing is associated with increased use of evidence-based quality indicators in patients receiving mechanical ventilation.

Kalpakjian, C. Z., W. M. Scelza, et al. (2007). "Preliminary reliability and validity of a Spinal Cord Injury Secondary Conditions Scale." *Journal of Spinal Cord Medicine* 30(2): 131-9.

BACKGROUND/OBJECTIVE: Although the impact of secondary conditions after spinal cord injury (SCI) on health, well being, and financial burden have been studied, there are psychometrically sound scales of secondary conditions in the extant literature. The use of such scales allows for cross-sample comparison of secondary condition prevalence rates

and associations with functional, medical, and psychosocial factors. Thus, the purpose of this study was to evaluate the preliminary reliability of a SCI secondary conditions scale. METHODS: The Spinal Cord Injury Secondary Conditions Scale (SCI-SCS) is a 16-item scale based on the Seekins Secondary Conditions Scale. Sixty-five individuals with SCI completed written surveys at 5 time-points over 2 years. RESULTS: Internal consistency across each of the time-points exceeded 0.76; test-retest reliability ranged from 0.569 to 0.805. Convergent validity was assessed with 6 physical functioning items from the SF-12. Spearman (coefficients were all statistically significant and ranged from 0.317 (accomplished less because of health problems) to 0.644 (pain). The most prevalent secondary conditions were chronic pain, joint and muscle pain, and sexual dysfunction. CONCLUSIONS: Preliminary testing of the SCI-SCS suggests that it is a reliable and valid scale, and further development (ie, factor analysis, item revision) and examination of validity are recommended with larger and more diverse SCI samples.

Keast, D. H., N. Parslow, et al. (2007). "Best practice recommendations for the prevention and treatment of pressure ulcers: update 2006." *Advances in Skin & Wound Care* 20(8): 447-60; quiz 461-2.

PURPOSE: The purpose of this article is to enhance the professional nurses' knowledge of the best practice recommendations for the prevention and treatment of pressure ulcers. TARGET AUDIENCE: This continuing education activity is intended for physicians and nurses with an interest in wound care. OBJECTIVES: After reading this article and taking this test, the reader should be able to: 1. Interpret the pathway to assess and treat pressure ulcers. 2. Differentiate the Registered Nurses' Association of Ontario (RNAO) levels of evidence. 3. Identify the scientific evidence for treatment recommendations. [References: 59]

Kivovics, P., M. Jahn, et al. (2007). "Frequency and location of traumatic ulcerations following placement of complete dentures." *International Journal of Prosthodontics* 20(4): 397-401.

PURPOSE: To determine the location of mucosal injuries that appear following placement of complete dentures, as well as the number of adjustments necessary to achieve patient comfort. The frequency of mucosal injuries in female and male patients and their connection with clinical anatomic features were also investigated. MATERIALS AND

METHODS: Sixty-one completely edentulous healthy patients who wore dentures (47 women and 14 men) took part in the study; 122 newly fabricated complete maxillary and mandibular dentures were investigated. All patients were seen for a 1-week adjustment appointment. Areas where signs of denture-induced mucosal injuries appeared were marked on an anatomic illustration. The follow-up period was in 1-week increments as deemed necessary by the patient. Associations between variables were analyzed with analysis of variance. Results were recorded as mean + SD. Statistical significance was set at $P < \text{or} = .05$. **RESULTS:** Eighty-seven percent of the dentures required adjustment at week 1, 50% at week 2, and only 7% at week 3. No patients required a further visit. Most frequently injured maxillary areas were the vestibular sulcus (41%), maxillary tuberosity (21%), and hamular notch (12%). In the mandible, the most frequently injured areas were the retromylohyoid area (17%), lingual sulcus (14%), and vestibular sulcus (13%). Denture-induced irritations were detected in a higher ratio in the mandible ($P < .001$), especially in male denture wearers at the first adjustment ($P < .05$). Men had a higher ratio of lesions at the region of the maxillary vestibular sulcus between the labial and buccal frenum and at the mandibular vestibular sulcus of the buccal shelf region ($P < .001$). **CONCLUSIONS:** Denture-induced irritations appeared most often in the vestibular sulcus of the maxilla and mandible, indicating that it is necessary to evaluate the area of the facial seal of the prosthesis by applying a medium- or a heavy-pressure indicator paste to the borders, and to make adjustments at the delivery stage and subsequent adjustment appointments. Denture placement must not be the final patient-clinician encounter when treating with complete dentures. Denture adjustments are very important clinical phases of denture fabrication and essential in patient care.

Kosmopoulos, D. I. and F. L. Tzeveleki (2007). "Automated pressure ulcer lesion diagnosis for telemedicine systems." *IEEE Engineering in Medicine & Biology Magazine* 26(5): 18-22.

Kring, D. L. (2007). "Reliability and validity of the Braden Scale for predicting pressure ulcer risk." *Journal of Wound, Ostomy, & Continence Nursing* 34(4): 399-406.

Multiple tools have been developed to assist nurses and other care providers to identify and quantify pressure ulcer risk. One of the most widely used tools is the Braden Scale for Predicting Pressure Ulcer Risk. It has been in use for 2 decades and multiple studies have individually reported on its reliability and validity. This article summarizes the reliability and validity of the instrument, and discusses implications for its use in clinical and

research settings. The Braden Scale for Predicting Pressure Ulcer Risk has generally performed well in the clinical setting. It has demonstrated reliability and validity in multiple clinical settings, and its parsimonious format enhances incorporation into routine clinical practice. Expanding the instrument may further increase its reliability and validity in the research setting.

Kroll, T., M. T. Neri, et al. (2007). "Secondary conditions in spinal cord injury: results from a prospective survey." *Disability & Rehabilitation* 29(15): 1229-37.

STUDY DESIGN: Prospective, self-report mail survey with two points of measurement one year apart. **OBJECTIVES:** To determine significant predictors of pressure ulcers (PU) and urinary tract infections (UTI) in adults with spinal cord injury (SCI) over 2 years. **SETTING:** Non-institutionalized adults with SCI living in the United States of America. **METHODS:** Secondary data analysis from 2 consecutive years. Independent variables included demographic, healthcare-related, functional, access to care, and health behavior measures. Dependent variables were the occurrence of PU and UTI at Time 2. **RESULTS:** Bivariate analyses showed significant associations between various independent variables and the occurrence of PU and UTI at Time 2. Separate logistic regression analyses for PU and UTI at Time 2 as dependent variables showed that PU at Time 1, not being married or cohabiting, not having access to primary care services when needed, and reporting a greater number of activities of daily living (ADL) requiring assistance were significant predictors of PU at Time 2. UTI at Time 1, a greater number of ADLs requiring assistance, and not engaging in weekly exercise are significant predictors of subsequent occurrence of UTI. **CONCLUSIONS:** Findings support previous research, and indicate the need for increased efforts to provide SCI self-management education to at-risk subpopulations, including individuals with greater personal assistance needs and functional limitations.

Lanzafame, R. J., I. Stadler, et al. (2007). "Reciprocity of exposure time and irradiance on energy density during photoradiation on wound healing in a murine pressure ulcer model." *Lasers in Surgery & Medicine* 39(6): 534-42.

BACKGROUND: Energy density and exposure time reciprocity is assumed and routinely used in low-level light therapy (LLLT) regimens. This study examined dose reciprocity effects on wound healing. **METHODS:** Pressure ulcers were created on seven groups of C57/BL mice (n = 18). Photoradiation was administered (18 days; 5 J/cm²/day @

670 nm) using a custom LED apparatus and treatment matrix varying both intensity and exposure. Control animals were treated similarly, without photoradiation. Ulcer staging was performed using a standardized scale. Changes in stage, wound area and wound closure rates were measured. Histology was performed. RESULTS: Photostimulatory effects at day 7 occurred with parameters of 125 seconds @ 40 mW x 1/day; 625 seconds @ 8 mWx1/day; 62.5 seconds @ 40 mWx2/day; and 312.5 seconds @ 8 mWx2/day; and at day 18 using 625 seconds @ 8 mW and 312.5 seconds @ 8 mWx2/day. Statistically significant increases in wound closure rates occurred using 625 seconds @ 8 mW; 62.5 seconds @ 40 mWx2/day; and 312.5 seconds @ 8 mWx2/day treatments. Mean ulcer grade scores were similar to controls. CONCLUSIONS: Varying irradiance and exposure time to achieve a specified energy density affects phototherapy outcomes in this model. Variation of exposure time and irradiance may account for conflicting results in the literature. Further studies of these effects are warranted. (c) 2007 Wiley-Liss, Inc.

Leblebici, B., N. Turhan, et al. (2007). "Clinical and epidemiologic evaluation of pressure ulcers in patients at a university hospital in Turkey." *Journal of Wound, Ostomy, & Continence Nursing* 34(4): 407-11.

