

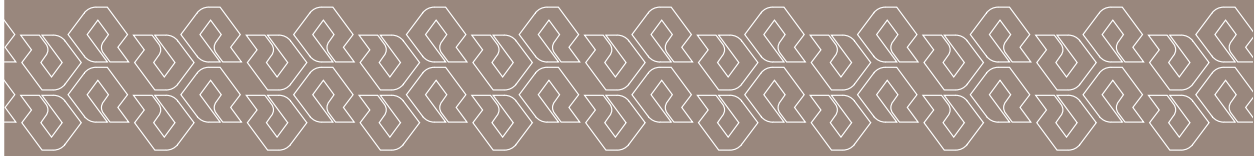


PUPPS 2

VQC State-wide PUPPS 2 Report 2004

Pressure ulcer point prevalence survey

Data collected from Victorian public health services
06.12.2004 – 15.12.2004



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Executive Summary

Pressure ulcers are an internationally recognised patient safety problem and are one of six such issues being addressed by the Victorian Quality Council (VQC), which is the expert strategic Ministerial advisory council in Victoria. The primary role of VQC is to improve safety and quality in health care by: Establishing a Safety and Quality Framework, Providing Improved Access to Better Data, Educating on Safety and Quality and Responding to Known Problems and Risks¹.

A pressure ulcer is any lesion caused by unrelieved pressure resulting in damage of the skin and underlying tissue², and in most instances is an adverse outcome of a healthcare admission³⁻⁶. Pressure ulcers primarily occur during periods of acute illness or trauma and predominantly affect the frail, debilitated, elderly, the neurologically impaired, and those who are immobile for long periods of time. Irreversible tissue damage can occur quickly and can have considerable impact on patients, their family, carers and health services.

The number of Australians living with a pressure ulcer is unknown. This situation could be described as a hidden 'epidemic under the sheets'⁷, with a large proportion of these ulcers remaining not only unseen but also untreated, unrecorded, and uncosted.

The physical consequences of pressure ulceration can lead to scarring, surgical intervention and death. Victorians accounted for almost 30% of the 923 people who died in Australia where pressure ulcers were identified as either the primary or secondary cause of death, for the period 2001 to 2003⁸. Already

stretched healthcare resources are further strained by the increased length of stay and associated cost of care required to treat patients with pressure ulcers^{3,4,9-12}.

In 2003 VQC conducted the first state-wide survey of the prevalence of pressure ulcers within Victoria's acute and subacute health services. With the release of the VQC State-wide PUPPS Report – 2003 (PUPPS 1), Victoria became the first Australian state to publicly detail the scope of the pressure ulcer issue in their public hospitals thereby setting a benchmark for the collection and distribution of information on this scale. The survey identified that one in four patients in these facilities had a pressure ulcer and that two thirds of the ulcers found were hospital acquired. The State-wide PUPPS Report – 2003 made a number of recommendations, one of which was that a further state-wide survey should be conducted at the end of 2004, to track the influence of initiatives recommended within the report in reducing the prevalence of pressure ulcers within Victorian public hospitals¹³.

This Pressure Ulcer Point Prevalence Survey Report – 2004 (PUPPS 2) is presented by VQC in response to the above recommendation. PUPPS 2 had two primary objectives:

1. To determine the prevalence of pressure ulcers in Victorian public hospitals and compare current findings to the prevalence of pressure ulcers identified in PUPPS 1; and
2. To track the level of improvement in pressure ulcer management through the implementation of the key recommendations from PUPPS 1.

The mean prevalence of pressure ulcers identified in PUPPS 2 was 20.8% (range 0% to 60%). This is a 21.5% improvement since PUPPS 1 in 2003. As in PUPPS 1, two thirds (66%) of the ulcers identified in PUPPS 2 were hospital acquired. A total of 2,559 ulcers were identified on 1,381 patients with 63% of these ulcers involving more than superficial skin damage. Patients over 60 years of age accounted for 80% of patients with ulcers.

Twenty paediatric patients (less than 18 years of age) were identified with a pressure ulcer, accounting for 1.5% of patients with ulcers. PUPPS 2 is the first time paediatric pressure ulcer prevalence has been detailed on a state-wide level.

While PUPPS 2 identified a prevalence of 20.8%, only 4.5% of these patients appear to have attracted a pressure ulcer code in the Victorian Admitted Episodes Dataset (VAED) over the same period. PUPPS 2 analysis indicated that patients with pressure ulcers stayed in hospital longer than patients without ulcers. Modelling of the VAED data indicates that patients with pressure ulcers have a 50% longer length of stay (LOS) than patients without ulcers, accounting for 44,406 beddays per annum. Although factors other than pressure ulcers may play a role in the extended LOS, the risk-adjusted cost of these additional beddays is approximately \$19 million.

Risk assessment to identify the level of risk for developing a pressure ulcer is widely acknowledged as a best practice strategy in the prevention of pressure ulcers. PUPPS 2 found that just over half the patients surveyed had had a risk assessment performed. Pressure reducing equipment was used for 60% of patients with pressure ulcers. Documentation of pressure ulcer management in the medical record was found in 45% of cases where pressure ulcers were identified. Written information for patients on pressure ulcer prevention was provided by 27% of health services.

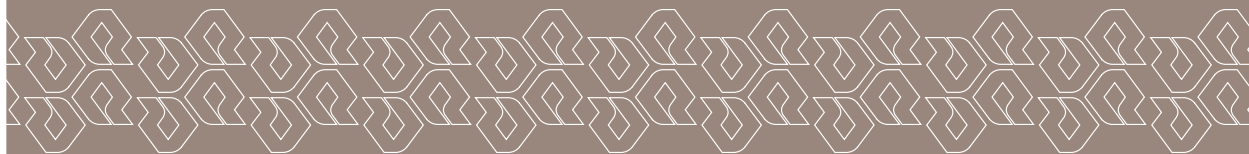
The results indicate there is an improvement in state-wide pressure ulcer prevalence within Victorian public hospitals with the average prevalence being similar to that found in a recent national study¹⁴. The decrease in pressure ulcer prevalence positions Victoria closer to data described in comparable international studies^{11,15,16}. Overall, the report demonstrates that improvement of organisational management of the

pressure ulcer issue in public hospitals has occurred state-wide with the majority of health services having implemented the key elements of a pressure ulcer prevention and management program as recommended in PUPPS 1. For the majority of facilities this includes an evidence-based prevention and management program, policies that are supported by executive staff and wound care committees. The results indicate however, that across all health services there remain diverse practices in pressure ulcer management. There are gaps between organisational policy and clinical practice with particular deficits in pressure ulcer risk assessment, the use of pressure reduction equipment, and documentation of pressure ulcer prevention or treatment strategies by all health professionals. Less than 38% of health services have staff trained in wound management with specific hours allocated to wound management education, prevention and management.

Immobility was again the primary associative risk factor identified in PUPPS 2 for developing a pressure ulcer. This emphasises the need to inform patients and staff of the importance of frequent position changes and early mobilisation. This message is reinforced within the VQC's pressure ulcer prevention patient publications 'Move, Move, Move' and 'Preventing Pressure Ulcers – a patient information booklet'^{17,18}. To decrease the risk associated with immobility, a comprehensive prevention plan that includes regular skin assessment, hygiene/skin care, a turning or re-positioning regimen, optimised nutrition and maximised opportunities to mobilise combined with pressure reducing support services is required^{2,19,20}.

As noted in PUPPS 1, the implementation of a multifaceted program to reduce the prevalence and incidence of pressure ulcers should be developed or continued. This program should be inclusive of wound management staff resources, pressure ulcer risk assessment, patient and staff education, pressure reduction equipment and associated reporting. As a consequence of conducting PUPPS 2 the VQC has identified a number of additional recommendations to those emanating from PUPPS 1. There should be a health service focus on two identified areas of greatest need, with improvements sustained through clinical risk reporting, regular review of data and outcomes, evaluation of the program and feedback to all stakeholders. Organisation-wide pressure ulcer data should be included in an organisation's minimum data set. The key message is to "implement, focus and sustain".

Through PUPPS 1 & 2, Victoria has taken a comprehensive step towards improving the prevention and management of pressure ulcers. The findings of this study indicate that significant improvement has occurred, but that more needs to be done. There is still a need for a co-ordinated and facilitated approach at both state and individual organisation levels to support sustained implementation of targeted prevention and management programs in order to minimise harm from a patient safety risk that is largely preventable.



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

To maximise consistency throughout the survey methodology, PUPPS 2 utilised the same definitions as PUPPS 1.

To maximise consistency throughout the survey methodology, PUPPS 2 utilised the same definitions as PUPPS 1.

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.

Results

05
Results

The results of this survey are reported under the following 3 groupings or subpopulations:

'PUPPS 1' represents the state-wide data of all 48 health services who participated in PUPPS 1 in 2003.

'PUPPS 2' represents the state-wide data of the 84 health services who participated in PUPPS 2 in 2004. (Although 87 health services consented to participate in PUPPS 2, 3 of the 87 health services had no eligible patients on survey day and therefore did not submit any patient data).

'PUPPS CG' (Comparison Group) represents a subset of the 2004 PUPPS 2 results for the 48 health services that also participated in PUPPS 1. Excluded from the PUPPS CG subset of PUPPS 2 state-wide data are patients <18 years of age and those health services that did not participate in PUPPS 1.

The key findings of the PUPPS 2 survey are summarised below in Table 1. These findings and further results are expanded in the following sections. The results are presented as 'Part A' which contains the PUPPS 2 state-wide data and 'Part B' which contains the PUPPS CG data.

Finding	PUPPS 1	PUPPS 2	PUPPS CG	Change % PUPPS 1 to PUPPS 2 [PUPPS 1 to PUPPS CG]
Pressure ulcer point prevalence	26.5%	20.8%	22.7%	-5.7 [-3.8]
Pressure ulcer risk assessment tool (RAT) completed	40.9%	52.8%	57.7%	11.9 [16.8]
Primary associative risk factor	Immobility	Immobility	Immobility	Unchanged
Use of devices in patients with a pressure ulcer	66.1%	59.6%	60.5%	-6.5 [-5.6]
Hospital acquired pressure ulcers	67.6%	66.2%	66.1%	-1.4 [-1.5]
Documentation of pressure ulcer management	90.2%	45.0%	44.4%	-45.2 [-45.8]
Provision of information to patients regarding pressure ulcers	3.7%*	26.5%	22.0%	22.8 [18.3]

Key Findings

Table 1. Key findings

This contextual factor was reported for PUPPS 1 at health service level (4.2%) in the VOC State-wide Report - 2003, but is reported at site level in this analysis.

Part A – PUPPS 2 State-wide data

1 Pressure Ulcer Point Prevalence PUPPS 2

1.1 State-wide prevalence PUPPS 2

The prevalence of pressure ulcers identified was 20.8% as represented in Graph 1a and Table 2a below.

Graph 1a. Victorian state-wide prevalence PUPPS 2

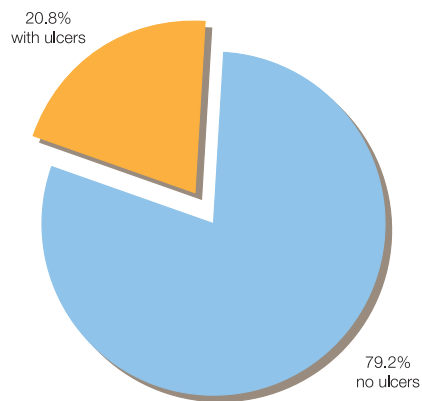


Table 2a. Victorian state-wide prevalence PUPPS 2

Group	Patient population	Patients refused	Patients seen	Patients with ulcers	Prevalence	95% confidence interval of prevalence
PUPPS 1	6,003	853	5,150	1,367	26.5%	25.3% - 27.7%
PUPPS 2	7,621	980	6,641	1,381	20.8%	19.8% - 21.8%

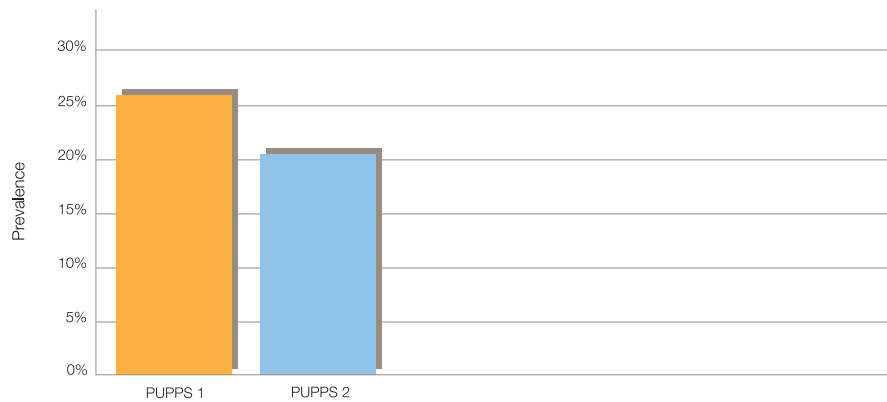
A number of international pressure ulcer prevalence studies do not include Stage 1 pressure ulcers. The prevalence of pressure ulcers excluding stage 1 pressure ulcers are presented below in Table 2b.

Table 2b. Victorian state-wide prevalence PUPPS 2 (excluding Stage 1 pressure ulcers)

Group	Patient population	Patients refused	Patients seen	Patients with ulcers	Prevalence	95% confidence interval of prevalence
PUPPS 1	6,003	853	5,150	882	17.1%	16.1% - 18.2%
PUPPS 2	7,621	980	6,641	976	14.7%	13.9% - 15.6%

Graph 1b shows the change in prevalence from PUPPS 1 (26.5%) to PUPPS 2 (20.8%) of -5.7% (95% CI -7.3% to -4.2%). This is an improvement of 21.5%.

Graph 1b. Change in state-wide prevalence PUPPS 1 to PUPPS 2

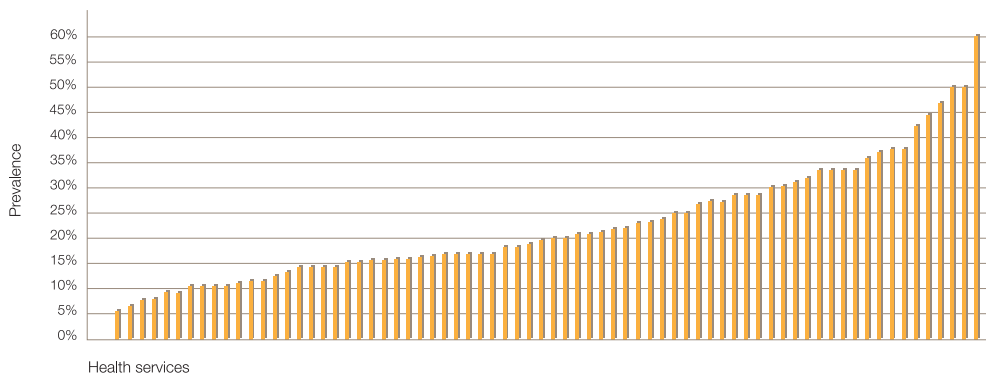


1.2 Pressure ulcer prevalence by health service PUPPS 2

Although 100% (n = 87) of Victorian health services participated in PUPPS 2, only patient data for 84 health services are included in the analysis, as 3 health services had no eligible patients on survey day and therefore had no data to submit. The state-wide mean was 20.8% with a range of 0.0% to 60.0%. See Graph 2 below.

The range of prevalence has increased from PUPPS 1 (5.6% to 48.4%). Pressure ulcer prevalence was above the state mean for 32 out of 84 participating health services (38.1%). Eleven health services identified 0% prevalence, which is represented as a single data point in Graph 2.

