



Pressure ulcers a cause for concern

Pressure ulcers – a cause for concern

Pressure ulcers are an internationally recognised patient safety problem. In addition, they are recognised as a clinical indicator of the standard of care provided⁵. Pressure ulcers are caused by unrelieved pressure, shear forces and friction resulting in damage of the skin and underlying tissue² and, in most instances, are an adverse outcome of a healthcare admission³⁻⁶. They predominantly occur during periods of acute or prolonged illness and affect frail, debilitated, elderly, or neurologically impaired patients, and those who are immobile for long periods of time^{12,21-23}. Irreversible tissue damage from unrelieved pressure can develop in a vulnerable patient in as little as 30 minutes. Whilst there is often a focus on the severest form of pressure ulcers at Stage 3 and Stage 4 (i.e. those that extend down to subcutaneous tissue, muscle or bone) as causing the most serious long-term damage, patients with additional co-morbid diseases and a less severe Stage 2 ulcer (extending into the dermis) can also be severely disabled; causing considerable impact on the patient and their family^{24,25}.

The physical consequences associated with pressure ulcers can range from mild scarring to chronic wounds requiring major surgical intervention and the possibility of permanent disfigurement. A pressure ulcer that exhibited full thickness skin and tissue loss may heal

by granulation and epithelialisation. The healed ulcer, however, will only attain 80% of the skin's original strength, and consequently will be susceptible to re-injury^{26,27}. Extensive or slow to heal pressure ulcers are prone to infection with the development

of osteomyelitis being a contributing cause of death in patients with pressure ulcers^{28,29}. The Australian Bureau of Statistics, for the period 2001 to 2003, recorded that 923 people died with pressure ulcers identified as either the primary or secondary cause of death⁹. Almost 30% of these deaths were Victorian.

Pressure ulcers generally have a detrimental effect on patients, families and the community at large. A patient's quality of life is affected by the presence of unsightly wounds that may or may not be malodorous, pain, increased length of hospital stay, and financial implications from potential loss of income or the cost of ongoing care. Families in turn are affected by all of these factors. The community and the health system bear the cost of pressure ulcers and health systems are further affected by lost opportunities for other admissions^{7,10,11,26,31,32}.

Although recorded since Egyptian times, pressure ulcers are largely preventable in all but a small percentage of highly compromised paediatric or adult patients^{3,31,32}. Reductions in the prevalence and incidence of pressure ulcers are possible through the implementation of comprehensive, multifaceted programs that emphasise prevention and treatment strategies which incorporate evidence based clinical guidelines, regular risk assessment, individual patient prevention plans, multidisciplinary expertise and, education and information sharing for patients, carers and staff^{2,19,23,33}.

Relieving pressure on the skin is cited as one of the main factors in reducing pressure induced tissue injury and can be easily achieved by altering the patient's position as little as 10 to 20 degrees^{2,34}. A patient's position must be changed frequently, whether lying in a bed or sitting in a chair if they are unable to reposition themselves². Special equipment such as pressure reduction mattresses and, cushions and adjunct devices such as booties can be used to reduce pressure in particular places. Individual care plans should also take into account the patient's diagnosis, any underlying co-morbidities, nutritional and hydration status and level of skin hygiene^{2,20}.

An international patient safety issue

Governments in Europe, the United States of America (USA) and the United Kingdom (UK) have identified pressure ulcers as a national health problem and have established national bodies whose specific objectives are to enhance both the delivery of and access to healthcare services to facilitate reductions in pressure ulcer incidence. The success of these nationally based initiatives is seen in the lower prevalence and incidence of pressure ulcers in these countries^{11,15,16}.