OBJECTIVE: We sought to measure the incidence of pressure ulcer development at a university health center in Turkey, and to determine whether the Waterlow Pressure Sore Risk (PSR) Scale score predicted pressure ulcer development, stage, or number of ulcers. DESIGN: We prospectively evaluated patients who were hospitalized at our university-based medical center. SETTING AND SUBJECTS: We analyzed data from 22,834 patients hospitalized at the Baskent University Adana Teaching and Medical Research Center in Ankara, Turkey from January 1, 2004 to December 31, 2004, including 360 patients who developed pressure ulcers. INSTRUMENTS: The Waterlow PSR Scale was used to assess pressure ulcer risk. In addition, age, sex, the ward or unit in which the patient was hospitalized, reason for hospitalization, and location and stage of ulcers were collected on a data form designed specifically for this study. METHODS: A single nurse physiotherapist assessed all patients daily during their hospitalization. When a pressure ulcer was diagnosed by the nurse physiotherapist, a physician staged the pressure ulcers based on the US National Pressure Ulcer Advisory Panel (NPUAP) staging system. RESULTS: Three hundred sixty out of 22,834 patients developed 1 or more pressure ulcers, resulting in an incidence rate of 1.6%. Most ulcers (59.2%) occurred in patients hospitalized in the intensive care unit (n = 213). A positive correlation between the Waterlow PSR Scale score and number of ulcers per patient (r: 0.178, P < .01) was identified. No significant correlation was

found linking Waterlow PSR Scale score and ulcer stage or the development of a single ulcer. CONCLUSION: We found significantly lower pressure ulcer incidence rates than those commonly reported in the literature, which we believe is principally attributable to short hospital stays and a strong emphasis on preventive nursing care. While high Waterlow PSR scale Scores correlated positively with development of multiple ulcers, this did not predict ulcer stage or the presence of a single pressure ulcer.

Lee, J.-T., L.-F. Cheng, et al. (2007). "A new technique of transferring island pedicled anterolateral thigh and vastus lateralis myocutaneous flaps for reconstruction of recurrent ischial pressure sores." *Journal of Plastic, Reconstructive & Aesthetic Surgery: JPRAS* 60(9): 1060-6.

We describe island pedicled anterolateral thigh and vastus lateralis myocutaneous flaps for reconstruction of the difficult, recurrent ischial pressure sore. Rather than transfer through a subcutaneous tunnel, the flap is transferred directly through the upper thigh to the ischial defect. A total of 15 patients with 16 recurrent ischial pressure sores were treated between May 2003 and April 2005. Eleven sores were treated with pedicled island anterolateral thigh flaps and five sores with vastus lateralis myocutaneous flaps. There was no difficulty in transferring the flap to reach the ischial defect in any patient. The length of the pedicle ranged from 8.5 to 14 cm. All donor sites were closed primarily. Fifteen of the 16 flaps survived completely. Total necrosis occurred in one vastus lateralis myocutaneous flap, which was located at the distal third of the thigh. We conclude this flap can be added to the repertoire for the treatment of recurrent, difficult ischial pressure sores.

LeMaster, K. M. "Reducing incidence and prevalence of hospital-acquired pressure ulcers at Genesis Medical Center." *Joint Commission Journal on Quality & Patient Safety* 33(10): 611-6.

The prevalence of pressure ulcers on both the pulmonary and oncology units decreased to zero in the first quarter after the intervention, results that were largely sustained through the end of 2006.

Leng, S. X., T. Finucane, et al. (2007). "Inadvertent self-healing in desperate times." *Lancet* 370(9596): 1458.

Levi, B. and R. Rees (2007). "Diagnosis and management of pressure ulcers." *Clinics in Plastic Surgery* 34(4): 735-48.

Pressure ulcers represent a significant health issue and cost for the growing number of elderly and debilitated patients. The plastic surgeon, as part of the wound care team, has the ultimate responsibility of forming a plan to allow for the eventual closure of the wound. This plan should start with breaking the cycle and eliminating the risk factors that led to the development of the wound. Simultaneously, the surgeon should order an MRI and erythrocyte sedimentation rate and take a bone biopsy to diagnose the extent of the wound and the bacteria present. If more than 10⁵ bacteria are present, surgical debridement should be performed, followed by 6 weeks of intravenous antibiotics. Once the bacterial load has been lessened, a 6-week course of Regranex should be applied. Finally, after the wound bed has been prepared adequately, definitive surgical closure should be planned and performed. [References: 53]

Lindbloom, E. J., J. Brandt, et al. (2007). "Elder mistreatment in the nursing home: a systematic review." *Journal of the American Medical Directors Association* 8(9): 610-6.

Because of their significant dependence on others for their care, nursing home residents are potentially vulnerable to abuse and/or neglect. The topic of elder mistreatment, whether in the nursing home or other living environments, received little attention from clinicians and researchers until the past 2 decades. Original research is now emerging that sheds light on the scope of the problem and the challenges to timely prevention, identification, and management. Practitioners may use this information to recognize and change factors associated with a higher likelihood of nursing home mistreatment. [References: 91]

Linder-Ganz, E. and A. Gefen (2007). "The effects of pressure and shear on capillary closure in the microstructure of skeletal muscles." *Annals of Biomedical Engineering* 35(12): 2095-107.

Deep tissue injury (DTI) is a severe pressure ulcer, which initiates in muscle tissue under a bony prominence, and progresses outwards. It is associated with mechanical pressure and shear that may cause capillaries to collapse and thus, induce ischemic

conditions. Recently, some investigators stipulated that ischemia alone cannot explain the etiology of DTI, and other mechanisms, particularly excessive cellular deformations may be involved. The goal of this study was to evaluate the functioning of capillaries in loaded muscle tissue, using animal and finite element (FE) models. Pressures of 12, 37, and 78 kPa were applied directly to one gracilis muscle of 11 rats for 2 h. Temperatures of the loaded and contralateral muscles were recorded with time using infrared thermography (IRT) as a measure of the ischemic level. In addition, a non-linear large deformation muscle-fascicle-level FE model was developed and subjected to pressures of 12-120 kPa without and with simultaneous shear strain of up to 8%. For each simulation case, the accumulative percentage of open capillary cross-sectional area and the number of completely closed capillaries were determined. After 2 h, temperature of the loaded muscles was 2.4 +/- 0.3 degrees C (mean +/- standard deviation) lower than that of the unloaded contralateral limbs (mean of plateau temperature values across all pressure groups). Temperature of the loaded muscles dropped within 10 min but then remained stable and significantly higher than room temperature for at least 30 additional minutes in all pressure groups, indicating that limbs were not completely ischemic within the first 40 min of the trials. Our FE model showed that in response to pressures of 12-120 kPa and no shear, the accumulative percentage of open capillary cross-sectional area decreased by up to 71%. When shear strains were added, the open capillary cross-sectional area decreased more rapidly, but even for maximal loading, only 46% of the capillaries were completely closed. Taken together, the animal and FE model results suggest that acute ischemia does not develop in skeletal muscles under physiological load levels within a timeframe of 40 min. Since there is evidence that DTI develops within a shorter time, ischemia is unlikely to be the only factor causing DTI.

Long, M. A. "Deep tissue injury." *Rehabilitation Nursing* 32(4): 135.

Lyder, C. H. (2007). "Pressure ulcers: identification and care." *Kansas Nurse* 82(5): 10-1.

Lykoudis, E. G. and G.-A. Ch Spyropoulou (2007). "The use of suture anchors in reconstruction of sacral pressure ulcers with gluteal fasciocutaneous advancement flaps." *Annals of Plastic Surgery* 59(1): 92-4.

Suture anchors have already been successfully used for soft-tissue fixation to bone. In this study, suture anchors were used in sacral pressure ulcer reconstruction, aiming at

secure midline attachment of gluteal fasciocutaneous flaps, obliteration of any dead space, and recreation of the natal cleft. Thirteen patients with sacral pressure ulcers were treated with bilateral gluteal fasciocutaneous V-Y advancement flaps. Suture anchors were used to invert and attach the flaps to the midline crest of the sacrum. All flaps healed well, no postoperative anchor failure or wound dehiscence was noticed, and the esthetic result was very pleasing. In conclusion, the use of suture anchors offers an easy, practical, and secure attachment of V-Y advancement gluteal fasciocutaneous flaps in sacral pressure ulcer reconstruction. Main advantages of the method suggested are reduction of suture-line tension, obliteration of any cavity at the midline, and recreation of the natal cleft.

Lynn, J., J. West, et al. (2007). "Collaborative clinical quality improvement for pressure ulcers in nursing homes.[see comment]." *Journal of the American Geriatrics Society* 55(10): 1663-9.

The National Nursing Home Improvement Collaborative aimed to reduce pressure ulcer (PU) incidence and prevalence. Guided by subject matter and process experts, 29 quality improvement organizations and six multistate long-term care corporations recruited 52 nursing homes in 39 states to implement recommended practices using quality improvement methods. Facilities monitored monthly PU incidence and prevalence, healing, and adoption of key care processes. In residents at 35 regularly reporting facilities, the total number of new nosocomial Stage III to IV PUs declined 69%. The facility median incidence of Stage III to IV lesions declined from 0.3 per 100 occupied beds per month to 0.0 ($P < .001$) and the incidence of Stage II to IV lesions declined from 3.2 to 2.3 per 100 occupied beds per month ($P = .03$). Prevalence of Stage III to IV lesions trended down (from 1.3 to 1.1 residents affected per 100 occupied beds ($P = .12$)). The incidence and prevalence of Stage II lesions and the healing time of Stage II to IV lesions remained unchanged. Improvement teams reported that Stage II lesions usually healed quickly and that new PUs corresponded with hospital transfer, admission, scars, obesity, and immobility and with noncompliant, younger, or newly declining residents. The publicly reported quality measure, prevalence of Stage I to IV lesions, did not improve. Participants documented disseminating methods and tools to more than 5,359 contacts in other facilities. Results suggest that facilities can reduce incidence of Stage III to IV lesions, that the incidence of Stage II lesions may not correlate with the incidence of Stage III to IV lesions, and that the publicly reported quality measure is insensitive to substantial improvement. The project demonstrated multiple opportunities in collaborative quality improvement, including improving the measurement of quality and identifying research priorities, as well as improving care.

Makhsous, M., M. Priebe, et al. (2007). "Measuring tissue perfusion during pressure relief maneuvers: insights into preventing pressure ulcers." *Journal of Spinal Cord Medicine* 30(5): 497-507.