Graph 2. Pressure ulcer prevalence by health service PUPPS 2

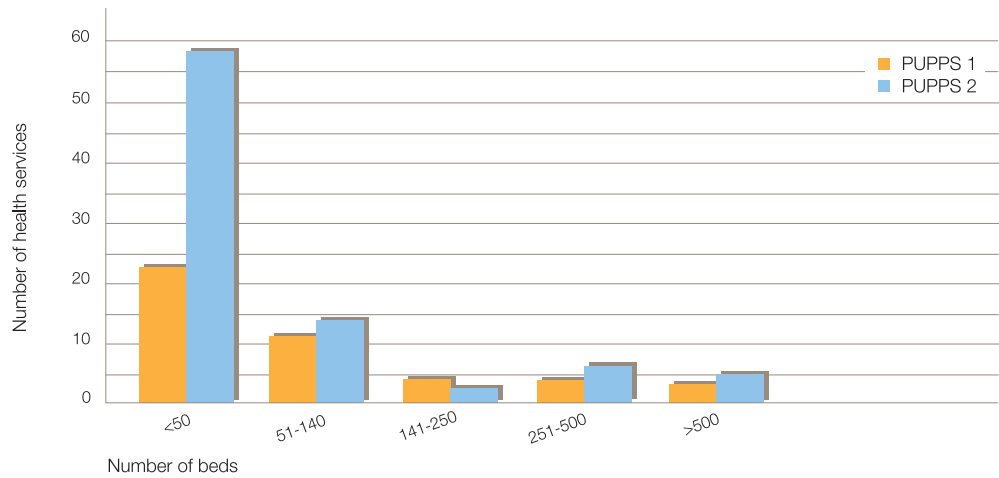


The number of participating Victorian acute and subacute health services increased from 77% in PUPPS 1 to 100% in PUPPS 2. The increase was primarily in the <50-bed size, which had increased by just under 50%. Graph 3 shows the change in number of health services by size of health service (bed numbers) from PUPPS 1 to PUPPS 2.

The inclusion of one health service in the over 500 bed group added over 1000 patients to the potential survey population.

This change in the number of health services in each of these groups should be considered when examining the results of the PUPPS 2 report.

Graph 3. Health service bed numbers PUPPS 2



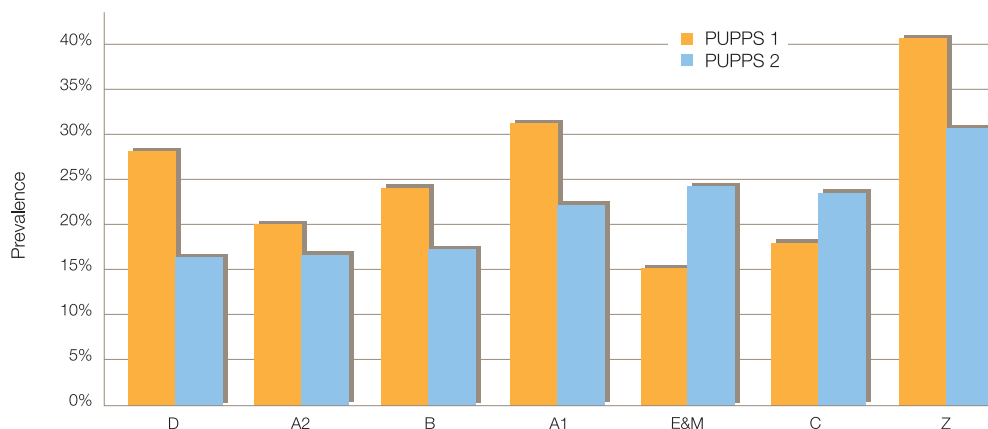
1.3 Pressure ulcer prevalence by DHS comparative groups PUPPS 2

Graph 4 benchmarks the Department of Human Services (DHS) comparative groups (see Key below) and shows the changes from PUPPS 1 to PUPPS 2. Each comparative group value is represented by the mean of each group as described in Table 3a.

Four groups were above (range 1.7% to 10.5%) the state-wide mean of 20.8% and three below (range 3.0% to 4.7%).

Five comparative groups showed a decrease in prevalence from PUPPS 1 to PUPPS 2 (range 3.0% to 12.0%). Two comparative groups (C, E&M) show an increase in prevalence (range 6.2% to 8.9%).

Graph 4. Pressure ulcer prevalence by DHS comparative groups PUPPS 2



Outlined in Table 3a is the prevalence by comparative group for PUPPS 2.

Table 3a. Pressure ulcer prevalence by DHS comparative groups PUPPS 2

DHS comparative group	Patients refused PUPPS 2 (%)		Patients seen PUPPS 2 (%)		Patients with ulcers PUPPS 2	Prevalence PUPPS 2 %	95% CI of prevalence %
A1	255	(12.4)	1,808	(27.2)	407	22.5	20.6 – 24.5
A2	374	(17.4)	1,777	(26.8)	298	16.8	15.1 – 18.6
B	164	(10.1)	1,452	(21.9)	259	17.8	16.0 – 19.9
C	44	(12.5)	308	(4.6)	75	24.4	19.9 – 29.4
D	48	(12.5)	336	(5.1)	54	16.1	12.5 – 20.4
E&M	4	(4.9)	168	(2.6)	40	23.8	17.6 – 31.0
Z	91	(10.3)	792	(11.9)	248	31.3	28.2 – 34.6
Total	980	(100)	6,641	(100)	1,381		

Table 3b shows the comparative group prevalence of PUPPS 2 compared to PUPPS 1.

Table 3b. Change in pressure ulcer prevalence by DHS comparative groups PUPPS 2

DHS comparative group	Prevalence PUPPS 1 % [Total patients seen]	Prevalence PUPPS 2 % [Total patients seen]	Change PUPPS 1 to PUPPS 2 % [p value]	95% CI of change %	
A1	31.0 [1,379]	22.5 [1,808]	-8.5 [0.00]	-13.8	-3.3
A2	19.8 [1,250]	16.8 [1,777]	-3.0 [0.09]	-6.5	0.5
B	23.8 [1,308]	17.8 [1,452]	-5.9 [0.01]	-10.6	-1.3
C	18.2 [313]	24.4 [308]	6.1 [0.13]	-1.8	14.0
D	28.1 [228]	16.1 [336]	-12.0 [0.00]	-19.5	-4.5
E&M	14.9 [47]	23.8 [168]	8.9 [0.00]	-1.3	19.0
Z	40.5 [625]	31.3 [792]	-9.2 [0.02]	-16.5	-1.8

Key: DHS comparative groups

ID	Description	Criteria
A1	Teaching hospitals – large	
A2	Teaching hospitals – other	
B	Large regional base and suburban	
C	Regional general hospitals	1000-4000 separations per annum
D	Area hospitals	500-1000 separations per annum
E	Local hospitals	<500 separations per annum
Z	Ungrouped agencies (non-casemix funded)	Generally subacute facilities
M	Multi purpose services	

1.4 Pressure ulcer prevalence by medical specialty PUPPS 2

Graph 5, Tables 4a, 4b & 4c show pressure ulcer prevalence by medical specialty. To simplify the range of medical specialties, broad groups were defined within the survey population (see Key below). Six groups were above the mean of 20.8% (range 0.8% to 37.3%) and, three groups were below (range 4.0% to 20.8%). Data was missing for 80 patients, which accounted for 0.9% (n = 13) of all patients with ulcers.

Five medical specialities recorded a decrease in pressure ulcer prevalence, with Critical Care demonstrating the greatest change, a decrease of 24.2% from PUPPS 1 (47.7%, 95% CI 39.1% – 56.3%) to PUPPS 2 (23.5%, 95% CI 18.2% – 29.8%).

Graph 5. Pressure ulcer prevalence by medical specialty PUPPS 2

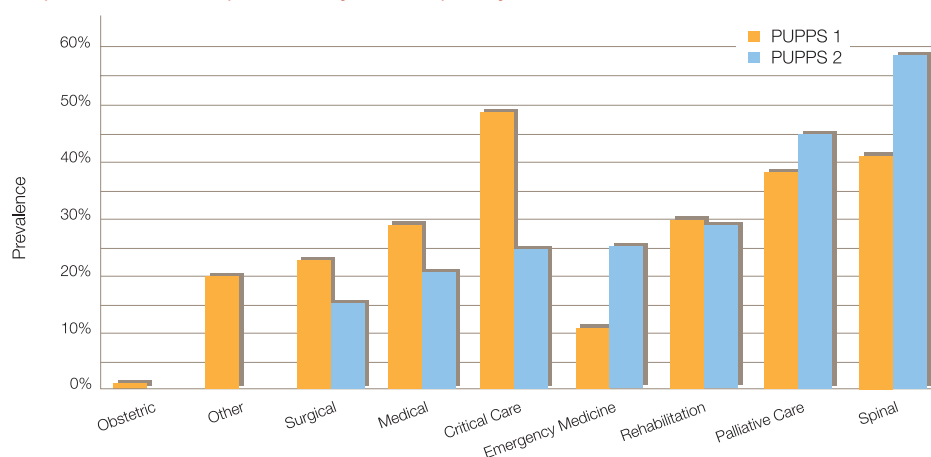


Table 4a. Pressure ulcer prevalence by medical specialty PUPPS 2

Medical specialty	PUPPS 2 patients refused	PUPPS 2 patients consenting	PUPPS 2 patients with ulcers	PUPPS 2 % prevalence within specialty	95% CI of prevalence
Spinal	3	31	18	58.1	40.8 – 73.6
Palliative Care	49	188	83	44.1	37.2 – 51.3
Rehabilitation	78	858	246	28.7	25.7 – 31.8
Emergency Medicine	13	89	22	24.7	16.9 – 34.6
Critical Care	19	200	47	23.5	18.2 – 29.8
Medical	489	3,382	711	21.0	19.7 – 22.4
Surgical	196	1,508	241	16.0	14.2 – 17.9
Other	3	14	0	0.0	0.0 – 21.5
Obstetric	109	312	0	0.0	0.0 – 1.2
Missing data	21	59	13	22.0	13.4 – 34.1
	980	6,641	1,381		

Table 4b shows the change in pressure ulcer prevalence between PUPPS 1 and PUPPS 2 for each medical speciality.

Increased emphasis on instructions for allocation of medical specialties in PUPPS 2 meant fewer patients were allocated to the 'other' group.

Table 4b. Change in pressure ulcer prevalence by medical specialty PUPPS 2

Medical specialty	PUPPS 1 % prevalence within specialty	PUPPS 2 % prevalence within specialty	Change PUPPS 1 to PUPPS 2 [p value]	95% CI of change %	
Spinal	41.4	58.1	16.7 [0.03]	1.9	31.5
Palliative Care	37.6	44.1	6.6 [0.19]	-3.2	16.3
Rehabilitation	29.9	28.7	-1.2 [0.74]	-8.5	6.0
Emergency Medicine	13.2	24.7	11.6 [0.13]	-3.5	26.6
Critical Care	47.7	23.5	-24.2 [0.00]	-36.2	-12.2
Medical	27.8	21.0	-6.8 [0.00]	-9.9	-3.7
Surgical	22.4	16.0	-6.3 [0.00]	-10.4	-2.2
Other	20.0	0.0	-20.0 [0.18]	-49.5	-9.5
Obstetric	1.1	0.0	-1.1 [0.16]	-2.7	0.5
Missing data	53.8	22.0	-31.8 [0.10]	-69.8	6.1

Table 4c demonstrates pressure ulcer prevalence by medical speciality as a proportion of the overall prevalence for PUPPS 2.

Table 4c. Pressure ulcer prevalence by population proportion by medical specialty PUPPS 2

Medical specialty	PUPPS 1 % prevalence over total patients with ulcers	PUPPS 2 % prevalence over total patients with ulcers	Change from PUPPS 1 to PUPPS 2	p value
Spinal	0.2	0.3	0.1	0.684
Palliative Care	1.0	1.2	0.2	0.155
Rehabilitation	3.4	3.7	0.3	0.374
Emergency Medicine	0.2	0.3	0.1	0.156
Critical Care	1.2	0.7	-0.5	<0.005
Medical	15.2	10.7	-4.5	<0.001
Surgical	5.1	3.6	-1.5	<0.001
Other	0.1	0.0	0.0	<0.005
Obstetric	0.1	0.0	0.0	0.191
Missing data	0.1	0.2	0.1	0.434
	26.5	20.8		

Key: Medical specialty groups

Group	Sub groupings
Medical	Cardiovascular/Cardiology, Endocrinology, Gastroenterology, General Medical, Geriatric Medicine, Haematology, Infectious Diseases, Neurological, Oncology, Renal, Respiratory Medicine & Stroke. And from the 'other' category - Dermatology, Detoxification, Management of venous ulcer, Pressure ulcer, Renal, Cellulitis, Obstetric, General observation, Allergic reaction, Falls, Overdose, Arthritis, Immunology, Oncology, and Dysphagia.
Surgical	Ear Nose & Throat, General Surgical, Gynaecology, Neurosurgical, Ophthalmology, Orthopaedic, Plastic Surgery, Thoracic Surgery, Transplant, Urological & Vascular. And from the 'other' category - Burns, Pain Management, Liver transplant, Unspecified surgery, Cardiovascular/Cardiology, Skin graft, Removal of foreign body, Abdominal pain, Oral facio-maxillary surgery, Head and neck.
Obstetric	Obstetric
Palliative Care	Palliative Care
Emergency Medicine	Emergency Medicine
Spinal	Spinal
Rehabilitation	Rehabilitation
Critical Care	Critical Care, High Dependency & Intensive Care Units
Other	All other medical specialties
Missing data	No medical specialty allocated

As with PUPPS 1, where surveyors identified the primary medical specialty as 'other' some patients were re-allocated to the nominated groups below:

- General Surgical – Colorectal (16 patients), Trauma (32 patients)
- General Medical – Special Care Nursery/ Neonatal (130 patients), Paediatric (34 patients), Rheumatology (12 patients), Hepatobiliary (8 patients)
- Geriatric Medicine – Awaiting placement (6 patients), Respite (3 patients), Interim care (45 patients), Nursing home type (8 patients), Cognitive impairment (1 patient), Debility (1 patient)
- Neurology – Motor (1 patient)
- Gastroenterology – Clinical nutrition (2 patients)
- Oncology – Radiotherapy (3 patients)
- Emergency – Abdominal pain (1 patient), Chest pain (1 patient)
- Rehabilitation – Assessment (1 patient)

Once the sub groupings were allocated to the broader categories the following primary medical specialties identified as 'other' were also allocated as follows:

- Medical – Dermatology (7 patients), Detoxification (5 patients), Management of venous ulcer (1 patient), Pressure ulcer (1 patient), Renal (6 patients), Cellulitis (3 patients), Obstetric (8 patients), General observation (1 patient), Allergic reaction (1 patient), Falls (4 patients), Overdose (1 patient), Arthritis (1 patient), Immunology (1 patient), Oncology (2 patients), Dysphagia (1 patient)
- Surgical – Burns (7 patients), Pain Management (3 patient), Liver transplant unit (2 patients), Unspecified surgery (1 patient), Cardiovascular/ Cardiology (27 patients), Skin graft (1 patient), Removal of foreign body (1 patient), Abdominal pain (1 patient), Oral facio-maxillary surgery (2 patients), Head and neck (2 patients), Head and Neck Oncology (1 patient)

Paediatric patients were allocated to their appropriate medical speciality and were not considered a separate group for the medical specialty analysis.

