

## Pressure Care References - May 2008

This month's pressure ulcer references cover publications in CINAHL that address pressure ulcer prevalence. Covering topics ranging from how to define and collect prevalence data through to reports of the use of prevalence in the assessment of the outcomes of pressure area care, these references are a starting point for exploring what is known regarding the prevalence of pressure ulcers.

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.

Amlung, S. R., W. L. Miller, et al. (2001). "The 1999 National Pressure Ulcer Prevalence Survey: a benchmarking approach." *Advances in Skin & Wound Care* 14(6): 297-301.

OBJECTIVE: Health care professionals are faced with the ongoing challenge of improving performance. From physicians and nurses to process improvement experts, health care professionals are discovering new approaches to increasing the overall effectiveness of procedures used in clinical areas. One way to collect data useful for benchmarking specific clinical practices is through the use of prevalence studies., DESIGN: A 1-day pressure ulcer prevalence survey was performed in March 1999. Acute care

facilities across the United States volunteered to participate in the data collection process. Patients' demographic information, pressure ulcer stages, locations, and support surfaces were noted., SETTING: 356 acute care facilities., PARTICIPANTS: 42,817 patients., RESULTS: The overall pressure ulcer prevalence was 14.8%, with a nosocomial pressure ulcer prevalence of 7.1%., CONCLUSIONS: Benchmarking is one of the tools that enables health care professionals to measure and identify inconsistencies in patient care practices. Understanding these inconsistencies enables the health care team to develop processes that are innovative and efficient. National pressure ulcer prevalence surveys provide a benchmark to evaluate an individual facility's care and treatment of patients at risk for pressure ulcer development. Success, however, lies in the health care professional's ability to take the information and apply it to clinical practice. Through the use of a benchmarking approach, performance gaps can be identified, processes can be put into place, and improved patient outcomes can be monitored and maintained.

Anthony, D., T. Reynolds, et al. (2003). "A regression analysis of the Waterlow score in pressure ulcer risk assessment." *Clinical Rehabilitation* 17(2): 216-23.

OBJECTIVE: To explore the predictive value of the Waterlow score, and the subscores of age and gender. DESIGN: Logistic regression analysis was conducted on the two subscores of the Waterlow score, and the residual Waterlow score with gender and age removed. Receiver operating characteristic (ROC) analysis gave a quantitative measure of the classification ability of the Waterlow score. SETTING: Burton, UK. SUBJECTS: All admissions over a five-year period to the District General Hospital, a total of 150,015 admissions of 82,691 patients. INTERVENTIONS: None. MAIN OUTCOME MEASURES: Area under the ROC curve for significant (as determined by logistic regression) variables. RESULTS: Data were inaccurate in at least 44.7% of the records, and analysis was conducted on the 43,735 records for which no errors were apparent. Nine hundred and fifty-four patients had a pressure ulcer on admission (2.1%); 277 developed a pressure ulcer (0.6%). The Waterlow score was predictive of pressure ulcers. Age was predictive, and gender was not found to be a significant predictor. CONCLUSIONS: The Waterlow score may be improved and simplified by removing gender from the scoring system.

Arblaster, G. M. (1998). "Reducing pressure sores after hip fractures." *Professional Nurse* 13(11): 749-52.

A study found that many patients with fractured hips are poorly nourished on admission and may be starved for prolonged periods in preparation for surgery, which may affect their nutritional status and thus their vulnerability to pressure sores.

Arling, G., S. L. Karon, et al. (1997). "Risk adjustment of nursing home quality indicators." *Gerontologist* 37(6): 757-66.

Aronovitch, S. A. (1999). "Intraoperatively acquired pressure ulcer prevalence: a national study." *Journal of WOCN* 26(3): 130-6.

**Objective:** This study was completed to determine the prevalence and identify comorbid conditions for intraoperatively acquired pressure ulcers. **Design:** A multisite, descriptive study was conducted. **Setting and Subjects:** A multisite sample population of patients from 33 of 50 states undergoing a surgical procedure of at least 3 hours' duration was studied. **Instruments:** A Hospital Background Data Form and a Patient Data Form were constructed to collect demographic data and information pertinent to surgically acquired pressure ulcerations, The Weighted Index Comorbidity Scale was incorporated into the Patient Data Form. **Methods:** Institutional and patient data forms were mailed to 1543 members of WOCN who practiced in an acute care facility. Each member was asked to collect data on those patients who had surgeries of 3 hours or longer during a period of 1 week. **Main Outcome Measures:** Patient and facility characteristics, visual observations of the patient's skin over a 72-hour period after surgery, and the Weighted Index Comorbidity Scale were used to determine the prevalence of surgically acquired pressure ulcers and the presence of relevant comorbid conditions. **Results:** An analysis of 104 returned facility surveys including 1128 patients was completed. The prevalence of pressure ulceration among this group was 8.5%. Forty percent of those surveyed underwent a procedure lasting approximately 3 hours and 33% underwent surgery lasting more than 5 hours. As the length of surgery increased, so did the percentage of patients with pressure ulcers. Most patients had at least 1 comorbid condition (78%). **Conclusions:** The risk of intraoperative ulcerations increases as surgical time increases. Although patients with comorbid conditions known to affect the risk of ulceration under normal circumstances experienced pressure ulcers in this investigation, no significant relationship was found to link the presence of these conditions to an increased risk of intraoperatively acquired ulcers. Therefore all surgical patients undergoing prolonged procedures should be considered at risk for intraoperative ulceration.

Aydin, C. (2002). "CalNOC methods 2002: leveraging technological innovation... 35th Annual Communicating Nursing Research Conference/16th Annual WIN Assembly, "Health Disparities: Meeting the Challenge," held April 18-20, 2002, Palm Springs, California." *Communicating Nursing Research*: 35 102.

Ayello, E. A. (2004). "Pressure ulcer benchmarking." *World Council of Enterostomal Therapists Journal* 24(3): 17-9.

This article is based on a presentation by Dr Ayello given at the Science of Surfaces Meeting, 21-22 January 2004 in Birmingham, UK and was originally published as a supplement sponsored by Hill-Rom in the *Journal of Wound Care*, July 2004., Benchmarking is an effective way for practitioners to improve their practice. In the US targets have aimed to reduce the incidence of pressure ulcers, particularly in nursing homes. It also provides an opportunity to share and compare information with other organisations.

Baldwin, K. M. (2002). "Incidence and prevalence of pressure ulcers in children." *Advances in Skin & Wound Care* 15(3 part 1): 121-4.

**OBJECTIVE:** To determine the incidence and prevalence of pressure ulcers in children. **DESIGN:** National survey mailed to 234 members of 4 pediatric-specific health care databases. **PARTICIPANTS:** A total of 55 questionnaires were returned (25% return rate). Fifty-one of the questionnaires were suitable for obtaining prevalence data and 40 were suitable for obtaining incidence data. **RESULTS:** The pressure ulcer incidence rate was 0.29% and the prevalence rate for 1998 was 0.47%. Many of the contributing factors cited by participants mirrored those seen in adult patients with pressure ulcers. **CONCLUSION:** Under the National Institutes of Health guidelines, children can be excluded from pressure ulcer studies that include subjects above age 21 because of the rarity of pressure ulcer development in the pediatric population. However, separate pediatric pressure ulcer studies should be conducted to determine best-practice models for children with pressure ulcers.

Ballard, N., A. McCombs, et al. (2008). "How our ICU decreased the rate of hospital-acquired pressure ulcers." *Journal of Nursing Care Quality* 23(1): 92-6.

We describe 7 strategies our intensive care unit implemented to decrease the rate of hospital-acquired pressure ulcers. These strategies include the following: (1) restructured risk assessment and documentation, (2) translated numeric data into graphs for ease of understanding by staff, (3) increased staff awareness, (4) implemented "turn rounds," (5) increased prevalence assessments and redesigned structure of the skin team, (6) used evidence-based practice as a basis for care, and (7) created an Access database to track weekly prevalence.

Barczak, C. A., R. I. Barnett, et al. (1997). "Fourth national pressure ulcer prevalence survey [corrected] [published erratum appears in *ADV WOUND CARE* 1997 Oct; 10(6): 28]." *Advances in Wound Care: The Journal for Prevention and Healing* 10(4): 18-26.

The fourth national pressure ulcer prevalence survey was conducted on November 9, 1995, with staff at 265 acute-care hospitals surveying 39,874 patients for the presence of pressure ulcers. Data were collected on patient demographics, ulcer site, ulcer stage, and support surface. The goal was to determine the aggregate prevalence of pressure ulcers and to compare the results to those of the previous three surveys. The overall prevalence was 10.1% (range 1.4% to 36.4%), with the sacrum and heels the most common pressure ulcer sites. The predominant age group of patients with pressure ulcers was 71 to 80 years. Seventy-four percent of pressure ulcers were superficial (i.e., Stages I and II). The national pressure ulcer prevalence has remained relatively constant throughout the four surveys, despite the many changes in health care over the past 7 years.

Barrois, B., F. A. Allaert, et al. (1995). "A survey of pressure sore prevalence in hospitals in the greater Paris region." *Journal of Wound Care* 4(5): 234-6.

In 1993 a preliminary survey was conducted in the Hospital of Gonesse to examine pressure sore prevalence. The averages obtained showed that 5.4% of patients in hospital suffer from pressure sores. This prompted a further investigation involving 12 050 patients: 5.2% were found to have pressure sores. Patients with pressure sores were significantly older (76.4+/-14 years) than the average age of patients in the study, and 42% of pressure sores were found in patients with neurological pathology. The majority of patients (57%) had a single pressure sore. Most were grade I lesions (38%). The greatest number of pressure sores were found on the medium and long-stay wards. A nationwide complementary survey is now being undertaken to confirm these overall results.

Baumgarten, M. (1998). "Methodology. Designing prevalence and incidence studies." *Advances in Wound Care: The Journal for Prevention and Healing* 11(6): 287-93.

Frequency, impact, and causes of diseases--including wound development--can be examined using prevalence and incidence studies. Understanding basic epidemiologic principles is necessary to avoid misinterpretation of the data and incorrect transiation of the results into clinical practice. Definitions and examples of prevalence, cumulative incidence, incidence rate, confidence intervals, and sample size are given. They will help practitioners comprehend these concepts and critically evaluate published research.

Bergquist, S. and R. Frantz (1999). "Pressure ulcers in community-based older adults receiving home health care." *Advances in Wound Care: The Journal for Prevention and Healing* 12(7): 339-51.

**OBJECTIVES:** To determine the prevalence and incidence of pressure ulcers in community-based adults receiving home health care and to identify risk factors for incident Stage II to IV pressure ulcers. **DESIGN:** Retrospective cohort study. **SETTING:** A large midwestern urban home health care agency. **PATIENTS:** The study cohort was 1711 nonhospice, nonintravenous therapy subjects admitted between January 1995 and March 1996 who were  $\geq$  age 60 and pressure ulcer-free on admission. **MEASUREMENTS:** Data on risk factors were extracted from admission information. Patient records were followed forward chronologically to the outcomes: pressure ulcer development or no pressure ulcer. **MAIN RESULTS:** The incidence of Stage II to IV pressure ulcers was 3.2%. Cox regression analyses revealed that limitation in activity to a wheelchair, needing assistance with the activities of daily living-dressing, bowel and/or bladder incontinence, a Braden Scale mobility subscore of very limited, anemia, adult child as primary caregiver, male gender, a recent fracture, oxygen use, and skin drainage predicted pressure ulcer development ( $P \leq 0.05$ ) in this exploratory model. **CONCLUSIONS:** Patients  $\geq$  age 60 who are admitted to a home health care agency with 1 or more of these risk factors require close monitoring for pressure ulcer development and should be taught preventive interventions on admission.

Berlowitz, D. R. and J. Halpern (1997). "Evaluating and improving pressure ulcer care: the VA experience with administrative data." *Joint Commission Journal on Quality Improvement* 23(8): 424-33.

Bermark, S., V. Zimmerdahl, et al. (2004). "Prevalence investigation of pressure ulcers." *EWMA Journal* 4(1): 7-11.

Bethell, E. (2002). "Incidence and prevalence data: can we ensure greater accuracy?" *Journal of Wound Care* 11(8): 285-8.

Practitioners in the UK will only know if they are meeting targets on pressure ulcer reduction if they provide valid and reliable prevalence and incidence data. But all too often, published data contain inconsistencies and can be misleading.

Biasioli, S., A. Destrebecq, et al. (2002). "The prevalence of pressure sores in a hospital of Lombardy region [Italian]." *Assistenza Infermieristica e Ricerca* 21(1): 14-6.

A one day prevalence survey was performed in a University Hospital, with the aim of assessing the risk of developing a pressure sore by patients systematically assessed with the Waterlow Scale. Out of the 141 at risk patients, 16 had a pressure sore (11.3%). For six of them the sore was already present at admission so that the in hospital incidence was 7% (10 patients). Most at risk patients (74.4) were still cared on a standard mattress., The advantages and limits of prevalence surveys are discussed at the end of the three articles that present a prevalence survey, an incidence survey and the study of sentinel events. This abstract was translated into English by the publisher or author.

Birchall, L. (2001). "Centralising supply of a trust's pressure-relieving equipment." *Journal of Wound Care* 10(6): 214-9.

This paper discusses the development of a centralised service by one large acute teaching hospital over a three-year period and the new system's impact on incidence and types of pressure ulcers.

Blackett, A., B. Landreth, et al. (2007). "Skin care nurse teams developed for successful prevalence and incidence pressure ulcer surveys... 39th Annual Wound, Ostomy and Continence Nurses Annual Conference." *Journal of WOCN* 34(3S): Supplement: S41-2.

Blaszczyk, J., M. Majewski, et al. (1998). "Make a difference: standardize your heel care practice." *Ostomy/Wound Management* 44(5): 32-8, 40.

The effective prevention and treatment of pressure ulcers has always been an essential nursing concern. Many advances, such as pressure reduction beds, have greatly reduced the incidence of ulcer development. In an urban teaching hospital the incidence of sacral ulcers decreased upon initiation of pressure reduction surfaces, while a concomitant

increase in heel ulcers was noted. Heel ulcer prevention had not previously been singled out as a specific area of focus in skin pressure ulcer prevention. Given the increased incidence of occurrence of heel pressure ulcers in this institution's patient population, a multidisciplinary team met to address the issue of heel ulcer prevention. A quick, easy and user-friendly risk stratification tool was developed and guidelines for care of the at-risk patient were implemented. Initiation of the heel pressure ulcer identification tool and guidelines resulted in a decrease of heel pressure ulcer prevalence in the medical intensive care unit patient population.

Bliss, D. Z., C. Zehrer, et al. (2006). "Incontinence-associated skin damage in nursing home residents: a secondary analysis of a prospective, multicenter study." *Ostomy/Wound Management* 52(12): 46-55.

More than half of the nursing home population is incontinent of urine or feces, presenting challenges to perineal skin health. To determine the occurrence and severity of skin damage in nursing home residents with incontinence, a secondary analysis of data collected from a multisite, open-label, quasi-experimental study of cost and efficacy of four regimens for preventing incontinence-associated dermatitis in nursing home residents was performed. Sixteen randomly selected nursing homes from across the US were included in the study. Participating nursing home residents were incontinent of urine and/or feces and free of skin damage. Of the 1,918 persons screened, 51% (n = 981) qualified for prospective surveillance. Perineal skin was assessed over a 6-week period; frequency, type, and severity of skin damage were observed. Skin damage developed after a median of 13 (range 6 to 42) days in 45 out of 981 residents (4.6%), of which 3.4% was determined to be incontinence-associated dermatitis. Some residents (14 out of 45, 31%) had incontinence-associated dermatitis of other skin damage in more than one area. This study is one of the first to report the characteristics of incontinence-associated dermatitis in a large sample of nursing home residents. The sample size and random selection of nursing homes impart generalizability to the findings. Incontinence-associated dermatitis is a risk in nursing home residents, especially those with fecal incontinence. These findings suggest that the rate and severity of incontinence-associated dermatitis are low with close monitoring and use of a defined skin care regimen that includes a pH-balanced cleanser and moisture barrier.

Bostick, J. E. (2002). "The relationship of nursing personnel and nursing home care quality." 97.

The purpose of this cross-sectional descriptive survey study was to examine the relationship of staffing hours per resident day to six Minimum Data Set (MDS) quality indicator (QI) scores while controlling for geographic location, facility size, case mix, ownership, and type of control. The sample consisted of 413 nursing homes in Missouri with 1999-2000 data available from On-line Survey Certification and Reporting System (OSCAR) and (MDS) databases. A logistic regression model was used to analyze QI scores for prevalence of weight loss, bladder or bowel incontinence, stage 1-4 pressure ulcers, problem behaviors toward others, late loss ADL decline, and physical restraint use., There were no statistically significant associations between RN, LPN, or NA staffing hours and the

prevalence of physical restraints, weight loss, incontinence, or problem behaviors toward others. A statistically significant (unfavorable) association was found between LPN staffing hours and the prevalence of late loss ADL decline ( $p = .0335$ ) and stage 1-4 pressure ulcers ( $p = .0216$ ). No significant association was found between RN hours and ADL decline, however, there was a significant (favorable) association for the prevalence of pressure ulcers ( $p = .0344$ ). Based on these results, there is some indication that increasing RN hours per resident day from 0.2 to 0.5 may result in better quality indicator scores. In addition, LPN and NA hours per resident day should be equivalent to the national average (0.7 and 2.0 respectively). Furthermore, incentive programs should be developed for non-professional nursing staff to further their education.

Bots, T. C. M. and B. F. G. Apotheker (2004). "The prevention of heel pressure ulcers using a hydropolymer dressing in surgical patients." *Journal of Wound Care* 13(9): 375-8.

\* Objective: A trial of a self-adhesive hydropolymer foam dressing (Tielle, Johnson & Johnson) demonstrated that it prevented the development of friction-generated pressure ulcers on the heels of ICU patients. Following the trial, use of the foam dressing became a standard preventive measure in the ICU and the prevalence of heel ulcers decreased by 72% in two years. This follow-up study evaluated the foam's effectiveness in preventing heel pressure ulcers in surgical patients., \* Method: A total of 140 surgical patients were screened over a four-month period. They were assigned to one of two groups, depending on their pressure ulcer risk score and the anticipated length of the surgical procedure. The foam dressing was used as a barrier on the heels, depending on the patient's risk status, which was assessed using a modified Norton scale, and the duration of their surgery. Heels were inspected on a daily basis for up to 10 days. All 23 patients in the group whose surgery lasted less than 90 minutes dropped out of the study as they were discharged with insufficient data., \* Results: A 76.7% reduction in heel pressure ulcers was achieved with this preventive measure., \* Conclusion: Use of an adhesive foam dressing on surgical patients can prevent heel ulcers. Research is needed on the effects of friction on the heel during the transfer and movement of surgical patients., \* Declaration of interest: This study was sponsored by Johnson & Johnson Medical.

Bours, G. J. J., R. J. G. Halfens, et al. (1999). "The development of a national registration form to measure the prevalence of pressure ulcers in the Netherlands." *Ostomy/Wound Management* 45(11): 28, 30-3, 36-8 passim.

To gain insight into the prevalence of pressure ulcers in Dutch healthcare institutions, a national registration form to measure the prevalence of pressure ulcers annually in different healthcare settings was developed based on a literature study and responses from a Delphi panel. The reliability and the feasibility of the form devised were tested in a pilot study conducted in a university hospital, a nursing home, and in a home healthcare setting. Interrater reliability of the grading system varied between the institutions from 0.49 to 0.97 (Cohen's Kappa). In the home healthcare setting, interrater reliability was 0.80 (Pearson correlation coefficient) for the total score on the Braden scale. The prevalence rates were 10.1% ( $n = 368$ ) in the university hospital, 12.7% ( $n = 1,541$ ) in the home healthcare setting,

and 83.6% (n =122) in the nursing home, although the latter figure seemed to be somewhat exaggerated. The most common lesions were found on the sacrum and below the knee (heel and malleolus). The pilot study concluded that it is possible to collect accurate and reliable data on the scope and severity of pressure ulcers with a uniform instrument in different healthcare settings.