BACKGROUND/OBJECTIVE: To study the effect on tissue perfusion of relieving interface pressure using standard wheelchair pushups compared with a mechanical automated dynamic pressure relief system. **DESIGN:** Repeated measures in 2 protocols on 3 groups of subjects. **PARTICIPANTS:** Twenty individuals with motor-complete paraplegia below T4, 20 with motor-complete tetraplegia, and 20 able-bodied subjects. **METHODS:** Two 1-hour sitting protocols: dynamic protocol, sitting configuration alternated every 10 minutes between a normal sitting configuration and an off-loading configuration; wheelchair pushup protocol, normal sitting configuration with standard wheelchair pushup once every 20 minutes. **MAIN OUTCOME MEASURES:** Transcutaneous partial pressures of oxygen and carbon dioxide measured from buttock overlying the ischial tuberosity and interface pressure measured at the seat back and buttocks. Perfusion deterioration and recovery times were calculated during changes in interface pressures. **RESULTS:** In the off-loading configuration, concentrated interface pressure during the normal sitting configuration was significantly diminished, and tissue perfusion was significantly improved. Wheelchair pushups showed complete relief of interface pressure but incomplete recovery of tissue perfusion. **CONCLUSIONS:** Interface pressure analysis does not provide complete information about the effectiveness of pressure relief maneuvers. Measures of tissue perfusion may help establish more effective strategies. Relief achieved by standard wheelchair pushups may not be sufficient to recover tissue perfusion compromised during sitting; alternate maneuvers may be necessary. The dynamic seating system provided effective pressure relief with sustained reduction in interface pressure adequate for complete recovery of tissue perfusion. Differences in perfusion recovery times between subjects with spinal cord injury (SCI) and controls raise questions about the importance of changes in vascular responses to pressure after SCI.

Makhsous, M., D. M. Rowles, et al. (2007). "Periodically relieving ischial sitting load to decrease the risk of pressure ulcers." *Archives of Physical Medicine & Rehabilitation* 88(7): 862-70.

OBJECTIVE: To investigate the relieving effect on interface pressure of an alternate sitting protocol involving a sitting posture that reduces ischial support. **DESIGN:** Repeated

measures in 2 protocols on 3 groups of subjects. SETTING: Laboratory. PARTICIPANTS: Twenty able-bodied persons, 20 persons with paraplegia, and 20 persons with tetraplegia. INTERVENTIONS: Two 1-hour protocols were used: alternate and normal plus pushup. In the alternate protocol, sitting posture was alternated every 10 minutes between normal (sitting upright with ischial support) and with partially removed ischial support (WO-BPS) postures; in the normal plus pushup protocol, sitting was in normal posture with pushups (lifting the subject off the seat) performed every 20 minutes. MAIN OUTCOME MEASURE: Interface pressure on seat and backrest. RESULTS: In WO-BPS posture, the concentrated interface pressure observed around the ischia in normal posture was significantly repositioned to the thighs. By cyclically repositioning the interface pressure, the alternate protocol was superior to the normal plus pushup protocol in terms of a significantly lower average interface pressure over the buttocks. CONCLUSIONS: A sitting protocol periodically reducing the ischial support helps lower the sitting load on the buttocks, especially the area close to ischial tuberosities.

McDonough, S. (2007). "An ounce of prevention." *Rehab Management* 20(2): 32-3.

McLean, R. (2007). "Incidence of complications in stroke patients in an acute rehabilitation unit in Singapore." *Cerebrovascular Diseases* 24(1): 129-32.

Meyer, G. and S. Kopke (2007). "[Quality in geriatric nursing--a commentary by fatigued nursing scientists: complaining but not stagnating]." *Pflege Zeitschrift* 60(10): 542-3.

Michael, S. M., D. Porter, et al. (2007). "Tilted seat position for non-ambulant individuals with neurological and neuromuscular impairment: a systematic review." *Clinical Rehabilitation* 21(12): 1063-74.

OBJECTIVE: To determine the effects of tilt-in-space seating on outcomes for people with neurological or neuromuscular impairment who cannot walk. DATA SOURCES: Search through electronic databases (MEDLINE, Embase, CINAHL, AMED). Discussions with researchers who are active in field. REVIEW METHODS: Selection criteria included interventional studies that investigated the effects of seat tilt on outcome or observational studies that identified outcomes for those who had used tilt-in-space seating in populations

with neurological or neuromuscular impairments. Two reviewers independently selected trials for inclusion, assessed quality and extracted data. RESULTS: Nineteen studies were identified which fulfilled the selection criteria. Seventeen of these were essentially before-after studies investigating the immediate effects of tilting the seating. All studies looked at populations with neurological impairment, and most were on children with cerebral palsy (n=8) or adults with spinal cord injury (n=8). REVIEWER'S CONCLUSION: Posterior tilt can reduce pressures at the interface under the pelvis. [References: 32]

Minabe, T. and K. Harii (2007). "Dorsal intercostal artery perforator flap: anatomical study and clinical applications." *Plastic & Reconstructive Surgery* 120(3): 681-9.

BACKGROUND: The posterior intercostal arteries form the largest angiosome in the torso by means of their many perforators to the skin, the arteries of which are proposed to be the vascular pedicle of an island flap. Using these perforators, the authors developed a new flap, the dorsal intercostal artery perforator flap, harvested in the back. METHODS: An anatomical study was conducted on five fresh human cadavers injected with a lead oxide-gelatin mixture as a radiopaque agent. The study consisted of the cadaver dissection and the angiographic studies to map the dorsal intercostal artery perforators in detail. RESULTS: Each of the fourth to twelfth posterior intercostal arteries consistently supplied the dorsal perforators. Those derived from the fourth, fifth, sixth, tenth, and eleventh posterior intercostal arteries were the dominant direct cutaneous perforators. They were located within 5 cm of the spinous processes of the vertebrae and were clinically detectable by Doppler probe preoperatively. Eleven dorsal intercostal artery perforator flaps were applied in 10 cases. In nine cases, the muscles of the latissimus dorsi, the trapezius, or the scapular circumflex artery had been sacrificed in previous operations. The maximum flap dimension was 31 x 13 cm. All flaps showed stable postoperative blood circulation and survived completely, except for marginal necrosis in the largest flap. No functional loss attributable to flap harvest was recognized. CONCLUSION: Flap extendibility and less invasiveness without sacrifice of the underlying muscles have proved that the dorsal intercostal artery perforator flap is a new reconstructive option in the back, where suitable flaps are often proposed.

Montalvo, I. (2007). "Pressure ulcer prevention.[comment]." *American Journal of Nursing* 107(7): 15.

Moreno-Pina, J. P., M. Richart-Martinez, et al. (2007). "[Analysis of risk assessment scales for pressure ulcer]." *Enfermeria Clinica* 17(4): 186-97.

OBJECTIVE: To perform a literature review of the scales and instruments used to assess the risk of developing a pressure ulcer (RPU) in the adult and elderly population and to analyze whether these scales meet the criteria of validity and reliability. To determine whether a specific scale has been developed for use in the domiciliary care setting and adapted to the Spanish environment. **METHOD:** We performed a descriptive study with a search of the CUIDEN, IME, CINAHL and MEDLINE databases between January 1990 and December 2005. A specifically-designed form was used to register the variables. Data extraction was performed by a single person. The key words used were pressure ulcer, decubitus ulcer, pressure sore, risk evaluation scales, validity, sensitivity, specificity and reliability and their equivalents in Spanish. **RESULTS:** Complete descriptions of 22 instruments and studies of the validity and/or reliability of 15 instruments were found. **CONCLUSIONS:** At present, and based on the results of this review, the RPU scale that has shown the greatest validity and reliability is the Braden-Bergstrom scale. [References: 53]

Morisod, J. and M. Coutaz "[Post-fall syndrome: how to recognize and treat it?]." *Revue Medicale Suisse* 3(132): 2531-2.

The post-fall syndrome is commonly observed in geriatric medicine, affecting near one out of five fallers. Left untreated, this condition can lead to a regressive syndrome, with physical, psychological and social consequences. To avoid such an evolution, specific physical therapy must be proposed as soon as possible. In this paper, clinical presentation and management of the post-fall syndrome are discussed.

Morris, C. and B. Pritchard (2007). "Performance indicators--a quest to improve patient care." *British Journal of Nursing* 16(20): S34-7.

Nurses working in the field of tissue viability constantly strive to improve pressure ulcer prevention and management in their clinical areas, knowing that pressure ulcers cause pain and suffering to patients while costing the NHS millions of pounds to treat. The aim of this initiative was for the tissue viability team to develop an audit tool based on recently devised performance indicators. The purpose of the audit was to provide the mechanism for

reviewing the quality of everyday care. The tool utilizes the 'traffic light' system to categorize the results. The initiative has improved clinical outcomes for patients and increased the awareness, education, knowledge and confidence of nurses in pressure ulcer prevention and management across a combined primary and secondary care Trust.

Nagase, T., I. Koshima, et al. (2007). "Ultrasonographic evaluation of an unusual peri-anal induration: a possible case of deep tissue injury." *Journal of Wound Care* 16(8): 365-7.

High-resolution ultrasound produces good quality echo images of skin and subcutaneous lesions. Here, it was used to characterise an atypical induration, which the authors speculate might have been a deep tissue injury. [References: 14]

Nakagami, G., H. Sanada, et al. (2007). "Evaluation of a new pressure ulcer preventive dressing containing ceramide 2 with low frictional outer layer.[erratum appears in *J Adv Nurs*. 2007 Nov;60(3):357]." *Journal of Advanced Nursing* 59(5): 520-9.