1.5 Distribution of pressure ulcers per patient PUPPS 2

The survey identified 1,381 patients with ulcers. Patients with more than 1 ulcer accounted for 44.7% (n = 618) of all patients with ulcers, and 21% (n = 287) of those had more than 2 ulcers. In the PUPPS 2 population 2 patients had 10 or more ulcers, as per Graph 6 and Table 5 below. Data was missing for 0.1% (n = 1) of patients. Compared to PUPPS 1 there are more people with only 1 ulcer and fewer with multiple ulcers. The distribution of pressure ulcers per patient represents a decrease of 5% in the number of patients with more than 1 ulcer.

Graph 6. Distribution of pressure ulcers per patient PUPPS 2

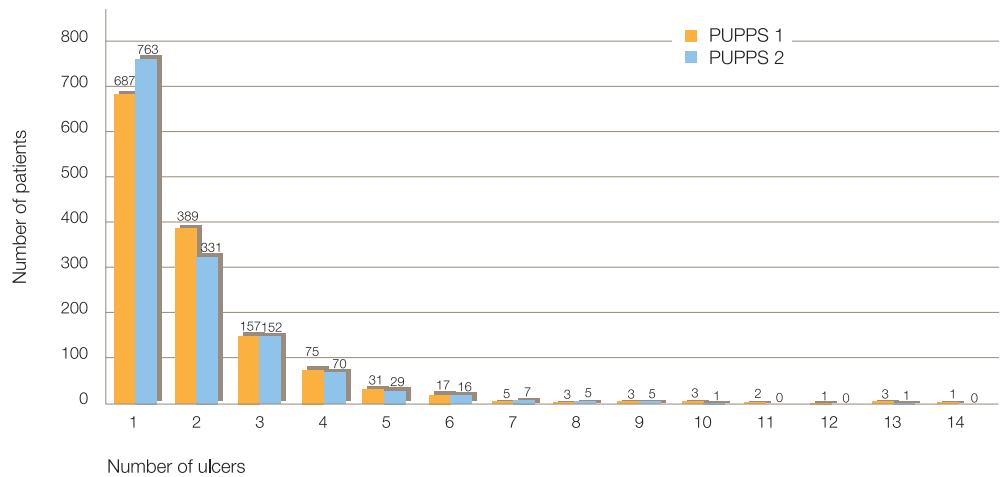


Table 5. Distribution of pressure ulcers per patient PUPPS 2

Number of pressure ulcers per patient	Number of patients with pressure ulcers	Number of pressure ulcers	% of all patients with pressure ulcers
1	763	763	55.3
2	331	662	24.0
3	152	456	11.0
4	70	280	5.1
5	29	145	2.1
6	16	96	1.2
7	7	49	0.5
8	5	40	0.4
9	5	45	0.4
10	1	10	0.1
11	0	0	0.0
12	0	0	0.0
13	1	13	0.1
14	0	0	0.0
Missing	1	0	0.1
Total	1,381	2,559	#

Column totals to 100.3 due to rounding of data.

1.6 Severity of pressure ulcers PUPPS 2

Severity of pressure ulcers by stage PUPPS 2

In total, 2,559 pressure ulcers were found in this survey on 1,381 patients. Stage 1 and Stage 2 pressure ulcers comprised 85.2% (n = 2,179) of these ulcers. Pressure ulcers classified as Stages 3 and 4 represented 14.8% (n = 380) of ulcers found (refer to definitions of pressure ulcer staging Appendix B). Graph 7 shows the percentage and number of each stage of ulcer.

Graph 7. Severity of pressure ulcers by stage PUPPS 2

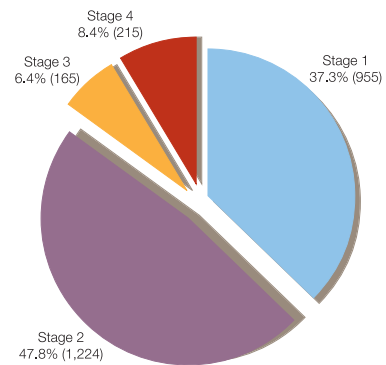


Table 6 summarizes the severity of pressure ulcers by stage for PUPPS 2 and shows the changes from PUPPS 1 to PUPPS 2. The proportion of Stage 1 ulcers decreased and the proportion of the remaining ulcers increased.

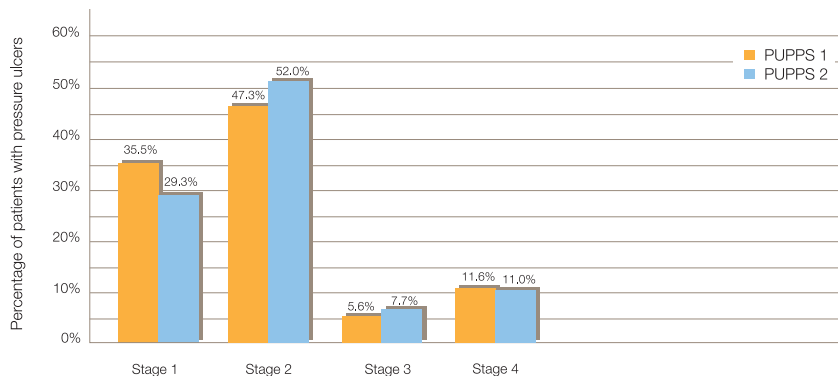
Table 6. Change in severity of pressure ulcers by stage PUPPS 2

Pressure ulcer stage	% (patients) of all pressure ulcers PUPPS 1	% (patients) of all pressure ulcers PUPPS 2	Change in % of all pressure ulcers PUPPS 1 to PUPPS 2	p value
1	43.1 (1,153)	37.3 (955)	-5.8	<0.001
2	44.2 (1,183)	47.8 (1,224)	3.6	<0.001
3	4.5 (120)	6.4 (165)	1.9	<0.001
4	8.2 (220)	8.4 (215)	0.2	<0.001
Total	100.0	100.0		

Severity of pressure ulcers by highest stage PUPPS 2

Pressure ulcers were found in 1,381 patients. Graph 8 shows the proportion of patients noting the severity of their highest stage of ulcer per patient. The PUPPS 2 result demonstrates a 6.2% decrease in Stage 1 pressure ulcers and a 0.6% decrease in Stage 4 pressure ulcers. There was a 4.7% increase in Stage 2 pressure ulcers and a 2.1% increase in Stage 3 pressure ulcers as compared to PUPPS 1. Patients with a Stage 3 or 4 pressure ulcer as their highest stage represent 18.7% (n = 258) of the population, and those with Stage 1 and 2 pressure ulcers as their highest stage represent 81.2% (n = 1,122). Data was missing for 0.1% (n = 1).

Graph 8. Change in severity of pressure ulcers by highest stage of pressure ulcers PUPPS 1 to PUPPS 2



1.7 Hospital acquired pressure ulcers PUPPS 2

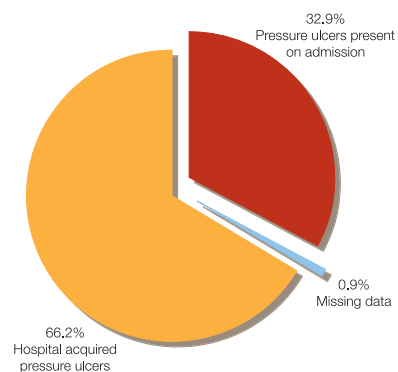
Pressure ulcers were defined as being hospital acquired if there was no documentation referring to the presence of a pressure ulcer within the first 24 hours of admission.

Of the patients with pressure ulcers, 66.2% (n = 914) were hospital acquired, whereas 33.0% of patients (n = 455) had at least one pressure ulcer on admission. This represents a decrease of 1.4% compared to the PUPPS 1 result of 67.6% hospital acquired pressure ulcers. Data was missing for 0.9% of patients (n=12). See Graph 9.

Patients who had a pressure ulcer on admission had greater numbers of Stage 3 and Stage 4 pressure ulcers.

Of the 455 patients who had a pressure ulcer on admission, 98 (21.5%) developed a combined total of 169 additional pressure ulcers during their admission. Approximately 53 developed 1 additional pressure ulcer (54.1%), and 45 patients developed more than 1 (45.9%). One patient developed 7 additional ulcers. Eight patients had pressure ulcers noted on admission, which resolved during the admission period prior to survey day.

Graph 9. Hospital acquired pressure ulcers PUPPS 2

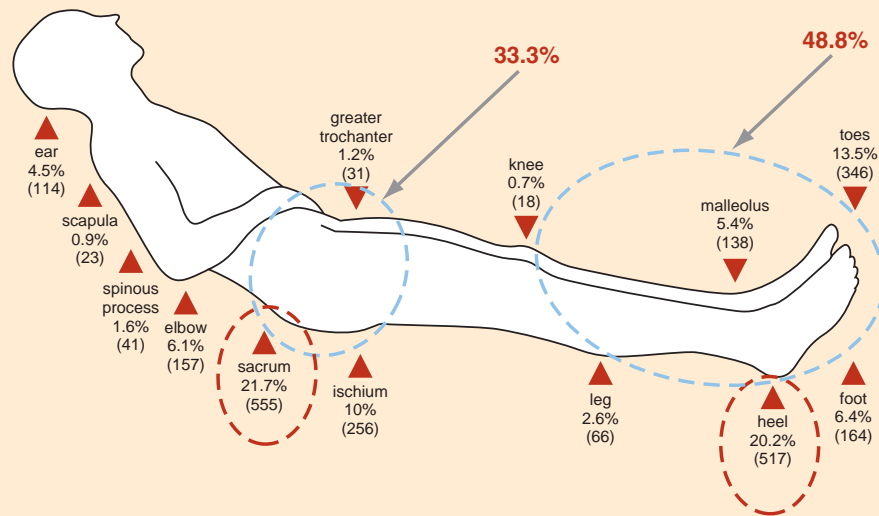


1.8 Anatomical distribution of pressure ulcers PUPPS 2

Figure 1 represents the percentage and number of pressure ulcers found at each anatomical location for the 2,559 pressure ulcers found on 1,381 patients. The following locations accounted for 65.4% (n = 1,674) of the ulcers found: sacrum/coccyx (21.7%, n = 555), heel (20.2%, n = 517 ulcers), toes (13.5%, n = 346), ischium/buttocks (10.0%, n = 256). As with PUPPS 1, the sacrum/coccyx and heel remain the most common sites for the development of pressure ulcers.

Utilising broader anatomical groupings the lower limb accounts for 48.8% (n = 1,249) and pelvic girdle for 33.3% (n = 853) of all ulcers found.

Figure 1. Anatomical distribution of pressure ulcers



For Figure 1 all remaining locations accounted for 5.2% of pressure ulcers (n = 133).

- ⊖ Denotes two highest frequency sites
- ⊖ Denotes broad category prevalence

Table 7 represents the percentages and number of pressure ulcers found at each anatomical location for the 2,559 pressure ulcers found in 1,381 patients.

Table 7. Anatomical distribution of pressure ulcers PUPPS 2

Anatomical location	PUPPS 2 number of ulcers at this location	PUPPS 2 % of all ulcers observed	PUPPS 2 number of patients with ulcer at this location	PUPPS 2 % of patients with ulcers at this location	Change in % of all ulcers identified PUPPS 1 to PUPPS 2
Sacrum/Coccyx	555	21.7	489	35.4	1.3
Heel	517	20.2	401	29.0	-2.6
Toes	346	13.5	262	19.0	0.5
Ischium/Buttocks	256	10.0	191	13.8	0.4
Foot	164	6.4	115	8.3	2.4
Elbow	157	6.1	134	9.7	0.8
Ear	114	4.5	91	6.6	-0.4
Lateral malleolus	106	4.1	91	6.6	0.0
Leg #	66	2.6	50	3.6	N/a
Spinous process	41	1.6	34	2.5	-0.3
Medial malleolus	32	1.3	27	2.0	-0.2
Greater trochanter	31	1.2	22	1.6	-0.2
Scapula	23	0.9	19	1.4	0.3
Knee	18	0.7	13	0.9	-0.5
Nose	16	0.6	16	1.2	-0.3
Occiput	11	0.4	11	0.8	0.3
Iliac crest	11	0.4	9	0.7	0.1
Chin	6	0.2	5	0.4	0.1
Fingers	7	0.3	7	0.5	-0.2
All other locations	82	3.2	60	4.3	-4.0
Total	2,559	100.0			

#The anatomical location 'leg' was not used in PUPPS 1.

Note: The "% of patients with ulcers" column does not sum to 100 as patients may have ulcers at multiple sites.

1.9 Pressure ulcer prevalence by demographic and clinical variables PUPPS 2

Tables 8a and 8b detail the relationship between various clinical and demographic variables and the presence of a pressure ulcer. The variables assessed were chosen for PUPPS 1 on the basis of literature reports and pragmatic assessment of their value in relation to available project resources. The same variables were used for PUPPS 2 so that comparable data could be produced, and any trends or relationships identified.

PUPPS 2 data suggests patients with a pressure ulcer are more likely to be older, male, have an emergency admission, lighter skin colour, diabetes, renal failure or an acquired brain injury, and be unable to independently reposition themselves. These patient demographic and clinical variables are similar to PUPPS 1 with the exception of gender.

The number of observations for each comparison depends on the number of "non missing" observations for the outcome (ulcer versus no ulcer) and the predictor (age, gender etc.). However, if any of these patients have missing values for the predictor, then the number of observations that can be made for this comparison reduce accordingly.

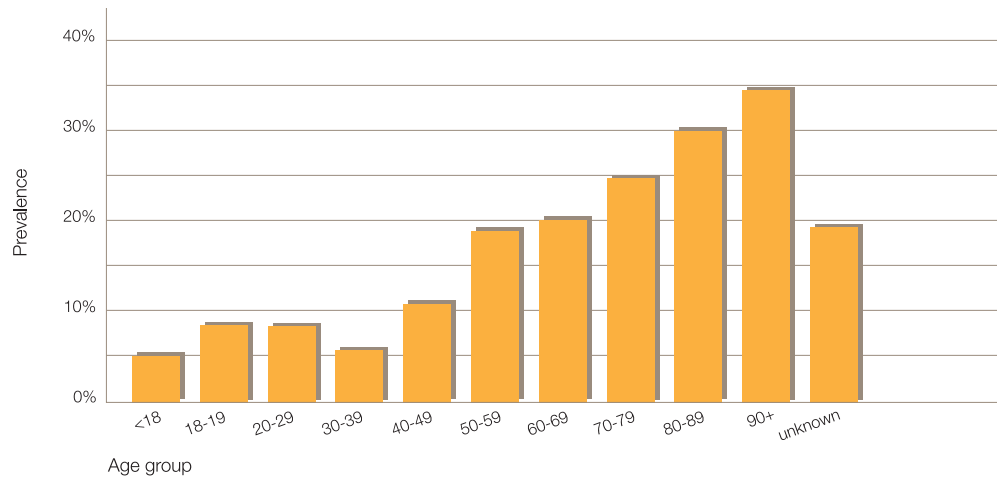
The relationship between presence of ulcer and predictors of outcomes (gender, presence or absence of disease, admission type, risk assessment performed and ability to independently reposition) and categorical predictors (skin colour) was assessed using Pearson Chi Square tests. An independent t-test was used to determine if patients with an ulcer had a different age to those who did not.