Bravo, M. A. E. (1998). "Frequency and characteristics of bedsores treated by primary health care nurses in the province of Caceres [Spanish]." *Revista ROL de Enfermeria* 21(237): 55-8.

**Introduction:** The number of patients afflicted by bedsores under the care of a Primary Health Clinic is not well-known. Nevertheless, it is a pathology directly related to nursing care and one which causes an important loss in a patient's quality of life; it aggravates and inhibits the cure of other health problems; it increases suffering and morbidity; and, at the same time, it increases nursing care time as well as the costs of health care. **Subjects and Methods:** Under a wide range study carried out during the month of March, 1996, data from homecare patients suffering from bedsores was collected by means of a registration list sent to 305 Primary Health Care Clinic nurses in the province. **Results.** The 177 nurses who responded registered 107 patients with bedsores. 93.45% of these patients were older than 65. 234 bedsores were recorded. This means 2.19 findings per patient, 38.03% on heels and 21.79% on trochanters. 36.75% presented superficial necrosis and 24.36% evidenced profound necrosis. The average reading on the Norton Scale was 8.65 +/- 3.25 (mean +/- standard deviation). **Observations.** The prevalence of Primary Health Care Clinic patients suffering from bedsores in the province of Caceres during the period studied swings from 4 to 6 patients for every 10,000 inhabitants and this value increases to between 22 and 26 for every 10,000 inhabitants over 65.

Brown, D. S., N. E. Donaldson, et al. (2002). "CaINOC findings 2002: links between staffing, falls & pressure ulcers... 35th Annual Communicating Nursing Research Conference/16th Annual WIN Assembly, "Health Disparities: Meeting the Challenge," held April 18-20, 2002, Palm Springs, California." *Communicating Nursing Research*: 35 100.

Brown, G. (2003). "Long-term outcomes of full-thickness pressure ulcers: healing and mortality." *Ostomy/Wound Management* 49(10): 42-4, 46, 48-50.

A non-experimental, retrospective analysis of pressure ulcer quality-assurance data was conducted from October 1997 to October 2002 to ascertain the relationship between the occurrence of nosocomial full-thickness pressure ulcers, healing, and mortality. The records of 74 patients (one woman, 73 men) who developed full-thickness pressure ulcers as inpatients at a regional Veterans Affairs medical center with acute, intensive, and long-term care units were assessed. Start day was the day that the ulcer was determined to have occurred and end day was the date the patient was pronounced dead. Major diagnoses for all patients, 70.7% for whom end-of-life planning was in effect, were cerebrovascular accident, diabetes, and cancer. The majority of ulcers were located in the sacral/coccygeal

area (66.2%) and heel (16.2%). None of the ulcers healed in patients who died within 180 days of ulcer onset. A 180-day mortality rate of 68.9% was noted in people who developed nosocomial full-thickness pressure ulcers, with an average of 47.0 days from ulcer onset to death. No deaths were related to the presence of the pressure ulcer. In this data set of people with a heavy disease burden who were approaching the end of life, the development of full-thickness pressure ulcers appeared to be a comorbid pathologic process. Collecting and analyzing long-term pressure ulcer healing and mortality outcomes is a missing component of pressure ulcer quality-assurance data.

Calianno, C. (2007). "Pressure ulcers: a quality issue." *Nursing Management* 38(5): 42-51.

Can your facility meet the changing expectations of healthcare insurers and consumers?

Carville, K. and J. Smith (2004). "A report on the effectiveness of comprehensive wound assessment and documentation in the community." *Primary Intention* 12(1): 41-4, 46-9.

This paper highlights the wisdom expressed here by Miss Nightingale in regard to the care of aged wounded war veterans in the domiciliary setting. Silver Chain Nursing Association is the largest provider of home care in Western Australia. In 2000 a wound survey was carried out on all Department of Veterans' Affairs (DVA) clients who were receiving wound management from Silver Chain. The aim of the survey was to review the prevalence, type and source of wounds on DVA clients referred, and to evaluate the nursing assessment and resources used to manage their wounds. A process was also established to review the times and costs involved in healing these wounds. In addition, when the findings of this study were compared with the findings of a wound prevalence survey that was conducted in 1996 amongst all Silver Chain clients who received nursing care, it was found that clients in the DVA study were 30% more likely to heal than those all-aged clients in the 1996 study. The significant reduction in healing rates and associated reduction in costs of wound healing were thought to be achieved when comprehensive nursing assessment and documentation were employed in the management of clients with wounds in the community.

Chan, E., S. Tan, et al. (2005). "Prevalence, incidence and predictors of pressure ulcers in a tertiary hospital in Singapore." *Journal of Wound Care* 14(8): 383-4, 386-8.

**OBJECTIVE:** In 2002 the hospital under study implemented a pressure ulcer standard care plan. This follow-up study aimed to determine the prevalence and incidence of pressure ulcers, whether demographic characteristics and medical diagnosis differed between those individuals who did and those who did not develop ulcers and the predictors of pressure-ulcer formation. **METHOD:** The prevalence study used a cross-sectional design, while the incidence study was a prospective cohort study. Participants were scored using the Braden scale and were examined for the presence of pressure ulcers. Those who were ulcer free were monitored twice weekly until they were discharged or for 28 days. **RESULTS:** The prevalence of pressure ulcers was 18.1% (95% CI: 15.5-20.9%), while the incidence was

8.1% (95% CI: 6.1-10.4%). Participants with ulcers were older, had a longer mean length of hospital stay, lower Braden scores and were diagnosed with or had a history of cardiovascular diseases or sepsis. Logistic regression found that the total Braden score was the only significant predictor of pressure ulcers. Compared with scores 16-23, the odds ratios were 7.7 (95% CI: 3.5-17.1,  $p < 0.001$ ) and 12.5 (95% CI: 4.5-34.6,  $p < 0.001$ ) for scores 12-15 and 6-11 respectively. Demographic characteristics, diagnosis and length of hospital stay were not significant predictors. **CONCLUSION:** The study identified a modest decrease in incidence and improvements in nursing care following the implementation of the care plan. It suggests that Braden scores are predictive of those at-risk of developing pressure ulcers.

Charlier, C. (2001). "Prevalence, incidence and risk: a study of pressure ulcers at a rural base hospital." *Primary Intention* 9(1): 12-3, 15-21.

This project was conducted in an Australian rural base hospital. It compared the Norton and Waterlow pressure ulcer risk assessment scales with an informal nurse assessment via a prevalence and an incidence study of inpatients. This study, more a pilot study due to the small sample size, suggests that the pressure ulcer prevalence and incidence within this Australian hospital was comparable to national and overseas studies. Statistical analysis of the incidence data using the Kappa and McNemar tests showed that the Waterlow risk assessment scale performed better than both the Norton scale and the informal nurse assessment when identifying patients at risk of developing pressure ulcers.

Chauhan, V. S., S. Goel, et al. (2005). "The prevalence of pressure ulcers in hospitalised patients in a university hospital in India." *Journal of Wound Care* 14(1): 36-7.

**OBJECTIVE:** To estimate the prevalence of pressure ulcers in hospitalised patients and any underlying or predisposing factors to ulceration. **METHOD:** This cross-sectional study took place in a university hospital in Varanasi, India. A total of 445 patients hospitalised in medical and surgical wards were examined in a single day for the number, site and grade of pressure ulcers. Haemoglobin, serum albumin and blood sugar levels of patients with pressure ulcers were recorded. **RESULTS:** The prevalence of pressure ulcers was high (4.94%). Anaemia, malnutrition and diabetes were important risk factors, while morbidity due to pressure ulcers in long-stay wards, such as neurology, was exceptionally high (40.9%). **CONCLUSION:** Pressure ulcers remain one of the most neglected aspects of health-care provision in India and identifying their associated risk factors at an early stage may go a long way in preventing their occurrence.

Chen, Y., M. J. DeVivo, et al. (2005). "Pressure ulcer prevalence in people with spinal cord injury: age-period-duration effects." *Archives of Physical Medicine and Rehabilitation* 86(6): 1208-13.

**OBJECTIVE:** To examine age-period-duration patterns of the prevalence of pressure ulcers in community-residing people with spinal cord injury (SCI). **DESIGN:** Multicenter

cohort study. SETTING: Nine Model Spinal Cord Injury Systems throughout the United States. PARTICIPANTS: People with SCI (N=3361) injured between 1986 and 1995 and followed up thereafter on a yearly basis through 2002. INTERVENTIONS: Not applicable. MAIN OUTCOME MEASURE: Physician-confirmed pressure ulcers of stage II or greater at the follow-up visits. RESULTS: The multivariable generalized estimating equations model showed a significant trend toward increasing pressure ulcer prevalence in the recent years (1994-2002 vs 1984-1993: odds ratio=1.4; 95% confidence interval, 1.2-1.6) not explained by aging, years since injury, or demographic and clinical factors. The risk of pressure ulcers appeared to be steady during the first 10 years and increased 15 years postinjury. Pressure ulcers were more common among the elderly, men, African Americans, singles, subjects with education less than high school, unemployed, subjects with complete injury, and subjects with history of pressure ulcers, rehospitalization, nursing home stay, and other medical conditions. Injury cause and level had no significant effect. CONCLUSIONS: These results highlight the need for research into factors that contribute to the increasing pressure ulcer prevalence. Copyright (C) 2005 by the American Congress of Rehabilitation Medicine and the American Academy of Physical Medicine and Rehabilitation

Cockbill-Black, S., J. Bond, et al. (1999). "Audit of pressure area care and documentation." *Professional Nurse* 15(3): 173-6.

Patients in intensive care units may be particularly at risk of developing pressure area damage. Nurses in one unit undertook an audit of pressure area management and documentation, and recommended modifications in the area of record-keeping.

Cole, L. and C. Nesbitt (2004). "A three-year multiphase pressure ulcer prevalence/incidence study in a regional referral hospital." *Ostomy/Wound Management* 50(11): 32-4, 36-8, 40.

Pressure ulcers can have a devastating impact on health and care provision, ranging from patient discomfort and increased healthcare costs to a potential reflection on the quality of care. To evaluate the outcomes of prevention education and skin integrity interventions on the incidence of pressure ulcers, a multiphase project was initiated in an urban 154-bed regional referral community hospital in Ontario, Canada that provides care to an urban and rural population. The prevalence study included 84 adult subjects at baseline, 77 after one year (Phase .1), and 100 after 3 years (Phase 2). The Braden Scale for Predicting Pressure Sore Risk and a data collection form were used to record prevalence, incidence, stage, and location of pressure ulcers, and related documented interventions. Incidence data were obtained from patient charts and defined as ulcers that developed >24 hours following admission. Phase 1 interventions involved staff education and replacement of existing skin care products. Phase 2 interventions included adoption of pressure ulcer prevention protocols, advanced wound care products, improved support surface usage, modification of documentation methods, and staff education., Of the 84 patients assessed at baseline, 15 (17.9%) developed 22 pressure ulcers compared to four of 77 (5.2%) during Phase 1 and two out of 100 (2.0%) during Phase 2. The difference between baseline and both subsequent time points was statistically significant ( $P < 0.05$ ). These results suggest that

education and the implementation of appropriate skin care products and procedures and pressure ulcer prevention protocols may reduce the incidence of hospital-acquired pressure ulcers.

Coleman, E. A., J. M. Martau, et al. (2002). "Pressure ulcer prevalence in long-term nursing home residents since the implementation of OBRA '87." *Journal of the American Geriatrics Society* 50(4): 728-32.

**OBJECTIVES:** To evaluate change in pressure ulcer prevalence in long-term nursing home residents since the implementation of the Omnibus Budget Reconciliation Act of 1987 (OBRA '87). **DESIGN:** Cross-sectional comparison of two time periods. **SETTING:** Ninety-two nursing homes scheduled for a quality-of-care survey randomly selected from 22 representative states. **PARTICIPANTS:** Four thousand six hundred seventy-nine residents who had resided in the facility for at least 100 days were evaluated: 2,336 during 1992-1994 and 2,343 during 1997-1998. **MEASUREMENTS:** Trained registered nurses collected data on pressure ulcer prevalence, stage, and risk factors from medical record review during on-site evaluations. Risk-adjusted differences were estimated using logistic regression. **RESULTS:** Unadjusted prevalence rates for all stages of pressure ulcers (8.52% vs 8.54%,  $P = .983$ ) and those rated stage 2 or greater (5.31% vs 5.63%,  $P = .624$ ) did not differ between the two time periods. After adjustment for urinary incontinence, immobility, poor nutrition, and history of previous pressure ulcers, the relative odds of having a pressure ulcer in 1992/4 versus 1997/8 was 1.06 (95% confidence interval (CI) = 0.84-1.34) for all stages and 1.21 (95% CI = 0.92-1.60) for stages 2 and greater. **CONCLUSIONS:** No change in pressure ulcer prevalence was demonstrated since implementation of OBRA '87 in this nationally derived sample of long-term nursing home residents.

Compher, C., B. P. Kinosian, et al. "Obesity reduces the risk of pressure ulcers in elderly hospitalized patients." *Journals of Gerontology* 62A(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.

David, J. (2005). "The size of the problem of pressure ulcers... this paper was first published in *Care -- Science and Practice*, 1981 (1):10-13." *Journal of Tissue Viability* 15(2): 12-4.

This paper describes the challenges that different classifications of pressure ulcers may impose upon understanding pressure ulcer epidemiology.

Davis, C. M. and N. G. Caseby (2001). "Prevalence and incidence studies of pressure ulcers in two long-term care facilities in Canada." *Ostomy/Wound Management* 47(11): 28-34.

This article discusses a study of publications on pressure ulcers from 1965 to 1999 using the information available in Medline. Results show that .06% of all articles relate to pressure ulcers. Of all the articles about pressure ulcers, 49% were research articles and 51% were clinical articles. When comparing the total percentage of articles on pressure ulcers to the costs of pressure ulcers in healthcare (1.3% of the total Netherland healthcare budget), one can conclude that clinicians and scientists insufficiently appreciate pressure ulcers as a problem. The number and the proportion of pressure ulcer articles are growing, as well as initiatives to urge researchers studying the same topic to start international working groups, but more research is needed. This article offers insight into the current status of pressure ulcer literature and addresses some reasons for the lack of interest in the pressure ulcer problem.

de Laat, E. H. E., L. Schoonhoven, et al. (2006). "Epidemiology, risk and prevention of pressure ulcers in critically ill patients: a literature review." *Journal of Wound Care* 15(6): 269-75.

New nursing interventions and pressure-redistributing devices in intensive care units, and specific risk factors affecting critically ill patients, mean that different factors must be taken into consideration in preventing pressure ulcers.

Dealey, C. (1997). "Pressure ulcer prevention -- the UK perspective." *Dermatology Nursing* 9(2): 108-13.

Pressure ulcers are a universal problem. Much attention has been given to them in the United Kingdom in recent years. They are seen as a key indicator of the quality of care. Their prevention has become politically, as well as clinically, important.

Dealey, C. (2002). "10 years of BJN: tissue viability nursing. Review of advances in pressure ulcer management since 1992." *British Journal of Nursing* 11(7): 486, 488, 490.

This article seeks to review the progress in the treatment and prevention of pressure ulcers over the last 10 years under the headings of attitudes, politics, research and best practice. It is considered that attitudes have changed and there is a greater awareness of, and interest in, the topic among other healthcare professionals, not just nurses. This may be in part because the topic has risen up the political agenda following studies which have highlighted the numbers of sufferers and the cost of treatment. Unfortunately, there is a scarcity of high quality research to inform practice. Despite these limitations, overall, there

has been some progress in preventing and treating pressure ulcers, but there is still a considerable journey ahead.

Defloor, T., M. Clark, et al. (2005). "EPUAP statement of prevalence and incidence monitoring of pressure ulcer occurrence." *Journal of Tissue Viability* 15(3): 20-7.

Dellefield, M. E. (2004). "Innovations in long-term care. Prevalence rate of pressure ulcers in California nursing homes: using the OSCAR database to develop a risk-adjustment model." *Journal of Gerontological Nursing* 30(11): 13-21.

This database contains approximately 700 variables that can be used to examine issues related to the quality of nursing home care.

Dixon, M. and C. Ratliff (2005). "Pediatric pressure ulcer prevalence -- one hospital's experience." *Ostomy/Wound Management* 51(6): 44-6, 48-50.

Pressure ulcers in children are presumed to be relatively uncommon and have not been well studied. To better understand the occurrence of pressure ulcers in the pediatric population, two wound ostomy continence certified nurses at the University of Virginia Children's Hospital conducted prevalence studies in June 2003 and in June 2004. All five pediatric units (the neonatal intensive care unit, the pediatric intensive care unit, two general acute care units, and the rehabilitation unit) were included in the study. Each hospitalized child present on the unit at the time of the study participated and was examined. The data were tabulated and analyzed using descriptive statistics. In June 2003, two of 77 patients (3%) and a year later three of 79 patients (4%) had a pressure ulcer. These results are comparable to recent multisite study prevalence figures. Priority outcomes of the prevalence studies include implementation of a pediatric pressure ulcer risk assessment tool, education of healthcare professionals, and continuous pressure ulcer prevalence monitoring.

Dobbs, N. A., P. Spanbauer, et al. (2007). "Continuous automated pressure ulcer monitoring." *Journal for Nurses in Staff Development* 23(3): 132-5.

In the spring of 2002, the nurses working in a 300-bed Midwest care center embarked on a mission to decrease patient suffering from skin breakdown and pressure ulcers. A continuous automated pressure ulcer monitoring system was developed to improve decision making and identify educational needs. As a result, the nurses have changed the skin culture of the facility and positively affected the rate of hospital-acquired pressure ulcers and non-pressure-related breakdown.

Donaldson, N., D. S. Brown, et al. (2005). "Leveraging nurse-related dashboard benchmarks to expedite performance improvement and document excellence." *Journal of Nursing Administration* 35(4): 163-72.

Using nursing quality benchmarks in operational dashboards and translating those data to drive performance excellence is a strategic imperative. Since access to unit-level, hospital-generated nurse-related benchmarks is an emerging arena, the authors provide an overview of aggregated trends and benchmarks gleaned from the California Nursing Outcome Coalition acute care database for 2 established nurse-related quality indicators-patient falls incidence and hospital-acquired pressure ulcer prevalence. Integrating these acute care benchmarks into clinical dashboards can be invaluable to clinicians, administrators, and policy makers who share a common commitment to expediting evidence-based improvement in patient care safety, outcomes, and excellence.

Duell, E., A. Navage, et al. (2006). "Nosocomial pressure ulcers in acute care: a descriptive study of patients at risk." *Journal of WOCN* 33(3S): Supplement 1: S46.

Dukich, J. and D. O'Connor (2001). "Impact of practice guidelines on support surface selection, incidence of pressure ulcers, and fiscal dollars." *Ostomy/Wound Management* 47(3): 44-8, 50-3.

Predicated on a need to control overall hospital costs and to integrate a Level 1 trauma center (Campus A) with a family practice based tertiary care hospital system (Campus B), expenditures associated with rental support surfaces were evaluated. Consistency and appropriateness of support surface selection is necessary to promote positive clinical outcomes, patient comfort, and a healthier bottom line, despite increasing costs. Clinical practice guidelines for therapeutic support surfaces were developed to decrease support surface expenditures and maintain prevalence rates below national averages. Utilizing the Agency for Health Care Policy and Research algorithm for managing tissue loads, along with other guidelines, criteria for prevention, comfort, and treatment were developed to assist nurses and physicians in support surface selections. A prevalence study was conducted before these criteria were implemented and repeated 1 year later. Expenditures for all rental support surfaces were assessed quarterly. Campus A, with a history of higher financial expenditures, was monitored weekly to assess whether support surfaces selections met guideline recommendations. Nursing staff reviewed hospital protocol regarding guidelines before implementation, and a self-administered review test was required during the first year post-implementation. One year later, a modest decrease in annual expenditures for rental support surfaces was noted. Campus A had a decrease in nosocomial pressure ulcers, while Campus B had an increased prevalence rate. Staff selection of support surfaces, within guideline recommendations, improved to 75% on medical/surgical units, and 98.8% in ICUs on Campus A. Although implementing support surface selection guidelines did not result in a significant reduction in cost, it created a framework for monitoring future related decisions.