AIM: This paper is a report of an evaluation of the effectiveness of a newly developed dressing for preventing persistent erythema and pressure ulcer development and improving the water-holding capacity without increasing the skin pH in bedridden older patients. **BACKGROUND:** Shear forces and skin dryness play important roles in persistent erythema and pressure ulcer development. To eliminate these risks, we developed a dressing to reduce shear forces and improve the water-holding capacity. However, the effects of this dressing in clinical settings remain unknown. **METHOD:** An experimental bilateral comparison study was conducted at a hospital in Japan in 2004 with 37 bedridden older patients at risk of pressure ulcer development. The dressing was randomly applied to the right or left greater trochanter for 3 weeks. No dressing was applied to the opposite side as a control. The skin was monitored weekly during the 3-week application for persistent erythema and pressure ulcer development. Skin hydration and pH were also assessed during the intervention and for 1 week after dressing removal. **FINDINGS:** The incidence of persistent erythema was significantly lower in the intervention area than the control area [$P = 0.007$, RR 0.18 (95% CI: 0.05-0.73) and NNT 4.11 (2.50-11.63)]. No pressure ulcers occurred in either the intervention or control area. Skin hydration increased significantly during dressing application and remained high after removal ($P < 0.001$) relative to the control area. Skin pH decreased significantly during the application ($P < 0.001$) but returned to control levels after removal ($P = 0.38$). **CONCLUSION:** This safe and effective dressing

can be used for patients with highly prominent bones and dry skin to prevent pressure ulcers.

Nixon, J., G. Cranny, et al. (2007). "Skin alterations of intact skin and risk factors associated with pressure ulcer development in surgical patients: a cohort study." *International Journal of Nursing Studies* 44(5): 655-63.

BACKGROUND: The pathology literature suggests three types of pressure ulcer with six possible mechanisms leading to tissue breakdown. A limitation of current evidence is the difficulty in replicating the clinical situation and in determining the point at which a tissue assault becomes irreversible and results in tissue breakdown. In particular clinical observations of alteration in darkly pigmented skin, blanching erythema, non-blanching erythema and non-blanching erythema with other skin changes including induration, oedema, pain, warmth or discolouration have not been assessed in relation to subsequent skin/tissue loss and their pathophysiological and aetiological importance is not fully understood. **OBJECTIVES:** To assess the validity of clinical signs of erythema as predictors of pressure ulcer development and identify variables which independently are predictive of Grade 2 pressure ulcer development. **DESIGN:** Prospective cohort study. **PARTICIPANTS:** 109 general, vascular and orthopaedic hospital patients, aged over 55 years with an expected length of stay of 5 days were recruited. Of these 97 were pressure ulcer free at baseline and/or had complete follow-up including 59 women and 38 men with a median age of 75 years (range 55-95). **SETTING:** Single centre large acute UK NHS hospital. **METHODS:** To identify clinical signs of erythema predictive of skin loss, the odds of pressure ulcer development were examined using logistic regression. To identify variables independently predictive of Grade 2 pressure ulcer development logistic regression modeling was undertaken. **RESULTS:** There was significantly increased odds of pressure ulcer development associated with non-blanching erythema (7.98, $p=0.002$) and non-blanching erythema with other skin changes (9.17, $p=0.035$). Logistic regression modeling identified non-blanching erythema, pre-operative albumin, weight loss, and intra-operative minimum diastolic blood pressure, as independent predictors of Grade ≥ 2 pressure ulcer development. **CONCLUSIONS:** Non-blanching erythema with or without other skin changes is distinct from normal skin/blanching erythema and is associated with subsequent pressure ulcer development.

Norton, L. (2007). "Finding a better surface." *Rehab Management* 20(9): 40-1.

Ones, K., E. Yilmaz, et al. (2007). "Comparison of functional results in non-traumatic and traumatic spinal cord injury." *Disability & Rehabilitation* 29(15): 1185-91.

PURPOSE: This study was conducted primarily to be a descriptive study about non-traumatic (NT) spinal cord injury (SCI) patients, in terms of their demographic and neurological features, and to investigate the complications and efficient results of rehabilitation in this group. The second aim of the study was to conduct a comparison between non-traumatic SCI patients and traumatic SCI patients. **MATERIALS AND METHODS:** The design was a retrospective study at a Physical Medicine and Rehabilitation Training and Research center. The study was carried out with 194 patients, of whom 63 had non-traumatic SCI and 131 had traumatic SCI. Main outcome measures were: Demographics, etiology, Functional Independent Measure score, and level of injury. **RESULTS:** A total of 32.47% (n = 63) of the patients in the study had a non-traumatic SCI. In traumatic SCI group, the proportion of male patients were significantly more than the proportion of female patients (p = 0.002). Admission FIM score of non-traumatic SCI group was better than the traumatic SCI group (p = 0.004). The comparison of discharge FIM scores between traumatic SCI and non-traumatic SCI groups did not yield any significant results (p = 0.303). However, the comparison of FIM gain between the two groups showed a significant difference (p = 0.03). The most common complication in non-traumatic SCI group was urinary tract infection and this was observed in 25 patients (39.68%). **CONCLUSIONS:** The present study showed that there are certain differences between NT and traumatic SCI patients. Therefore, not all SCI patients should be considered to be falling under a single category, and should be divided into groups on the basis of the etiology of the injury. It is important to consider this information while developing the targets and planning of the rehabilitation program.

Orkiszewski, M. (2007). "[Maggots of *Lucilia sericata* in treatment of intractable wounds]." *Wiadomosci Lekarskie* 60(7-8): 381-5.

Although beneficial effects of wound infestation with maggots had been known for many centuries, it was not until Dr Zacharias recognized medical importance of maggots during the American Civil War. He intentionally introduced maggots into the wound for its debridement. Baer successfully used maggots in treatment of osteomyelitis in 4 children in the 1930'. After many successes in the 1930' maggots therapy had become limited to intractable wounds after introducing sulphonamides and mass-production of Fleming's

penicillin. Present use of maggots came in the 1980' when better methods of sterilization both eggs and maggot were developed and clinical efficiency of antibiotics used for wound treatment decreased dramatically. Today maggots' therapy became less treatment of last resort but of first choice in leg ulcers, carbuncles, pressure ulcers and infected traumatic wounds. Its beneficial effect was noted in diabetic foot and in destroying malignant tissue as well. Easiness in application, safety, near no side effects and often exceptional efficiency in wound debridement makes maggots therapy the first line therapeutic tool in both hospital and out-patient surgery. Clinical experience has demonstrated that maggot therapy may reduce costs of treatment considerably by shortening hospital stay and decrease usage of antibiotics. [References: 28]

Osman, B. and M. H. Kernodle (2007). "A new look at pressure ulcers." *Provider* 33(4): 35-7.

Palma, M. R. and P. L. Casanova (2007). "[Special surfaces for the management of pressure]." *Revista de Enfermeria* 30(9): 43-50.

Summary Bedsores (UPPs) should be viewed as a multifaceted problem, but the direct relationship which exists between these lesions and the pressure which is exercised between the surface one rests on and a zone having a prominent bone bears significant weight. Therefore, the following are some basic measures which can prevent bedsores: mobility posture changes, local protection and the use of special surfaces for the management of pressure.

Panfil, E.-M. and E. Linde (2007). "[Valid and reliable methods for describing pressure sores and leg ulcer--a systematic literature review]." *Pflege* 20(4): 225-47.

In the wound documentation of pressure sore and leg ulcer the most important tasks and objectives are the presentation of the outcomes of the diagnostic inspection, planning of therapy and evaluation of wound healing. The aim of the systematic literature review covering the period of time between 2001 and 2006 was to look for valid, reliable and feasible methods to the size, appearance, edge, grade, and healing of wounds. Due to their heterogeneity the studies that were found can hardly be compared; some of them show methodological weaknesses. Measurements of an elliptical area based on the perpendicular method using a ruler are the most reliable within the linear methods; however, they only

allow an estimation of the size. Together with mechanical or digital planimetry tracings can measure the wound's size reliably. Photographs do not assess large or circular wounds reliably, nor do they adequately document the wound's colour. There are no valid and reliable standardized procedures for the documentation of the wound's colour, exudate, odour; margins and maceration. To describe the pressure sore's degree of severity there are twenty different systems of classification. The data, however, confirm the difficulty to classify pressure ulcers reliably. Wound healing can also be assessed by a number of standardized tools: PSST, PUSH, SWHT, SS, PUHP, CODED and DESIGN (pressure sore) and LUMT (leg ulcer). These tools have not been translated into German and have not been adequately researched. No data exists to allow generalization concerning the practicability of these methods. For all methods of measurement, it can be concluded that training and experience in the use of the method is required and that the validity and reliability are higher when measurements are conducted by an experienced person. [References: 60]

Papanikolaou, P., P. Lyne, et al. (2007). "Using the discrete choice experimental design to investigate decision-making about pressure ulcer prevention by community nurses." *Health & Social Care in the Community* 15(6): 588-98.

This study investigates the preferences of senior community nurses who work as district nurse team leaders in selecting preventive care plans for elderly people at high risk of pressure ulcer formation. The discrete choice experiment (DCE) technique was used. Focus group work produced the following five attributes of nurse decision-making: 'ease of care plan management', 'impact of care plan on patient's lifestyle', 'speed of obtaining the equipment', 'affordability', 'evidence-based practice'. These were incorporated into a self-administered questionnaire, posted to 102 nurses from two integrated acute/community NHS Trusts in Wales. A response rate of 55% was achieved. Respondents were asked to rate the importance of the selected attributes on a 5-point scale. They rated 'evidence-based practice', 'impact of care plan on patient's lifestyle', 'ease of care plan management' and 'speed of obtaining the equipment' highly, whereas 'affordability' was of less importance. However, regression analysis, which is part of the DCE technique, produced a somewhat different picture, with 'impact' being least and 'affordability' most statistically significant. The reasons for this apparent anomaly are discussed and the paper concludes that the DCE approach is capable of yielding important information, which is not produced by simple rating exercises. Such information is potentially of value in the context of modernisation and service configuration.