In the USA, the National Pressure Ulcer Advisory Panel (NPUAP) informs government on issues related to pressure ulcers and tracks nation wide improvement through annual serial prevalence studies, conferences, publications and education. Pressure ulcer reduction is part of the national health promotion and disease prevention initiative Healthy People 2010 program³⁵. In the UK, the National Health Service (NHS), working with the Royal College of Nursing (RCN), has also developed comprehensive clinical guidelines for prevention and management of pressure ulcers. They have allocated research funding to investigate preventative strategies and collected prevalence and incidence data as part of their program to improve pressure ulcer risk assessment and prevention, through dissemination and implementation of the RCN guideline 'Risk Assessment and Prevention of Pressure Ulcers'³⁶. The European Pressure Ulcer Advisory Panel (EPUAP), contribute to improved pressure ulcer prevention with clinical guidelines, education, publications, research and conferences^{15,37}.

Hospital acquired pressure ulcers have been increasingly associated with litigation^{6,38-40}. This trend is more common in the USA, however a patient in the UK successfully sued a health authority for £100,000 (approximately \$250,000 AUS) after they developed a pressure ulcer following hip surgery³⁸. The key message is that institutions that do not provide appropriate intervention strategies to minimise risk of patients developing pressure ulcers run the risk of being litigated against for providing care that 'falls below community standards and expectations'^{6,38}.

A national safety priority

Pressure ulcers in Australia could be described as the hidden 'epidemic under the sheets'⁷, as a large proportion of ulcers remain undiagnosed and untreated. Australia, through the Australian Council for Safety and Quality in Healthcare (ACSQHC) has identified pressure ulcers as a patient safety priority. Data and reporting on pressure ulcers has been included in the document 'Charting the Safety and Quality of Health Care in Australia' produced by the ACSQHC⁴¹. The pressure ulcer classification system recommended in the Australian Wound Management Association's (AWMA) Clinical Practice Guidelines for the Prediction and Prevention of Pressure Ulcers, has been incorporated into the ICD10AM Disease Classification System to ensure a common language and classification system is in place nationally⁴². AWMA and the various state wound management associations act as resources for clinicians and patients, facilitate wound management conferences and publish relevant literature^{2,43}. AWMA has also begun the process of developing a national body to lead in the areas of governance, research and education related to pressure ulcers in Australia. The Australian Council on Healthcare Standards (ACHS) includes pressure ulcer indicators in their clinical indicator set for health care accreditation⁵.

Pressure ulcer prevention and management programs at state and territory level are varied with improvement initiatives implemented by individual units, hospitals or health services which in many cases have achieved a reduction in prevalence. Cohesive state-wide approaches are in the early stages of development in several states but little published evidence of improvement or sustainability is currently available.

Opportunities exist for programs in the provision of education, pressure reduction equipment specifications, patient information, the collection and dissemination of national data and nationally driven and supported clinical prevention and management guidelines.

PUPPS (Pressure Ulcer Point Prevalence Survey) – the Victorian approach

Whilst individual Victorian health services have contributed considerable human and financial resources to improving pressure ulcer prevention and management, achieving major reductions in public hospital prevalence lacked a state-wide profile and approach until the advent of PUPPS 1 in 2003. The main aims of undertaking the first state-wide prevalence study were to focus attention on the problem, gain insight into the magnitude of the issue, educate staff, review the allocation and use of resources and, ultimately, to improve patient outcomes¹³.

Victoria is the first state to publicly detail the scope of the pressure ulcer issue in their acute and subacute hospitals, setting a benchmark for the collection and distribution of information on this scale. The methodology used to conduct both PUPPS 1 and PUPPS 2 was first used in Australia by Prentice⁴⁴, and adapted successfully to a state-wide model by VQC⁴⁵. This model has also been effectively used as the basis for prevalence surveys in acute, domiciliary and high/low care community settings in South Australia, Tasmania, Western Australia, Queensland and New South Wales.

VQC's PUPPS 1 project, the first Victorian state-wide pressure ulcer survey, achieved success on a number of fronts: as an effective model for conducting state-wide prevalence surveys, as a vehicle for providing quality, practical information to health services and the public on pressure ulcers and as a springboard for state and organisation-wide action aimed at improving pressure ulcer prevention and management. PUPPS 1 quantified the magnitude of pressure ulcers in Victoria, by identifying that more than 1 in 4 Victorian public hospital patients (26.5%) had a pressure ulcer at some point during their hospital admission. Two thirds of these ulcers (67.6%) were hospital acquired.