Edwards, J. L., H. Pandit, et al. (2006). "Perioperative analgesia: a factor in the development of heel pressure ulcers?" *British Journal of Nursing* 15(6): Tissue Viability Supplement: S20-2, S24-5.

This article presents the incidence of heel pressure ulcers after an elective hip or a knee replacement. The majority of patients in the authors' institute receive either a neuraxial block (epidural and/or spinal) or peripheral nerve blocks (femoral and sciatic), depending on the anaesthetist's and surgeon's preference, and the patient's physical status. The past few years have seen increasing use of peripheral nerve blocks for knee replacement surgery. Patients with either the central or peripheral nerve blockade are at an increased risk of developing heel pressure ulcers. This article describes the experience at a tertiary referral centre and, in particular, highlights the risk of developing heel ulcers in patients receiving peripheral nerve blocks. Medical and nursing staff looking after these patients should be made aware of this complication and appropriate measures should be taken to prevent this avoidable complication.

Ellis, I., N. Santamaria, et al. (2006). "Improving pressure ulcer management in Australian nursing homes: results of the PRIME trial organisational study." *Primary Intention* 14(3): 106-11.

Pressure ulcer prevalence is frequently cited as a factor used to determine the quality of nursing care and is used as a proxy measure for nursing home quality. This paper reports the results of the organisational study conducted as a subcomponent of the PRIME trial. The PRIME trial was a multi-dimensional clinical trial designed to investigate the effectiveness of an integrated pressure ulcer management system in reducing the pressure ulcer prevalence and incidence in a cohort of Australian nursing homes. A stratified random sample of staff were interviewed from 17 consenting nursing homes (n=120). The interviews used a 10 question, semi-structured questionnaire covering four organisational quality factors and six PRIME trial implementation factors. Responses to questions were ranked on a scale of 1-5, 1 representing no evidence and 5 representing embedded practice. Data were aggregated by nursing home and the mean scores were calculated. Data were correlated with baseline pressure ulcer prevalence and the post PRIME pressure ulcer prevalence. The results of this study show that there was no relationship between baseline pressure ulcer prevalence and the context of care as measured by a range of organisational factors, including staff development planning, equipment and resource management, communication management and effectiveness of staff and resident feedback. The PRIME trial was able to significantly reduce prevalence of pressure ulcers regardless of the context of care. Paired sample t-tests showed a significant difference between the mean baseline prevalence (25.8%) and the mean post PRIME pressure ulcer prevalence (16.6%) (p=0.008) in nursing homes participating in the organisational component of the PRIME trial.

Emmons, P. J., P. Simmons, et al. (2006). "Interdisciplinary quality improvement team develops and implements a pressure ulcer prevention program using algorithms to guide staff practice." *Journal of WOCN* 33(3S): Supplement 1: S34.

Fisher, A. R., G. Wells, et al. (2004). "Factors associated with pressure ulcers in adults in acute care hospitals." *Advances in Skin & Wound Care* 17(2): 80-90.

**OBJECTIVES:** To identify and describe the relationship of factors associated with pressure ulcers in adults in acute care hospitals. **DESIGN:** Cross-sectional prevalence studies. **SETTING:** University teaching hospital. **PATIENTS:** Prevalence studies conducted from 1993 to 1995 with a total of 1992 subjects served as the derivation sample and a 1996 prevalence study with 581 subjects served as the validation sample. **MAIN OUTCOME MEASURES:** Pressure ulcers and the Braden risk assessment subscale scores. **DATA ANALYSIS:** Logistic regression analysis was used to derive a model that fit the data and performed well at identifying factors associated with pressure ulcers. Performance of the model, in terms of calibration, was statistically evaluated using the Hosmer-Lemeshow goodness-of-fit test. The effectiveness of the model, in terms of discrimination, was assessed by considering the cut-off values using 2 by 2 classification tables to measure the overall percentage of subjects correctly classified in the validation sample. **MAIN RESULTS:** Factors associated with pressure ulcers in adults in acute care hospitals were identified as age, male gender, sensory perception, moisture, mobility, nutrition, and friction/shear. Three interactions were also found to be associated with pressure ulcers; 2 interactions (age and sensory perception and moisture and sensory perception) were negatively associated and 1 interaction (nutrition and gender/male) was positively associated with pressure ulcers. The Hosmer-Lemeshow goodness-of-fit test for the derivation sample (.76) and the validation sample (.79) indicated that the model was well calibrated and a good fit. The overall percentage of subjects correctly classified using the validation sample was 88%, indicating that the model performed well. **CONCLUSIONS::** This study enhances the knowledge of the relationship of factors associated with pressure ulcers in adults in acute care populations and enhances the use and relative importance of particular Braden Scale sub-scales.

Fisher, A. R., G. Wells, et al. (2004). "Factors associated with pressure ulcers in adults in acute care hospitals... previously published in *Advances in Skin and Wound Care*, Volume 17, Issue No. 2, pp. 80-90 (2004). Reprinted with permission." *Holistic Nursing Practice* 18(5): 242-53.

**Objectives:** To identify and describe the relationship of factors associated with pressure ulcers in adults in acute care hospitals., **Design:** Cross-sectional prevalence studies., **Setting:** University teaching hospital., **Patients:** Prevalence studies conducted from 1993 to 1995 with a total of 1992 subjects served as the derivation sample and a 1996 prevalence study with 581 subjects served as the validation sample., **Main outcome measures:** Pressure ulcers and the Braden risk assessment subscale scores., **Data analysis:** Logistic regression analysis was used to derive a model that fit the data and performed well at identifying factors associated with pressure ulcers. Performance of the model, in terms of calibration, was statistically evaluated using the Hosmer-Lemeshow goodness-of-fit test. The effectiveness of the model, in terms of discrimination, was assessed by considering the cut-off values using 2 by 2 classification tables to measure the overall percentage of subjects correctly classified in the validation sample., **Main results:** Factors associated with pressure ulcers in adults in acute care hospitals were identified as age, male gender, sensory perception, moisture, mobility, nutrition, and friction/shear. Three interactions were also found to be associated with pressure ulcers; 2 interactions (age and sensory perception and moisture and sensory perception) were negatively associated and 1 interaction (nutrition and gender/male) was positively associated with pressure ulcers. The Hosmer-Lemeshow goodness-of-fit test for the derivation sample (0.76) and the validation sample (0.79)

indicated that the model was well calibrated and a good fit. The overall percentage of subjects correctly classified using the validation sample was 88%, indicating that the model performed well., Conclusions: This study enhances the knowledge of the relationship of factors associated with pressure ulcers in adults in acute care populations and enhances the use and relative importance of particular Braden Scale subscales.

Fleischer, I. and D. Bryant (1997). "Evaluating replacement mattresses." *Nursing Management* 28(8): 38, 40-1.

A multidisciplinary team evaluated four replacement mattresses. The mattress that was found to be most effective in preventing pressure ulcers was then compared to the static air mattress. The study's results and outcomes are presented.

Fletcher, J. (2001). "How can we improve prevalence and incidence monitoring?" *Journal of Wound Care* 10(8): 311-4.

Many studies have attempted to calculate pressure ulcer occurrence rates, but their results cannot be compared due to variations in the methodologies used. How can this problem be overcome?

Fletcher, J. (2003). "Measuring the prevalence and incidence of chronic wounds." *Professional Nurse* 18(7): 384-6, 388.

Chronic wounds such as leg ulcers and pressure sores are a burden on resources and patients who have to live with them. Surveys of prevalence and incidence attempt to clarify the problem. However, it is vital that researchers give appropriate definitions and measurements, take case mix into account and compare like with like when publishing their findings.

Frantz, R. A. (1997). "Measuring prevalence and incidence of pressure ulcers." *Advances in Wound Care: The Journal for Prevention and Healing* 10(1): 21-4.

The current competitive health care environment has intensified the need for data that provide a snapshot of the realities of clinical practice. As decision making moves from a clinically based perspective to one grounded in scientific data, health care providers are increasingly being challenged to document the extent of a problem and the effectiveness of its management. This is especially true with pressure ulcers, which are viewed as high-volume, high-risk problems in most health care settings. Moreover, in long-term care facilities, regulatory agencies have designated the development of pressure ulcers as an indicator of quality of care provided to patients. Thus, it is essential that data related to the scope and severity of pressure ulcers in a facility be gathered accurately. The aim of this article is to describe a methodology for determining prevalence and incidence of pressure ulcers that accurately measures the effectiveness of preventive intervention. The importance

of risk assessment and of clear operational definitions of the population and a case will be addressed.

Gallagher, S. M. (1997). "Outcomes in clinical practice: pressure ulcer prevalence and incidence studies." *Ostomy/Wound Management* 43(1): 28-30, 32, 34-5 passim.

Payors and providers are seeking strategies to reduce the number and severity of pressure ulcers, while consumer groups are demanding reporting systems that reflect the success of such strategies. Prevalence and incidence studies are a quality assurance method of monitoring the success of pressure ulcer prevention and treatment in an acute care setting. Outcomes-based practice can be a result of Continuous Quality Improvement, of which benchmarking is a powerful tool. Outcomes can be identified through epidemiologic studies and prevalence and incidence studies. To measure outcomes, it is important to consider the various members of the study team, choose an appropriate time between the prevalence and incidence studies, and design consistent methods of data collection. The goal is to be able to analyze the data in such a manner that it can be compared to data collected in other studies. Success in managing the identified and measured outcomes lies in being able to pinpoint trends, track outcomes over time, and share and compare the resulting information. Quality improvement activities are an avenue for all patient care providers to blend theory, practical experience, and research principles into more fiscally-responsible, quality-based care.

Gethin, G., J. Jordan-O'Brien, et al. (2005). "Estimating costs of pressure area management based on a survey of ulcer care in one Irish hospital." *Journal of Wound Care* 14(4): 162-5.

Pressure ulceration remains a significant cause of morbidity for patients and has a real economic impact on the health sector. Studies to date have estimated the cost of management but have not always given a breakdown of how these figures were calculated. There are no published studies that have estimated the cost of management of pressure ulcers in Ireland. A two-part study was therefore undertaken. Part one determined the prevalence of pressure ulcers in a 626-bed Irish acute hospital. Part two set out to derive a best estimate of the cost of managing pressure ulcers in Ireland. The European Pressure Ulcer Advisory Panel (EPUAP) minimum data set tool was used to complete the prevalence survey. Tissue viability nurses trained in the data-collection tool collected the data. A cost was obtained for all items of care for the management of one patient with three grade IV pressure ulcers over a five-month period. Of the patients in the acute hospital, 2.5% had pressure ulcers. It cost 119,000 Euros to successfully treat the one patient with the three grade IV pressure ulcers. We estimate that it costs 250,000,000 Euros per annum to manage pressure ulcers across all care settings in Ireland.

Gibbons, W., H. T. Shanks, et al. (2006). "Clinical excellence series. Eliminating facility-acquired pressure ulcers at Ascension Health." *Joint Commission Journal on Quality and Patient Safety* 32(9): 488-96.

Background: In 2004, as part of Ascension Health's "Healthcare That Is Safe" initiative, St. Vincent's Medical Center, as an alpha site, was charged with defining best practices to eliminate facility-acquired pressure ulcers. A comprehensive plan, including the "SKIN" (Surfaces, Keep the patients turning, Incontinence management, Nutrition) bundle, was developed., Results: The incidence of pressure ulcers decreased from > 2% to < 1% from December 2004 through February 2006. No new Stage III or IV facility-acquired pressure ulcers occurred between August 2004 and February 2006. Weekly SKIN operations meetings and use of the SKIN process tool ensured that all at-risk patients were receiving appropriate interventions., Reporting and Spread: The alpha site work and SKIN bundle were presented to all 67 Ascension Health acute care facilities at a rapid-design-format Pressure Ulcer Summit in mid 2005. All acute care facilities agreed to a single model of care using the SKIN bundle and common measures of quality and performance., Discussion: The St. Vincent's alpha site initiative in pressure ulcer prevention, enabled it to identify at-risk populations, implement appropriate actions, and achieve positive, measurable, meaningful results., Conclusion: The SKIN program was adopted and is being implemented throughout Ascension Health.

Gordon, M. D., M. M. Gottschlich, et al. (2004). "Review of evidenced-based practice for the prevention of pressure sores in burn patients." *Journal of Burn Care & Rehabilitation* 25(5): 388-410.

Pressure ulcers represent a complex clinical problem, with a reported incidence of 2.7% to 29.5% in hospitalized patients and an etiology that is multifactorial. The prevention of pressure sores in the burn patient population is clearly an area of practice in need of guidelines for care. A multidisciplinary group of advanced burn care professionals have compiled, critiqued, and summarized herein the current evidence of practice in nursing, nutrition, and rehabilitation as it pertains to the prevention of pressure sores after burn injuries. A broad overview of risk factors and assessment scales is described, and current intervention practices and recommendations for care are provided based, whenever possible, on research findings. In addition, research questions are generated in an attempt to move the specialty of burns toward the formal investigation of pressure sores with the ultimate goal being the development of evidence-based practice guidelines.

Granick, M. S. and D. A. Ladin (1998). "The multidisciplinary in-hospital wound care team: two models." *Advances in Wound Care: The Journal for Prevention and Healing* 11(2): 80-3.

The cost of community- and hospital-acquired pressure ulcers is particularly high in terms of both patient morbidity and economics. Multidisciplinary wound care teams were developed independently at two different hospitals to deal with the needs of patients with pressure ulcers and to control costs. Although the goals of the teams at both institutions were similar, the strategies for achieving the goals were different because they were adapted to the needs of the particular institution. As a result, care and prevention of pressure ulcers has improved at both hospitals.

Groeneveld, A., M. Anderson, et al. (2004). "The prevalence of pressure ulcers in a tertiary care pediatric and adult hospital." *Journal of WOCN* 31(3): 108-22.

**OBJECTIVE:** To describe the pressure ulcer prevalence, stage and body location, and demographic characteristics of patients with pressure ulcers at a tertiary care adult hospital and a tertiary care pediatric hospital., **DESIGN:** Prevalence survey., **SETTING AND SUBJECTS:** A total of 513 inpatients, including 416 adults admitted to a tertiary care hospital and 97 children admitted to a tertiary care pediatric hospital. Only inpatients with mental health-related diagnoses were excluded., **INSTRUMENTS:** The Kinetics Concepts International's Prevalence and Incidence Study Collection Form was used to assess variables, including demographic information; presence, location, and stage of pressure ulcers; and presence of special support surfaces., **METHODS:** All patients had head-to-toe skin assessments performed during an 8-hour period by teams of 3 multidisciplinary staff members. Kinetics Concepts International's Prevalence and Incidence Program software and Microsoft Excel were used for data entry and analysis., **RESULTS:** Combined pressure ulcer prevalence was 26.3%, with 29.2% in adult patients and 13.1% in pediatric patients. The most common body locations for pressure ulcers were the sacrum (22.1%), heels (14.8%), ears (12.9%), elbows (10.6%), and the buttocks (6.8%). Forty-eight percent of the ulcers were stage I, 36% Stage II, 6% Stage III-IV, and 10% unable to stage., **CONCLUSIONS:** Overall combined pressure ulcer prevalence and common body locations were consistent with findings from comparable hospitals. Patients at the extreme ends of the age spectrum had an increased risk of pressure ulcers. Stage I and II ulcers occurred most frequently. Potential prevention and early management strategies may be effective in decreasing the prevalence of these ulcers.

Gunningberg, L. (2006). "EPUAP pressure ulcer prevalence survey in Sweden: a two-year follow-up of quality indicators." *Journal of WOCN* 33(3): 258-66.

**OBJECTIVE:** The aim of this study was to determine the effects of quality improvement programs for pressure ulcer prevention by conducting a follow-up survey in a hospital in Sweden., **DESIGN:** A cross-sectional survey design with comparison between data collected in 2002 and 2004., **SETTING AND SUBJECTS:** All inpatient areas were surveyed in the surgical, medical, and geriatric departments in a university hospital. A total of 369 patients were included., **INSTRUMENTS:** The European Pressure Ulcer Advisory Panel data collection form including some additional questions., **METHODS:** The 1-day survey was conducted on March 23, 2004. Each patient was visited by 2 registered nurses, who inspected the patient's skin for any pressure ulcer classified according to the EPUAP grading system., **RESULTS:** There were no significant differences in gender, age, or Braden score between the patients in surgical, medical, or geriatric care in 2002 and 2004. The overall prevalence of pressure ulcers was 33.3% (grade 1 excluded: 10.9%) in 2002 and 28.2% (grade 1 excluded: 14.1%) in 2004. In surgical care, the prevalence was reduced from 26.8% to 17.3% ( $P = .051$ ). In medical care, the prevalence was 23.6% in 2002 and 26.7% in 2004. Corresponding prevalence figures for geriatric care were 59.3% and 50.0%. A quarter of the patients in surgical care, a third in medical care, and more than half in geriatric care had a pressure ulcer upon arrival at the ward. The use of pressure-reducing mattresses had increased significantly from 16.0% to 42.7% in medical care ( $P = .000$ )., **CONCLUSIONS:** The EPUAP methodology has facilitated the introduction of pressure ulcer

as a quality indicator at hospital level. Pressure ulcer prevalence surveys with a standardized methodology should be repeated on a regular basis in order to stimulate quality improvement.

Gunningberg, L. and A. Ehrenberg (2004). "Wound care. Accuracy and quality in the nursing documentation of pressure ulcers: a comparison of record content and patient examination." *Journal of WOCN* 31(6): 328-35.

**OBJECTIVE:** To determine the accuracy and describe the quality of nursing documentation of pressure ulcers in a hospital care setting., **DESIGN:** A cross-sectional survey was used comparing retrospective audits of nursing documentation of pressure ulcers to previous physical examinations of patients., **SETTING AND SUBJECTS:** All inpatient records (n = 413) from February 5, 2002, at the surgical/orthopedic (n = 144), medical (n = 182), and geriatric (n = 87) departments of one Swedish University hospital., **INSTRUMENTS:** The European Pressure Ulcer Advisory Panel data collection form and the Comprehensiveness in Nursing Documentation., **METHODS:** All 413 records were reviewed for presence of notes on pressure ulcers; the findings were compared with the previous examination of patients' skin condition. Records with notes on pressure ulcers (n = 59) were audited using the European Pressure Ulcer Advisory Panel and Comprehensiveness In Nursing Documentation instruments., **RESULTS:** The overall prevalence of pressure ulcers obtained by audit of patient records was 14.3% compared to 33.3% when the patients' skin was examined. The lack of accuracy was most evident in the documentation of grade 1 pressure ulcers. The quality of the nursing documentation of pressure ulcer (n = 59) was generally poor., **CONCLUSIONS:** Patient records did not present valid and reliable data about pressure ulcers. There is a need for guidelines to support the care planning process and facilitate the use of research-based knowledge in clinical practice. More attention must be focused on the quality of clinical data to make proper use of electronic patient records in the future.

Haas, J. P. (2007). "Wound wise. Sorting out incidence and prevalence: which is best to use in measuring rates of pressure ulcers?" *American Journal of Nursing* 107(4): 50.

Halfens, R. J. G., G. J. J. Bours, et al. (2002). "Prevalence and incidence study sparks issues... "Prevalence and incidence studies of pressure ulcers in two long-term care facilities in Canada" 2001;47[11]:28-34." *Ostomy/Wound Management* 48(3): 8, 10, 12.