Parnham, A. (2007). "Using the benchmarking process to enhance pressure ulcer prevention." *British Journal of Community Nursing* 12(9): S31-6.

Pressure ulcers are a recognized source of increased debilitation that continually impact on patients' quality of life and the NHS economy. While it remains arguable that all pressure ulcers can be prevented, it could be suggested that with closer monitoring of care provision by the healthcare professionals delivering that care, not only will quality of care be enhanced but a reduction in pressure ulcer incidence is a further potential outcome. The Department of Health prioritised pressure ulcer prevention within Essence of Care and the introduction of clinical benchmarking across a number of care settings demonstrates that care provision relating to pressure ulcer prevention can be enhanced through this process. Clinical benchmarking is an on-going process and should remain an integral component to every day nursing practice in order to sustain this positive phenomenon of change.

[References: 13]

Rainfray, M., P. Dehail, et al. (2007). "[Complications of immobility and bed rest. Prevention and management]." *Revue du Praticien* 57(6): 671-6.

Raissi, G. R., A. Mokhtari, et al. (2007). "Reports from spinal cord injury patients: eight months after the 2003 earthquake in Bam, Iran." *American Journal of Physical Medicine & Rehabilitation* 86(11): 912-7.

OBJECTIVE: The World Health Organization defines disaster as a sudden ecologic phenomenon of sufficient magnitude to require external assistance. On December 26, 2003, the Bam earthquake left more than 200 spinal cord injury (SCI) patients. Our study of these SCI patients and the rehabilitation of disabled persons in Bam may assist in the organization of rehabilitation programs during future disasters. **DESIGN:** Eight months after the disaster, we planned to visit the SCI patients in Bam. We visited 61 patients in Bam, Baravat, and surrounding villages. We completed a questionnaire during our visit. **RESULTS:** The patients' mean age was 31.9 +/- 9.6 yrs. Twenty-nine (53.7%) patients were female, and 25 (46.3%) were male. Fifty-two (96.3%) patients had pain syndromes, which had started from 3 days to 8 mos after injury. Thirty-three (61%) patients used clean intermittent catheterization, and 29 (53.7%) did not have bowel programs. Nineteen (35.2%) patients had pressure sores. **CONCLUSIONS:** All aspects of disasters should be considered seriously by all countries. The special needs of people with disabilities during and long after

any disaster are important. The impact of disasters on disabled people is magnified because of their condition, so special attention must be paid to this group.

Redelings, M. D., M. Wise, et al. (2007). "Using multiple cause-of-death data to investigate associations and causality between conditions listed on the death certificate." *American Journal of Epidemiology* 166(1): 104-8.

Death rarely results from only one cause, and it can be caused by a variety of factors. Multiple cause-of-death data files can list as many as 20 contributing causes of death in addition to the reported underlying cause of death. Analysis of multiple cause-of-death data can provide information on associations between causes of death, revealing common combinations of events or conditions which lead to death. Additionally, physicians report the causal train of events through which they believe that different conditions or events may have led to each other and ultimately caused death. In this paper, the authors discuss methods used in studying associations between reported causes of death and in investigating commonly reported causal pathways between events or conditions listed on the death certificate.

Rees, R. S. and N. Bashshur (2007). "The effects of TeleWound management on use of service and financial outcomes." *Telemedicine Journal & E-Health* 13(6): 663-74.

This study investigated the effects of a TeleWound program on the use of service and financial outcomes among homebound patients with chronic wounds. The TeleWound program consisted of a Web-based transmission of digital photographs together with a clinical protocol. It enabled homebound patients with chronic pressure ulcers to be monitored remotely by a plastic surgeon. Chronic wounds are highly prevalent among chronically ill patients in the United States (U.S.). About 5 million chronically ill patients in the U.S. have chronic wounds, and the aggregate cost of their care exceeds \$20 billion annually. Although 25% of home care referrals in the U.S. are for wounds, less than 0.2% of the registered nurses in the U.S. are wound care certified. This implies that the majority of patients with chronic wounds may not be receiving optimal care in their home environments. We hypothesized that TeleWound management would reduce visits to the emergency department (ED), hospitalization, length of stay, and visit acuity. Hence, it would improve financial performance for the hospital. A quasi-experimental design was used. A sample of 19 patients receiving this intervention was observed prospectively for 2 years. This was

matched to a historical control group of an additional 19 patients from hospital records. Findings from the study revealed that TeleWound patients had fewer ED visits, fewer hospitalizations, and shorter length of stay, as compared to the control group. Overall, they encumbered lower cost. The results of this clinical study are striking and provide strong encouragement that a single provider can affect positive clinical and financial outcomes using a telemedicine wound care program. TeleWound was found to be a credible modality to manage pressure ulcers at lower cost and possibly better health outcomes. The next step in this process is to integrate the model into daily practice at bellwether medical centers to determine programmatic effectiveness in larger clinical arenas.

Reger, S. I., V. K. Ranganathan, et al. (2007). "Support surface interface pressure, microenvironment, and the prevalence of pressure ulcers: an analysis of the literature." *Ostomy Wound Management* 53(10): 50-8.

External pressure is the most frequently considered stress factor in the formation of ulcers. A review and analysis of existing literature addressing the relationship between pressure ulcer prevalence and interface pressures at various anatomic sites was conducted. Results suggest a nearly non-existent or slightly negative correlation between interface pressure and ulcer prevalence in general and spinal cord injured populations, respectively. Despite limitations of the analysis methods used, the observed lack of a direct relationship confirms the results of other studies and suggests that ulcer formation also may involve factors secondary to pressure and mechanical factors (eg, temperature, moisture, duration of the applied load, atrophy, and posture). Based on currently available information, clinicians should include these considerations when selecting a support surface. Studies directly relating primary stress factors and tissue viability with prevalence and incidence of pressure ulcers are needed to better understand the benefits of pressure-relieving support surfaces and to improve the effectiveness of prevention and treatment. [References: 35]

Rieger, U., O. Scheufler, et al. (2007). "[Six treatment principles of the basle pressure sore concept]." *Handchirurgie, Mikrochirurgie, Plastische Chirurgie* 39(3): 206-14.

The treatment of pressure sores has gained importance due to the increase of geriatric patients and general life expectancy as well as improved therapeutic options in patients with spinal cord injuries. The aetiology of pressure sores is multifactorial. Risk factors such as immobility, malnutrition, and other co-morbidities have to be considered.

Therapy of pressure sores is time- and cost-consuming and recurrence rates are high. Successful treatment is based on the interdisciplinary cooperation between conservative and surgical disciplines, nursing, as well as on continuous patient education. The Basle pressure sore concept consists of six principles. Over a total treatment period of approximately three months usually two operative interventions are performed. For effective relief of pressure (1st principle) patients are placed on low-airloss beds. Operative debridement of pressure sores is performed early and systemic or local infection is treated (2nd principle). The wound is then conditioned with moist dressings or VAC (3rd principle). Simultaneously concomitant malnutrition is quantified clinically and chemically and treated by oral or, if necessary, parenteral nutrition. Other risk factors are optimised as well as possible (4th principle). Hereby optimal conditions for plastic-surgical coverage are provided (5th principle). Postoperatively a standardised concept of pressure relief and mobilisation is adhered to (6th principle). This multimodal treatment concept is well established at the University Hospital of Basle for many years. Combined with an effective prevention, the rate of pressure sores could be significantly reduced, wounds could be healed, and the number of recurrences diminished. In a two-year period between January 2004 and December 2005 the Basle plastic surgery team treated 170 pressure sores in 142 patients according to this concept in the Swiss paraplegic centre in Nottwil. In 2006, 78 % of these patients (111 patients) were followed up and recurrence rates of 23 % (26 pressure sores) were found. The Basle pressure sore concept is well established for an interdisciplinary and structured treatment of geriatric and paraplegic patients with pressure sores and provides a reliable basis for effective treatment for this complex disease.

Rockwood, K. and A. Mitnitski (2007). "Geriatric syndromes.[comment]." *Journal of the American Geriatrics Society* 55(12): 2092; author reply 2092-3.

Rodriguez-Key, M. and A. Alonzi "Nutrition, skin integrity, and pressure ulcer healing in chronically ill children: an overview." *Ostomy Wound Management* 53(6): 56-8.

Although information in the literature is scant, pediatric patients in long-term care are known to be at risk for pressure ulcers. Modifying adult guidelines and standards for well children has helped guide provision of care in the authors' pediatric long-term care and rehabilitation facility. In addition to standard comprehensive clinical and nutritional assessment protocols, patient growth and a history of prematurity, as well as the effect of chromosomal and neurological abnormalities, must be considered. Optimal protein intake is

of particular concern in this population. Experience, along with necessary protocol adaptations, has offered insight into nutritional requirements and modifications needed for positive outcomes in pressure ulcer healing in chronically ill children. Better understanding of the role of nutrition in the assessment, treatment, and prevention of pressure ulcers is essential in any population. Research to increase understanding of the role of nutrition in maintaining skin integrity and optimizing repair in chronically ill children is needed to help clinicians improve care and outcomes. [References: 31]

Sae-Sia, W., D. D. Wipke-Tevis, et al. (2007). "The effect of clinically relevant pressure duration on sacral skin blood flow and temperature in patients after acute spinal cord injury." *Archives of Physical Medicine & Rehabilitation* 88(12): 1673-80.