As a consequence of conducting PUPPS 1, the VQC State-wide PUPPS Report – 2003 made a number of recommendations aimed at providing both government and health services with achievable action steps to guide them towards improving pressure ulcer prevention and management¹³. These recommendations included suggestions for action in the areas of: pressure reducing equipment, wound management staff resources, staff and patient education, risk assessment, monitoring and ongoing reporting.

To date direct outcomes of the PUPPS 1 recommendations include: the allocation of \$2 million in government funding for a state-wide Mattress Replacement Program, the support of several of the recommendations by their inclusion in the Victorian Department of Human Services (DHS) Policy and Funding Guidelines, the development of patient information literature on pressure ulcer prevention that is available in 11 languages, the roll out of a 'Pressure Ulcer Basics' education workshop across Victoria and the PUPPS 2 project. Indirect consequences stemming from the PUPPS 1 initiative are: raising the profile of pressure ulcer issues in Victoria, the development of a technical specification standard for static pressure reduction foam mattresses as part of the DHS Mattress Replacement Program (see Appendix A) and dissemination of the PUPPS methodology interstate.

PUPPS 2

In committing to improve access to safety and quality data, VQC undertook to act on the PUPPS 1 recommendation that a second state-wide survey be conducted. PUPPS 2 was designed as a quality improvement audit that aimed to build on the experiences and lessons learned from PUPPS 1. The primary aims of PUPPS 2 were to determine the prevalence of pressure ulcers in Victorian public health services, compare the data with that of PUPPS 1, and to track the level of improvement in pressure ulcer management through the implementation of the key recommendations from PUPPS 1. By replicating the methodology used in PUPPS 1, broad comparisons can be made between existing Victorian, national and state data and comparable international studies.

Pressure ulcer prevalence measures the number of patients with a pressure ulcer at a given point in time. This provides information on the magnitude of the problem to health services, which may be of assistance when planning health service resources or strategies to address this problem^{37,46,47}. As with many prevalence surveys, PUPPS 2 also collected data on prevention and treatment strategies, which "may allow inferences to be made regarding the compliance with prevention and treatment protocols at a specific moment"³⁷. The information from PUPPS 2 therefore represents not only a snapshot of data related to pressure ulcer issues for individual health services, but also permits conclusions to be drawn between the data and prevention and management approaches at each health service. This in turn assists with the development of practical, informed recommendations on strategies for improvement.

Several elements critical to the success of PUPPS 1 were identified and preserved in PUPPS 2: the importance of thorough planning and project management; preparation and provision of information materials for health services to enable organisations and their patients to make an informed decision to participate; refinement of the earlier methodology based on feedback and lessons learned from PUPPS 1; testing of and support for PUPPS 2 surveyors; and, the importance of and flow-on effects of the surveyor education program.



The complex logistical challenge of PUPPS 2 was to take the successful methodology of PUPPS 1, plan and implement the scheduling of education and survey days across 136 metropolitan and rural health facilities for the 577 surveyors and site co-ordinators and maintain reliable collection of quality data. This was achieved using a project management framework incorporating the key functional steps of: Scope, Time, Communication, Cost, Quality, Human Resources, Risk and Contract/Procurement Management⁴⁸. An experienced project manager with a clinical background directed the project with the additional resource of a project officer seconded from a current acute care podiatry practice. Regular and consistent communication to site co-ordinators regarding planning and progress ensured adherence to the schedule and delivery of the final data.

Definitions

03 Definitions

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A "Pressure Ulcer" is defined as any lesion caused by unrelieved pressure resulting in damage of the skin and underlying tissue².

Prevalence is the number of existing cases of a particular disease or condition in a given population at a designated time².

Incidence is the number of new cases of a particular disease or event in a population during a specific time period².

Inter-rater reliability involves testing of surveyors (following their exposure to an education program) to ensure consistency and agreement between surveyors in classifying pressure ulcers as well as engendering reliability in data outcomes.