Table 8a. Pressure ulcer prevalence by demographic variables PUPPS 2

Variable	Patients consenting	Patients with ulcer	Prevalence %	p value
Age				<0.001
< 42 days	178	7	3.9	
43 days to <1yr	42	2	4.8	
1 – 4 yrs	33	3	9.1	
5 – 9 yrs	33	1	3.0	
10 - 17 yrs	93	7	7.5	
18 - 19 yrs	53	4	7.6	
20 - 29 yrs	320	24	7.5	
30 - 39 yrs	435	24	5.5	
40 - 49 yrs	424	48	11.3	
50 - 59 yrs	566	101	17.8	
60 - 69 yrs	894	178	19.9	
70 - 79 yrs	1,532	374	24.4	
80 - 89 yrs	1,450	438	30.2	
90 + yrs	382	132	34.6	
Unknown	206	38	18.5	
Gender				0.021
Male	3,026	675	22.3	
Female	3,557	695	19.5	
Unknown	58	11	19.0	
Admission type				<0.001
Elective	2,439	449	18.4	
Emergency	3,943	880	22.3	
Unknown	259	52	20.1	
Skin colour				<0.001
White	5,183	1,160	22.4	
Olive	1,390	212	15.3	
Black	52	4	7.7	
Unknown	16	5	31.3	

Pressure ulcer prevalence by age group for the total population is detailed in Graph 10a below. Patients 60 years of age and over represented 81% (n = 1,160) of those identified with a pressure ulcer.

Graph 10a. Prevalence by age group PUPPS 2



The prevalence for paediatric patients as a subgroup is 5.3%. Paediatric patients accounted for 5.7% (n = 379) of the survey population, and accounted for 1.4% of all patients with pressure ulcers.

Graph 10b. Prevalence by paediatric age group PUPPS 2

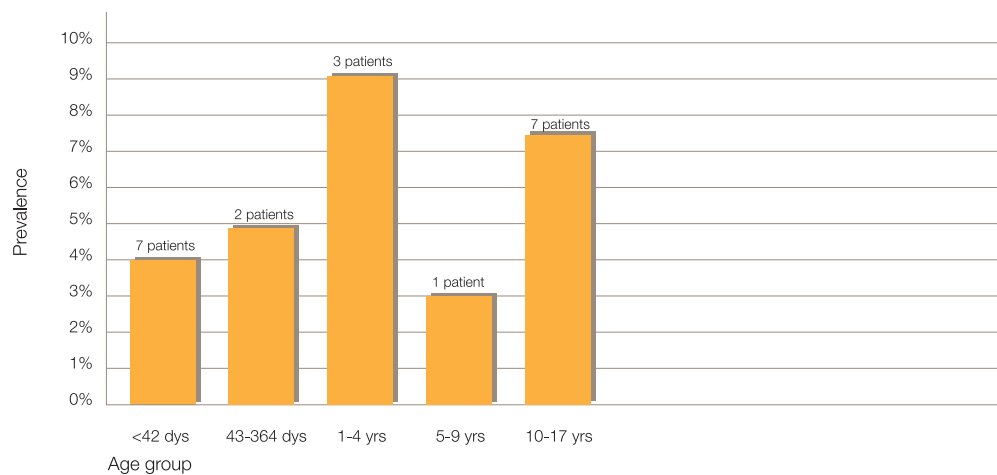


Table 8b. Pressure ulcer prevalence by clinical variables PUPPS 2

Variable	Patients consenting	Patients with ulcer	Prevalence %	p value
Principal diagnosis				
				0.003
Cancer	710	178	25.1	
No cancer	5,917	1,199	20.3	
				0.366
Drug or alcohol	107	26	24.3	
No drug or alcohol	6,520	1,351	20.7	
Co-morbidities				
				<0.001
Diabetes	1,214	326	26.9	
No diabetes	5,427	1,055	19.4	
				<0.001
Renal failure	390	123	31.5	
No renal failure	6,251	1,258	20.1	
				<0.001
Acquired brain injury	462	133	28.8	
No acquired brain injury	6,179	1,248	20.2	
History of smoking				
				<0.001
Smoker	925	146	15.8	
Past smoker (last 10 years)	819	181	22.1	
Non-smoker	4,849	1,030	21.2	
Missing	48	24	50.0	
Risk assessment				
				<0.001
Done	3,547	823	23.2	
Not done	3,037	534	17.6	
Independent repositioning				
				<0.001
Able	5,212	821	15.8	
Unable	1,351	532	39.4	

2 Pressure ulcer risk assessment PUPPS 2

2.1 Frequency of assessment PUPPS 2

Graph 11 and Table 9 show the use of pressure ulcer risk assessment tools in the health services surveyed. Over half of the surveyed population (52.8%, n = 3,970) had evidence of a pressure ulcer risk assessment being performed. This is an increase of 11.9% from PUPPS 1 (p = 0.001). The tool used was again spread between three internationally recognised and validated tools (Braden, Waterlow and Norton²) and in-house tools. The recorded risk was medium to very high in 31.6% (n = 1,254) of the population with 68.4% (n = 2,716) assessed as having low or no risk. Risk class data was missing or not recorded for 1.9% (n = 76) of the risk assessments performed.

Graph 11. Risk class PUPPS 2

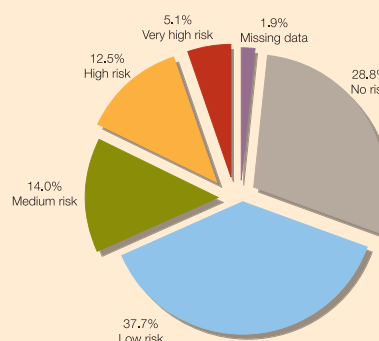


Table 9. Pressure ulcer risk assessment PUPPS 2

	Number of patients	Proportion
Risk assessment performed	3,970	52.8% of the cohort#
Tool used		% of those with a risk assessment
Validated tool	3,036	76.5
Other tool (includes in-house)	770	19.4
Not stated	164	4.1
Total	3,970	100.0
Risk class		% of those with this risk class score
No risk	1,143	28.8
Low	1,497	37.7
Medium	556	14.0
High	496	12.5
Very high	202	5.1
Missing data	76	1.9
Total	3,894 (98.1%) class reported	100.0

This is for the full cohort including refusals, where it is known if an assessment was done (n = 7,525).

2.2 Risk assessment and pressure reducing/relieving devices PUPPS 2

As with PUPPS 1, the PUPPS 2 results indicate that the higher the level of risk assessed on the screening tool, the more likely that a pressure reducing/relieving device was found insitu (see Table 10). This may indicate that patients who had a pressure ulcer risk assessment completed had been subjectively deemed to be at higher risk than other patients, or that

hospital sites where assessment was regularly performed were also more likely to regularly use pressure reducing/relieving devices in their prevention strategies.

Across the total population there was an 11.8% decrease in patients with a pressure relieving/reducing device in situ from PUPPS 1 to PUPPS 2.

Table 10. Risk assessment and pressure reducing /relieving devices PUPPS 2

Risk class	Number of patients	Number of patients with pressure reducing/relieving device insitu	% patients with pressure reducing/relieving device insitu
Risk assessment performed			
No risk	1,036	341	32.9
Low	1,369	578	42.2
Medium	488	286	58.6
High	415	281	67.7
Very high	172	130	75.6
Missing data (assessment done, but no class recorded)	67	20	29.9
Total risk assessment performed	3,547	1,636	46.1
No risk assessment performed	3,037	1,139	37.5
Missing data (not known if assessment done)	57	18	31.6
Total all patients	6,641#	2,793	42.1

Of the patients who consented to a skin inspection, the presence or absence of a pressure reducing/relieving device was not recorded for 84 patients. These patients are not included in this analysis.

Table 11 details information on risk assessment, presence of a pressure reducing/relieving device and the presence of a pressure ulcer for PUPPS 2.

Of the patients assessed as “no risk or low risk” of developing a pressure ulcer, 396 had a pressure ulcer (prevalence of 16.6%). Of patients who did not have an assessment in the PUPPS 2 group, 38% had devices insitu which may indicate some form of clinical assessment had been performed.

Of those patients with pressure ulcers 59.6% (n = 823) had a pressure relieving device in situ. For 587 of the PUPPS 2 patients assessed in the “high or very high risk” category 167 (28.4%) had no device insitu yet 54 (9.2%) of these patients had at least one pressure ulcer.

For patients in the both the “devices insitu” and “no devices insitu” group there is an increase in the rates of pressure ulcer in patients who have higher risk screening scores.

Table 11. Risk assessment, devices and pressure ulcers PUPPS 2

Risk class	Total	Devices insitu			No devices insitu		
		Patients with device	Patients with ulcer	Prevalence PUPPS 2 (PUPPS 1)	Patients with no device	Patients with ulcer	Prevalence PUPPS 2 (PUPPS 1)
No risk	1,025	341	53	15.5% (19.6%)	684	66	9.6% (9.9%)
Low	1,357	578	156	27.0% (22.7%)	779	121	15.5% (16.3%)
Medium	479	286	106	37.1% (38.7%)	193	58	30.1% (22.1%)
High	410	281	130	46.3% (47.6%)	129	39	30.2% (37.3%)
Very high	168	130	72	55.4% (54.9%)	38	15	39.5 (27.8%)
Not recorded	67	20	7	35.0% (44.9%)	47	6	12.8% (26.8%)
No assessment	2,996	1,139	295	25.9% (34.3%)	1,857	223	12.0% (18.8%)
Missing data	55	18	4	22.2% (54.5%)	37	6	16.2% (25.0%)
Totals	6,557#	2,793	823		3764	534	

#Of the patients who consented to a skin inspection (n = 6,641), the presence or absence of a pressure reducing/relieving device was not recorded for 84 patients, which included 24 patients with pressure ulcers. These patients are not included in this analysis.

3 Devices PUPPS 2

3.1 Pressure reducing/relieving devices PUPPS 2

No devices were in place for 534 patients (38.7%) who had ulcers including 83 (6.0%) who had either a Stage 3 or a Stage 4 as their highest stage of pressure ulcer (see Table 12). Data was missing for 1.3% of patients (n = 84). The data here demonstrates a small decrease in the proportion of patients surveyed with a device insitu from PUPPS 1.

Data was not collected on the appropriateness of devices relative to the risk or stage of pressure ulcer found. Some patients had more than one type of device in situ.

Table 12. Pressure reducing/relieving devices PUPPS 2

Number of patients with device in situ (%)		Number of patients (%) with Highest Stage of pressure ulcers				
Device		Stage 1 (%)	Stage 2 (%)	Stage 3 (%)	Stage 4 (%)	Total (%)
Comfort/adjunct	897 (13.5)	69 (24.6)	142 (50.7)	28 (10.0)	41 (14.6)	280 (100)
Cushions & overlays static	856 (12.9)	73 (29.7)	131 (53.3)	17 (6.9)	25 (10.2)	246 (100)
Cushions & overlays dynamic	170 (2.6)	11 (13.3)	51 (61.4)	10 (12.0)	11 (13.3)	83# (100)
Replacement mattresses static	1,371 (20.6)	100 (31.0)	173 (53.6)	22 (6.8)	28 (8.7)	323 (100)
Replacement mattresses dynamic	381 (5.7)	45 (22.3)	98 (48.5)	19 (9.4)	40 (19.8)	202 (100)
Specialty beds	60 (0.9)	6 (28.6)	11 (52.4)	0 (0.0)	4 (19.0)	21 (100)
Total device insitu	2,793 (42.1)	217 (26.3)	439 (53.4)	68 (8.3)	98 (11.9)	822 (100)
Number of patients with no device insitu (%)						
No device	3,764 (56.7)	182 (34.1)	269 (50.4)	33 (6.2)	50 (9.4)	534 (100)
Missing data	84 (1.3)	5 (20.8)	10 (41.7)	5 (20.8)	4 (16.7)	24 (100)
Total	6,641 (100)					1,380## (100)

Some health services have replaced a significant proportion of their standard mattresses with an improved pressure reducing foam mattress categorised as 'replacement mattress static' in this survey.

#The number of patients with ulcers under dynamic cushions and overlays only adds up to 83. This is because data for one patient with an ulcer and a pressure reducing/relieving device insitu did not contain any information on the number, stage or location of ulcers.

##The total number of patients is 1 less than the expected overall total (1,381) due to the missing data noted above.

4 Documentation of pressure ulcer management PUPPS 2

In order to determine if there was documentation related to the progress or management of pressure ulcers identified in the survey population, an audit of the medical record of patients with pressure ulcers was completed. Documentation was deemed to have been identified if written notation regarding any of the ulcers identified was found in any part of the medical record on the survey day or the 4 days prior. This documentation could be noted in general medical progress notes, nursing care plans, clinical pathways and wound care charts, see Graph 12 below.

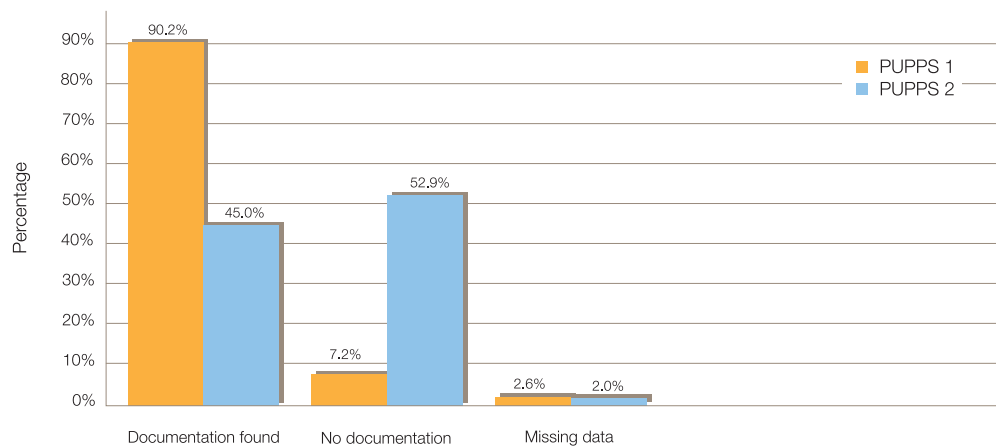
Documentation related to the progress and management of pressure ulcers was found in 45.0% (n = 622) of patients. No documentation was found in 52.9% (n = 731) of patients and data was missing in 2.0%

(n = 28) of cases. This result represents a significant decrease from the PUPPS 1 result where 90.2% of patients were noted to have some documentation related to their pressure ulcer management.

The data did not identify if the documentation noted one, some or all of the ulcers identified on the patient on survey day.

While PUPPS 2 observed a prevalence of 20.8%, only 4.4% of these patients appear to have attracted a pressure ulcer code in the Victorian Admitted Episodes Dataset (VAED). Currently coding of pressure ulcers requires that if a patient has multiple ulcer sites of differing stages only one code, indicating the highest stage is required.

Graph 12. Documentation of pressure ulcer management PUPPS 2



5 Demographic and clinical variables PUPPS 2

5.1 Demographic & clinical variable frequency tables PUPPS 2

The relationship between refusal or acceptance of skin inspection dichotomous variables (gender, presence or absence of disease, admission type, risk assessment performed and ability to independently reposition) and categorical predictors (skin colour) was assessed using Pearson Chi Square tests. An independent t-test was used to determine if the age of the group who refused was different to the group who accepted skin inspection. Due to the highly skewed distribution of length of stay (LOS), a Mann-Whitney U test was performed.

Missing data from a range of variables for the patients who declined a skin inspection influences interpretation of differences between patients who consented and those who declined. Patients who declined were younger, had lower rate of history of smoking, shorter LOS, had a greater rate of diabetes and cancer admissions, but lower rate of drug and alcohol and acquired brain injury, and were less likely to have had a risk assessment performed. See Tables 13a & 13b.

The demographic and clinical variables of the group that declined a skin inspection were similar to PUPPS 1.