Hanson, R. (1997). "Wound care. Sore points sorted... a point prevalence audit of pressure sores." *Nursing Times* 93(7): 66, 68, 70 passim.

Ruth Hanson's care study suggests how the prevalence of pressure sores can be identified and incidence rates reduced.

Harrison, M. B., J. Logan, et al. (1998). "Quality improvement, research, and evidence-based practice: 5 years experience with pressure ulcers." *Evidence-Based Nursing* 1(4): 108-10.

Helberg, D., E. Mertens, et al. (2006). "Treatment of pressure ulcers: results of a study comparing evidence and practice." *Ostomy/Wound Management* 52(8): 60-3, 66, 68 passim.

Pressure ulcers remain prevalent in hospitals and nursing homes despite the availability of evidence-based guidelines for prevention and care. To evaluate the level of evidence-based literature and its application in pressure ulcer treatment, a search was conducted of relevant English and German articles published between 1994 and 2002 using the key terms decubitus ulcer and its synonyms in different combinations with therapy, wound management, and specific wound treatment terms. Results were compared to wound dressing use data obtained from two pressure ulcer prevalence surveys conducted in 51 hospitals and 15 nursing homes in Germany in 2001 and 2002 (N = 11,584). Dressing usage evidence levels were reviewed and reported usage was classified as consistent or not consistent with existing guidelines or as evidence base unknown. Pressure ulcer prevalence rates ranged from 10.6% to 13.2% and the majority of pressure ulcers (60%) were Grade 1. In nursing homes, dressing selection was consistent with current evidence in 6.8% of Grade 1 and 27.8% of Grade 2 ulcers. In acute care facilities, dressing selection in 2001 and 2002 was consistent with current evidence in 21.6% and 38.5%, respectively, of Grade 1 ulcers and in 40.2% and 51.5%, respectively, of Grade 2 ulcers. Although strong evidence exists to support the use of dressings that facilitate moist wound healing, barely half of the grade 3 and grade 4 ulcers in all care settings received this treatment. While dressing classification limitations restricted the ability to analyze all treatment methods used, findings suggest that clinician knowledge deficits regarding evidence-based treatments remain. The literature review results also indicate the level of evidence for many practice recommendations remains low. Studies to increase evidence levels of pressure ulcer prevention and treatment as well as programs to improve awareness and implementation of current evidence-based guidelines are needed.

Helvig, E. I. (2007). "The quest to capture pressure ulcer incidence... 39th Annual Wound, Ostomy and Continence Nurses Annual Conference." *Journal of WOCN* 34(3S): Supplement: S44-5.

Hill, M., M. Labik, et al. (1997). "Managing skin care with the CareMap system." *Journal of WOCN* 24(1): 26-37.

In the last three decades, WOC nursing has evolved into an increasingly complex practice. The CareMap is a tool designed to assist in management of patient care. This article defines the CareMap system and describes the development, implementation, and pilot evaluation of a skin care pathway created with the CareMap at Western Pennsylvania Hospital.

Hiser, B., J. Rochette, et al. (2006). "Implementing a pressure ulcer prevention program and enhancing the role of the CWOCN: impact on outcomes." *Ostomy/Wound Management* 52(2): 48-59.

Hospitals in the US are increasingly concerned with the rising number of hospital-acquired pressure ulcers. To reduce its 2002-2003 average hospital-acquired pressure ulcer prevalence rate of 9.2%, a regional medical center in southeastern US initiated a process improvement and education program. Quarterly pressure ulcer prevalence studies were conducted and the Medical Intensive Care Unit was found to have the highest number of hospital-acquired pressure ulcers among the five units participating in the study. As part of a new Pressure Ulcer Strategic Plan, significant changes were made to the organizational infrastructure and processes, which included implementing the Braden Risk Scale Assessment Tool in place of the Norton Risk Scale, developing a pressure ulcer prevention protocol, creating Pressure Ulcer/Skin Tear Physician orders for nurses, establishing a Skin Resource Team, and providing additional education, training, and other relevant resources. Better appreciation for and enhanced utilization of Certified Wound Ostomy Continence Nurses were encouraged. New support surfaces were purchased. Implementing these changes resulted in a decrease in the quarterly hospital-acquired pressure ulcer prevalence in participating units, including the Medical Intensive Care Unit where rates dropped from a high of 29% to near 0%. Clinicians now approach pressure ulcers as preventable rather than inevitable and view Certified Wound Ostomy Continence Nurses as resources and clinical experts for prevention and treatment. Overall quality of care and financial resource utilization also have substantially improved.

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., S. A. Bender, et al. (2002). "Description of the National Pressure Ulcer Long-Term Care Study." *Journal of the American Geriatrics Society* 50(11): 1816-25.

OBJECTIVES: To describe and provide baseline data from The National Pressure Ulcer Long-Term Care Study (NPULS). DESIGN: Retrospective cohort study of detailed resident characteristics, treatments, and outcomes using convenience sampling. SETTING: One hundred nine long-term care facilities throughout the United States. PARTICIPANTS: Two thousand four hundred twenty adult residents aged 18 and older, with a length of stay of 14 days or longer and who were at risk of developing a pressure ulcer, as defined by a Braden Scale for Predicting Pressure Sore Risk MEASUREMENTS: More than 500 characteristics were obtained for each resident over a 12-week period. This paper describes the NPULS database with respect to the resident (sex, age, diagnoses, severity of illness scores, Braden Scale score, activities of daily living, cognitive ability, mobility, bowel or bladder incontinence, laboratory values, nutritional assessment, and pressure ulcer assessment documentation), treatment (nutritional interventions, pressure relieving devices, incontinence interventions, protective devices, turning schedules, and pressure ulcer treatments), and outcome variables (pressure ulcer development and healing, pressure ulcer and systemic infection, changes in nutritional status, and discharge disposition) associated with pressure ulcers. Descriptive statistics and bivariate associations were used for preliminary analyses of resident, treatment, and outcome characteristics. RESULTS: The average age +/- standard deviation was 79.7 +/- 14.2; 70% of the residents were female. Fifty-three percent of residents (n = 1,293) were at risk of developing a pressure ulcer but never developed one during the study (Group 1), 19% developed a new pressure ulcer during the study (n = 457) (Group 2), 22% had an existing pressure ulcer (n = 534) (Group 3), and 6% had an existing pressure ulcer and developed a new ulcer during the study (n = 136) (Group 4). Residents who developed a new pressure ulcer (Group 2) were more likely to be female, older, cognitively impaired, and immobile than residents who had an existing pressure ulcer (Group 3). CONCLUSIONS: This baseline study describes the NPULS database with respect to the resident, treatment, and outcome variables associated with pressure ulcers. Future studies will focus on multivariate analyses for risk factor prediction of pressure ulcer development and pressure ulcer healing. Research-based pressure ulcer prevention and treatment protocols can then be developed.

Hunter, S., J. Anderson, et al. (2003). "Clinical trial of a prevention and treatment protocol for skin breakdown in two nursing homes [corrected] [published erratum appears in J WOCN 2003 Nov;30(6):350]." *Journal of WOCN* 30(5): 250-8.

OBJECTIVE: Our objective was to assess the effectiveness of skin care protocols, including a body wash and skin protectant, on skin breakdown in 2 nursing homes. DESIGN:

This was a quasi-experimental pretest/posttest design study. Setting and subjects Adult residents (n = 136) of 2 skilled nursing homes consented to participate in this study. Seventy percent were women; the sample average age of 82 years. INSTRUMENTS: A researcher-designed data recording form documented resident demographics, incidence and type of skin breakdown or pressure ulcer, presence of urinary or fecal incontinence, and assessment of the effectiveness of body wash and skin protectant. METHODS: Baseline data on prevalence of pressure ulcers and skin protocol were collected weekly for a 3-month period followed by a week-long educational program by the researchers about skin care and the body wash and skin protectant. During the 3-month trial with the body wash and skin protectant incorporated into routine care, research assistants recorded resident data weekly and researchers again assessed prevalence and incidence of pressure ulcers and skin breakdown weekly. RESULTS: Incorporation of a body wash and skin protectant into a skin care prevention and early intervention protocol in 2 nursing homes documented a decrease in skin breakdowns from 68 pre-intervention to 40 postintervention; the decrease in agency B was statistically significant. There was a statistically significant decrease in stage I and II pressure ulcer incidence overall (pre-intervention = 19.9%, postintervention = 8.1%). Nurses evaluated the body wash and skin protectant as effective for 98% of the time used. CONCLUSION: Implementation of a protocol for skin care along with staff education, including the prophylactic use of a body wash and skin protectant, reduced the incidence of skin breakdown, including pressure ulcers and perineal dermatitis, in 2 long-term care facilities.

Inman, C. and J. R. Firth (1998). "Pressure sore prevalence in the community." *Professional Nurse* 13(8): 515-7, 519-20.

As increasing numbers of patients are now being nursed in the community it is important that strategies for the prevention of pressures sores are in place. A prevalence survey in one trust helped staff to assess their resource needs and plan care.

Jacksich, B. B. (1997). "Pressure ulcer prevalence and prevention of nosocomial development: one hospital's experience." *Ostomy/Wound Management* 43(3): 32-4, 36, 38-40.

A 500 bed acute care facility needed to replace their old medical-surgical patient beds and reduce the costly use of specialty beds and overlays. After a review of the literature, the facility focused on the 44-bed AIDS/Oncology unit, first trialing a new therapeutic bed, then replacing all the beds. A prevalence survey was conducted 5 days before the placement of the new beds and monthly thereafter for 6 months. It was hypothesized that (1) incidence of nosocomial pressure ulcers would decrease, (2) use of specialty beds would be reduced, resulting in significant cost savings within a few months, and (3) there would be a learning curve regarding use of the beds and proper "zoning" of patients. From April through November 1995, 256 patients were surveyed. Pre-survey, the average range on the unit for pressure ulcer prevalence was 7.5 to 15% (both nosocomial and admitted). Post-survey, the range was 3 to 16% (admitted ulcers only). Zero nosocomial pressure ulcers developed during the study period. Use of foam overlays and low air loss

surfaces decreased, resulting in a savings of 83%. There were no problems with using the beds or zoning patients. These survey results suggest that other institutions could achieve similar clinical and financial outcomes by converting rental dollars to capital assets.

Jackson, P. (2005). "Commentary on Lahmann N, Halfens R and Dassen T (2005) Prevalence of pressure ulcers in Germany. *Journal of Clinical Nursing* 14, 165-172... including author response." *Journal of Clinical Nursing* 14(10): 1271-3.

James, G. A., E. Swogger, et al. (2008). "Biofilms in chronic wounds." *Wound Repair and Regeneration* 16(1): 37-44.

Chronic wounds including diabetic foot ulcers, pressure ulcers, and venous leg ulcers are a worldwide health problem. It has been speculated that bacteria colonizing chronic wounds exist as highly persistent biofilm communities. This research examined chronic and acute wounds for biofilms and characterized microorganisms inhabiting these wounds. Chronic wound specimens were obtained from 77 subjects and acute wound specimens were obtained from 16 subjects. Culture data were collected using standard clinical techniques. Light and scanning electron microscopy techniques were used to analyze 50 of the chronic wound specimens and the 16 acute wound specimens. Molecular analyses were performed on the remaining 27 chronic wound specimens using denaturing gradient gel electrophoresis and sequence analysis. Of the 50 chronic wound specimens evaluated by microscopy, 30 were characterized as containing biofilm (60%), whereas only one of the 16 acute wound specimens was characterized as containing biofilm (6%). This was a statistically significant difference ( $p < 0.001$ ). Molecular analyses of chronic wound specimens revealed diverse polymicrobial communities and the presence of bacteria, including strictly anaerobic bacteria, not revealed by culture. Bacterial biofilm prevalence in specimens from chronic wounds relative to acute wounds observed in this study provides evidence that biofilms may be abundant in chronic wounds.

James, J. (2004). "Pressure ulcers. A static-led approach to pressure ulcers: an evaluation after 3 years." *British Journal of Nursing* 13(20): 1221-2, 1224-5.

Pressure damage has high cost implications to the patient and care providers. The choice of appropriate equipment to help in the prevention of tissue damage is hampered by extensive choice and little guidance on the most effective product to use. The static-led approach was introduced into Carmarthenshire NHS Trust 3 years ago. This approach simplified the choice of equipment, improving the appropriate usage and reducing expenditure. This article aims to evaluate the approach 3 years after its introduction to determine if the benefits to the patient and the organization still apply.

Klingel, P. (1996). "Exploring the process of a skin care team." *Ostomy/Wound Management* 42(10): 30-2, 34, 36-8 passim.

In early 1994, the nursing department in a 153 bed acute care facility with a twenty bed short-term physical rehabilitation unit noticed that patients were developing nosocomial skin care problems at their facility. It was found that patients who returned to the facility within 31 days were at risk. A one-day, prevalence survey was conducted which revealed the presence of a high percentage of pressure ulcers among the patients surveyed. A group of nurses decided to institute a multidisciplinary team in an attempt to solve the skin care problems, which resulted in the formation of a Skin Care Team. The Skin Care Team sought to improve the appropriateness, effectiveness, and efficiency of delivering skin care to patients, as well as to improve the continuity of care among healthcare providers in the provision of skin care services. The following article was written by a member of the Skin Care Team. The concept of teamwork is defined and explored, and a description of the developmental process of a team, specifically a skin care team, is also provided.

Lahmann, N. A., R. J. G. Halfens, et al. (2005). "Prevalence of pressure ulcers in Germany." *Journal of Clinical Nursing* 14(2): 165-72.

**AIMS AND OBJECTIVES:** This article establishes the prevalence of pressure ulcers in hospitals and nursing homes for national and international comparison. **BACKGROUND:** Although many European countries evaluate the prevalence of pressure ulcers, it has not recently been examined in German healthcare facilities. **DESIGN:** Descriptive study design, point prevalence survey in 2001 and 2002. A total of 11 584 patients and residents in 66 institutions throughout Germany took part in the study. **METHODS:** Prevalence rates were calculated for the different types of institutions, different years, different risk groups and different disciplines. All calculations were made by including as well as excluding pressure ulcer grade 1. The Braden scale (cut-off  $<$  or  $=20$ ) was applied to define at risk and not at risk patients/residents. **RESULTS:** The prevalence including (excluding) grade 1 pressure ulcers was 11.7% (5.2%) for the whole sample, while in the group at risk it was 24.5% (11.5%). The size of the group at risk in the nursing homes was 63.9% and less than 40% in the hospitals. Comparisons between disciplines showed a great range of prevalence rates. The use of special surface devices for persons at risk was more common in nursing homes than in hospitals. **CONCLUSION:** The prevalence of pressure ulcers bears resemblance to results produced by other studies, but it is uncertain if these similarities are more than coincidental. Due to the influence of sampling the use of a standardized samples method is essential. For comparisons of groups with differences regarding their risk assessment it would be more appropriate to use the prevalence of patients and residents at risk. **RELEVANCE TO CLINICAL PRACTICE:** The study provides accurate data about the extent of the problem of pressure ulcers in German healthcare facilities.

Lahmann, N. A., R. J. G. Halfens, et al. (2006). "Pressure ulcers in German nursing homes and acute care hospitals: prevalence, frequency, and ulcer characteristics." *Ostomy/Wound Management* 52(2): 20-2, 24, 26 passim.

In German healthcare facilities, research-based knowledge of pressure ulcers and their relation to patient characteristics is limited. To provide information for national and international comparison on pressure ulcers and related issues, two cross-sectional surveys

were conducted among 21,574 German hospital patients and nursing home residents (147 institutions total) in 2002 and 2003. Prevalence and frequency rates of pressure ulcers in people at risk (Braden score of  $\leq 20$ ) in different institution types were compared and descriptive data on severity, location, history, and origin of 3,857 wounds were analyzed to examine the relationship between age, body mass index, and Braden score and the frequency and severity of wounds. The studies found that among all persons at risk, pressure ulcer prevalence was 21.1% and that the number of pressure ulcers per person was higher in hospitals (1.91, 24.6%) than in nursing homes (1.42, 13.9%). In addition, in hospital patients and nursing home residents, 36.4% and 46.7% of wounds, respectively, were grade 2 severity and higher. In both types of institutions, the most common pressure ulcer locations were the lower back and the heels. In hospital patients, 51.4% of pressure ulcers were facility-acquired, compared to 60.2% in nursing homes. In hospital patients and nursing home residents, 7.4% and 29.7% of wounds, respectively, had existed for more than 3 months. The studies also found that persons with lower Braden scale scores had more ulcers and more severe pressure ulcers. Analysis of wounds in this large patient population provides more detailed information about the problem of pressure ulcers and should help improve prevention and treatment.

Lake, N. O. (1999). "Methodology. Measuring incidence and prevalence of pressure ulcers for intergroup comparison." *Advances in Wound Care: The Journal for Prevention and Healing* 12(1): 31-4.

As more emphasis is placed on outcome measurement as a tool for evaluating quality of care, development of a standard method for reporting the incidence and prevalence of pressure ulcers will become essential. Furthermore, the ability to use such a tool for intergroup comparisons will be a necessary component. In order to develop such a standard method, the issue of population definition must be addressed. A standard statistical method is presented that simplifies population concerns and that factors out the bias of varying degree or level of risk. Performing such calculations would facilitate meaningful comparison of incidence and prevalence rates between groups.

Langemo, D., J. Anderson, et al. (2007). "Research forum. A quick overview on measuring pressure ulcer prevalence and incidence." *Advances in Skin & Wound Care* 20(12): 642, 644.

Langemo, D. K., J. Anderson, et al. (2003). "Skin and wound care extra. Uncovering pressure ulcer incidence: research reveals the relationship between care hours and condition occurrence." *Nursing Management* 34(10): 54-7.

Researchers compare state-specific pressure ulcer incidence, staff mix, and nursing care hours to American Nurses Association care quality outcomes data.

Langemo, D. K., J. Anderson, et al. (2004). "Uncovering pressure ulcer incidence... previously published in Nursing Management 2003;34(10):54-7." *Holistic Nursing Practice* 18(1): 42-4.

Researchers compare state-specific pressure ulcer incidence, staff mix, and nursing care hours to American Nurses Association care quality outcomes data.

Lewin, G., K. Carville, et al. (2003). "Determining the effectiveness of implementing the AWMA Guidelines for the Prediction and Prevention of Pressure Ulcers in Silver Chain, a large home care agency: stage 1: baseline measurement... Australian Wound Management Association." *Primary Intention* 11(2): 57-8, 60-7, 69-72.

Silver Chain is the largest aged and community care provider in Western Australia and assists the frail aged and disabled to remain in their own homes. Many of these individuals have compromised mobility and health status and without appropriate prevention are at significant risk of developing pressure ulcers. Like many other community organisations, Silver Chain did not have any standardised work processes for predicting the risk and reporting of pressure ulcers. As part of its commitment to providing high quality care, Silver Chain is currently undertaking a project to introduce the Australian Wound Management Association's (AWMA) Clinical Practice Guidelines for the Prediction and Prevention of Pressure Ulcers. This will be achieved by incorporating the guidelines into everyday work processes and accompanying the introduction of the new processes by a comprehensive staff education and training programme. The methodology and the tools developed by Prentice for the introduction and evaluation of the AWMA guidelines in Australian tertiary hospitals were adapted for use within a community setting. Baseline measurements of clinical and non-clinical staff knowledge and pressure ulcer prevalence were collected in December 2002. The results of the baseline study clearly demonstrated a need to improve staff knowledge of pressure ulcer prevention and the need to implement standardised quality processes to prevent pressure ulcers.

Lindholm, C., H. Andersson, et al. (2005). "Wounds scrutiny in a Swedish hospital: prevalence, nursing care and bacteriology, including MRSA." *Journal of Wound Care* 14(7): 313-9.