Pressure ulcers were staged according to the Australian Wound Management Association's (AWMA) Clinical Practice Guidelines for the Prediction and Prevention of Pressure Ulcers².

See Appendix B for schematic diagrams and clinical photos.

- **Stage 1** – Observable pressure related alteration of intact skin whose indicators as compared to the adjacent or opposite area of the body may include changes in one or more of the following: skin temperature (warmth or coolness), tissue consistency (firm or boggy feel) and/or sensation (pain, itching). The ulcer appears as a defined area of persistent redness in lightly pigmented skin, whereas in darker skin tones, the ulcer may appear with persistent red, blue or purple hues.
- **Stage 2** - Partial thickness skin loss involving epidermis and/or dermis. The ulcer is superficial and presents clinically as an abrasion, blister, or shallow crater.
- **Stage 3** - Full thickness skin loss involving damage or necrosis of subcutaneous tissue that may extend down to but not through underlying fascia. The ulcer presents clinically as a deep crater with or without undermining of adjacent tissue.
- **Stage 4** - Full thickness skin loss with extensive destruction, tissue necrosis or damage to muscle, bone, or supporting structures (for example, tendon or joint capsule). Undermining and sinus tracts may also be associated with Stage 4 pressure ulcers.

04

Methodology

Methodology

Population

All Victorian acute and subacute health services (87 organisations across 136 sites) were invited and 100% of organisations elected to participate in PUPPS 2. No patient data was submitted by 3 health services as there were no eligible patients in the facilities on the survey day. This report, unless otherwise stated, contains the analysed data of the remaining 84 health services. Two specialist hospitals elected to only survey a limited number of units, the remaining 82 health services surveyed all eligible patients. Over the period of the survey a combination of fluctuations in bed occupancy and survey exclusion criteria reduced the potential survey population to 7,621 patients.

The PUPPS 2 population differs from PUPPS 1 primarily due to the increased number of participating health services and the inclusion of paediatric and neonatal patients. The decision to include these

groups of patients in PUPPS 2 accounted for the need to be representative of the diverse range of patients in Victorian public hospitals and the need to offer pressure ulcer education to all staff in all acute and subacute sectors. In addition, there is a commonly held perception that pressure ulcers only occur in elderly, infirm or neurologically impaired patients and not in paediatric populations. As the literature refers to pressure ulcer occurrence in this group it was deemed important to identify the prevalence of pressure ulcers in these patients from a Victorian perspective^{49,50}.

Victorian public acute and sub acute health services vary widely in size, case mix and location. Health service size ranged from 1 campus to 5 and from 4 beds to 1,002. The division according to location was: metropolitan 68%, regional 14% and rural 18% of total beds involved.

Survey criteria

The criteria for inclusion were all adult, paediatric and neonatal inpatients on site on the day of the survey (including qualified newborns and Emergency Department patients flagged for admission). Psychiatric, unqualified newborns (i.e. a newborn less than 9 days old who does not require clinical care), hospital in the home, day surgery and day procedure patients were excluded.

Minor modifications were also made to the PUPPS 1 Survey Tool, shown in full as Appendix C, in the areas of:

- Age to capture neonatal and paediatric patients;
- Smoking history to assist in a clearer determination;
- Anatomical location identifiers to better reflect the systematic approach to skin inspection and the pressure ulcer sites identified in PUPPS 1;
- Pressure ulcers present on admission to identify the number documented.

PUPPS 2 used the PUPPS 1 model of "Train, Test & Tabulate" with minor modifications to the methodology based on lessons learned from the first survey. The model used to facilitate PUPPS 2 has been shown to be practical, efficient and achievable⁴⁵. It provided the comprehensive data required to establish pressure ulcer prevalence, and track improvement in pressure ulcer prevention and management across a sizeable geographic area and a large number of health services of varying sizes and casemix.