Table 13a. Demographic variables PUPPS 2

Demographic variable	Patients consented (n = 6,641)	Patients missing data	Patients refused (n = 980)	Patients missing data	Total patients (n = 7,621)	p value
Age (mean [sd])	63.0 [23.9]	206	55.8 [26.4]	25	62.1 [24.3]	<0.001
Gender (% female)	53.6	58	57.8	15	54.1	0.004
Emergency (vs Elective) %	59.4	259	59.0	57	59.3	0.017
LOS (median, [IQR])	6 [2-15]	32	5 [2-14]	10	6 [2-15]	0.002

Table 13b. Clinical variables PUPPS 2

Clinical variable	Patients consented (n = 6,641)	Patients missing data	Patients refused (n = 980)	Patients missing data	Total patients (n = 7,621)	p value
Principal Diagnosis (%)		14		20		
Cancer	10.7		13.3		11.0	<0.001
Pressure Ulcer	1.0		0.6		0.9	<0.001
Drug or Alcohol	1.6		2.7		1.8	<0.001
Co-morbidities (%)		26		26		
Diabetes	18.3		15.9		18.0	0.072
Renal failure	5.9		5.9		5.9	0.955
Acquired brain injury	7.0		4.4		6.6	0.003
History of Smoking (%)	26.3	48	20.5	183	25.5	<0.001

5.2 Reasons for refusal of skin inspection PUPP 2

Table 14 identifies the reasons 980 patients refused a skin inspection. The percentage of total population who refused a skin inspection was 12.9%. Within the refusal group, 194 (19.8%) were deemed too ill to participate. Consent was declined by either the patient or nursing staff for 438 (44.7%). It is important to consider the reasons for the refusals and how this group may have influenced the final prevalence results. These figures are similar to the results from PUPPS 1.

The rate of refusal was higher for patients under 18 years (19.9%) than those over (12.4%).

Table 14. Reasons for refusal of skin inspection PUPPS 2

Reason	Number of patients with each response	% of total patient refusals
Too ill	194	19.8
Consent declined	438	44.7
Other#	343	35.0
Not recorded	5	0.5
Total	980	100.0

'Other' included patients absent from the ward at the time of the survey who may have been in theatre, other departments or in active labour.

5.3 Time from admission to survey PUPPS 2

Patients who have a pressure ulcer have a longer time from admission to survey (TAS) than those who do not (Mann-Whitney U test). TAS is defined as length of stay from admission to survey day. Again, it is unclear if patients stay longer because they have a pressure ulcer or have a pressure ulcer because they stay longer. The higher the stage of ulcer, the longer the patient's TAS, see Table 15 below.

The TAS analysis was repeated looking only at those patients who did not have a pressure ulcer on admission but developed one during their admission. This resulted in 458 patients with pressure ulcers being dropped from the analysis (33.2% of all patients with a pressure ulcer). When patients who were admitted with a pressure ulcer are removed from the analysis, patients who acquire an ulcer during hospitalisation have a longer TAS than those who do not develop an ulcer.

Patients with a hospital acquired Stage 3 or 4 pressure ulcer appear to stay longer than those patients with pressure ulcers present on admission. Mean TAS for all groups except Stage 3 (increase of 0.1) has decreased from PUPPS 1 (range 5.8 to 19.5), but the standard deviation is larger in PUPPS 2.

Table 15. Time since admission by stage of pressure ulcer PUPPS 2

Highest Stage	Mean TAS (days)	Standard deviation	Median TAS (days)	25th percentile	75th percentile	# N
No ulcer	15.8	117.4	5	2	13	5,233
Stage 1	27.1	152.9	9	4	21	402
Stage 2	19.9	61.6	9	4	20	716
Stage 3	67.7	309.8	14.5	5	36	106
Stage 4	28.2	46.4	16.5	6	30	152
Total	18.1	119.9	6	2	15	6,609

N is the number of valid observations. Table 15 includes all pressure ulcers identified (hospital and non-hospital acquired).

Time from admission to survey, length of stay and the impact of pressure ulcers

To estimate the impact of pressure ulcers on time in hospital in Victoria, a multiple linear regression analysis was performed which included ulcer presence, age, gender, medical specialty and year of survey. Health service was included as a longitudinal variable, so that results from each health service were analysed together. Account was taken of the highly skewed TAS variable, most patients had been admitted for only a few days but a very small number had been admitted for very long periods, by the use of a logarithmic transformation.

Patients with pressure ulcers have a 45% longer TAS than those without (95% confidence interval 39% to 52%).

While PUPPS 2 observed a prevalence of 20.8%, only 4.4% of these patients appear to have attracted a pressure ulcer code in the Victorian Admitted Episodes Dataset (VAED). Modelling of the VAED data indicated that patients with pressure ulcers had a 50.0% longer length of stay (LOS defined as time from admission to separation) than patients without ulcers, accounting for 44,406 beddays per annum. Although factors other than pressure ulcers may play a role in the extended LOS, the risk-adjusted cost of these additional beddays is \$19 million.

6 Education program PUPPS 2

6.1 Interrater reliability PUPPS 2

The PUPPS 2 education program was delivered to 557 surveyors (including site co-ordinators). An 85% pass rate on the first inter-rater reliability test was achieved by 73.7% (compared to 60.5% for PUPPS 1) of the surveyors (n = 451). For the second test 81.6% (n = 102) achieved a pass with 3.2% (n = 4) scoring less than 85%. See Appendix F for PUPPS 2 Survey Inter-rater Reliability Tool.

6.2 Education program evaluation PUPPS 2

Feedback on the education program from surveyors and site co-ordinators was again overwhelmingly positive. Four questions utilised a bipolar five-point Likert scale (strongly agree – strongly disagree) to measure responses. Results ranged from 91.7% to 98.9% positive responses (agree and strongly agree). This result is similar to the range obtained for PUPPS 1 (89.6% to 97.7%). A final open question requested any further comments regarding the program.

7 Contextual data PUPPS 2

The contextual data audit was completed by all health services prior to the education and survey days of PUPPS 2. This analysis includes all 87 health services, 136 sites, that completed the audit. The information is self-reported and therefore likely to contain a subjective component. Changes in contextual data from PUPPS 1 to PUPPS 2 are noted in Table 16.

An increase in positive responses was seen across almost all contextual measures from PUPPS 1 to PUPPS 2. Analysis of the relationship of this data to pressure ulcer prevalence is problematic given the binary nature of the responses (either yes or no) and the use of the 87 health services as units despite the obvious operating differences between small rural and large metropolitan health services.

Although 80.9% of health services have an organisation wide strategy to reduce hospital acquired pressure ulcers, a smaller proportion (66.2%) have existing protocols and policies for the prevention and management of pressure ulcers.

A Pressure Ulcer (or Wound Management) committee was present in 69.1% of health services and 58.8% had an Executive Sponsor.

Health services who actively involved 2 or more allied health disciplines in their pressure ulcer prevention and management strategies accounted for 50.7% of the cohort.

The Australian Wound Management Association Clinical Practice Guidelines for the Prediction and Prevention of Pressure Ulcers², which use designated levels of evidence as recommended by the National Health and Medical Research Council, was used by 68.4% of health services as the basis for their policies and strategic plan.

Pressure ulcer prevention literature was supplied to patients in 26.5% of health services.

Specialist wound management staff with specific hours dedicated to this role were present in 37.5% of health services. A large proportion of staff from the smaller health services that participated in PUPPS 2 have wound or pressure ulcer management as their portfolio but with no additional management time allocation, i.e. they incorporate these responsibilities into their clinical working hours.

Collecting pressure ulcer data as part of clinical risk management programs are performed by 70.6% of health services surveyed. Pressure ulcer risk assessment tools are used by 91.2% of health services and 88.2% of these require risk assessment to be performed on admission. 72.8% of sites stated that recommended interventions for the prediction and prevention of pressure ulcers according to level of assessed risk are implemented.

Mattress replacement programs were occurring in 78.7% of health services.

Table 16. Change in quantitative contextual data PUPPS 2

Factors or strategies	PUPPS 1#	PUPPS 2	Change PUPPS 1 to PUPPS 2	95% CI of change		p value
Existing protocols and policies on pressure ulcers in place	35.4%	66.2%	30.8%	19.0%	42.7%	< 0.001
Education or program on pressure ulcer prevention and management in place	40.2%	66.9%	26.7%	14.4%	39.0%	< 0.001
AWMA clinical guidelines (or similar) in use	48.8%	68.4%	19.6%	7.6%	31.6%	0.001
Patient literature regarding pressure ulcers in use	3.7%#	26.5%	22.8%	14.5%	31.2%	< 0.001
Pressure reduction mattress replacement program	46.3%	78.7%	32.3%	20.6%	44.0%	< 0.001
Specialist wound management staff with allocated time	46.3%	37.5%	-8.8%##	-19.1%	1.4%	0.091
Active wound or pressure ulcer committee	61.0%	69.1%	8.1%	-3.0%	19.3%	0.153
Pressure ulcer data collected as part of clinical risk management program	46.3%	70.6%	24.2%	13.1%	35.3%	< 0.001

This contextual factor was reported for PUPPS 1 at health service level (4.2%) in the VOC State-wide Report – 2003, but is reported at site level in this analysis.

A large number of smaller health services participated in PUPPS 2 and a large number of staff have wound or pressure management as their clinical portfolio but with no additional clinical time allocated.

Part B – PUPPS CG State-wide data

Results Part B-PUPPS CG presents a limited selection of data outlining results for the PUPPS Comparison Group (PUPPS CG). Not all sections, tables and graphs in the previous results, Part A-PUPPS 2, are presented, however, the sections, tables and graphs in this part are numbered to align with the previous results chapter. Numbering for sections, tables and graphs are therefore not consecutive and also contain the addition of CG in the heading. This is to assist with comparison and discussion between datasets.

'PUPPS 1' represents the state-wide data of all 48 health services who participated in PUPPS 1 in 2003.

'PUPPS CG' (Comparison Group) represents a subset of the 2004 PUPPS 2 results for the 48 health services that also participated in PUPPS 1. Excluded from this subset of PUPPS 2 state-wide data are patients <18 years of age and those health services that did not participate in PUPPS 1.

1 Pressure Ulcer Point Prevalence PUPPS CG

1.1 State-wide prevalence PUPPS CG

The prevalence of pressure ulcers identified was 22.7% as represented in Graph 1aCG and Table 2aCG below.

Graph 1aCG. Victorian state-wide prevalence PUPPS CG

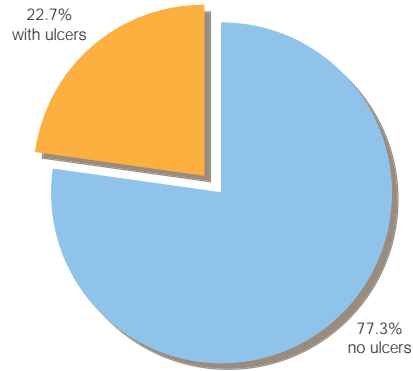


Table 2aCG. Victorian state-wide prevalence PUPPS CG

Group	Patient population	Patients refused	Patients seen	Patients with ulcers	Prevalence	95% confidence interval of prevalence
PUPPS 1	6,003	853	5,150	1,367	26.5%	25.3% - 27.7%
PUPPS CG	5,812	733	5,079	1,153	22.7%	21.6% - 23.9%

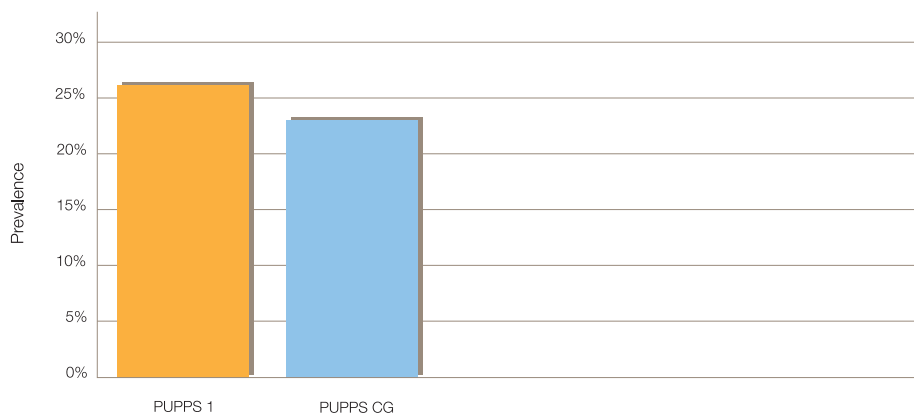
The prevalence of pressure ulcers excluding stage 1 pressure ulcers are presented below in Table 2bCG.

Table 2bCG. Victorian state-wide prevalence PUPPS CG (excluding stage 1 pressure ulcers)

Group	Patient population	Patients refused	Patients seen	Patients with ulcers	Prevalence	95% confidence interval of prevalence
PUPPS 1	6,003	853	5,150	882	17.1%	16.1% - 18.2%
PUPPS CG	5,812	733	5,079	819	16.1%	15.1% - 17.2%

The change in prevalence from PUPPS 1 (26.5%) to PUPPS CG (22.7%) is -3.8% (95% CI -5.5% to -2.2%) and is shown in Graph 1bCG. This is an improvement of 14.3%.

Graph 1bCG. Change in state-wide prevalence PUPPS 1 to PUPPS CG



1.3 Pressure ulcer prevalence by DHS comparative groups PUPPS CG

Table 3aCG benchmarks the Department of Human Services (DHS) comparative groups (See Key in Results Part A section 1.3). Each comparative group value is represented by the mean of each group as described in Table 3aCG.

Three groups were above the mean (range 3.1% to 10.9%) and four below (range 2.2% to 4.7%). Five comparative groups showed a decrease in prevalence from PUPPS 1 to PUPPS CG (range 0.9% to 9.7%).

Five comparative groups showed a decrease in prevalence from PUPPS 1 to PUPPS CG (range 0.9% to 9.7%). Two comparative groups (C, E&M) showed an increase in prevalence (range 5.1% to 5.6%).

Table 3aCG. Pressure ulcer prevalence by DHS comparative groups PUPPS CG

DHS comparative group	Patients refused PUPPS CG (%)	Patients seen PUPPS CG (%)	Patients with ulcers PUPPS CG	Prevalence PUPPS CG %	95% CI of prevalence %
A1	186 (12.1)	1351 (26.6)	348	25.8	23.5 – 28.2
A2	286 (18.1)	1293 (25.5)	244	18.9	16.8 – 21.1
B	137 (9.4)	1318 (25.9)	250	19.0	16.9 – 21.2
C	36 (11.6)	275 (5.4)	64	23.3	18.7 – 28.6
D	27 (11.8)	201 (4.0)	37	18.4	13.7 – 24.3
E&M#	1 (4.8)	39 (0.8)	8	20.5	9.5 – 26.5
Z	60 (9.1)	602 (11.9)	202	33.6	29.9 – 37.4
Total	733 (100)	5,079 (100)	1,153		

#Groups E & M were combined for the comparative benchmarking analysis

Table 3bCG shows the comparative group prevalence of PUPPS CG compared to PUPPS 1.

Table 3bCG. Change in pressure ulcer prevalence by DHS comparative groups PUPPS CG

DHS comparative group	Prevalence PUPPS 1% [Total patients seen]	Prevalence PUPPS CG % [Total patients seen]	Change PUPPS 1 to PUPPS CG % [p value]	95% CI of change %	
A1	31.0 [1,379]	25.8 [1,351]	-5.2 [0.00]	-8.7	-1.8
A2	19.8 [1,250]	18.9 [1,293]	-0.9 [0.63]	-4.5	2.7
B	23.8 [1,308]	19.0 [1,318]	-4.8 [0.05]	-9.7	0.1
C	18.2 [313]	23.3 [275]	5.1 [0.19]	-2.5	12.7
D	28.1 [228]	18.4 [201]	-9.7 [0.01]	-17.4	-2.0
E&M#	14.9 [47]	20.5 [39]	5.6 [0.07]	-9.2	20.3
Z	40.5 [625]	33.6 [602]	-6.9 [0.10]	-15.3	1.4

#Groups E & M were combined for the comparative benchmarking analysis

1.4 Pressure ulcer prevalence by medical specialty PUPPS CG

Table 4bCG presents the change in pressure ulcer prevalence of each medical specialty group from PUPPS 1 to PUPPS CG.