Objective: To identify all wounds, wound types and wound characteristics; to identify bacteria in all wounds, particularly MRSA, VRE and multi-resistant Gram-negative rods; ., Method: All patients admitted to or visiting hospital clinics were examined. If the patient had a wound, a questionnaire was filled in by a nurse, and if the wound met the inclusion criteria swabs were taken. Results: A total of 2 172 patients were admitted to or visited the hospital; 408 (19%) had a total of 668 wounds. Of this number, 248 were cultured. Thirty-seven patients had pressure ulcers, 83 had leg and foot ulcers and 288 patients had other types of wounds. Nursing care varied according to wound type and ward. Fifty-eight different types of wound dressings were used. Cleansing was performed with saline in 58% of the wounds. The mean number of dressing changes was once daily. Wounds were painful in 37% of the cases, with a predominance of leg and foot ulcers (51%). Many patients did not receive analgesia. MRSA was identified in two patients. No VRE was identified, and there was a low

prevalence of multi-resistance in Enterobacteriaceae and Pseudomonas aeruginosa., Conclusion: The study provided important information for future improvement of wound care in a university hospital. Fewer resistant bacteria, particularly MRSA, were identified than expected., Declaration of interest: None.

Lindholm, C., A. Bergsten, et al. (1999). "Chronic wounds and nursing care." *Journal of Wound Care* 8(1): 5-10.

This study has collated data on the prevalence of chronic wounds and the demography of patients with these wounds. Diagnostic methods, nursing care, the presence of diabetes and pain are analysed, as well as data on healing, amputation and mortality three months post-study. A total of 694 patients were identified: 406 with leg or foot ulcers, 117 with pressure ulcers and 171 with other wounds. Most patients were treated in the community. Leg ulcer aetiology was verified with ultrasound Doppler examination. There was a correlation between low Norton score (< 20) and severity of pressure ulcer (Stage III or IV). The use of 113 different wound dressings or combinations of products was reported. Time spent on dressing changes was the equivalent of full-time employment for 57 nurses. Wound cleansing was not predominantly performed with tap water, as recommended, but with saline. Almost all patients with venous leg ulcers (88%) were treated with compression but in 35% of these support stockings were used. Pain was present in almost half of all patients, more commonly in Stage III or IV pressure ulcers than in Stages I and II, and was most often reported in older patients. Diabetes was present in 25% of all patients with leg and pressure ulcers, and in 57% of patients with foot ulcers. At three-month follow-up, 28% of pressure ulcers, 40% of leg ulcers and 61% of other wounds had healed. Mortality was 35% in patients with pressure ulcers, 4% in those with leg ulcers and 7% in those with foot ulcers. These data have been presented to politicians in the county, resulting in allocation of resources for a wound healing centre.

Lockhart, D. G. (2002). "The legal implications of pressure ulcers in acute care." *Critical Care Nursing Quarterly* 25(1): 63-8.

The ever increasing threat of a patient or family member filing a lawsuit for the development or deterioration of a pressure ulcer while in a health care facility is reality. Every licensed nurse has a moral, ethical, professional, and legal obligation to provide the standard of care. When such care is not provided, there is a breach of duty. If the breach of duty and substandard care cause harm or injury to the individual, a lawsuit may be filed and damages may be awarded. Prevention, utilization of the nursing process, and documentation are vital components in maintaining the standard of care and avoiding litigation. Copyright (C) 2002 by Aspen Publishers, Inc.

Madsen, W. and M. Leonard (1997). "Monitoring pressure ulcers in nursing homes." *Journal of Quality in Clinical Practice* 17(4): 209-13.

Clinical indicators may be used to monitor the quality of care delivery. Unfortunately, they are often viewed by nursing staff as unnecessary paper work. This study used Waterlow's Pressure Sore Risk Assessment Tool as the basis of a clinical indicator to monitor pressure ulcers within a nursing home. It was found that by closely monitoring the skin status of residents, preventative actions could be implemented, thereby minimizing the risk of pressure ulcer development. The advantage of utilizing such a tool is that it is seen to be clinically relevant for nursing staff while providing a bank of data for quality management.

Margolis, D. J., W. Bilker, et al. (2002). "The incidence and prevalence of pressure ulcers among elderly patients in general medical practice." *Annals of Epidemiology* 12(5): 321-5.

**PURPOSE:** The objective of this study was to estimate the period prevalence and incidence of pressure ulcer among those 65 years of age and older. **METHODS:** We used a patient-record database called the General Practice Research Database (GPRD). Subjects were 65 years of age and older and cases were ascertained based on strict inclusion and exclusion criteria. The accuracy of the ascertainment strategy was estimated using mailed physician-answered questionnaires. Annual period prevalence and age-specific incidence were estimated per 100 person-years with exact 95% confidence intervals (CI). **RESULTS:** The accuracy of our ascertainment strategy was excellent, with a positive predictive value of 100% (95% CI: 92%,100%) and negative predictive value of 95% (85%, 95%). Over 200,000 person-years of data were analyzed. The annual period prevalence of pressure ulcer among those 65 years of age and older varied from 0.31% to 0.70%. The incidence varied significantly with advancing patient age from 0.18 to 3.36 per 100-person years ( $p < 0.001$ ) but was not associated with gender ( $p = 0.95$ ). **CONCLUSIONS:** Pressure ulcers are seen in the general practice setting. They are most likely to occur in those over 85 years of age. Preventative strategies within the general practice setting should concentrate on the oldest of the elderly.

Maylor, M. and C. Torrance (1999). "Pressure sore survey: part 3: locus of control." *Journal of Wound Care* 8(3): 101-5.

This is the third in a three-part article which investigates the prevalence, knowledge and attitudes to pressure sores in one NHS trust. This study describes the methodology used in choosing and developing attitude scales to explore whether there are any relationships between the locus of control and pressure sore prevention. Factors to do with attitude and the value associated with pressure sore prevention have a central role. Attitudes and beliefs affect what we do and may contribute to pressure sore development.

Maylor, M. E. (2000). "Short report. Investigating the value of pressure sore prevention." *British Journal of Nursing* 9(12): Tissue Viability: S50-1.

McGough, A. (1998). "Epidemiological issues in monitoring pressure damage." *Journal of Wound Care* 7(4): 214-5.

A discussion of a reporting system on the prevalence and incidence of pressure sores.

McKinley, W. O., A. B. Jackson, et al. (1999). "Long-term medical complications after traumatic spinal cord injury: a regional model systems analysis." *Archives of Physical Medicine and Rehabilitation* 80(11): 1402-10.

**OBJECTIVE:** To analyze the incidence, risk factors, and trends of long-term secondary medical complications in individuals with traumatic spinal cord injury. **DESIGN:** Data were reviewed from the National SCI Statistical Center on annual evaluations performed at 1, 2, 5, 10, 15, and 20 years after injury on patients injured between 1973 and 1998. **SETTING:** Multicenter Regional SCI Model Systems. **MAIN OUTCOME MEASURES:** Secondary medical complications at annual follow-up years, including pneumonia/atelectasis, autonomic dysreflexia, deep venous thrombosis, pulmonary embolism, pressure ulcers, fractures, and renal calculi. **RESULTS:** Pressure ulcers were the most frequent secondary medical complications in all years, and individuals at significant ( $p < .05$ ) risk included those with complete injuries (years 1, 2, 5, 10), younger age (year 2), concomitant pneumonia/atelectasis (year 1, 2, 5), and violent injury (years 1, 2, 5, 10). The incidence of pneumonia/atelectasis was 3.4% between rehabilitation discharge and year-1 follow-up with those most significantly at risk being older than 60 years (years 1, 2, 5, 10) and tetraplegia-complete (years 1, 2). One-year incidence of deep venous thrombosis was 2.1% with a significant decline seen at year 2 (1.2%), and individuals most significantly ( $p < .001$ ) at risk were those with complete injuries (year 1). The incidence of calculi (kidney and/or ureter) was 1.5% at 1-year follow-up and 1.9% at 5 years and was more frequent in patients with complete tetraplegia. Intermittent catheterization was the most common method of bladder management among patients with paraplegia but became less common at later postinjury visits. **CONCLUSIONS:** Pressure ulcers, autonomic dysreflexia, and pneumonia/atelectasis were the most common long-term secondary medical complications found at annual follow-ups. Risk factors included complete injury, tetraplegia, older age, concomitant illness, and violent injury. Copyright (C) 1999 by the American Congress of Rehabilitation Medicine and the American Academy of Physical Medicine and Rehabilitation

McLane, K. M., K. Bookout, et al. (2004). "The 2003 National Pediatric Pressure Ulcer and Skin Breakdown Prevalence Survey: a multisite study." *Journal of WOCN* 31(4): 168-78.

**OBJECTIVE:** The purpose of this study was to document the prevalence of pressure ulcers and other types of skin breakdown in hospitalized children., **DESIGN:** This descriptive study included documentation of findings from chart reviews and physical assessments of children., **SETTING AND SUBJECTS:** Nine children's hospitals from throughout the United States participated for a total sample of 1064 children. Subjects were inpatients in the children's hospitals between the ages of neonate to 17 years., **INSTRUMENTS:** The data collection tools included the interrater reliability quiz, the patient data collection form, FAST data collection software, the Braden Q Risk Assessment Scale, and the Neonatal/Infant Braden Q Risk Assessment Scale., **METHODS:** Prevalence of pressure ulcers and skin breakdown was measured on a predetermined day during an 8-hour period at each

institution. Eight hospitals required a signed informed consent before study participation; 1 hospital's institutional review board waived consent. A physical skin assessment was done on each inpatient, and all pressure ulcers found were staged according to the National Pressure Ulcer Advisory Panel staging system. A chart review was done on all subjects to collect information on patient demographics and potential risk factors. The Neonatal/Infant Braden Q Risk Assessment was scored for infants younger than 1 year old, and the Braden Q Risk Assessment for children 1 year and older. Patient data collection forms were completed, and all data were entered into the FAST data collection software at the end of the study day. Analyses of data and reports were generated from a central site., RESULTS: There were 1,064 children surveyed, with a pressure ulcer prevalence of 4.0% and other skin breakdown prevalence of 14.8%. Ninety-two percent of the pressure ulcers were partial thickness, Stages I and II. Sixty-six percent of the pressure ulcers were facility associated. Locations of pressure ulcers were predominately in the head area 31%, seat area 20%, and foot area 19%. The 3 most common types of skin breakdown were excoriation/diaper dermatitis, skin tear, and IV extravasation. Predominant locations for skin breakdown were seat area 35%, foot area 20%, and upper extremities 18%., CONCLUSIONS: The prevalence of pressure ulcers was low in the pediatric population studied, but skin breakdown prevalence (excluding pressure ulcers) was higher, with 74% of all wound types consisting of excoriation/diaper dermatitis, skin tears, and IV extravasation sites. Future studies are needed to evaluate prevention and treatment options for pressure ulcers and skin breakdown in this population. Repeating this multisite study at intervals may be beneficial to continue to build and modify the benchmark data.

Meehan, M., L. O'Hara, et al. (1999). "Report on the prevalence of skin ulcers in a home health agency population." *Advances in Wound Care: The Journal for Prevention and Healing* 12(9): 459-67.

**OBJECTIVE:** This survey was conducted to assess the presence of skin ulcers within a home health agency population in the United States. **DESIGN:** This voluntary survey was conducted by 177 home health agencies. A single observation of each patient within the agency's active caseload formed the cohort examined. Patients deemed to be at low risk (Braden Scale score >19) were eliminated from further evaluation, while those with skin ulcers were evaluated for wound- and caregiver-related factors. Surveys were conducted between March 1, 1996, and December 31, 1997. **SETTING:** Home health agencies in 19 states throughout the United States, with no restrictions on the type or acuity of the patients served. **RESULTS:** A total of 21,529 patients were surveyed, with a prevalence of pressure ulcers (inclusive of all stages) of 6.8% (n = 1455). Rates for each agency ranged between 0.5% and 35.7%. The total number of ulcers reported was 2526 (average per patient was 1.7), with 36% (n = 919) found on the sacrum and the buttocks. **CONCLUSION:** Pressure ulcers were the most frequently reported reason for admission to the agency's caseload. Survey results are similar to rates reported in other segments of the health care industry. However, among the home health care population, the primary caregiver is unlikely to be a health care professional. This survey found that the patient's spouse was the primary caregiver in 30% (n = 437) of the 1450 responses received regarding the relationship of the primary caregiver to the patient.

Meraviglia, M., H. Becker, et al. (2002). "Maintenance of skin integrity as a clinical indicator of nursing care." *Advances in Skin & Wound Care* 15(1): 24-9.

**OBJECTIVE:** To assess maintenance of skin integrity in hospitalized patients as a clinical indicator of quality nursing care. **DESIGN:** Descriptive correlational study. **SETTING:** 17 acute care urban and rural hospitals in Texas. **PARTICIPANTS:** 723 hospitalized patients from 33 medical-surgical units. **MAIN OUTCOME MEASURES:** Pressure ulcers since admission and nursing care practices per unit. **MAIN RESULTS:** Overall prevalence of pressure ulcers since admission (4.7%) was lower than previously reported for acute care settings. Prevalence of pressure ulcers in hospitalized patients (10%) was higher than found in the Texas Nurses Association feasibility study (3.7%). The skin integrity ratio was strongly correlated for several unit variables, including number of beds per unit ( $r = 0.623$ ) and average daily census per unit ( $r = 0.909$ ). Benchmarking data across units showed that units with subjects that maintained skin integrity had a lower percentage of patients assessed on admission and performed daily assessments less frequently than did the units with subjects that did not maintain skin integrity. In addition, the units with subjects that maintained skin integrity classified fewer patients as at risk for pressure ulcer development and did not implement a skin care protocol for these patients. **CONCLUSION:** Patients who developed a pressure ulcer after admission were older and had more risk for pressure ulcers than those who maintained skin integrity. Benchmarking data detected various differences in nursing care. Significant relationships between study variables demonstrate the importance of assessing clinical indicators to monitor nursing care. Outcomes such as skin integrity, pressure ulcer since admission, and nosocomial ratio represent the quality of nursing care.

Monaghan, H., S. Halstead, et al. (2000). "Heel pressure ulcers: the extent of the problem." *Nursing Times* 96(29): NTplus: 9-11.

Heather Monaghan and colleagues decided to find out what their trust was doing to prevent and manage pressure ulcers on patients' heels. Here they report the findings of their audit.

Moore, S. M. and L. Wise (1997). "Reducing nosocomial pressure ulcers." *Journal of Nursing Administration* 27(10): 28-34.

The authors analyze the processes surrounding an initial failure and eventual success in implementing organizational change. The specific organizational change involves prevention and treatment of pressure ulcers. It provides insight as to how critical factors serve to bring about and sustain change in an organization. It also serves to illustrate deficiencies in traditional and popular change theories.

Moore, Z. and S. Pitman (2000). "Towards establishing a pressure sore prevention and management policy in an acute hospital setting." *All Ireland Journal of Nursing & Midwifery* 1(1): 7-11.

The true cost of pressure sores is unknown and internationally prevalence studies have identified differences between countries (Allcock et al 1994, O Dea 1995). These variations may reflect differences in health care structure and cultural variations in the prevention and management of pressure sores. In the Republic of Ireland there is currently no published data available on the prevalence of sores. To develop a policy for the prevention and management of pressure sores that combines quality of care and effective use of resources, a baseline prevalence rate for the problem is essential. A descriptive survey was conducted on 297 adult inpatients in an acute Dublin teaching hospital. A prevalence rate of 12.5 per cent was identified. The majority of sores were stage 1 and 2 with 65 per cent developing following admission. Documentation of pressure sores in nursing and medical notes was highlighted as a particular problem and, of particular concern is that many patients identified as 'at risk' still went on to develop sores. The survey's findings provided valuable information necessary for the development of the subsequent stages of a pressure sore prevention and management policy.

Moran, V. M. (1998). "No substitute for vigilance... "Are you aware" (Letters, March 1998, p. 8)." *Nursing Management* 29(6): 6.

Newall, N. (2005). "Western Australian pressure ulcer initiatives: Pressure Ulcer Risk Assessment and Management System project (PURAMS)." *Primary Intention* 13(3): 138.

Noonan, C., S. Quigley, et al. (2006). "Skin integrity in hospitalized infants and children: a prevalence survey." *Journal of Pediatric Nursing: Nursing Care of Children and Families* 21(6): 445-53.

The purpose of this paper was to describe the spectrum of alterations in skin integrity and skin care needs of hospitalized infants and children. A 1-day skin prevalence audit was conducted in the spring of 2005 in a tertiary care university-affiliated children's hospital. Patient skin was assessed for any alterations. The Braden Q Scale was used to assess patient risk for pressure ulcer development. Alterations in skin integrity included diaper dermatitis, pressure ulcers, intravenous infiltrations, device-related injuries, and epidermal injuries. Many patients required additional skin care, including wound/incision care, ostomy care, and care related to invasive devices. Alterations in skin integrity represent a serious problem in the pediatric inpatient setting. The data presented identify skin integrity challenges in the hospitalized patient and can help guide staff education and resource allocation, encourage evidenced-based management protocols, and serve as a benchmark for similar pediatric facilities. Copyright (C) 2006 by Elsevier Inc.

Noonan, C. F., S. Quigley, et al. (2007). "A pediatric skin integrity prevalence survey... 39th Annual Wound, Ostomy and Continence Nurses Annual Conference." *Journal of WOCN* 34(3S): Supplement: S4.

O'Brien, S. P., S. Wind, et al. (1998). "Objectives III: other prevention issues. Sequential biannual prevalence studies of pressure ulcers at Allegheny-Hahnemann University Hospital... including commentary by McGough-Csarny J, Beitz J, Braden B with author response." *Ostomy/Wound Management* 44(3A): Spec Suppl: 78S-92S.

To assess the prevalence, documentation and care of pressure ulcers, and the effect of teaching and prevention strategies in a 750-bed university hospital one-day studies were conducted in 1993, 1995, and 1997. Data gathered was used to evaluate areas in need of improvement and find cost-effective ways to reduce the prevalence of pressure ulcers. The overall prevalence of ulcers decreased from 18 percent in 1993 to 10 percent in 1995 and 1997. The prevalence of nosocomial ulcers decreased from 14 percent in 1993 to 8 percent in 1995 and 6 percent in 1997. The number of nutritional consults increased from 54 percent in 1993 to 67 percent in 1997, and more than half of all patients tested had serum albumin levels < 3.5 mg/dL. Skin assessments upon admission were completed in the majority of patients. While ulcer documentation was less than adequate for the majority of patients in 1993 and 1997, care measures, eg, placement of patients on specialty beds or mattresses and use of dressings that provide a moist environment, improved considerably. The results of this study indicate that system-wide educational efforts aimed at all levels of patient care providers, and multi-specialty prevention and care efforts can reduce the prevalence of pressure ulcers.

O'Dea, K. (1999). "The prevalence of pressure damage in acute care hospital patients in the UK." *Journal of Wound Care* 8(4): 192-4.

This paper aims to provide information on the prevalence of pressure damage in UK hospital patients since 1992. A survey method and data handling service provided by a medical device company was used to set targets and monitor trends. The results of these surveys provide evidence that over a six year period, the prevalence of pressure damage in this population in the UK has shown a significant reduction.

Pieper, B., T. N. Templin, et al. (1999). "Clinical investigation. Wound prevalence, types, and treatments in home care." *Advances in Wound Care: The Journal for Prevention and Healing* 12(3): 117-26.