OBJECTIVE: To test the effect of clinically relevant duration of pressure loading (2 h) on sacral skin blood flow (SBF) and skin temperature in subjects with spinal cord injury (SCI) within 24 to 96 hours after injury compared with subjects with acute orthopedic trauma and healthy subjects. **DESIGN:** Three-group, repeated-measures, inception cohort. **SETTING:** Three acute care hospitals in southern Thailand. **PARTICIPANTS:** Convenience sample of 20 subjects with acute SCI within 24 to 96 hours after injury. Age- and sex-matched subjects with acute orthopedic trauma (n=35) and healthy subjects (n=47) served as comparison groups. **INTERVENTIONS:** Not applicable. **MAIN OUTCOME MEASURES:** Sacral SBF and skin temperature were measured simultaneously by using a laser Doppler sensor and thermocouple sensor, respectively, with subjects lying in the lateral (baseline, no pressure, 30 min), supine (pressure loading, 2 h), and lateral position (recovery, no pressure, 90 min). **RESULTS:** Baseline skin temperature was higher in subjects with acute SCI ($P<.05$) compared with subjects with orthopedic trauma and healthy subjects. A relative decrease in sacral SBF occurred in subjects with acute SCI ($P<.01$) over 2 hours of pressure loading compared with subjects with orthopedic trauma and healthy subjects. During the same time course, subjects with acute SCI had a smaller increase in sacral skin temperature compared with subjects with orthopedic trauma and healthy subjects ($P<.001$). During recovery, the time to the initial sacral SBF-reactive hyperemia response was shorter in subjects with acute SCI compared with subjects with orthopedic trauma ($P<.001$) and healthy subjects ($P=.003$). Additionally, the initial positive slope of the SBF reactive hyperemia response was higher in subjects with acute SCI than subjects with orthopedic trauma ($P=.005$) and healthy ($P=.004$) subjects. **CONCLUSIONS:** Collectively, a negative change in SBF during pressure loading plus a shorter time to increase and greater slope for SBF after pressure release reveal microvascular dysfunction in acute SCI subjects. The clinical relevance of the protocol

suggests that turning interval guidelines may require reevaluation for patients with acute SCI.

Salcido, R., A. Popescu, et al. (2007). "Animal models in pressure ulcer research." *Journal of Spinal Cord Medicine* 30(2): 107-16.

BACKGROUND/OBJECTIVE: Research targeting the pathophysiology, prevention, and treatment of pressure ulcers (PrUs) continue to be a significant priority for clinical and basic science research. Spinal cord injury patients particularly benefit from PrU research, because the prevalence of chronic wounds in this category is increasing despite standardized medical care. Because of practical, ethical, and safety considerations, PrUs in the human environment are limited to studies involving patients with pre-existing ulcers. Therefore, we are limited in our basic knowledge pertaining to the development, progression, and healing environment in this devastating disease. **METHODS:** This review provides a synopsis of literature and a discussion of techniques used to induce PrUs in animal models. The question of what animal model best mimics the human PrU environment has been a subject of debate by investigators, peer review panels, and editors. The similarities in wound development and healing in mammalian tissue make murine models a relevant model for understanding the causal factors as well as the wound healing elements. Although we are beginning to understand some of the mechanisms of PrU development, a key dilemma of what makes an apparently healthy tissue develop a PrU waits to be solved. **RESULTS AND CONCLUSIONS:** No single method of induction and exploring PrUs in animals can address all the aspects of the pathology of chronic wounds. Each model has its particular strengths and weaknesses. Certain types of models can selectively identify specific aspects of wound development, quantify the extent of lesions, and assess outcomes from interventions. The appropriate interpretation of these methods is significant for proper study design, an understanding of the results, and extrapolation to clinical relevance. [References: 46]

Sanada, H. (2007). "[Updated pressure ulcer management]." *Nippon Ronen Igakkai Zasshi - Japanese Journal of Geriatrics* 44(4): 425-8.

Schoonhoven, L., M. T. Bousema, et al. (2007). "The prevalence and incidence of pressure ulcers in hospitalised patients in the Netherlands: a prospective inception cohort study." *International Journal of Nursing Studies* 44(6): 927-35.

BACKGROUND: Pressure ulcers frequently occur in hospitalised patients. The prevalence of pressure ulcers grade 2 or worse varies from 3% to 12% in hospitalised patients. Incidence figures are not frequently reported. While incidence and prevalence are both measures of disease frequency, they provide different perspectives on pressure ulcers. **OBJECTIVES:** To describe the incidence rate and prevalence of pressure ulcers in hospitalised patients. **DESIGN:** Prospective inception cohort study. **SETTING:** Two large hospitals, one general (530-beds) and one teaching (1042-beds), in The Netherlands. **PARTICIPANTS:** A non-selected, though not strictly random, sample of 1536 patients was eligible for inclusion in the study. One thousand four hundred and thirty one patients (93.2%) consented to participate. Eventually, 1229 patients (80%) had a complete follow-up. The sample consisted of patients admitted to the surgical, internal, neurological and geriatric wards for more than 5 days between January 1999 and June 2000. **METHODS:** Follow-up once a week until pressure ulcer occurrence, discharge or length of stay over 12 weeks. **MAIN OUTCOME MEASURES:** Occurrence of a pressure ulcer grade 2 or worse during admission to hospital, according to the classification of the European Pressure Ulcer Advisory Panel. **RESULTS:** One hundred and thirty four patients developed 172 pressure ulcers during follow-up. The overall weekly incidence rate was 0.06 per week (95% confidence interval 0.05-0.07 per week). Highest rates were observed for surgical patients and lowest for geriatric and neurologic patients (0.08 and 0.02, respectively). The week specific prevalence varied between 12.8% and 20.3%. **CONCLUSIONS:** Among patients hospitalised for more than 5 days overall one may expect 6% per week to develop pressure ulcers. It would appear that any preventive measures can only be effective if taken timely. Accordingly, preventive measures should be considered early, because pressure ulcers were observed already within the first week of admission.

Sheerin, F. and R. de Frein (2007). "The occipital and sacral pressures experienced by healthy volunteers under spinal immobilization: a trial of three surfaces." *Journal of Emergency Nursing* 33(5): 447-50.

BACKGROUND: The development of a pressure ulcer is of great significance to the life-long rehabilitative management of the person with a spinal cord injury, and may indeed delay and repeatedly interfere with that process. That the period preceding admission to the specialized spinal injury unit is crucial with regard to pressure ulcer development is evident in the professional literature. Both anecdotal and empirical evidence indicates that a significant number of pressure ulcers occur as a result of management provided prior to admission, and that such ulcers are more likely to occur in those patients who have

undergone a transfer process from a hospital distal to the specialist unit on a hard spinal board. AIM: In consideration of this and of the fact that, in Ireland, the interhospital transfer of spinal injured patients has usually involved the employment of such spinal boards to achieve immobilization, this study sought to identify whether or not the pressure experienced by individuals at two anatomical locations was dependent on the support surface employed. METHODOLOGY: Pressure under the occiput and sacrum of three healthy volunteers immobilized on three support surfaces was measured using air-filled pressure-measuring sacks. The surfaces employed were an uncovered spinal board; a spinal board with inflatable raft device; and a full-body vacuum splint. DISCUSSION: Marked reductions in pressure were measured when using the inflatable raft and the vacuum mattress. The results of this study will provide a basis for a larger study and, through that, the formulation of recommendations for standardized practice along a national care pathway.

Smith, R. B., R. Cheung, et al. (2007). "Medicaid markets and pediatric patient safety in hospitals." *Health Services Research* 42(5): 1981-98.

OBJECTIVE: To examine the association of Medicaid market characteristics to potentially preventable adverse medical events for hospitalized children, controlling for patient- and hospital-level factors. DATA SOURCES/STUDY SETTING: Two carefully selected Agency for Healthcare Research and Quality (AHRQ) pediatric patient safety indicators (decubitus ulcers and laceration) are analyzed using the new pediatric-specific, risk-adjusting, patient safety algorithm from the AHRQ. All pediatric hospital discharges for patients age 0-17 in Florida, New York, and Wisconsin, and at risk of any of these two patient safety events, are examined for the years 1999-2001 (N=859,922). STUDY DESIGN: Logistic regression on the relevant pool of discharges estimates the probability an individual patient experiences one of the two PSI events. DATA EXTRACTION METHODS: Pediatric discharges from the 1999 to 2001 State Inpatient Databases (SIDs) from the AHRQ Healthcare Cost and Utilization Project, merged with hospital-level data from the American Hospital Association's Annual Survey, Medicaid data obtained from the Centers for Medicare and Medicaid Services and state Medicaid offices, and private and Medicaid managed care enrollment data obtained from InterStudy, are used in the estimations. PRINCIPAL FINDINGS: At the market level, patients in markets in which Medicaid payers face relatively little competition are more likely to experience a patient safety event (odds ratio [OR]=1.602), while patients in markets in which hospitals face relatively little competition are less likely to experience an adverse event (OR=0.686). At the patient-discharge and hospital levels, Medicaid characteristics are not significantly associated with the incidence of a

pediatric patient safety event. CONCLUSIONS: Our analysis offers additional insights to previous work and suggests a new factor--the Medicaid-payer market--as relevant to the issue of pediatric patient safety.

Stausberg, J., N. Lehmann, et al. (2007). "Reliability and validity of pressure ulcer diagnosis and grading: an image-based survey." *International Journal of Nursing Studies* 44(8): 1316-23.