Table 4bCG. Change in pressure ulcer prevalence by medical specialty PUPPS CG

Medical specialty	PUPPS 1 % prevalence within specialty	PUPPS CG % prevalence within specialty	Change PUPPS 1 to PUPPS CG [p value]	95% CI of change %	
Spinal	41.4	62.1	20.7 [0.01]	6.1	35.3
Palliative Care	37.6	45.1	7.5 [0.15]	-2.8	17.7
Rehabilitation	29.9	28.1	-1.1 [0.79]	-9.1	6.9
Emergency Medicine	13.2	31.0	17.8 [0.04]	0.7	35.0
Critical Care	47.7	39.8	-7.9 [0.19]	-19.8	3.9
Medical	27.8	22.6	-5.2 [0.00]	-8.2	-2.2
Surgical	22.4	17.4	-4.8 [0.03]	-9.1	-0.5
Other	20.0	0.0	-20.0 [0.19]	-50.0	-10.0
Obstetric	1.1	0.0	-1.1 [0.16]	-2.7	0.5
Missing data	53.8	37.5	-16.3 [0.40]	-54.7	22.0

1.5 Distribution of pressure ulcers per patient PUPPS CG

The survey identified 1,153 patients with ulcers. Patients with more than 1 ulcer accounted for 46.2% (n = 533) of all patients with ulcers, and 21% (n = 242) of those had more than 2 ulcers. In the PUPPS CG population 2 patients had 10 or more ulcers, as per Table 5CG below.

Compared to PUPPS 1 there are more people with only 1 ulcer and fewer with multiple ulcers. The distribution of pressure ulcers per patient represents a decrease of 3.5% in the number of patients with more than 1 ulcer.

Table 5CG. Distribution of pressure ulcers per patient PUPPS CG

Number of pressure ulcers per patient	Number of patients with pressure ulcers	Number of pressure ulcers	% of all patients with pressure ulcers
1	620	620	53.8
2	291	582	25.2
3	132	396	11.5
4	56	224	4.9
5	24	120	2.1
6	13	78	1.1
7	5	35	0.4
8	5	40	0.4
9	4	36	0.4
10	1	10	0.1
11	0	0	0.0
12	0	0	0.0
13	1	13	0.1
14	0	0	0.0
Missing	1	0	0.1
Total	1,153	2,154	100.0

1.6 Severity of pressure ulcers PUPPS CG

Severity of pressure ulcers by stage PUPPS CG

In total, 2,154 pressure ulcers were found in this subpopulation on 1,153 patients. Stage 1 and Stage 2 pressure ulcers comprised 82.3% (n = 1,837) of ulcers. Pressure ulcers classified as Stages 3 and 4 represented 14.7% (n = 317) of ulcers found (refer to definitions of pressure ulcer staging Appendix B). Table 6CG summarizes the severity of press ulcers by stage for PUPPS CG and shows the changes from PUPPS 1 to PUPPS CG. The proportion of Stage 1 ulcers decreased, Stage 4 ulcers remained the same and the proportion of the remaining ulcers increased.

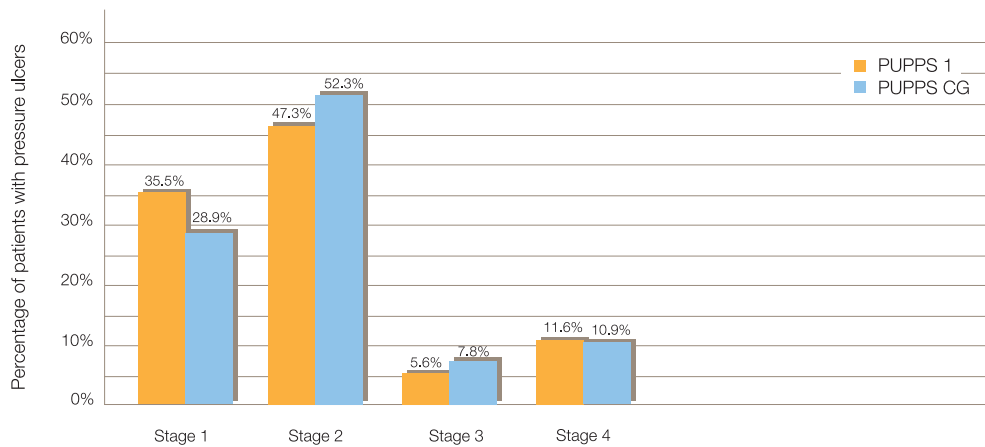
Table 6CG. Severity of pressure ulcers by stage PUPPS CG

Pressure ulcer stage	% (patients) of all pressure ulcers PUPPS 1	% (patients) of all pressure ulcers PUPPS CG	Change in % of all pressure ulcers PUPPS 1 to PUPPS CG	p value
1	43.1 (1,153)	37.3 (804)	-5.8	<0.001
2	44.2 (1,183)	48.0 (1,033)	3.8	<0.001
3	4.5 (120)	6.6 (141)	2.1	<0.001
4	8.2 (220)	8.2 (176)	0.0	<0.001
Total	100.0	100.0		

Severity of pressure ulcers by highest stage PUPPS CG

Pressure ulcers were found in 1,153 patients. Graph 8CG shows the proportion of patients noting the severity of their highest stage of ulcer per patient. The PUPPS CG result demonstrates a 6.6% decrease in Stage 1 pressure ulcers and a 0.7% decrease in Stage 4 pressure ulcers. There was a 5.0% increase in Stage 2 pressure ulcers and a 2.2% increase in Stage 3 pressure ulcers as compared to PUPPS 1. Patients with a Stage 3 or 4 pressure ulcer represent 18.7% (n = 216) of the population, and Stage 1 and 2 pressure ulcers represent 81.2% (n = 936). Data was missing for 0.1% (n = 1).

Graph 8CG. Change in severity of pressure ulcers by highest stage of pressure ulcers PUPPS 1 to PUPPS CG



1.8 Anatomical distribution of pressure ulcers PUPPS CG

Table 7CG details the percentage and number of pressure ulcers found at each anatomical location for the 2,154 pressure ulcers found in 1,153 patients. The following locations accounted for 66.0% (n = 1,422) of the ulcers found: sacrum/coccyx (21.2%, n = 456), heel (21.0%, n = 453 ulcers), toes (14.0%, n = 301), ischium/buttocks (9.8%, n = 212). As with PUPPS 1, the sacrum/coccyx and heel remain the most common sites for the development of pressure ulcers.

Utilising broader anatomical groupings the lower limb accounts for 49.8% (n = 1,073) and pelvic girdle for 32.1% (n = 692) of all pressure ulcers found.

Table 7CG. Anatomical distribution of pressure ulcers PUPPS CG

Anatomical location	PUPPS CG number of ulcers at this location	PUPPS CG % of all ulcers observed	PUPPS CG number of patients with ulcer at this location	PUPPS CG % of patients with ulcers at this location	Change in % of all ulcers identified PUPPS 1 to PUPPS CG
Sacrum/Coccyx	456	21.2	402	34.8	0.8
Heel	453	21.0	349	30.3	-1.8
Toes	301	14.0	224	19.4	1.0
Ischium/Buttocks	212	9.8	157	13.6	0.2
Foot	143	6.6	97	8.4	2.2
Elbow	138	6.4	117	10.1	1.1
Ear	101	4.7	80	6.9	-0.2
Lateral malleolus	88	4.1	74	6.4	0.0
Leg #	52	2.4	40	3.5	N/a
Spinous process	33	1.5	30	2.6	-0.4
Medial malleolus	23	1.1	20	1.7	-0.4
Greater trochanter	24	1.1	16	1.4	-0.3
Scapula	19	0.9	15	1.3	0.3
Knee	13	0.6	9	0.8	-0.6
Nose	9	0.4	9	0.8	-0.5
Occiput	8	0.4	8	0.7	0.3
Iliac crest	11	0.5	9	0.7	0.2
Chin	2	0.1	2	0.2	0.0
Fingers	5	0.2	5	0.4	-0.3
All other locations	63	2.9	51	4.4	-4.3
Total	2,154	100.0			

#The anatomical location 'leg' was not used in PUPPS 1. Note: The "% of patients with ulcers" column does not sum to 100 as patients may have ulcers at multiple sites.

2 Pressure ulcer risk assessment PUPPS CG

2.1 Frequency of assessment

Table 9CG shows the use of pressure ulcer risk assessment tools in the health services surveyed. Over half of the surveyed population (57.7%, n = 3,319) had evidence of a pressure ulcer risk assessment being performed. This is an increase of 16.8% from PUPPS 1 (p = 0.001). Again, the tool used was spread between three internationally

recognised and validated tools (Braden, Waterlow and Norton²) and in-house tools. The recorded risk was medium to very high in 33.7% (n = 1,117) of the population with 64.2% (n = 2,131) assessed as having low or no risk. Risk class data was missing or not recorded for 2.1% (n = 71) of the risk assessments performed.

Table 9CG. Pressure ulcer risk assessment PUPPS CG

	Number of patients	Proportion
Risk assessment performed	3,319	57.7% of the cohort#
Tool used		% of those with a risk assessment
Validated tool	2,476	74.6
Other tool (includes in-house)	712	21.4
Not stated	131	4.0
Total	3,319	100.0
Risk class		% of those with this risk class score
No risk	883	26.6
Low	1,248	37.6
Medium	488	14.7
High	440	13.3
Very high	189	5.7
Missing data	71	2.1
Total	3,248 (97.9%) class reported	100.0

2.2 Risk assessment and pressure reducing/relieving devices PUPPS CG

As with PUPPS 1, the results indicate that the higher the level of risk assessed on the screening tool, the more likely that a pressure reducing/relieving device was found insitu (see Table 10CG). This may indicate that patients who had a pressure ulcer risk assessment completed had been subjectively deemed to be at higher risk than other patients, or that

hospital sites where assessment was regularly performed were also more likely to regularly use pressure reducing/relieving devices in their prevention strategies.

Across the total population there was a 9.0% decrease in patients with a pressure relieving/reducing device in situ from PUPPS 1 to PUPPS CG.

Table 10CG. Risk assessment and pressure reducing/relieving devices CG

Risk class	Number of patients	Number of patients with pressure reducing/relieving device insitu	% patients with pressure reducing/relieving device insitu
Risk assessment performed			
No risk	811	290	35.8
Low	1,141	492	43.1
Medium	429	256	59.7
High	365	248	67.9
Very high	160	120	75.0
Missing data (assessment done, but no class recorded)	62	18	29.0
Total risk assessment performed	2,968	1,424	48.0
No risk assessment performed	2,082	841	40.4
Missing data (not known if assessment done)	29	13	44.8
Total all patients	5,079#	2,278	44.9

Table 11CG details information on risk assessment, presence of a pressure reducing/relieving device and the presence of a pressure ulcer for PUPPS CG.

Of the patients assessed as "no risk or low risk" of developing a pressure ulcer, 394 had a pressure ulcer (prevalence of 20.4%). Of the patients not assessed in the PUPPS CG group, 40.9% had devices insitu which may indicate some form of clinical assessment had been performed.

Of those patients with pressure ulcers 60.5% (n = 697), had a pressure relieving device in situ.

For 517 of the PUPPS CG patients assessed in the "high or very high risk" category 149 (25.4%) had no device insitu yet 48 (8.2%) of these patients had at least one pressure ulcer.

For patients in the both the "devices insitu" and "no devices insitu" group there is an increase in the rates of pressure ulcer in patients who have higher risk screening scores.

Table 11CG. Risk assessment, devices and pressure ulcers PUPPS CG

Risk class	Total	Devices insitu			No devices insitu		
		Patients with device	Patients with ulcer	Prevalence PUPPS CG (PUPPS 1)	Patients with no device	Patients with ulcer	Prevalence PUPPS CG (PUPPS 1)
No risk	803	290	43	14.8% (1.6%)	513	51	9.9% (9.9%)
Low	1,132	492	132	26.8% (22.7%)	640	94	14.7% (16.3%)
Medium	421	256	90	35.2% (38.7%)	165	54	32.7% (22.1%)
High	361	248	166	66.9% (47.6%)	113	34	30.1% (37.3%)
Very high	156	120	66	55.0% (54.9%)	36	14	38.9% (27.8%)
Not recorded	62	18	6	33.3% (44.9%)	44	6	13.6% (26.8%)
No assessment	2,058	841	242	28.8% (34.3%)	1,217	183	15.0% (18.8%)
Missing data	29	13	2	15.4% (54.5%)	16	3	18.8% (25.0%)
Totals	5,022#	2,278	697		2,744	439	

#Of the patients who consented to a skin inspection (5,079), the presence or absence of a pressure reducing/relieving device was not recorded for 57 patients, which included 17 patients with pressure ulcers. These patients are not included in this analysis.

3 Devices PUPPS CG

3.1 Pressure reducing/relieving devices PUPPS CG

No devices were in place for 439 patients (38.1%) who had ulcers including 48 (4.2%) who had either a Stage 3 or a Stage 4 as their highest stage of pressure ulcer (see Table 12CG). The majority of patients had a device in situ 60.4% (n = 696). Data was missing for 1.1% of patients (n = 57). The data here demonstrates a small decrease in the proportion of patients surveyed with a device insitu from PUPPS 1.

Data was not collected on the appropriateness of devices relative to the risk or stage of pressure ulcer found. Some patients had more than one type of device in situ.

Table 12CG. Pressure reducing/relieving devices PUPPS CG

Number of patients with device in situ (%)		Number of patients (%) with Highest Stage of pressure ulcers				
Device		Stage 1 (%)	Stage 2 (%)	Stage 3 (%)	Stage 4 (%)	Total (%)
Comfort/ adjunct	657 (12.9)	51 (23.3)	111 (50.7)	25 (11.4)	32 (14.6)	219 (100)
Cushions & overlays static	694 (13.7)	61 (30.0)	110 (54.2)	16 (7.9)	16 (7.9)	203 (100)
Cushions & overlays dynamic	137 (2.7)	9 (13.85)	37 (56.9)	9 (13.85)	10 (15.4)	#65 (100)
Replacement mattresses static	1,195 (23.5)	91 (31.1)	158 (53.9)	17 (5.8)	27 (9.2)	293 (100)
Replacement mattresses dynamic	334 (6.6)	40 (23.1)	86 (49.7)	14 (8.1)	33 (19.1)	173 (100)
Specialty beds	46 (0.9)	6 (31.6)	9 (47.4)	0 (0.0)	4 (21.0)	19 (100)
Total device insitu	2,278 (44.9)	183 (26.3)	375 (53.9)	58 (8.3)	80 (11.5)	696 (100)
Number of patients with no device insitu (%)						
No device	2,744 (54.0)	146 (33.3)	222 (50.5)	28 (6.4)	43 (9.8)	439 (100)
Missing data	57 (1.1)	4 (23.5)	6 (35.3)	4 (23.5)	3 (17.7)	17 (100)
Total	5,079					1,153##

#The number of patients with ulcers on dynamic cushions and overlays only add up to 66. This is because data for one patient with an ulcer and a pressure reducing/relieving device in situ did not contain any information on the number, stage or location of ulcers.

##The total number of patients is 1 less than the expected overall total (1,154) due to the missing data noted above.