**OBJECTIVE:** To ascertain the number of home care patients with wounds, determine the types of wounds being treated in the community, and identify wound care treatments used at home. **DESIGN:** Descriptive, multisite, collaborative project. **SETTING:** 13 home care agencies located throughout lower Michigan that had voluntarily formed a research consortium. The location of patients visited was 43% urban, 39% suburban, 16% rural, and 2% unaccounted. **PATIENTS:** Systematic sampling was used to select nurses in each agency to collect data. Nurses (n = 281) recorded information about adult patients visited during the 1 week of the study. Data were recorded about 2847 patients, M age = 72.5 years. They included 1793 women and 1040 men (gender was not recorded for 14 patients); most patients in the sample (72%) were white. **MAIN PLANNED OUTCOMES:** A significant number of home visits would include wound care and that wound care would be primarily done with tap water and gauze. **RESULTS:** Wounds were present in 36.3% of patients. Of

the patients with wounds, 58.3% had 1 wound and 41.7% had multiple wounds. Wound types included surgical (62.4%), pressure ulcers (24.9%), and vascular leg ulcers (22.2%). Tap water and gauze were the most-used wound care treatments. Patients with wounds had significantly longer home care visits than patients without wounds. CONCLUSIONS: Patients with wounds are commonly found in home care. There is a low utilization of specialty dressings and commercial irrigation solutions across all wound types. Nurses who follow patients with wounds may need additional time to provide the care.

Porell, F. and F. G. Caro (1998). "Facility-level outcome performance measures for nursing homes." *Gerontologist* 38(6): 665-83.

Prentice, J. L., M. C. Stacey, et al. (2003). "An Australian model for conducting pressure ulcer prevalence surveys." *Primary Intention* 11(2): 87-8, 90-1, 93-6 passim.

Pressure ulcers are recognised internationally as iatrogenic injuries of the skin and underlying tissues and, in most cases, are seen as avoidable adverse events. They are also seen as clinical indicators of the standard of care provided. Numerous researchers have examined pressure ulcer prevalence within a variety of clinical settings. Meaningful comparison of data is impaired by reoccurring anomalies relating to different methodological approaches used to collect and analyse data. Therefore the conclusions that can be drawn regarding pressure ulcer prevalence and the impact of pressure ulcers on both patients and health care systems are lessened. This paper describes a subsection of the methodology used in a national multi-centre study which evaluated the efficacy of Australian guidelines for pressure ulcers in improving doctors' and nurses' knowledge of pressure ulcers, and in reducing pressure ulcer prevalence when implemented in conjunction with an education programme. The subsection presented here proposes a standardised model for surveillance of pressure ulcer point prevalence. It addresses discrepancies with data collection methods used in previous Australian studies assessing pressure ulcer prevalence and meets international standards for conducting multi-centre prevalence studies. Using a standardised approach, as this model proposes, ensures a common understanding of pressure ulcer terminology, improved inter-rater reliability (IRR) in classifying pressure ulcers, and less variance in the quality of data collected. Only a brief summary of the prevalence found in this study will be discussed here. Detailed results of the study will be presented in a forthcoming article. This study, however, has found Australian guidelines for pressure ulcers to be effective in reducing pressure ulcer prevalence from 26.5% to 22% ( $p < 0.002$ ) when implemented in conjunction with an education programme.

Provo, B., L. Piacentine, et al. (1997). "Practice versus knowledge when it comes to pressure ulcer prevention." *Journal of WOCN* 24(5): 265-9.

**PURPOSE:** This study was completed to determine the current knowledge and documentation patterns of nursing staff in the prevention of pressure ulcers and to identify the prevalence of pressure ulcers. **METHODS:** This pre-post intervention study was carried out in three phases. In phase I, 67 nursing staff members completed a modified version of

Bostrom's Patient Skin Integrity Survey. A Braden Scale score, the presence of actual skin breakdown, and the presence of nursing documentation were collected for each patient (n = 43). Phase II consisted of a 20-minute educational session to all staff. In phase III, 51 nursing staff completed a second questionnaire similar to that completed in phase I. Patient data (n = 49) were again collected using the same procedure as phase I. RESULTS: Twenty-seven staff members completed questionnaires in both phase I and phase III of the study. No statistically significant differences were found in the knowledge of the staff before or after the educational session. The number of patients with a documented plan of care showed a statistically significant difference from phase I to phase III. The number of patients with pressure ulcers or at risk for pressure ulcer development (determined by a Braden Scale score of 16 or less) did not differ statistically from phase I to phase III. CONCLUSION: Knowledge about pressure ulcers in this sample of staff nurses was for the most part current and consistent with the recommendations in the Agency for Health Care Policy and Research guideline. Documentation of pressure ulcer prevention and treatment improved after the educational session. Although a significant change was noted in documentation, it is unclear whether it reflected an actual change in practice.

Purvis, K. and A. Pearman (2005). "How the use of electric profiling beds can reduce the prevalence of pressure ulcers." *Professional Nurse* 20(8): 46-8.

Investment in electric profiling beds and a change in patient-assessment procedures have had a significant impact on the prevalence of hospital-acquired pressure ulcers in one trust, while at the same time increasing patient independence and reducing pain, length of hospital stay and the risk of potentially costly litigation.

Quickfall, J. and D. Shields (1998). "Wound care. Peak performance." *Nursing Times* 94(7): 74, 76-7.

Julia Quickfall and Debbie Shields explain the implementation in Scotland of a national strategy for pressure area care.

Rademakers, L. M. F., T. Vainas, et al. (2007). "Pressure ulcers and prolonged hospital stay in hip fracture patients affected by time-to-surgery." *European Journal of Trauma and Emergency Surgery* 33(3): 238-44.

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.

Reifsnyder, J., L. M. Hoplamazian, et al. (2004). "Preventing & treating pressure ulcers in hospice patients." *Caring* 23(11): 30-7.

The recent death of actor and activist Christopher Reeve from an infection caused by a pressure ulcer has brought more attention to this common complication associated with bed-bound patients. In this comprehensive look at the problem, Dr. JoAnne Reifsnyder and colleagues examine the incidence and prevalence of pressure ulcers in hospice patients, and explore the results of a pilot study on a large sampling of such patients. The findings help lay the groundwork for much-needed evidence-based guidelines for treating such wounds in the hospice populace.

Reifsnyder, J. and H. S. Magee (2005). "Development of pressure ulcers in patients receiving home hospice care." *Wounds: A Compendium of Clinical Research and Practice* 17(4): 74-9.

Pressure ulcers are common in most healthcare settings, yet precise estimates of incidence and prevalence are unknown. In particular, very little is known about the occurrence of pressure ulcers in hospice care settings. This article reports on a study to describe incidence and prevalence in a sample of home hospice patients who were followed by pharmacists providing palliative pharmacotherapy care planning and consultation to hospice nurses in 4 hospice programs. The researcher examined retrospective data for patients admitted to hospice during the first 6 months of calendar year 2003 for each of the 4 hospice programs (Time 1); for hospice nurse-reported pressure ulcer prevalence at the inception of the prospective study (Time 2); and for the 3-month study period (Time 3). Ninety-nine patients developed pressure ulcers during the study period (incidence = 10%). Prevalence of pressure ulcers for Time 3 was 26.9%. Patients who developed pressure ulcers were significantly older ( $p=0.006$ ), and Karnofsky/Palliative Performance Scale scores were significantly lower ( $p=0.001$ ). Patients with non-cancer diagnoses were disproportionately affected by development of new pressure ulcers.

Richards, J., K. Lowery, et al. (2003). "Wound care. Installing electrically operated beds." *Nursing Times* 99(13): 71.

Jayne Richards, Kath Lowery and Bev Atkinson describe a project that aimed to reduce pressure damage, improve patient comfort and minimise the risk of back injury to staff by introducing electrically operated profiling beds. The project won the Nursing Times Essence of Care in Wound Care award 2002.

Robinson, C., M. Gloeckner, et al. (2003). "Determining the efficacy of a pressure ulcer prevention program by collecting prevalence and incidence data: a unit-based effort." *Ostomy/Wound Management* 49(5): 44-6, 48, 50-1.

Pressure ulcer prevention falls within the domain of nursing practice. When the results of a quality improvement survey indicated both an increase in the number of pressure ulcers and a higher prevalence than the national average, the nursing staff of a 500-bed Midwest hospital developed a pressure ulcer prevention program guided by the AHCPH guidelines. The literature supports collecting prevalence and incidence data as indicators of prevention program effectiveness, and the best indicator of the effectiveness of prevention strategies to reduce nosocomial pressure ulcers is incidence. Since the tracking mechanism was instituted, awareness of the results and impact of prevention measures increased; most nursing units experienced a 10% to 20% decrease in the incidence of pressure ulcers. Designing an efficient, timely, and practical method of retrieving pressure ulcer prevalence and incidence data provided a quality assurance method of monitoring the success of the program.

Roney, E. A. (2006). "One good turn deserves another: the prevention of nosocomial pressure ulcers at a community hospital in Hagerstown, Maryland." *Journal of WOCN* 33(3S): Supplement 1: S32-3.

Russell Localio, A., D. J. Margolis, et al. (2006). "Use of photographs for the identification of pressure ulcers in elderly hospitalized patients: validity and reliability." *Wound Repair and Regeneration* 14(4): 506-13.

To evaluate the ability of research nurses to identify pressure ulcers, the authors assembled digital photographs of the skin of 160 consenting elderly patients (80% African American, 63% women). The series included 39 photos of pressure ulcers, 109 of normal skin, and 12 of other skin conditions, determined by consensus by two experts (D.J.M. and S.H.K.). Photos were packaged electronically into eight blocks of 20, with pressure ulcer prevalence ranging from 20% to 30% per block. The eight blocks were duplicated to create two sets of 160 photos each. Each of six raters (experienced clinical research nurses), working independently, evaluated the 320 photos as if each photo depicted a different patient. For analysis, the ratings were collapsed into binary determinations (any pressure ulcer vs. none). The overall sensitivity and specificity of the ratings were 0.97 (95% confidence interval: 0.94, 0.98) and 0.81 (95% confidence interval: 0.77, 0.86), respectively. Rater-specific prevalence (range: 31.8-47.5%) exceeded the true prevalence (24.4%). Inter- and intrarater reliability coefficients were 0.69 and 0.84, respectively. Trained research nurses can accurately classify pressure ulcers from photographs, even when patients are

largely non-White and the photographs depict pressure ulcers spanning all pressure ulcer stages.

Russell, T. and A. Logsdon (2003). "Pressure ulcers and lateral rotation beds: a case study." *Journal of WOCN* 30(3): 143-5.

During a 6-month period, the WOC nurses at a 500-bed medical treatment facility noticed the development of nosocomial pressure ulcers on the sacrum, occiput, and heel areas of patients who were placed on lateral rotation specialty beds because they had pulmonary disorders. Measures were taken to address the problem by repositioning the patients and through a staff education program. Repositioning included repositioning the patient's head every 2 hours, thorough skin assessments every 2 hours, and ensuring that the patient's heels were subject to zero pressure. Staff education centered on the importance of using a risk assessment tool (the Braden scale) and understanding the clinical uses for lateral rotation beds. During the subsequent 6 months, the incidence of hospital-acquired pressure ulcers decreased by 52%. Efforts to further decrease the number of pressure ulcers related to the use of lateral rotation beds continue. Issues such as length of stay on the bed and the appropriateness of manufacturer's guidelines still need to be addressed at this facility. This case study highlights the potential issues associated with lateral rotation beds and identifies the need for further research.

Sacharok, C. and J. Drew (1998). "Use of a total quality management model to reduce pressure ulcer prevalence in the acute care setting." *Journal of WOCN* 25(2): 89-92.

As the population ages and becomes more frail, pressure ulcer prevalence and incidence within specific care settings are being evaluated through outcomes review. This article summarizes the process and outcomes of an ongoing prevalence study at a 300-bed acute care community hospital. All patients on the adult medical, surgical, and critical care units were examined regularly by the "Rear Admirals," a team comprising a skin care resource person and a nursing unit representative. The Total Quality Management model, characterized by the phrase "Plan-Do-Check-Act," was used to address barriers to quality care. Findings during that time prompted changes in policies, products, protocols, work assignments, and documentation tools. The outcomes achieved demonstrate the effectiveness of those strategies. After implementation of the Total Quality Management model at our institution, the prevalence of patients with nosocomial pressure ulcers was reduced by 83%.

Salzberg, C. A., D. W. Byrne, et al. (1998). "Predicting and preventing pressure ulcers in adults with paralysis." *Advances in Wound Care: The Journal for Prevention and Healing* 11(5): 237-46.

A questionnaire mailed to all 2,295 members of the Eastern Paralyzed Veterans Association measured 45 potential risk factors for pressure ulcers. Logistic-regression analysis and Cox proportional-hazards analyses were used to identify the variables that

were independently associated with pressure ulcers. The survey response rate was 42.2%. Among 15 risk factors from a previously published scale by the authors, 7 were independent predictors of pressure ulcer development: level of activity, level of mobility, complete spinal cord injury, urine incontinence or moisture, autonomic dysreflexia, pulmonary disease, and renal disease. In addition, 2 new variables added significant predictive value: being prone to infections that cause breathing problems and paralysis caused by trauma (as opposed to disease). Using these 9 risk factors, a new pressure ulcer risk assessment scale was designed specifically for persons with paralysis who are living in a community setting. It appears to be a more accurate method of predicting pressure ulcers than currently used risk assessment scales.

Santamaria, N., K. Carville, et al. (2005). "Pressure ulcer prevalence and its relationship to comorbidity in nursing home residents: results from phase 1 of the PRIME Trial." *Primary Intention* 13(3): 107, 109-10, 112 passim.

Pressure ulcers are a significant cause of morbidity and mortality in the aged care population with prevalence rates reported to be as high as 43% in some aged care facilities. The PRIME Trial was designed to investigate the effectiveness of an integrated pressure ulcer management system in reducing pressure ulcer prevalence and incidence in nursing homes. A total of 1956 residents from 23 nursing homes in NSW, Vic, SA and WA were enrolled in this Commonwealth funded study. This paper presents the results from phase 1 of the trial and indicates that the prevalence of pressure ulcers in the cohort of 1956 residents was 25.9%. Significant associations between the development of a pressure ulcer and comorbidity level (Charlson Index) ( $p=0.01$ ), risk assessment level (Braden Scale) ( $p=0.00$ ) and the lack of appropriate equipment ( $p=0.00$ ) were detected. Residents who developed a pressure ulcer whilst in an acute hospital showed a trend to develop more than one ulcer and ulcers that were of higher severity than those developed in a nursing home. The results from phase 1 of the PRIME Trial suggest that emphasis needs to be given to appropriate risk assessment of the elderly nursing home resident that should include comorbidity status and the provision of suitable pressure relieving equipment.

Schnelle, J. F., G. M. Adamson, et al. (1997). "Skin disorders and moisture in incontinent nursing home residents: intervention implications." *Journal of the American Geriatrics Society* 45(10): 1182-8.

**OBJECTIVE:** To provide data needed to design an intervention trial to prevent or treat skin disorders in a high risk, incontinent nursing home population. **DESIGN:** The incidence and prevalence of nine common skin disorders were measured prospectively over a 60-day period using trained observers. Urinary and fecal incontinence frequency were measured over 24 hours, and mobility was measured with subjects both in and out of bed. Direct measures of skin moisture were taken with an impedance device in the presence and absence of urinary incontinence. Multiple regression analyses were used to relate the incontinence and mobility variables to the presence and development of skin disorders. **SETTING:** Four nursing homes. **PARTICIPANTS:** One hundred incontinent nursing home residents. **MAIN OUTCOME MEASURES:** Prospective measures of nine common skin

disorders and skin moisture in four perineal regions under continent and incontinent conditions. RESULTS: All subjects had at least one skin condition identified during the 60-day data collection period. The most commonly observed skin condition was blanchable erythema, which occurred in 94% of the subjects, predominantly in the front and back regions that were closest to the urethra and rectum. Twenty-one percent of residents developed either a Stage 1 (nonblanchable erythema) or 2 pressure ulcer. All skin conditions were transient when measured every 3 weeks with the exception of blanchable erythema, which showed stability. Stage 3 or greater pressure ulcers and edema were not observed, and interrater reliability for the measure of papules was poor. Measures of urinary and fecal incontinence severity were correlated with blanchable erythema severity, and blanchable erythema and low bed mobility were predictive of pressure ulcer severity. Blanchable erythema severity was also predictive of Stage 1 and 2 pressure ulcers. Skin moisture levels in the back perineal farthest from the rectum (peripheral) were affected most by urinary incontinence. CONCLUSION: A trial to detect a 50% preventive effect on Stage 1 and 2 pressure ulcers would require that 167 subjects be monitored for 60 days. The transient nature of the skin effects require that skin be monitored at least once a week. Because blanchable erythema is so prevalent and appears to be associated with more severe skin conditions, it would make an excellent marker for beginning to assess the potential preventive effects of various interventions on the incidence of pressure ulcers and other related skin disorders in incontinent patients. It is likely that the back area peripheral to the urethra and rectum would experience the greatest benefit from an intervention trial to reduce moisture caused by incontinence.

Schols, J. M. G., C. N. Kleijer, et al. (2003). "Pressure ulcer care: nutritional therapy need not add to costs." *Journal of Wound Care* 12(2): 57-61.

Fewer patients with pressure ulcers in Dutch nursing homes receive nutritional therapy via sip feeds, possibly because of cost concerns. But this therapy would not cost more if it reduced the duration of nursing care by even one day, this paper argues.

Schue, R. M. and D. K. Langemo (1998). "Pressure ulcer prevalence and incidence and a modification of the Braden Scale for a rehabilitation unit." *Journal of WOCN* 25(1): 36-43.

Purpose. We examined pressure ulcer incidence and prevalence, the cutoff score for risk for skin breakdown, and the contribution of each of the subscale risk factors of the Braden pressure ulcer risk-assessment tool in an inpatient rehabilitation unit. Subjects and Setting. One hundred seventy adult men hospitalized on a rehabilitation unit during 1 calendar year were included in the research. Subject ages ranged from 35 to 99 years (M = 69). Instruments. Pressure ulcer risk was assessed using the Braden Scale. Methods: A retrospective chart review of a continuous series of 170 adult male patients hospitalized during a 1-year period on a 50-bed rehabilitation unit was conducted. Data were documented on a standardized researcher-designed form. Results. A total of 46 pressure ulcers occurred, with the sacrum the most common location (46%), followed closely by the heel-ankle area (44%, n = 20). Most pressure ulcers (57%) were stage II, 24% were stage I, 15% stage III, and 4% stage IV. When using a cutoff score of 16, the Braden Scale

demonstrated limited usefulness in predicting pressure ulcer development on our inpatient rehabilitation unit. Further calculations were completed, and a cutoff score of 18 or higher was found to provide better predictive value. With use of multiple logistic regression analysis, three of the six risk factors from the Braden Scale were found to significantly contribute to risk for pressure ulcer development in this sample: moisture, nutrition, and friction and shear. Therefore a modified Braden Scale was developed, with a possible range of scores from 3 to 11; the cutoff score was 8, sensitivity was 52%, and specificity 66%. Conclusions. The mean prevalence rate of 12% was comparable, and the incidence rate of 6% for this unit was lower compared with other skilled care and rehabilitation settings reported in the literature. The proactive, interdisciplinary approach to skin integrity on this unit likely contributed to the lower incidence rate. Risk factors most predictive of pressure ulcer development in this sample were moisture, nutrition, and friction and shear. Predicting risk for skin breakdown with use of a consistent risk-assessment tool is essential for all rehabilitation patients. Assessing risk with the Braden Scale merits further research.

Schue, R. M. and D. K. Langemo (1999). "Prevalence, incidence, and prediction of pressure ulcers on a rehabilitation unit... including commentary by Whitney JD." *Journal of WOCN* 26(3): 121-9.

**Objective:** This retrospective chart review study was conducted to determine the prevalence and incidence of pressure ulcers, and the contribution of known risk factors toward the predicted occurrence of pressure ulcers in a long-term rehabilitation setting. **Subjects and Setting:** A continuous series of 170 adult men with a mean age of 69.2 years were studied during a 1-year period. **Methods:** Patient charts were reviewed retrospectively for risk factors and documentation of pressure ulcer development by 1 researcher on a data recording form. **Results:** The pressure ulcer prevalence was 12% and the incidence over the 1-year observation period 6%. Using the odds ratio test, significant risk factors in the sample were identified as hypoalbuminemia (odds ratio = 11:1), low diastolic blood pressure (odds ratio = 4.6:1), stool and urine incontinence (odds ratio = 1.5:1), and peripheral edema (odds ratio = 3.5:1). **Conclusion:** Specific characteristics in this sample of patients in a long-term rehabilitation center contributed to the increased risk for pressure ulcer development. Risk assessment based on knowledge of specific risk factors, prevention, and early intervention is crucial to lowering the prevalence and incidence of pressure ulcers in this setting.