Health services were requested to nominate an onsite co-ordinator to work with VQC project staff to prepare for the survey and to provide staff to act as surveyors. VQC provided funding for education of surveyors, backfilling of staff involved in the project and, catering expenses. VQC also provided relevant project and ethics related information. Staff from each participating organisation were trained in accessing and auditing their own patients medical records during which such issues as patient confidentiality, security of patient information and, the patient consent process were addressed. Additional details regarding this information may be found in Appendices D & E.

The 20 week timetable used for PUPPS 1 was condensed for PUPPS 2 into a 2 week period in order to create a more sustainable logistical model for annual period prevalence surveys to be conducted, and to minimise seasonal variation. 19 metropolitan and rural education sessions ran concurrently over the first week and surveys were facilitated at 136 sites in geographical groups over the second week. To assist with the education and on-site survey support a core team of 10 clinicians with expertise in wound management and wound education was convened.

Train

Prior to attending the education day each surveyor was issued with a 'Surveyor's Toolkit' which contained general information on the survey, pre-reading material providing background on pressure ulcers, prevalence surveys and pressure ulcer classification, the survey tool, survey protocol and patient information.

PUPPS 2 education sessions covered: epidemiology and aetiology of pressure ulcers, anatomy and physiology of the skin, pressure ulcer classification, and survey protocols. An additional session on pressure ulcer prevention and management was included as a result of feedback regarding the need for this from PUPPS 1 surveyors.

Test

Unchanged in format from PUPPS 1, the inter-rater reliability testing was performed utilising the testing tool developed by Prentice⁴⁴, included as Appendix F. The surveyors were required to write responses to questions regarding staging definitions and then to appropriately stage clinical slides of pressure ulcers. New clinical slides were included for PUPPS 2. The required pass rate was 85% and surveyors had two formal opportunities to achieve this. Clinical assessment and testing was not undertaken for logistical and financial reasons associated with the large number of sites and surveyors.



Tabulate

The key points of the PUPPS 2 protocol and guidelines (Appendix G) included: teams of 2 surveyors (1 team per 40 beds with additional teams for Intensive Care Units, Emergency Departments and large geographical areas) performing a full body skin inspection of consenting patients. A diagram noting common pressure points was provided to assist with anatomical location of ulcers identified (Appendix H). Surveyors documented their findings and completed an audit of the medical record for relevant documentation.

It was stipulated to all surveyors that in the presence of reactive hyperaemia patients should be repositioned off the affected area and re-checked 30 minutes later for evidence of a Stage 1 pressure ulcer. Any ulcer of dubious aetiology and any finding of 5 or more pressure ulcers on one patient was to be discussed and checked with the site coordinator and/or a member of the PUPPS 2 core team.

Contextual information

All health services were asked to respond to a number of questions with the aim of determining the extent to which the key recommendations of PUPPS 1 had been implemented. Contextual information questions were replicated from PUPPS 1 with additional questions related to the 8 key recommendations of PUPPS 1 included (Appendix I). The data was collected using a combination of quantitative and qualitative questions and was completed by the PUPPS site co-ordinators.

Site co-ordinators were employed in a diverse range of roles in their organisations prior to being seconded as the health service liaison for PUPPS 2. Consequently the information obtained for this part of the project should be viewed as containing a degree of subjectivity related to individual impressions and organisational responsibilities.

Data Analysis

Data was scanned electronically into the character recognition and data software program Verity® TeleForm® Version 8, Verity Intellectual Capital Management, Sunnyvale, CA, USA.

Data was verified, processed and exported using StatTransfer (CircleSystems Inc, Seattle, WA, 2003) into a Stata database (StataCorp, College Station, TX USA, 2003). Stata 7.0 was used for all data analysis and reporting.

Data for individual health service reports were prepared for using Microsoft Access and Microsoft Excel (Microsoft Corporation, Seattle WA, 2003).

Additional contextual data provided via written responses from individual site co-ordinators of each health service were keyed into a spreadsheet (Microsoft Excel 2000 9.0.7616 SP-3) and analysed using Stata database (StataCorp, College Station, TX USA, 2003).

All data analysis and reporting was undertaken by the Monash Institute of Health Services Research.