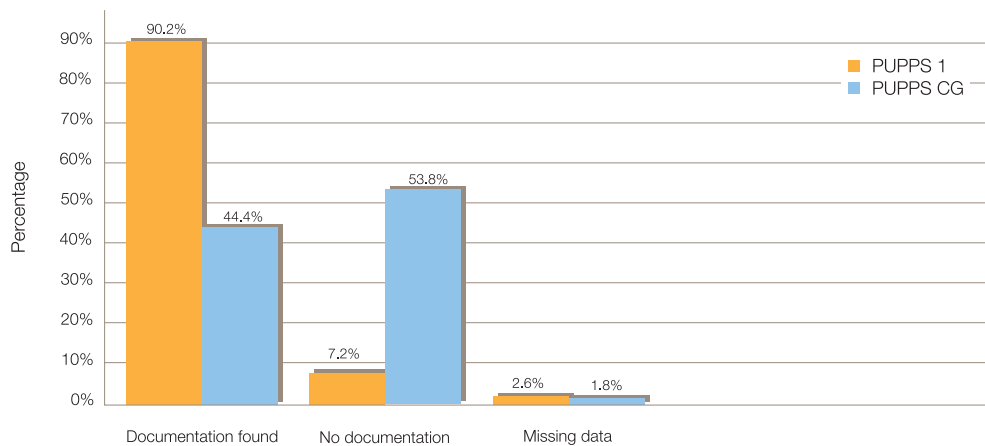
4 Documentation of pressure ulcer management PUPPS CG

In order to determine if there was documentation related to the progress or management of pressure ulcers identified in the survey population an audit of the medical record of patients with pressure ulcers was completed. Documentation was deemed to have been identified if written notation regarding any of the ulcers identified was found in any part of the medical record on the survey day or the 4 days prior. This documentation could be noted in general medical progress notes, nursing care plans, clinical pathway and wound care charts, see Graph 12CG below.

Documentation related to the progress and management of pressure ulcers was found in 44.4% (n = 512) of patients. No documentation was found in 53.8% (n = 620) of patients and data was missing in 0.7% (n = 8) of cases. This result represents a significant decrease from the PUPPS 1 result where 90.2% of patients had some documentation related to their pressure ulcer management (see Graph 12CG below).

The data did not identify if the documentation noted one, some or all of the ulcers identified on the patient on survey day.

Graph 12CG. Documentation of pressure ulcer management PUPPS CG



7 Contextual data PUPPS CG

The contextual data audit was completed by all health services prior to the education and survey days of PUPPS 2. The information is self-reported and therefore likely to have a subjective component. For all 48 health services, only data from sites involved in both surveys were analysed. Changes in contextual data from PUPPS 1 to PUPPS CG are noted in Table 16CG.

An increase in positive responses was seen across almost all contextual measures from PUPPS 1 to PUPPS 2. Analysis of the relationship of this data to pressure ulcer prevalence is problematic given the binary nature of the responses (either yes or no) and the use of the 82 health service sites as units despite the obvious operating differences between small rural and large metropolitan health services.

Although 81.7% of health services had an organisation wide strategy to reduce hospital acquired pressure ulcers, a smaller proportion (70.7%) had existing protocols and policies for the prevention and management of pressure ulcers.

A Pressure Ulcer (or Wound Management) committee was present in 78.0% of Health Services and 67.1% have an Executive Sponsor.

Health services that actively involved 2 or more Allied Health disciplines in their pressure ulcer prevention and management strategies accounted for 52.4% of the group.

The Australian Wound Management Association's Clinical Practice Guidelines for the Prediction and Prevention of Pressure Ulcers², which use designated levels of evidence as recommended by the National Health and Medical Research Council, was used by 76.8% of health services as the basis for their policies and strategic plan for pressure ulcers.

Pressure ulcer prevention literature is supplied to patients in 22.0% of health services.

Specialist wound management staff with specific hours dedicated to this role remained stable, and were present in 46.3% of health services. As with the PUPPS 2 group, a larger proportion of health services have a staff member who has wound management or pressure ulcers as part of their clinical portfolio, but have no dedicated hours attached to their role.

Collecting pressure ulcer data as part of clinical risk management programs are performed by 72.0% of health services surveyed. Pressure ulcer risk assessment tools are used by 92.7% of health services and 100% of these require risk assessment to be performed on admission. 67.1% of sites stated that recommended interventions for the prediction and prevention of pressure ulcers according to level of assessed risk are implemented.

Mattress replacement programs were occurring in 86.6% of health services.

Table 16CG. Change in quantitative contextual data PUPPS CG

Factors or strategies	PUPPS 1#	PUPPS CG	Change PUPPS 1 to PUPPS CG	95% CI of change		p value
Existing protocols and policies on pressure ulcers in place	35.4%	70.7%	35.4%	22.9%	47.8%	< 0.001
Education or program on pressure ulcer prevention and management in place	40.2%	70.7%	30.5%	17.5%	43.5%	< 0.001
AWMA clinical guidelines (or similar) in use	48.8%	76.8%	28.0%	16.1%	40.0%	< 0.001
Patient literature regarding pressure ulcers in use	3.7%#	22.0%	18.3%	8.6%	28.0%	< 0.001
Pressure reduction mattress replacement program	46.3%	86.6%	40.2%	29.0%	51.5%	< 0.001
Specialist wound management staff with allocated time	46.3%	46.3%	0.0%##	-10.2%	10.2%	1.000
Active wound or pressure ulcer committee	61.0%	78.0%	17.1%	6.4%	27.7%	0.002
Pressure ulcer data collected as part of clinical risk management program	46.3%	72.0%	25.6%	14.4%	36.8%	< 0.001

This contextual factor was reported for PUPPS 1 at health service level (4.2%) in the VQC State-wide Report – 2003, but is reported at site level in this analysis.

A large number of smaller health services participated in PUPPS 2 and a large number of staff have wound or pressure management as their portfolio but with no additional time allocation.

06

Discussion

Discussion

The PUPPS 2 report presents data obtained from health services involved in the second state-wide pressure ulcer prevalence survey. The changes between PUPPS 1 and PUPPS 2 are highlighted along with practical strategies to assist health services prevent pressure ulcers.

Overall, the PUPPS 2 data shows improvement in pressure ulcer prevention and management evidenced by a significant reduction in pressure ulcer prevalence, and positive changes related to a take up of or action on most of the key recommendations from PUPPS 1. Examination of the results of PUPPS 2, at both a state and individual health service level, may be useful for health services to measure the impact of their implementation of key recommendations from PUPPS 1. Clinicians and managers may also use this information to assist them to effectively target resources for pressure ulcer prevention and management in a way that is relevant to their health service. Sustained decreases in pressure ulcer prevalence are possible through the implementation of comprehensive programs that incorporate multiple strategies such as: pressure ulcer risk assessment tools, evidence based clinical guidelines, a multi or interdisciplinary approach, care delivery systems that integrate pressure ulcer policy and education or information sharing for patients, carers and staff in the prevention and treatment of pressure ulcers⁵¹.

Organisational environment & improvement

Contextual data was collected to quantify health services progress in implementing the PUPPS 1 recommendations. Health services responded to questions on their organisation's pressure ulcer prevention and management policies, allocation of staff and equipment resources, use of risk assessment tools, patient information and education for patients and staff. Despite the subjective nature of these responses it is valuable to discuss these data in more detail as it describes and qualifies the environmental and organisational context in which the quantitative data were collected.

PUPPS 2 further demonstrated that there are diverse practices in pressure ulcer prevention and management. The contextual data indicates improvements across the state that could also be translated as an intention to change as most health services that participated in PUPPS 2 were demonstrating a degree of progress on implementing the recommendations from PUPPS 1. All contextual factors showed progress except the

allocation of qualified wound management staff time. However, improvement in the organisational environment has not necessarily translated directly to lower pressure ulcer prevalence. There were no strong statistical associations identified between contextual data responses on pressure ulcer prevention strategies and pressure ulcer prevalence. There was, however, a trend towards a positive association between the use of pressure reduction mattress replacement programs, and the existence of pressure ulcer prevention and management policies with lower pressure ulcer prevalence.

The lack of statistical association between the contextual factors and pressure ulcer prevalence was not unexpected. Achieving sustained change in organisations takes time. For most health services 12 months is a relatively short time in which to have planned, implemented and achieved significant practice changes and improvements in clinical outcomes, particularly if there were no prior programs or strategies in place. Whilst contextual changes reported between PUPPS 1 and PUPPS 2 were considerable several factors make the link to pressure ulcer prevalence complex. An additional 39 health services participated in PUPPS 2, with the majority of those having less than 50 beds and generally lower casemix acuity, i.e. patients at less risk of developing a pressure ulcer. The use of units of analysis at an individual health service level also add complexity to the analysis of prevalence data which is primarily used to inform planning on a broad scale. Specific or targeted planning at a health service level is more appropriately informed with incidence data. The complexities of providing care in health services with a wide acuity of casemix and throughput also makes it difficult to 'attribute causation to a particular policy or action because it cannot be isolated from all the other reform drivers within the health system'⁵². This tends to undermine the ability to draw strong statistical conclusions from the 84 health service units which range in bed size from 4 to 1,000. Expectations that the PUPPS CG

group (which represents the 48 health services who participated in both PUPPS 1 & PUPPS 2) may have performed better in this area than the state as a whole were not realised. This finding may have been influenced by a number of factors such as the state-wide distribution of the PUPPS 1 report; the inclusion of some of the recommendations in the DHS Policy and Funding Guidelines; the continuing high profile of pressure ulcers through the DHS Mattress Replacement Program, and the existence of pre-PUPPS pressure ulcer prevention programs in many health services who did not participate in PUPPS 1.

Additional assessment or review of the degree to which key recommendations from PUPPS 1 may have been implemented by health services was beyond the scope of this audit. However, impressions gained from qualitative contextual data suggest barriers to implementation are more related to underdeveloped organisational change management skills, competing clinical priorities and management of limited resources rather than any ineffective or inappropriate recommendation or an unwillingness by organisations to commit to improvement. Many health services have reportedly made the recommended changes to their policies but this unfortunately has not yet translated to organisational wide changes in practice or sizeable decreases in prevalence. Several respondents commented that while certain key recommendations had been incorporated into health service policy, the existence of the policy alone did not make the implementation occur. A variety of reasons were identified as barriers to change such as lack of communication, executive support, time, resources, equipment and staff resistance to change. This is not a problem unique to Victorian health services. O'Dea commenting on pressure ulcer prevalence in the UK noted 'the most striking finding on examining all the information from these surveys is the lack of a systematic approach to pressure damage prevention and treatment, even where lengthy protocols have been produced'⁴⁷.

In PUPPS 2 there were many examples of single health services, hospitals or units effecting change with a focused, clinical leader driving implementation strategies resourced with the support of executive and direct care clinical staff. One metropolitan multi-campus health service that used a targeted 2-year project to implement sustained change in pressure ulcer prevention strategies realised a decrease in pressure ulcer prevalence of more than 50% from 33% to 12.8%.

Critical elements for successful change in this area are the use of pressure ulcer risk assessment tools linked to prevention and management plans, education of patients and staff and regular reporting^{7,51,53}.

The effectiveness of similar strategies internationally are well documented and has been seen to reduce pressure ulcer prevalence by up to 30%^{54,55}. It is also well recognised that long term improvements are incremental and require 'extraordinary effort and dedication', particularly from local champions and clinical leaders^{51,56}. Staff are more likely to embrace and value reforms if they are supported by executive management, they demonstrate quick wins towards a well articulated vision, and they lead to demonstrable improvements in patient outcomes⁵².

Leadership is also required on a state level for pressure ulcer prevention strategies to be successful. Mainstreaming of the key elements of the PUPPS projects, lessons learned and subsequent recommendations requires an ongoing commitment from government. This commitment could take the form of facilitation of ongoing prevalence surveys, coordinated surveillance methods and reporting mechanisms from health services, funding for wound management staff and equipment resources in health services, and support for education and research.

Prevalence

The prevalence of pressure ulcers identified in PUPPS 2 was 20.8%, a statistically significant improvement from that of PUPPS 1. This change of 5.7 from the PUPPS 1 26.5% is an overall improvement of 21.5%. For the PUPPS CG group, the overall prevalence was 22.7%, a decrease of 3.8 which equates to an improvement of 14.3% from PUPPS 1. Discussion comparing changes in results between PUPPS 1 and PUPPS CG, and to a lesser extent PUPPS 1 and PUPPS 2, can be made with a degree of confidence given the use of a consistent, validated methodology for data collection and small differences in population demographic and clinical variables.

Across the DHS comparative groups, the results reflect an overall trend towards improvement with decreased prevalence in 5 of the 7 comparative groups (Tables 3b & 3bCG). Overall, 2,559 pressure ulcers were found on 1,381 patients, which equates to 1 in 5 Victorians still experiencing at least 1 pressure ulcer during their acute or subacute admission. This result is an improvement over the previous survey (which identified 1 in 4 Victorians with a pressure ulcer), but does not yet reflect a 'zero tolerance' proposal as was recommended in PUPPS 1. This improvement may be attributed to a number of influences linked to the learning experiences of PUPPS 1: the raised profile of pressure ulcer prevention and management in Victoria through PUPPS; and the Mattress Replacement Program; the inclusion of several PUPPS recommendations in the Victorian - Public Hospital and Mental Health Services Policy and Funding Guidelines 2004-2005⁵⁷, and the training of several hundred clinical staff as surveyors who are now empowered with increased knowledge and skills relating to pressure ulcer prevention and management.

Although zero tolerance on pressure ulcers is advised, there will be situations where even faithful adherence to the principles of preventative care will not prevent the development of pressure ulcers in some patients due to the health status of the patient⁵⁸. The knowledge, methods and time required to reduce the risk in all

patients may not be available⁵⁸. This presents a dilemma: do we identify and accept a certain, low level of pressure ulcer prevalence as the realistic target of caring for patients, or will such an arbitrary value be used to excuse pressure ulcer prevalence rates?

Prentice's national pressure ulcer study in 2000 found that pressure ulcer prevalence decreased from 26.5% to 22.0% after the introduction of pressure ulcer prevention and management guidelines, but that this reduction was smaller than expected and pressure ulcer prevalence remained high¹⁴. The improvement in pressure ulcer prevalence from PUPPS 1 to PUPPS 2 is an improvement which re-positions Victoria closer to this national data and to a lesser extent results from comparable international studies which range from 14.8% to 18.1%^{4,11,15,16}.

Health services in the USA, UK and Europe have spent a great deal of energy and resources over many years in lowering the prevalence and incidence of pressure ulcers in their respective regions. This suggests that whilst lowering incidence and prevalence rates is not impossible, it does require sustained effort⁵⁹. It is important that Victorian health services take the opportunity to learn from the experiences and successes of our international counterparts in how they have achieved these reductions. There should be recognition of the incremental nature of improvement by clinicians and managers so that expectations of change are reasonable and achievable. Incremental improvement can be more sustainable as it is often a reflection of changes in organisational philosophy and practice rather than a single high-energy program of change that implements broad, quick changes the effect of which are negated over time⁶⁰.

The improvement in results for PUPPS 2 and PUPPS CG may be considered as paralleling other published serial prevalence data^{10,13,14,61}. The effect of serial prevalence studies done in Tasmania and Western Australia have shown decreases in prevalence and plateauing of prevalence at 12% to 14%^{10,62}. This is a national benchmark we should all be aiming for and adds weight to the argument for zero tolerance.

A European study found that pressure ulcer prevalence decreased incrementally when tracked over 5 years⁶¹ and that the feedback provided to health services assisted in facilitating this reduction. Although feedback from point prevalence surveys is a valuable and effective tool to assist health care professionals to focus on the issue, there has been no clear definition of what is the best form for this feedback to take⁶¹. Further investigation of this particular aspect would be valuable for future state-wide strategies.