Schumacher, R. and K. Eveslage (1999). "Wound care. Pressure gauge." *Nursing Times* 95(27): 71.

This article describes the development of a nursing pressure sore manual and presents the results of a risk assessment and point prevalence survey.

Schwien, T., J. Gilbert, et al. (2005). "Pressure ulcer prevalence and the role of negative pressure wound therapy in home health quality outcomes." *Ostomy/Wound Management* 51(9): 47-50, 52-8, 60.

Home health agencies, challenged to demonstrate quality while containing costs, are motivated to find best practices for managing patient and wound care. The effects of different wound therapies on frequency of hospitalization and emergent care, two prominent quality measures, have not been studied. A retrospective study was conducted to determine the prevalence of Stage III and Stage IV pressure ulcers in the home health population and to quantify the impact of negative pressure wound therapy in reducing acute care hospitalizations and emergent care in general, and wound infection or deteriorating wound status in particular. Data from 1.94 million OASIS start-of-care assessments in 2003 and 2004 were evaluated to estimate pressure ulcer prevalence and a retrospective matched group analysis compared patients using ( $n = 60$ ) and not using ( $n = 2,288$ ) negative pressure wound therapy. In 2003, 6.9% and in 2004, 7% of patients had pressure ulcers at start of care. Of these, 23% were Stage III or Stage IV and 31% were 'not healing.' In the matched analysis group, it was found that compared to comparison group patients, those receiving negative pressure wound therapy experienced lower rates of hospitalization (35% versus 48%,  $P < .05$ ), hospitalization due to wound problems (5% versus 14%,  $P < .01$ ), and emergent care for wound problems (0% versus 8%,  $P = .01$ ). To offset potential limitations in generalizability and increase practical application of these results, further research is needed with a larger, nationally representative sample to compare other quality outcomes as well as the cost of providing negative pressure wound therapy to other specific wound care modalities.

Sheffet, A., A. S. Cytryn, et al. (2000). "Applying electric and electromagnetic energy as adjuvant treatment for pressure ulcers: a critical review." *Ostomy/Wound Management* 46(2): 28-33, 36-8, 40 passim.

Chronic pressure ulcers are a significant health problem especially in the aging population. National estimated annual treatment costs are in the billions of dollars. Only two treatment-related recommendations receive high ratings for reported experimental evidence of validity: Use of moist wound dressings and adjunctive electrotherapy for unresponsive Stage III and IV and recalcitrant Stage II ulcers. A critical literature review pertaining to electrotherapy reveals a myriad of electrical treatment modalities varying greatly in electric current type, strength, direction, frequency, waveform, and underlying voltage. However, few clinical trials pertaining to electrotherapy exist with almost all of them characterized by a small sample size leading to a biased group assignment with no possibility for stratification by ulcer stage, site, and other important factors. Power analysis shows that a sample size of at least 164 subjects is needed to permit cost-effectiveness evaluation with attention to critical variables. "Time to healing" is recommended as the treatment outcome measure to permit proper efficiency comparisons between the various treatment modalities and controls. These comparisons are crucial in a cost-conscious environment.

Siem, C. A., D. D. Wipke-Tevis, et al. (2003). "Skin assessment and pressure ulcer care in hospital-based skilled nursing facilities." *Ostomy/Wound Management* 49(6): 42-4, 46, 48 passim.

The Minimum Data Set, a comprehensive assessment tool for nursing home residents, is used for clinical decision-making, research, quality improvement, and Medicare and Medicaid reimbursement. Within the Minimum Data Set, pressure ulcers and skin condition are evaluated. Because information about pressure ulcer prevalence and care in hospital-based skilled nursing facilities is sparse, a study was conducted to: a) determine pressure ulcer prevalence upon admission to hospital-based skilled nursing facilities in the state of Missouri, and b) ascertain methods of assessment, treatment, and documentation of skin and pressure ulcer care in these facilities. Prevalence data were obtained from analysis of the Minimum Data Set data, and a survey was conducted to obtain skin care practices. The vast majority of residents (96%) were admitted from acute care facilities, and pressure ulcer prevalence on admission was 18.4% +/- 8.0%. Seventy-seven percent (77%) of the 88 surveys mailed were returned. The Braden or Norton Scale for risk assessment is reportedly used by 55% of facilities; whereas, 35% use a facility-developed tool. Commonly reported pressure ulcer prevention/treatment interventions used include: dietitian referral, use of barrier ointments, and a written repositioning schedule. Incontinence management and minimizing the head of bed elevation were infrequently used. Nearly one-half (47%) of facilities reported daily reassessment and documentation of wound status, suggesting less-than-optimal, time-consuming wound care practices. Despite the limitations inherent in survey designs and the use of databases such as the Minimum Data Set, the results of this study suggest that pressure ulcers are a common problem in acute care and hospital-based skilled nursing facilities and research-based risk assessment, prevention, and wound assessment strategies have not been widely implemented. The results of this study provide a basis for developing educational programs and a guide for future research.

Smith, D. P. and H. S. Jordan (2008). "Piloting nursing-sensitive hospital care measures in Massachusetts." *Journal of Nursing Care Quality* 23(1): 23-33.

Under the umbrella of the Massachusetts Hospital Association and Massachusetts Organization of Nurse Executives Patients First Initiative, Massachusetts hospitals tested a subset of NQF-endorsed nursing-sensitive care measures in 2006. In this report, we describe the pilot test, report on pilot test measure data, summarize participant feedback on the tested measures, and offer observations on lessons learned from the pilot test.

Soldevilla, J., J. Torra, et al. (2006). "Epidemiology of chronic wounds in Spain: results of the first national studies on pressure and leg ulcer prevalence." *Wounds: A Compendium of Clinical Research and Practice* 18(8): 213-26.

Chronic ulcers constitute a major health problem of which the epidemiological impact in Spain is still unknown. For this reason, the Spanish advisory panel on chronic wounds, Grupo Nacional para el Estudio y Asesoramiento en Ulceras por Presion y Heridas Cronicas (GNEAUPP), contemplated the possibility of conducting 2 national prevalence studies: one on pressure ulcers and the other on leg ulcers. Materials and methods: The authors conducted a nationwide point-prevalence survey based on an intentional sample. A specific questionnaire was prepared and distributed to all GNEAUPP members. The study on pressure ulcers was conducted between November and December 2001, and the leg ulcer

study was conducted between October and December 2002. Results: During the research period, a total of 458 questionnaires were received for the pressure ulcer study and 353 for the leg ulcer study. The questionnaires received allowed the authors to estimate an 8.25% average pressure ulcer prevalence (8.34% in home care, 8.81% in hospitals, and 7.60% in socio-health centers). Regarding leg ulcers in patients over age 14, there is a 0.16% prevalence estimate (0.09% in venous ulcers, 0.06% in mixed ulcers, 0.013% in arterial ulcers, 0.53% in diabetic foot ulcers). Discussion: Pressure and leg ulcers in Spain constitute a major health problem that is even more serious in older patients. Regarding pressure ulcers, the authors' data indicate that prevention is not yet considered to be a priority. In the case of venous ulcers, it is noteworthy that there is little use of effective compression therapy systems. A global approach to the pressure and leg ulcer problem in Spain is needed.

Stausberg, J., K. Kroger, et al. (2005). "Pressure ulcers in secondary care: incidence, prevalence, and relevance." *Advances in Skin & Wound Care* 18(3): 140-5.

**OBJECTIVE:** To compare point and period prevalence rates. **DESIGN:** Descriptive, cohort, cross-sectional survey. **PARTICIPANTS:** From a cohort of 25,075 cases, information on pressure ulcer status on admission was recorded for 20,283 cases. From 3237 selected cases, the pressure ulcer team made 2234 assessments. **MAIN OUTCOME MEASURES:** Point prevalence, period prevalence, and incidence rates. **MAIN RESULTS:** The cohort showed a period prevalence rate of 1.4% and an incidence rate of 0.6%. Patients with a pressure ulcer were older, were more likely to have had surgery, had longer hospital stays, and had a higher cost weight. The cross-sectional survey revealed a point prevalence rate of 5.3%. Patients within the cross-sectional survey had longer lengths of stay, were more likely to have had surgery, and presented a higher cost weight in comparison with the cohort. **CONCLUSIONS:** In an unselected hospital sample one can expect a period prevalence rate of 2% and a point prevalence rate of 10%. As demonstrated by the present study, differences between the 2 prevalence measurements are mainly due to the confounding of point prevalence rates by length of stay. Length of stay determines the probability of inclusion in a cross-sectional study and should be considered in pressure ulcer trials in the future.

Stevens, J., F. Murphy, et al. (2000). "Community and residential homes pressure ulcer audit." *Nursing & Residential Care* 2(4): 174-5, 177, 179 passim.

Julie Stevens, Fiona Murphy and Rowena Smith detail the aims, methods and findings of a trust-wide baseline pressure ulcer audit of the patients registered on Hounslow and Spelthorne's district nursing caseloads.

Stewart, S. and J. S. Box-Panksepp (2004). "Preventing hospital-acquired pressure ulcers: a point prevalence study." *Ostomy/Wound Management* 50(3): 46-8, 50-1.

The deleterious effects of mechanical forces on the development of pressure ulcers have been recognized for many years. A cross-sectional study was conducted to ascertain

the effect of implementing a new support surface on the development of pressure ulcers in one acute care facility. Two pressure ulcer prevalence studies were conducted using the Pressure Ulcer Prevalence Audit Data Collection Tool. To ascertain whether ulcers were facility-acquired, a retrospective chart review was completed for all patients with pressure ulcers. Following completion of the first audit, only the support surface used for at-risk patients was changed. The second audit was conducted 3 months after the new support surface was implemented. Pressure ulcer prevalence was 8.3% in June 1999 and 7.8% in October 2000; whereas, the prevalence of nosocomial pressure ulcers was 5.5% in 1999 and 3.1% in October 2000. Despite the inherent limitations of this study design, the results suggest that use of the new support surfaces for at-risk patients has lowered the prevalence of nosocomial pressure ulcers in this facility.

Strachan, V. (2005). "Victorian pressure ulcer initiatives: the Victorian Quality Council's contribution to reducing patient harm from pressure ulcers." *Primary Intention* 13(3): 135-6.

Strachan, V. and C. Balding (2004). "Raising PUPPS: establishing the prevalence of pressure ulcers in the acute and subacute health sectors in Victoria -- a state-wide methodology model." *Primary Intention* 12(1): 14, 16-20, 22 passim.

In 2003 the Victorian Quality Council (VQC) undertook a pressure ulcer point prevalence survey; a project that affectionately became known State-wide as PUPPS. Pressure ulcers are an internationally recognised patient safety problem and, as such, a reduction in pressure ulcer prevalence in Victoria is a key outcome of the VQC strategic plan. This paper describes the PUPPS methodology used by the VQC to ascertain the prevalence of pressure ulcers in the acute and subacute sectors of Victorian public health services. Building on the model advocated by Prentice, PUPPS proved a manageable and successful approach to conducting a State-wide pressure ulcer point prevalence survey. It also served as a useful guide to those wishing to conduct pressure ulcer prevalence surveys locally. Several elements critical to success were identified - the importance of thorough planning and project management; the preparation and provision of information materials for health services to enable them to make an informed decision to participate; the piloting and refinement of the methodology; the testing of and support for surveyors; and the importance of and flow-on effects of the surveyor education programme. These elements are discussed in detail, along with the many practical lessons learned throughout the course of the survey. Results of the prevalence survey will be presented in a forthcoming article.

Strachan, V. and K. May (2005). "PUPPS 2: a short report on the model for conducting serial state-wide pressure ulcer prevalence surveys in the acute and sub-acute health sectors in Victoria." *Primary Intention* 13(1): 19-21.

Pressure ulcers are an internationally recognised patient safety problem, one of six being addressed by the Victorian Quality Council (VQC), which operates as an expert, strategic, ministerial advisory council with a primary role to improve safety and quality in health care'. As a consequence of conducting PUPPS 1, the acronym given to the first State-

wide pressure ulcer point prevalence survey, the VQC State-wide PUPPS report 2003[2] made a number of recommendations aimed at improving pressure ulcer prevention and management. These included suggestions for action in the areas of pressure reducing equipment resources, wound management staff resources, education for staff and patients, risk assessment, monitoring and ongoing reporting., Action on the PUPPS 1 recommendations to date includes: support for several of the recommendations by their inclusion in the Victorian Department of Human Services (DHS) Policy and Funding Guidelines for 2004-2005; \$2 million in funding for a State-wide mattress replacement programme; development of patient/consumer information on pressure ulcer prevention (also available in 10 alternative language versions), roll-out of a 'pressure ulcer basics' education programme State-wide; and a second State-wide recording of pressure ulcer prevalence - PUPPS 2., This report outlines the methodology/model used by VQC for the collection of serial State-wide pressure ulcer prevalence of in the acute and subacute sectors of Victorian public health services.

Streed, S. A. and H. B. Loehne (2007). "Preventing infections to improve wound care outcomes: an epidemiological approach." *Wounds: A Compendium of Clinical Research and Practice* 19(11): 320-30.

Measuring and tracking wound complications and associated risk factors are powerful tools in managing wound outcomes. The authors review fundamental epidemiological approaches to clinical investigation, beginning with some basic study designs, and their relative strengths and weaknesses, with respect to the usefulness of the findings. Examples of methods to calculate rates and proportions and ways to measure significant change over time are presented. A conceptual model that is universally used by infection prevention professionals in the development and implementation of prevention strategies is also described. Risk stratification systems that have been derived through the analysis of thousands of patients are presented. These systems help predict those patients who are at risk for developing adverse outcomes (eg, infections or pressure ulcers), and therefore, should help caregivers address those risks by applying scientifically derived prevention strategies. Finally, various prevention strategies and how they relate to the conceptual model of infection prevention are discussed.

Taler, G. (2002). "What do prevalence studies of pressure ulcers in nursing homes really tell us?" *Journal of the American Geriatrics Society* 50(4): 773-4.

Talley, M. E. and A. Z. Moore (2006). "An integrated health system endeavor to reduce the prevalence of hospital-acquired pressure ulcers." *Journal of WOCN* 33(3S): Supplement 1: S33.

Tammelinn, A., C. Lindholm, et al. (1998). "Chronic ulcers and antibiotic treatment." *Journal of Wound Care* 7(9): 435-7.

This study analysed 656 wound samples from patients with chronic wounds in order to determine the bacterial flora and patterns of antibiotic use and resistance. Almost all wounds (95.1%) were colonised with at least one bacterial species; 26% of all patients were on antibiotic treatment. The total number of bacterial isolates resistant to antibiotics was low.

Thompson, P., J. Anderson, et al. (2007). "Research forum. Multidisciplinary care." *Advances in Skin & Wound Care* 20(11): 586-8, 590.

Thompson, P., D. Langemo, et al. (2005). "Skin care protocols for pressure ulcers and incontinence in long-term care: a quasi-experimental study." *Advances in Skin & Wound Care* 18(8): 422-9.

**OBJECTIVE:** To evaluate the effect on pressure ulcer prevalence, incidence, and healing time of incorporating use of a specific body wash and a skin protectant into skin care protocols that are based on guidelines from the Agency for Health Care Policy and Research., **DESIGN:** Quasi-experimental intervention study., **SETTING:** 2 rural long-term-care facilities., **PARTICIPANTS:** A convenience sample of 136 residents at 2 rural long-term-care facilities during a 3-month preintervention and a 3-month postintervention period., **INTERVENTIONS:** A 3-month preintervention observation period (baseline) was followed by a staff in-service session, in which the use of a body wash and a skin protectant was introduced into skin care protocols, and a 3-month postintervention observation period. The skin care protocols included skin assessment techniques, prevention and treatment strategies for Stage I and Stage II pressure ulcers, and management of incontinence., **MAIN OUTCOME MEASURES:** Differences in the occurrence and healing time of Stage I and Stage II pressure ulcers before and after introduction of use of a body wash and a skin protectant into skin care protocols and the occurrence rate of urinary and fecal incontinence., **RESULTS:** Stage I and Stage II pressure ulcers significantly decreased from 35 preintervention to 14 postintervention ( $t = 19.48$ ,  $df = 47$ ,  $P = .05$ ). The prevalence of pressure ulcers preintervention was 11.3%, compared with 4.8% postintervention ( $t = 2.47$ ,  $df = 1.0$ ,  $P = .24$ ). The change in the incidence of pressure ulcers was significant ( $t = 8.48$ ,  $df = -2.0$ ,  $P = .01$ ), with 32.7% preintervention and 8.9% postintervention. Healing time for pressure ulcers ranged from 4 to 70 days preintervention (mean [M] = 22.72 +/- 18.25) to 6 to 49 days postintervention (M = 16.0 +/- 12.93). The decrease in pressure ulcer healing time (rapid, medium, and long) preintervention to postintervention was statistically significant ( $[\chi]^2 = 14.9$ ,  $P = .001$ ). The presence of fecal and urinary incontinence was significantly associated with the development of Stage I and Stage II pressure ulcers ( $[\chi]^2 = 44.8$ ,  $P = .000$ )., **CONCLUSIONS:** Implementation of skin care protocols that included use of a body wash and a skin protectant reduced the incidence of Stage I and Stage II pressure ulcers and decreased healing time. The skin protectant and body wash used in the protocols were found to be effective in preventing and treating Stage I and Stage II pressure ulcers.

Thomson, J. S. and R. G. Brooks (1999). "The economics of preventing and treating pressure ulcers: a pilot study." *Journal of Wound Care* 8(6): 312-6.

A pilot economic evaluation of a projected pressure ulcer prevention policy was carried out in a 252-bed geriatric unit in Glasgow. The aim was to set up a framework for evaluating and comparing the costs and benefits of current care and a potential prevention programme. Data were collated from prevalence and incidence studies. Prevalence results showed that 41% of the patient population suffered pressure damage to some extent and incidence data showed that 45% of these were potentially preventable. Evaluation of the costs and benefits shows that the prevention programme would be cost-effective. The cost would be between 7,606 pounds and 28,669 pounds but the benefits would range from 305,506 pounds to 342,510 pounds. The authors conclude that economic appraisal is feasible.

Tippett, A. W. (2005). "Wounds at the end of life." *Wounds: A Compendium of Clinical Research and Practice* 17(4): 91-8.

Wounds are commonly encountered at the end of life. There is a need for palliative wound care, but little exists, and public policies do not focus on palliation. Understanding the magnitude and scope of the problem can provide a basis for developing palliative treatments and influencing public policy. Method: A cross-sectional study and retrospective records review from patients in a large urban/suburban hospice were conducted to describe (a) the prevalence of wounds and (b) the types of wounds and characteristics of hospice patients referred for wound care. Among 383 hospice patients, 35% had skin wounds, of which 50% were pressure ulcers. In a case series of 192 consecutive patients referred for wound consultation, the average age of patients was 82, 67% of patients were female, patients had numerous co-morbidities, and 40% of all wounds were pressure ulcers. Despite short treatment periods, palliative wound care measures resulted in significant healing for nearly half of wounds identified. Conclusions: These studies shed light on a problem of immense proportion. Wounds afflict more than one-third of the nearly 1 million hospice patients in the United States and many more patients at the end of life. Knowing characteristics of the patients and wounds as presented here can provide an evidence-based foundation to foster development of appropriate palliative treatment for these patients.

Torrance, C. and M. Maylor (1999). "Pressure sore survey: part one." *Journal of Wound Care* 8(1): 27-30.