BACKGROUND: The reliability and validity of pressure ulcer diagnosis and grading are major methodological issues in studies and reports on pressure ulcer frequency. **OBJECTIVES:** The aim of the study was to estimate the reliability and validity of pressure ulcer diagnosis and grading within the interdisciplinary pressure ulcer project of the University Clinics of Essen, Germany. **DESIGN:** Fifty images of wounds from the foot/heel region and 50 images of wounds from the buttock/hip region were classified using a 4-grade scale. A gold standard was established by consensus of two senior physicians. **SETTINGS:** The images were assessed PC-based, independently by each rater. **PARTICIPANTS:** Five nursing experts and two physicians participated. **METHODS:** Mean simple Kappa and per cent agreement were calculated to assess reliability and validity. **RESULTS:** Mean simple Kappa values showed a moderate interrater agreement for grading and a fair interrater agreement for diagnosis. The percentage of agreements was highest for pressure ulcer diagnosis in the buttock/hip region with 90.5% and lowest for pressure ulcer grading in the buttock/hip region with 63.5%. No differences could be found between nurses and physicians. **CONCLUSIONS:** The differentiation between pressure ulcers and other skin lesions is rather difficult. It is important to assign the lower grade when the available information does not definitely support the higher grade. The level of agreement found was intermediate in the range of published results. A substantial level of agreement should be obtainable through further standardisation and training. Future studies should control for dependency in the assessment situation and dispense with the category "uncertain".

Stoelting, J., L. McKenna, et al. (2007). "Prevention of nosocomial pressure ulcers: a process improvement project." *Journal of Wound, Ostomy, & Continence Nursing* 34(4): 382-8.

Nosocomial pressure ulcers (PU) occur in approximately 12% of all hospitalized patients. The risk can be determined by a variety of intrinsic and extrinsic factors. As a first

line of defense against nosocomial PU, we use the Braden Scale to determine the potential risk of PU development during hospitalization. Once risk was identified, our standard was to implement an individualized plan of care. However, consistent implementation of PU preventative measures was lacking. As a result, a process improvement project was developed and implemented. The purpose of this process improvement project was to increase communication about and awareness of the need to vigorously intervene and document whenever there is risk of, or development of, a nosocomial PU. By initiating consistent use of a PU Tracking Form, developing unit-based wound champions that serve as experts in ulcer prevention, and creating an individual case analysis process, PU prevention and tracking was institutionalized. Results indicate that our nosocomial PU rate has declined from 7% to 4%.

Stotts, N. A. and L. Gunningberg (2007). "How to try this: predicting pressure ulcer risk. Using the Braden scale with hospitalized older adults: the evidence supports it." *American Journal of Nursing* 107(11): 40-8; quiz 48-9.

Stotts, N. A. and H.-S. Wu "Hospital recovery is facilitated by prevention of pressure ulcers in older adults." *Critical Care Nursing Clinics of North America* 19(3): 269-75.

Pressure ulcers are areas of tissue damage caused by unrelieved pressure that results in ischemia. About 70% of pressure ulcers occur in adults who are older than 65 years of age; the most common sites are the sacrum and heels. The rate at which new ulcers develop in acute care settings varies from 0.4% to 38%, with a mean incidence of about 7%. Recovery in patients who have pressure ulcers is delayed, as demonstrated by an increased length of hospitalization and increased health care costs. This article addresses recovery in older adults who are at risk for the development of a pressure ulcer.

Subbanna, P. K., F. X. Margaret Shanti, et al. (2007). "Topical phenytoin solution for treating pressure ulcers: a prospective, randomized, double-blind clinical trial." *Spinal Cord* 45(11): 739-43.

STUDY DESIGN: Prospective, randomized, double-blind clinical trial. **Objectives:** To evaluate the efficacy of topical phenytoin solution in treating pressure ulcers among patients with spinal cord disorders and to evaluate the systemic absorption of topical phenytoin.

SETTING: Physical Medicine and Rehabilitation Unit, Christian Medical College, Vellore, India. **METHODS:** Twenty-eight patients with stage 2 pressure ulcers were randomized to receive either phenytoin solution (5 mg/ml) or normal saline dressing on their ulcers once daily for 15 days. Efficacy of the treatment was determined by assessing the reduction in Pressure Ulcer Scores for Healing (PUSH 3.0), ulcer volume and ulcer size as on day 16. Serum phenytoin concentrations were estimated to determine the systemic absorption of topical phenytoin. **RESULTS:** Statistically insignificant but marginally higher reduction in PUSH 3.0 scores and ulcer size were seen with topical phenytoin treatment. Systemic absorption of topical phenytoin was negligible. No adverse drug events were detected during the study. **CONCLUSIONS:** Phenytoin solution is a safe topical agent that accelerates healing of pressure ulcers. However, its efficacy is only slightly more than normal saline treatment.

Sugama, J., Y. Matsui, et al. (2007). "A study of the efficiency and convenience of an advanced portable Wound Measurement System (VISITRAK)." *Journal of Clinical Nursing* 16(7): 1265-9.

AIMS AND OBJECTIVES: A reduction of pressure ulcer wound area is one of the most important indicators of wound healing. A wound measurement system (VISITRAK), which calculates the area based on simple tracings of wounds, has been developed as a practical tool for assessing wound area at the bedside. However, its accuracy has remained to be clarified in a clinical setting. This study aimed to clarify the clinical accuracy of the VISITRAK system. **DESIGN:** A descriptive correlational study. **METHODS:** Intra- and inter-rater reliability of wound measuring techniques were calculated using an intraclass correlation coefficient (ICC) from 10 pressure ulcers. Concurrent validity was assessed, using 30 pressure ulcers, by comparing VISITRAK and digital planimetry. Assessment times for VISITRAK and digital planimetry were also compared for clinical practicality. **RESULTS:** The VISITRAK reliability results showed high (0.99) ICC values. For validity, a correlation coefficient between VISITRAK and digital planimetry was 0.99. The median time to take a measurement with VISITRAK was significantly shorter than that required for digital planimetry. **CONCLUSIONS:** Based on our results, VISITRAK was found to have high intra- and inter-rater reliability and high validity. **RELEVANCE TO CLINICAL PRACTICE:** The short measurement time with the VISITRAK system, and the ability to use it at the bedside, make it a useful, convenient device for clinical use.

Suriadi, H. Sanada, et al. (2007). "Risk factors in the development of pressure ulcers in an intensive care unit in Pontianak, Indonesia." *International Wound Journal* 4(3): 208-15.

The purpose of this study was to identify risk factors associated with the presence of pressure ulcer development in adult patients at an intensive care unit hospital in Indonesia. The prospective cohort design was conducted in this study. A total of 105 patients participated and a pressure ulcer developed in 35 patients. The initial analysis identified several variables as significant risk factors for pressure ulcer development (interface pressure, fecal incontinence, skin moisture, diastolic blood pressure, smoking and body temperature). However, when entered into a final multivariate analysis, four factors, interface pressure [odds ratio (OR) 17.6, 95% confidence interval (CI) 4.1, 74.3], skin moisture (OR 8.2, 95% CI 2.2, 30.9), smoking (12.7, 95% CI 2.8, 56.7) and body temperature (OR 102.0, 95% CI 7.7, 98.8) were found to be significant. The results suggest that interface pressure measured using a multipad pressure evaluator, skin moisture measured by a moisture checker, thermometer for body temperature and smoking status are adequate instruments for the prediction of pressure ulcer development.

Suriadi, H. Sanada, et al. (2008). "Development of a new risk assessment scale for predicting pressure ulcers in an intensive care unit." *Nursing in Critical Care* 13(1): 34-43.

AIMS AND OBJECTIVES: The study aimed to evaluate the predictive validity and accuracy of a new pressure ulcer risk assessment scale in two Indonesia intensive care units (ICUs). **BACKGROUND:** Several risk assessment scales have been designed to identify patients at risk of developing pressure ulcers in ICU. However, the relative weight of each variable that contributes to pressure ulcer development in these scales is not described to enable designing of a risk assessment scale. Currently, the risk factors contributing to pressure ulcer development include interface pressure, body temperature and cigarette smoking. **DESIGN:** A prospective cohort study was conducted in two ICUs in Pontianak, Indonesia. **METHODS:** A total of 253 patients were recruited to the study from both hospitals. Data collection included new risk assessment scale [i.e. the Suriadi and Sanada (S.S.) scale] scoring, demographic, pressure ulcer severity scores (based on the National Pressure Ulcer Advisory Panel) and skin condition measures. Using the S.S. scale, trained data collectors scored patients once and assessed the body temperature daily until patients were discharged. Additionally, daily data were also collected in relation to the patient's skin condition and stage of pressure ulcer. **RESULTS:** Out of the 253 patients, 72 (28.4%) developed pressure ulcers. In ICU A, the incidence was 27%; pressure ulcers developed into stage I (41.7%), stage II (45.8%), stage III (10.4%) and stage IV (2.1%). In ICU B, the

incidence was 31.6%; the development of pressure ulcers was 48% in stage I and 52% in stage II. Using the predictive validity test, the S.S. scale balanced sensitivity (81%) and specificity (83%) at a cut-off score of 4. The area under the receiver-operating characteristic curve was 0.888 (confidence interval: 0.84-0.93). CONCLUSION: The S.S. scale was found to be a valid risk assessment tool to identify the patients at risk of developing pressure ulcers in Indonesia ICU.

Suwa, T., S. Kinoshita, et al. (2007). "[Care team for bed sores]." *Nippon Naika Gakkai Zasshi - Journal of Japanese Society of Internal Medicine* 96(8): 1758-64.

Taler, G. A. (2007). "A clarion call to rethink pressure ulcers in America.[comment]." *Journal of the American Geriatrics Society* 55(10): 1674-5.

Thomas, D. R. (2007). "Managing pressure ulcers: learning to give up cherished dogma.[comment]." *Journal of the American Medical Directors Association* 8(6): 347-8.

Thomason, S. S., C. P. Evitt, et al. (2007). "Providers' perceptions of spinal cord injury pressure ulcer guidelines." *Journal of Spinal Cord Medicine* 30(2): 117-26.