Prevalence and equipment surveys were performed annually in the first of a three-part survey investigating the prevalence of pressure sores in an NHS trust, and the effect of staff knowledge and attitudes. The study was undertaken in an integrated trust with acute and community services. The surveys investigated prevalence of pressure sores and availability of equipment, and identified characteristics of the patient population for comparison with other studies. The results of the equipment survey indicated that there is enough suitable pressure-reducing apparatus to treat those patients with existing severe and superficial sores and more than enough to provide preventive assistance to patients at medium and low risk. The results over the five year period studied suggest that the introduction of pressure sore incidence monitoring is helpful in focusing attention on the pressure sore problem.

Trigilia, D., S. DeLong, et al. (2007). "Reducing prevalence of pressure ulcers in the long-term acute care setting... 39th Annual Wound, Ostomy and Continence Nurses Annual Conference." *Journal of WOCN* 34(3S): Supplement: S44.

Uzun, O. and M. Tan (2007). "A prospective, descriptive pressure ulcer risk factor and prevalence study at a university hospital in Turkey." *Ostomy/Wound Management* 53(2): 44-6, 48, 50-6.

Valid and reliable patient records regarding pressure ulcers and standard procedures to promote pressure ulcer prevention are not generally available in Turkish hospitals. Consequently, information about pressure ulcer prevalence and risk factors is limited and cannot be obtained retrospectively. A prospective, 1-day, cross-sectional descriptive study was conducted among all eligible, hospitalized patients in the adult medical, surgical, and intensive care units of a university hospital in Turkey. The purpose of the study was to ascertain the prevalence and characteristics of patients with or at risk for developing pressure ulcers. A patient history and demographic and length of stay variables were obtained and skin integrity and Braden scale score variables were assessed for all eligible patients (n = 344 patients admitted more than 24 hours before the study). Forty (40) patients had at least one pressure ulcer (prevalence rate 11.6%) and 111 (32.3%) were found to be at risk for pressure ulcer development. Patients with a low albumin level and other diseases or medical problems as well as those who were comatose or had surgery had a higher rate of pressure ulcers. Patients at risk for pressure ulcer development were found to be male, older, unconscious, and post surgery; additionally, they had a low body mass index and serum albumin as well as other health problems known to be associated with pressure ulcer formation. A significant, negative correlation between hospital length of stay and Braden scale score also was observed. These findings confirm prevalence and risk factor data from studies conducted in other countries and suggest that assessment and prevention efforts in Turkish hospitals must improve in order to decrease the burden of pressure ulcers.

VanGilder, C. (2006). "Long-term care US 2005 International Pressure Ulcer Prevalence Survey results." *Journal of WOCN* 33(3S): Supplement 1: S49.

VanGilder, C., S. Decker, et al. (2007). "2006 INTERNATIONAL PRESSURE ULCER PREVALENCE survey results... 39th Annual Wound, Ostomy and Continence Nurses Annual Conference." *Journal of WOCN* 34(3S): Supplement: S61.

VanGilder, C., G. D. MacFarlane, et al. (2008). "Results of nine international pressure ulcer prevalence surveys: 1989 to 2005." *Ostomy/Wound Management* 54(2): 40-54.

Pressure ulcers continue to be a significant problem for patients and healthcare facilities. Since 1989, results from the International Pressure Ulcer Prevalence[TM] surveys -

observational, cross-sectional cohort studies - conducted by Hill-Rom(R), Batesville, Ind, have been used to document aggregate prevalence rates and provide acute care, long-term acute care, and longterm care facilities with internal and external benchmarks of process improvement. During each of the nine surveys conducted between 1989 and 2005, clinical teams in participating facilities predominantly in the US (some facilities in Canada, Saudi Arabia, and Australia participated after 2003) assessed admitted patients on assigned study dates. For this study, trends using all records (n = 447,930; average, 49,770 per year) were reviewed. The majority of facilities in each survey year were in the US (99% overall). Overall and nosocomial pressure ulcer prevalence rates ranged from 9.2% and 5.6% in 1989 to 15.5% and 10% in 2003 and 2004, respectively. The highest prevalence was documented in long-term acute care (27.3% overall, 8.5% nosocomial). Most commonly, ulcers were located at the sacrum (28%), heels (23.6%), and buttocks (17.2%). Ulcers were more commonly assessed as Stage I and Stage II (>70%). However, in patients with dark skin tone (2004 and 2005 data, n = 162,296), 13% of identified ulcers were Stage I compared to 32% in patients with medium and 38% in patients with light skin tone. Using the most complete data sets (2003, 2004, and 2005), more severe pressure ulcer prevalence (Stage III+) was not found to be age-related. Approximately 48% of all patients who had pressure ulcers and 48% of patients with nosocomial pressure ulcers were assessed at mild or no risk (Braden scale score >14). Prevalence within the Braden Score risk categories aligned with risk for developing pressure ulcers. Despite increased attention to the pressure ulcer problem, prevalence rates from the last five survey years are relatively unchanged.

Vargo, D. M. (2006). "The journey we took, "countdown to decreasing pressure ulcer prevalence"." *Journal of WOCN* 33(3S): Supplement 1: S33.

Vati, J., S. Chopra, et al. (2004). "Nurse's role in the management and prevention of pressure ulcers - a study." *Nursing Journal of India* 95(5): 111-2.

von Baum, H., C. Schmidt, et al. (2002). "Risk factors for methicillin-resistant *Staphylococcus aureus* carriage in residents of German nursing homes." *Infection Control and Hospital Epidemiology* 23(9): 511-5.

**OBJECTIVES:** To determine the prevalence of and the risk factors for methicillin-resistant *Staphylococcus aureus* (MRSA) carriage in nursing home residents in the Rhine-Neckar region of southern Germany. **DESIGN:** Point-prevalence survey. **SETTING:** Forty-seven nursing homes in the region. **PARTICIPANTS:** All residents of the approached nursing homes who agreed to participate. **METHODS:** After informed consent was obtained, all participants had their nares swabbed, some personal data collected, or both. All swabs were examined for growth of MRSA. All *S. aureus* isolates underwent oxacillin susceptibility testing and polymerase chain reaction for demonstration of the *mecA* gene. All MRSA isolates were typed using pulsed-field gel electrophoresis after digestion with *Sma*I. **RESULTS:** Swabs from 3,236 nursing home residents yielded 36 MRSA strains, contributing to a prevalence rate of 1.1%. Significant risk factors for MRSA carriage in the multivariate analysis were the presence of wounds or urinary catheters, limited mobility, admission to a

hospital during the preceding 3 months, or stay in a medium-size nursing home. One predominant MRSA strain could be detected in 30 of the 36 MRSA carriers.

CONCLUSIONS: The prevalence of MRSA in German nursing homes is still low. These residents seemed to acquire their MRSA in the hospital and transfer it to their nursing home. Apart from well-known risk factors for the acquisition of MRSA, we identified the size of the nursing home as an independent risk factor. This might be due to an increased use of and microbials in nursing homes of a certain size.

Wall, J. and T. Colley (2003). "Preventing pressure ulcers among wheelchair users: preliminary comments on the development of a self-administered risk assessment tool." *Journal of Tissue Viability* 13(2): 48, 50, 52-4 passim.

The prevalence of pressure ulcers among permanent wheelchair users remains high. While many risk factors for pressure ulcer development in this group have been identified only a minority of these have been evaluated scientifically and it is generally acknowledged that existing risk assessment tools are inadequate for predicting risk in seated persons who use a wheelchair for mobility. A 2-year prospective study is underway to design a new self-administered pressure ulcer risk indicator to be used by non-ambulant wheelchair users and their carers in conjunction with professionals. This instrument will be designed as a result of triangulation of methods., \* A systematic review of available evidence, \* Latest professional opinion, \* A qualitative study exploring the issues from the perspective of seated persons with a history of pressure ulcers (n = 10) undertaken by one of the authors (JW), \* A 2-year prospective study identifying key risk factors in a sample of 160 seated persons. This paper offers an insight into the findings on the recruitment of the 160 individuals into the prospective study, which is currently collecting a large amount of data on the health, degree of disability and integrity of skin of all the participants. The paper offers an overview of the medical diagnosis, degree of physical disability, issues pertaining to continence and prevalence of pressure ulcers in this group on recruitment. Early findings suggest that the new risk indicator should include measures of degree of physical disability and ability to transfer as an integral part of selfassessment and therefore prevention of pressure ulcers. The study was due for completion in the autumn of 2002. It is envisaged that early work on the development of the tool should be complete by the summer of 2003.

Westendorp, C. and E. S. Wilson (1997). "Poster presentation: a step by step process... continued from September, 1997." *CAET Journal* 16(4): 23-9.

Westrate, J. and F. Heule (2001). "Prevalence of pressure ulcers, risk factors and use of pressure-relieving mattresses in ICU patients." *Connect: The World of Critical Care Nursing* 1(3): 77-8, 80-2.

Whittington, K. (2002). "Wound care. Under pressure: P&I studies can improve pressure ulcer treatment outcomes." *Advance for Directors in Rehabilitation* 11(2): 29-30.

Whittington, K. (2003). "Reply to pressure ulcers... The Australian model for conducting pressure ulcer prevalence surveys (Primary Intention 2003; 11(2):87-109)." Primary Intention 11(4): 168.

Whittington, K. and R. Briones (2006). "National pressure ulcer prevalence and incidence study -- seven years of data." Journal of WOCN 33(3S): Supplement 1: S45.

Whittington, K., M. Patrick, et al. (2000). "A national study of pressure ulcer prevalence and incidence in acute care hospitals." Journal of WOCN 27(4): 209-15.

**OBJECTIVE:** This study sought to establish national benchmarks for pressure ulcer prevalence and incidence among acute care health organizations served by Novation LLC. **Setting and subjects:** One hundred sixteen acute care facilities from 34 states participated; the sample consisted of 17,560 patients in hospital-based medical-surgical or intensive care units. **INSTRUMENTS:** Standardized education kits were provided to each participating site. The kits included an educational video about pressure ulcer staging, a post-test and answer key, and assessment form for patient data collection. **METHODS:** Pressure ulcer prevalence was measured during a predetermined 24-hour period at each facility. Incidence was measured over the average length of stay determined for each participating facility. Subjects were assessed by teams consisting of a registered nurse and one other health care professional (eg, licensed practical nurse, physical therapist). Demographic, wound, and other data were collected for these patients. Data collection forms were audited and submitted to a central site for database entry, analysis, and generation of reports. **RESULTS:** The average length of stay for the participating facilities was 5 days. Pressure ulcers developed in 7% of the subjects (n = 383); 90% were stage I or II pressure ulcers, and 73% occurred in patients older than 65 years. The most sites based on both prevalence and incidence measurements were the sacrum and coccyx at 26% and 31%, respectively. **CONCLUSIONS:** Prevalence and incidence studies must be routinely conducted to clearly identify the extent of the pressure ulcer problem to provide guidance for efficient and effective corrective action.

Whittington, K. T. and R. Briones (2004). "National prevalence and incidence study: 6-year sequential acute care data." Advances in Skin & Wound Care 17(9): 490-4.

**OBJECTIVE:** To provide health care organizations with a benchmark to measure pressure ulcer prevalence and incidence., **SUBJECTS:** Medical, surgical, and intensive care unit patients at participating health care organizations. **DESIGN:** Pressure ulcer prevalence was measured during a predetermined 24-hour period at each participating health care organization, using a standardized data collection form. Incidence was measured over the average length of stay determined for each participating health care organization. Patient demographics, pressure ulcer stages, pressure ulcer locations, and contributing factors were collected during the study. Collected data forms were audited prior to being submitted to a

central site for database entry, analysis, and report generation. RESULTS: Pressure ulcer prevalence ranged from a low of 14% (2001 and 2002) to a high of 17% (1999). Incidence ranged from a low of 7% (2001, 2003, 2004) to a high of 9% (2000). Comprehensive reports were delivered to the participating health care organizations, with each health care organization's data compiled to create a comparison database., CONCLUSION: A standardized methodology for prevalence and incidence study data collection/reporting has been developed and used in successive studies and years. This provides a tool to help health care organizations measure the effectiveness of interventions, improve patient outcomes on an ongoing basis, and begin trending analysis.

Woodbury, M. G. and P. E. Houghton (2004). "Prevalence of pressure ulcers in Canadian healthcare settings." *Ostomy/Wound Management* 50(10): 22-4, 26, 28 passim.

Although statistics regarding the number of pressure ulcers in the US and other countries are available, little information is known about the number of individuals in Canada who have pressure ulcers. Such information is important to assess the scope and healthcare costs of pressure ulcers and develop public policies. To obtain estimated pressure ulcer prevalence rates in Canada, existing data (gathered between 1990 and 2003) from different healthcare settings across the country were obtained from peer-reviewed published studies and from unpublished studies provided by individuals and pressure ulcer support surface manufacturers. Methods used to gather and report prevalence data in each study were critically appraised using a modified version of published criteria. Retrospective chart audit studies that did not involve direct patient assessment were excluded. The data included information from 18 acute care facilities involving 4,831 patients, 23 non-acute care facilities with 3,390 patients, 19 mixed healthcare settings with 4,200 patients, and five community care agencies that surveyed 1,681 patients. Estimates of pressure ulcer prevalence were 25.1% (95% Confidence Interval, 23.8% to 26.3%) for acute care settings, 29.9% (95% Confidence Interval, 28.3% to 31.4%) in non-acute care settings, 22.1% (95% Confidence Interval, 20.9% to 23.4%) in mixed health settings, and 15.1% (95% Confidence Interval, 13.4% to 16.8%) in community care. The overall estimate of the prevalence of pressure ulcers in all healthcare institutions across Canada was 26.0% (95% Confidence Interval, 25.2% to 26.8%). The Canadian prevalence estimates differed among the healthcare settings and were higher than those reported in the US and the Netherlands. Although additional studies are needed, the data suggest that pressure ulcers are a significant concern in all healthcare settings in Canada.

Young, J., S. Nikoletti, et al. (2002). "Risk factors associated with pressure ulcer development at a major western Australian teaching hospital from 1998 to 2000: secondary data analysis." *Journal of WOCN* 29(5): 234-41.

OBJECTIVE: The purpose of this study was to identify risk factors associated with the presence of pressure ulcer development in adult patients at an acute care teaching hospital. DESIGN: The database was established by combining the results from 3 annual cross-sectional pressure ulcer prevalence studies conducted between 1998 and 2000. SETTING AND SAMPLE: The sample consisted of all medical and surgical patients who

were inpatients on the day of the pressure ulcer surveys. The sample includes a total of 1394 patients. METHODS: This study undertook secondary data analysis with use of logistic regression and descriptive statistics. RESULTS: Overall pressure ulcer prevalence was calculated at 15.9%, with this figure decreasing slightly to 12.7% when pressure ulcers present on admission were excluded. Initial analysis identified several variables as significant risk factors for pressure ulcer development (age, Braden Scale risk category, and admission type and specialty). However, when entered into a final multivariate model, only 2 factors, age and Braden Scale risk category, were found to be significant. The odds ratio matrix revealed a consistent trend toward increasing odds ratios with increasing Braden Scale risk category within each age group. The magnitude of this trend was more pronounced in the younger age groups, highlighting the importance of undertaking Braden Scale assessments of younger patients, some of whom may be at greater risk of having a pressure ulcer develop than would otherwise be expected. CONCLUSION: Pressure ulcer prevalence in this acute care setting is high when compared with other Australian data. However, comparisons of pressure ulcer prevalence across studies are difficult to interpret because of different reporting methods. Although predictor variables for pressure ulcers have been identified in a number of studies, longitudinal studies are needed to identify the cause-and-effect relationships for potential predictor variables. In addition, more sophisticated statistical analyses such as the use of the odds ratio matrix may help guide further research into interaction effects between predictor variables and how these might affect the psychometric properties of risk assessment tools such as the Braden Scale. Pressure ulcer interventions should be targeted at the sacrum and heel, because these appear to be the most frequently observed locations for pressure ulcers.

Young, T. (1997). "Pressure sore management. Pressure sores: incidence, risk assessment and prevention." *British Journal of Nursing* 6(6): 319-22.

Pressure sores have a physiological basis which, in common with other disease processes, is influenced by intrinsic and extrinsic factors unique to the individual. A comprehensive patient assessment will identify factors affecting the individual and consequently direct preventive intervention. The issue of pressure sores should be addressed at a patient, trust or regional level to ensure that preventive strategies/policies cross all healthcare boundaries. Identification of the size of the problem is the starting point upon which a preventive strategy can be built. A comprehensive strategy for pressure sore prevention has existed in the USA since 1992, and its contents demonstrate the multidisciplinary input required to develop and implement the recommendations. Nurses have a key role in the prevention of pressure sores; however, they need educational, managerial and financial support in order to function effectively within this role.

Zulkowski, K. (1998). "MDS+ RAP items associated with pressure ulcer prevalence in newly institutionalized elderly: study I." *Ostomy/Wound Management* 44(11): 40-2, 44, 46-8 passim.

All federally funded facilities are required to use the Minimum Data Set Plus (MDS+) for functional assessment of their residents. Within the MDS+ there are 18 specific

conditions addressed through Resident Assessment Protocols (RAPs). There is a RAP for pressure ulcers but the validity of the pressure ulcer RAP items has not been documented. The purpose of this study was to determine which pressure ulcer RAP items correlate with pressure ulcer prevalence in newly institutionalized elderly and whether inclusion of nutritional status information to the correlated RAP items increases association with pressure ulcer prevalence. Data were collected through a retrospective chart review of 990 residents over age 65 at 8 nursing homes. Five pressure ulcer RAP items were predictive of pressure ulcer prevalence 19.76% of the time. When nutritional status markers were added in a logistic regression, pressure ulcers were correctly predicted 32.3% of the time. In clinical practice, the pressure ulcer RAP needs to include nutritional status information to accurately reflect pressure ulcer risk.

Zulkowski, K. (1999). "MDS+ items not contained in the pressure ulcer RAP associated with pressure ulcer prevalence in newly institutionalized elderly." *Ostomy/Wound Management* 45(1): 24-6, 28-33.

All federally funded facilities are required to use the Minimum Data Set Plus (MDS+) for functional assessment of their residents. Within the MDS+ there are 18 specific conditions addressed through Resident Assessment Protocols (RAPs). The purpose of this study was to determine if MDS+ items not included in the pressure ulcer RAP correlated with pressure ulcer prevalence in newly institutionalized elderly. Additionally, this study examined whether the addition of nutritional status information to the correlated items increased association with pressure ulcer prevalence. Data were collected through a retrospective chart review of 990 residents over age 65 at eight nursing homes. Pressure ulcer prevalence was 33.2%. Nineteen of 59 non-RAP MDS+ items were correlated with pressure ulcer prevalence. Logistic regression determined that 10 MDS+ items predicted pressure ulcer prevalence in 28.88% of the subjects. Including serum albumin in the logistic model increased the predictability for pressure ulcer prevalence to 36.3%. Results of this study demonstrate the strong association between nutrition and pressure ulcer prevalence and the need to revise the pressure ulcer RAP.

Zulkowski, K. and D. Kindsfater (2000). "Examination of care-planning needs for elderly newly admitted to an acute care setting." *Ostomy/Wound Management* 46(1): 32-6, 38.

This study examined characteristics of elderly people newly admitted to an acute care setting who should be included in routine care planning. The mean serum albumin for the 137 participants was 3.0 g/dL, and 75% (n = 102) needed assistance with activity/transfer and going up stairs. Of the participants, 32.4% (n = 44) experienced some degree of either fecal or urinary incontinence. Use of the nutritional, functional and cognitive profile developed from this study will enable nurses and medical personnel to better plan care to prevent functional decline and improve nutritional status during hospitalization of elderly patients.

Zulkowski, K., D. Langemo, et al. (2005). "From the NPUAP. Coming to consensus on deep tissue injury... National Pressure Ulcer Advisory Panel." *Advances in Skin & Wound Care* 18(1): 28-9.