BACKGROUND/OBJECTIVE: Pressure ulcers are a serious complication for people with spinal cord injury (SCI). The Consortium for Spinal Cord Medicine (CSCM) published clinical practice guidelines (CPGs) that provided guidance for pressure ulcer prevention and treatment after SCI. The aim of this study was to assess providers' perceptions for each of the 32 CPG recommendations regarding their agreement with CPGs, degree of CPG implementation, and CPG implementation barriers and facilitators. **METHODS:** This descriptive mixed-methods study included both qualitative (focus groups) and quantitative (survey) data collection approaches. The sample (n = 60) included 24 physicians and 36 nurses who attended the 2004 annual national conferences of the American Paraplegia Society or American Association of Spinal Cord Injury Nurses. This sample drew from two sources: a purposive sample from a list of preregistered participants and a convenience sample of conference attendee volunteers. We analyzed quantitative data using descriptive statistics and qualitative data using a coding scheme to capture barriers and facilitators. **RESULTS:** The focus groups agreed unanimously on the substance of 6 of the 32

recommendations. Nurse and physician focus groups disagreed on the degree of CGP implementation at their sites, with nurses as a group perceiving less progress in implementation of the guideline recommendations. The focus groups identified only one recommendation, complications of surgery, as being fully implemented at their sites. Categories of barriers and facilitators for implementation of CPGs that emerged from the qualitative analysis included (a) characteristics of CPGs: need for research/evidence, (b) characteristics of CPGs: complexity of design and wording, (c) organizational factors, (d) lack of knowledge, and (e) lack of resources. CONCLUSIONS: Although generally SCI physicians and nurses agreed with the CPG recommendations as written, they did not feel these recommendations were fully implemented in their respective clinical settings. The focus groups identified multiple barriers to the implementation of the CPGs and suggested several facilitators/solutions to improve implementation of these guidelines in SCI. Participants identified organizational factors and the lack of knowledge as the most substantial systems/issues that created barriers to CPG implementation.

Thornton, R. P., K. P. Leible, et al. (2007). "Getting a jump on wound care." *Provider* 33(1): 35-6.

Tully, S., C. Ganson, et al. "Implementing a wound care resource nurse program." *Ostomy Wound Management* 53(8): 46-8.

Nurses are leaders in implementing innovations that can create positive outcomes in the prevention and management of pressure ulcers in patients admitted to acute care hospitals. Believing that nurses knowledgeable in best practices could impact prevalence, incidence, and care of pressure ulcers, an educational program was developed in a Canadian healthcare system to inform and empower nurses providing skin and wound care. The program afforded participants the opportunity to acquire the knowledge and skill to recognize patients at risk for developing pressure ulcers and to independently treat Stage I and Stage II pressure ulcers and skin breakdown related to moisture, friction, and shear. The program includes evidence-based practice recommendations and highlights the Best Practice Guidelines developed by the Registered Nurses Association of Ontario, a provincial body taking an active role in the development, implementation, and evaluation of published guidelines derived from global research literature synthesis. Pre- and post participation assessment of 65 nurse participants from three hospitals deemed the program successful in terms of knowledge and fulfillment of their educational expectations. Organizational support

to implement the skin and wound care resource nurse role was encouraging and medical directives for Stage I and Stage II pressure ulcers by nurses were implemented. Evaluation and monitoring of program outcomes, including pressure ulcer incidence rates, continue.

Turnbull, G. B. (2007). "A pressure ulcer and an ostomy: an unlikely combination?" *Ostomy Wound Management* 53(5): 10-2.

van der Steen, J. T., R. L. Kruse, et al. (2007). "Dementia severity, decline and improvement after a lower respiratory tract infection." *Journal of Nutrition, Health & Aging* 11(6): 502-6.

OBJECTIVE: To assess decline and improvement in functional characteristics, cognition and restraint use after a lower respiratory tract infection (LRI) and describe variation by dementia severity. **DESIGN:** Two prospective cohort studies. **SETTING:** Nursing homes in the Netherlands and in Missouri, USA. **PARTICIPANTS:** 227 Dutch and 396 Missouri nursing home residents with dementia and LRI who were treated with antibiotics. **MEASUREMENTS:** We compared functional characteristics (Activities of Daily Living [ADL], bedfast status, pressure ulcers, incontinence), cognition and restraint use 3 months after an LRI with status 1 to 2 weeks before diagnosis. **RESULTS:** Residents with LRI frequently declined on all measures, but many also improved, including those with severe dementia. On the measures where residents could still decline further, residents with severe dementia showed higher variability than residents with less severe dementia. This was most obvious for bedfast status and restraint use. **CONCLUSIONS:** Compared with less severely demented residents, residents with severe dementia showed more decline on measures where they still had room for change. However, on these measures, residents with severe dementia also improved more often. LRI does not necessarily lead to deterioration even in individuals with severe dementia.

Vu, T., A. Harris, et al. (2007). "Cost-effectiveness of multidisciplinary wound care in nursing homes: a pseudo-randomized pragmatic cluster trial.[see comment]." *Family Practice* 24(4): 372-9.

OBJECTIVES: To evaluate the cost-effectiveness of a multidisciplinary wound care team in the nursing home setting from a health system perspective. **METHODS:** Pseudo-randomized pragmatic cluster trial with 20-week follow-up involving 342 uncomplicated leg

and pressure ulcers in 176 residents located in 44 high-care nursing homes in Melbourne, Australia in 1999-2000. Twenty-one nursing homes (180 wounds in 94 residents) were assigned to the intervention arm and 23 to the control arm (162 wounds in 82 residents). Residents in the intervention arm received standardized treatment from a wound care team comprising of trained community pharmacists and nurses. Residents in the control arm received usual care. RESULTS: More wounds healed during the trial in the intervention arm than in the control arm (61.7% versus 52.5%, $P = 0.07$). A Cox regression with shared frailty predicted that the chances of healing increased 73% for intervention wounds [95% confidence interval (CI) 20-150%, $P = 0.003$]. The mean treatment cost was \$A616.4 for intervention and \$A977.9 for control patients ($P = 0.006$). Most cost reduction was obtained from decreases in nursing time and waste disposal. The mean cost saving per wound, adjusted for baseline wound severity and random censoring, was \$A277.9 (95% CI \$A21.6-\$A534.1). CONCLUSIONS: Standardized treatment provided by a multidisciplinary wound care team saved costs and improved chronic wound healing in nursing homes. The main source of saving was in the cost of nursing time in applying traditional dressings and in the cost of their disposal.

Warnet, S. and L. Bandelier (2007). "[Prevention and management of decubitus ulcers]." *Revue de L'Infirmiere*(130): 24-5.

Weber, M. (2007). "[Managing nursing errors and legal sequelae: documentation plays a major role]." *Pflege Zeitschrift* 60(11): 615-6.

Werkman, H., P. Simodejka, et al. (2008). "Partnering for prevention: a Pressure Ulcer Prevention Collaborative project." *Home Healthcare Nurse* 26(1): 17-22.

In a statewide initiative, coordinated by the New Jersey Hospital Association (NJHA) Quality Institute, hospitals together with nursing home and home care agencies were asked to participate in a Pressure Ulcer Prevention Collaborative. The goal of this collaborative was to decrease the incidence and prevalence of pressure ulcers across the state by 25% within a 12-month period. This article discusses the rationale for the Collaborative as well as the requirements and implementation of the initiative within Community Medical Center's Home Health Program.

Worley, C. A. (2007). "Skin failure: the permissible pressure ulcer?" *Dermatology Nursing* 19(4): 384-5.

Wurster, J. (2007). "What role can nurse leaders play in reducing the incidence of pressure sores?" *Nursing Economics* 25(5): 267-9.

Pressure sores have plagued the nursing profession for many years as a major health care problem in terms of a patient's suffering and financial cost. Pressure sores are increasingly common in hospitalized patients in the United States with a 63% increase from 1993 to 2003. The nurse leader is accountable for the occurrence of pressure sores, a nurse-sensitive indicator, by a scorecard which is benchmarked against other facilities. The nurse leader must take a systematic approach in the prevention of pressure sores, with the strategy being consistent and motivating to the staff in order to improve patient outcome. The chief nursing officer, the unit manager, and the bedside nurse must all collaborate to prevent tissue injury in patients at risk for developing pressure sores and to promote wound healing in patients with existing breakdown. [References: 12]

Yang, L.-C., M.-H. Chen, et al. (2007). "[Elevating the accuracy rate for nurses' changes of patients' positions]." *Hu Li Tsa Chih - Journal of Nursing* 54(5): 64-71.

The incidence of pressure sores among inpatients had increased in our ward month by month. Clinical checklists and data analysis showed that the accuracy rate for nurses' changes of patients' positions was 12%. The investigation of reasons for this low accuracy rate included: (1) A flawed nursing standard for position changes. (2) Lack of training for position changing. (3) Lack of quality management and control of position changes. (4) Lack of practice and unfamiliarity with the procedures for position changing. (5) Poor quality of pressure-reducing surfaces. (6) Shortage of pressure-reducing surfaces. (7) Inappropriate method of use of pressure-reducing surfaces. (8) Non-inclusion by management of incidence of pressure sores within the scope of quality control. After a review of literature and group discussion, strategies were adopted to: (1) Establish a detailed explanation of standards for position changes. (2) Arrange lectures and promotional campaigns. (3) Add more pillows and water cushions. (4) Conduct case analysis when a patient develops a new pressure sore. After completion of this project, the accuracy rate for nurses' changes of patients' positions increased from 12% to 88%, and the incidence of pressure sores decreased from

0.47% to 0.05%. The result shows that accuracy of position change may affect the rate of pressure sore. We expect this project to serve as a reference in clinical practice for promotion of the quality of patient care.