Length of stay

The impact of developing a pressure ulcer on both patients and the organisation is evident in the analysis of length of stay (LOS). In PUPPS 2 patients who had a pressure ulcer (hospital acquired or present on admission) stayed longer than those without an ulcer. The more severe the ulcer, the longer the patient had stayed.

While it is unclear if patients stay longer because they have a pressure ulcer or have a pressure ulcer because they stay longer, the implications of these results are clear. Pressure ulcers lead to preventable increased hospital LOS over and above the usual LOS associated with patients diagnostic groupings. In PUPPS 2 patients with pressure ulcers had a 45% longer time from admission to survey day than patients without ulcers. Modelling of the Victorian Admitted Episodes Dataset (VAED) data indicated that patients with pressure ulcers had a 50% longer LOS than patients without ulcers, accounting for 44,406 beddays per annum. Although factors other than pressure ulcers may play a role in this extended LOS, the risk-adjusted cost of these additional beddays is \$19 million per annum. State-wide the additional LOS associated with pressure ulcers represents not only preventable additional costs for health services and patients, additional time and stress for the patients, families and carers, it also represents missed opportunities for admission and treatment of other patients.

Hospital acquired pressure ulcers

There has been little change in the proportion of hospital acquired pressure ulcers between PUPPS 1 & PUPPS 2, with approximately two thirds of all pressure ulcers identified being acquired during their current admission (66.2%). This result reiterates the iatrogenic nature of pressure ulcers and follows the trend of national and international data^{14,47}. Of the 455 patients who had a pressure ulcer on admission, 98 (21.5%) developed an additional 169 pressure ulcers during their admission. Patients who had a pressure ulcer on admission had greater numbers of Stage 3 and Stage 4 pressure ulcers. The development of additional pressure ulcers on patients with co-existing pressure ulcers on admission has not been extensively examined in the literature. One study reported that of the four people admitted with a pressure ulcer (out of 275 patients), two developed further pressure ulcers⁶³. Another reported that of the 20% of patients admitted with a pressure ulcer, 55% went on to develop further pressure ulcers during their admission⁶⁴. This data puts the findings of PUPPS 2 in a positive light in that the prevalence rate for patients admitted with pressure ulcers was less than half that of international studies.

It has been suggested that that "the development of pressure ulcers in a patient should always be viewed as an adverse outcome of treatment"⁶. It is well documented in the literature that a comprehensive program of risk assessment, risk management, increased staff knowledge and incidence reporting in a no blame environment can effect a reduction in pressure ulcer prevalence^{3,65}. The presence of an organisation wide strategy for reducing hospital acquired pressure ulcers is reported by 81.7% of health services, and 92.4% reported the use of a risk assessment tool on admission. The fact that only 52.8% of patients assessed had a risk assessment undertaken and only 45.0% of patients with a pressure ulcer had any documentation regarding the management of their pressure ulcer in the previous 5 days suggests that these intentions do not always lead to actual change. As previously noted, hospital acquired pressure ulcers are increasingly associated with litigious action^{6,38-40}.

Severity and distribution of pressure ulcers

The results for PUPPS 2 reflect a trend similar to PUPPS 1 for severity and anatomical distribution of pressure ulcers. There was a slight increase in the proportion of sacral pressure ulcers, making these the most frequent site for pressure ulcer formation (21.2%), closely followed by the heel (21.0%). Notably, 48.8% of pressure ulcers occurred below the knee. Anti-embolic stockings, or normal socks that often cover lower limbs make incidental observation of the lower limb and heel difficult. When combined with a medical condition that places a patient at risk for developing a pressure ulcer, there is a strong potential for pressure ulcers to develop undetected. If the energy of pressure ulcer prevention programs was directed solely at reducing the pressure prevalence at these 2 sites by 50%, the overall number of pressure ulcers could drop by 20% (or could reduce the overall state-wide prevalence to 16.6%). Considering that a concentrated effort in 2 anatomical locations would raise the awareness of the issue overall, and monitoring of adjacent high frequency sites would be incidental, this reduction would be a conservative estimate.

As previously discussed, the involvement of allied health staff such as podiatrists and occupational therapists, who by the nature of their work often examine the lower limb, can add to the potential benefit of this proposal. Allied health staff also work mainly one on one with the patient, creating more opportunity for the patient to communicate any areas of concern. The involvement of allied health clinicians could be as simple as asking every patient they see if they have any sore bony areas. Repeated raising of the issue increases awareness and places pressure ulcer prevention high on the agenda for the clinician and the patient.

PUPPS 2 found a slight increase in the number of pressure ulcers on the elbow, possibly the result of altered lifting techniques and the increased emphasis on patients assisting with their own repositioning. Some health services have used the 'back safe prevention strategy' to remind staff that if they identify

a patient that can independently reposition they need to be encouraged do so on a regular basis.

Although there was a lower state-wide prevalence for PUPPS 2, there seems to have been an increase in the severity of pressure ulcers found, i.e. more Stage 3 and 4 ulcers. There was also an increase in the proportion of Stage 2 pressure ulcers. Whilst Stage 2 pressure ulcers are often not considered 'severe' by clinicians, the impact of the healing process on the patient and their family can be considerable. For one patient, a Stage 2 heel pressure ulcer took 18 months to resolve and involved multiple visits to an outpatient department for extensive and expensive wound management, as well as requiring additional wound care by his wife at home²⁵. The direct wound care costs alone totalled over \$20,000. Overall 71% of patients surveyed had a Stage 2 or above as their highest stage of pressure ulcer. The implementation of guidelines, education, regular reporting and the use of a risk assessment tool can have the effect of not only changing the total number of ulcers found, but the severity as well. This has not been reflected in the Victorian data.

Paediatric prevalence

Pressure ulcer prevalence in patients under the age of 18 years was 1.4% (n = 20) and reflected the lower prevalence of pressure ulcers for this group reported in the international literature^{49,50}. This result is still of concern, as for every 4 – 7 year age group under 17 years there was at least one patient with a pressure ulcer. Paediatric and neonatal patients have a variety of risk factors which increase their risk of developing pressure ulcers, some in common with the adult population and some unique to their age. Most differences are usually explained by the diverse nature of illness or variations in body size and shape. It has been reported in the international literature that paediatric patients are more likely to develop pressure ulcers in the sacral area, but neonatal patients tend to have pressure ulcers occur in the occipital region due to a proportionally larger head to body ratio than paediatric or adult patients^{50,66}. The anatomical

distribution seen in the PUPPS 2 paediatric and neonatal patients identified 9.4% of pressure ulcers were on the occiput and no ulcers were identified in the sacral area. The head region accounted for 34.4% and the lower limb accounted for 56.3% of pressure ulcers in this group.

Clinical and demographic variables

Patients surveyed in PUPPS 2 were more likely to develop a pressure ulcer if they were male, an emergency admission, had a lighter skin colour, diabetes, renal failure or an acquired brain injury and were unable to independently reposition themselves. This follows the trend of PUPPS 1 with the exception of gender. However, this change was limited and little clinical value can be placed on the change. Over 80% of people with pressure ulcers were greater than 60 years of age, reflecting the findings of the international literature^{46,47}. As for PUPPS 1, aside from immobility, none of the clinical and demographic variables were significantly associated with risk for developing a pressure ulcer. This may reflect the interrelated nature of these variables and the complex environment of patients with multiple co-morbidities. The value of collecting this data as a predictor of pressure ulcer development in future prevalence surveys should be questioned.

Risk factors

Immobility remains strongly associated with risk of pressure ulcer development. This reinforces the 'Move, Move, Move' message of VQC's patient education brochures and the importance of frequent position changes^{17,18}. To decrease the risk associated with immobility a comprehensive prevention plan that includes regular skin assessment, hygiene/skin care, a turning or re-positioning regimen, adequate nutrition and maximising opportunities to mobilise combined with pressure reducing support services is required^{2,19}. Staff awareness of the relationship between immobility and pressure ulcer development must also be improved. Patients may be able to independently reposition themselves but be confined to strict bed rest, or have diabetes related peripheral neuropathy

where they do not feel pain in their feet and therefore are not aware of the need to reposition. Patients moved from a lying position to sitting in a chair are still at risk of pressure ulcers, albeit in different anatomical locations, if they are left for long periods of time with no pressure relief. Again implementation of individual prevention plans should be coupled with clinical judgement and frequent review.

Comparisons across medical specialities

Across the medical specialities little change was noted from PUPPS 1 to PUPPS 2 apart from the Critical Care group, which incorporated Intensive Care, Neonatal Intensive Care, High Dependency and Critical Care Units. The prevalence of this group reduced by 50.1% from 47.7% in PUPPS 1 (the highest medical speciality prevalence identified in the first survey) to 23.5% for PUPPS 2.

Intensive Care Units in major metropolitan hospitals, which formed approximately 50% of the critical care group, were involved in a DHS Breakthrough Collaborative approximately 18 months ago which aimed to reduce hospital acquired pressure ulcers. This project served to raise the profile of the pressure ulcer issue, produced data for trending and benchmarking, and improved local education, communication and prevention planning with a subsequent reduction in pressure ulcer prevalence and incidence. Discussions with staff involved in these areas noted that the issue waned following the collaborative and the PUPPS 1 project, which occurred a short time after the collaborative served to reenergise these units. This reenergising appears to be built on a foundation of a good pressure ulcer preventative planning program, including management support, clinical leaders, education, communication, data collection and feedback of data. These units have the advantage of having, in most instances, a small establishment of staff who have a strong focus on research and data collection for clinical outcomes that may have assisted with their communication and education.

The specialties of medicine, surgery and rehabilitation accounted for 87.0% of all patients surveyed and for 86.8% of patients with ulcers. Although these specialties demonstrated a decrease in prevalence between PUPPS 1 and PUPPS 2 this finding has implications for where resources are best allocated to reduce prevalence. Even though spinal and palliative care units had higher prevalence within their specialties they accounted for only a small proportion of all patients with ulcers. These specialties are well recognised as having patients with higher levels of risk and often have sound strategies in place to minimise this risk.

Although the overall prevalence for the medical group has decreased, it constitutes the largest proportion of all patients with pressure ulcers. This group consists of a large number of diverse specialties, perhaps making any risk management plan difficult to implement across the entire group considering the matrix of patients and staff across many discrete wards and units. Many of the patients admitted under the group designated 'general medicine' are elderly with complex co-morbidities. This group inherently has many of the previously identified risk factors for developing a pressure ulcer, such as an inability to independently reposition, incontinence and poor nutrition which are often exacerbated by underlying aetiologies that precipitated the patient's admission in the first instance.

Patients in the Emergency Medicine group were found to have a pressure ulcer prevalence of 24.7%, an 11.5% increase from PUPPS 1 at 13.2%. These data were derived from a small group of patients and should not be seen as representative of all patients cared for in Emergency Departments. The criteria for inclusion in PUPPS 2 was that the patient had been admitted or flagged for admission which generally only accounts for a small proportion of patients in the Emergency Department. The collection of incidence data on all patients in Emergency Departments would provide a more accurate assessment of the rate of pressure ulcers in this area. It is important to note emergency patients flagged for admission may spend

extended periods of time lying immobile on trolleys waiting for review by medical and other staff or waiting for a range of tests to be done. Trolley mattresses are usually much thinner and of poorer quality than most standard hospital mattresses. High quality pressure reduction foam trolley mattresses have been included as a product option in the DHS Mattress Replacement Program funding. Secondly in Emergency Departments the focus is on managing the presenting diagnosis and other concerns, including pressure ulcer prevention are ranked less important.

There were no obstetric patients identified with pressure ulcers in PUPPS 2 as opposed to 2 patients with ulcer in PUPPS 1. Although predisposing risk factors for this group are cited in the literature they are considered to be at very low risk^{67,68}.

Risk assessment

Over 90% of health services that participated in PUPPS 2 reportedly require patients to be risk assessed for pressure ulcers on admission (Table 16), with many requiring this assessment to be repeated on at least a weekly basis or when the patients condition changed. However, only 52.8% of patients surveyed were identified as having had a risk assessment undertaken on admission. Although this finding equates to an improvement of 11.9% from PUPPS 1 40.9%, it pinpoints a significant gap between organisational policy and actual clinical practice.

Undertaking a risk assessment without putting an action plan in place is counterproductive. Over 70% of the health services that participated in PUPPS 2 stated that they use a risk assessment tool linked to interventions based on level of risk (Table 16). This policy is not reflected in the practice observed in PUPPS 2 where only 65% of patients assessed as medium risk or above have a pressure reducing device insitu. The use of pressure reducing devices forms only a part of any preventative plan, but in patients identified at high risk some form of pressure reducing equipment should be employed².

Data collected during PUPPS 2 included the presence or absence of a pressure reducing/relieving devices, but not whether the device was appropriate to the patient and their level of risk. And although PUPPS 2 did not collect data on whether other risk minimisation strategies had been implemented, such as 2 hourly repositioning, this result contributes to the overall impression of gaps between policy and practice.

Assessment and accurate documentation of a patient's skin integrity prior to, or on admission to, a health service, during the period of hospitalisation, and prior to any inter-health service transfer, is essential for both continuity of care and improved service delivery.

Too often, risk assessment is seen as one more administrative task that takes clinician time away from direct patient care. Clinicians need to be supported in developing the necessary knowledge and skills and be given time to appropriately assess their patients and implement a targeted individual prevention and management plan. Pressure ulcer risk assessment on admission is an ideal opportunity to pro-actively implement prevention strategies rather than reactively managing a pressure ulcer once it has developed. Repeated risk assessments are crucial in those patients deemed not 'at risk' but whose health status may have changed due to intrinsic or extrinsic factors such as an operative or diagnostic procedure. When pressure ulcers develop in patients who fit this clinical picture it is more indicative of the quality of care provided and of how well evidence based principles of practice are implemented. This supports the argument that pressure ulcers should be universally recognised as a clinical indicator for patient safety^{41,69}.

There is international consensus around the value of undertaking a risk assessment. It is widely accepted that early detection and appropriate intervention to relieve pressure from 'at risk' tissue will lead to restoration of the blood supply and tissue recovery. The reverse is also true, as unrelieved pressure or repetitive reperfusion injury will lead to progressive destruction of skin and underlying tissue^{37,70}.



Pressure ulcer prevention is presumed to commence with risk assessment that identifies those patients at risk of developing a pressure ulcer and informs preventative planning^{37,71}. It is also assumed that by undertaking a risk assessment, the risk for developing a pressure ulcer for the person who has been assessed as 'at risk' reduces due to the implementation of preventative measures³⁷. These assumptions are sound where action (preventative measures) is taken. Data from PUPPS 2 suggests that preventative action based on risk assessment is performed inconsistently in many Victorian health services.

A greater understanding by health service staff of the aetiology of pressure ulcers, combined with thorough risk assessment processes are integral to early detection, prevention, or subsequent treatment of pressure induced tissue injury. Consistent commitment to implementing this approach is required by organisations and all staff if sustained improvements in the rate of hospital acquired pressure ulcers are to be achieved.

Pressure relieving/reducing equipment

The use of pressure relieving/reducing devices remains inconsistent and no improvement in the use of devices was seen in PUPPS 2. Across the population surveyed, 42.1% of patients were identified with a pressure relieving/relieving device insitu. Patients who had been risk assessed had a higher rate of devices insitu (46.1%) than those not risk assessed (37.5%). Of particular concern are the group of patients assessed as being at high or very high risk where 28.9% had no pressure relieving/reducing devices insitu, including 54 patients (9.2%) with ulcers.

For each risk class the patients with a pressure relieving/reducing device insitu have a higher rate of ulcers than patients without. This may reflect the use of devices being reactive rather than proactive, that is, equipment is used once an ulcer is identified, rather than as part of a preventative plan. Although pressure relieving devices are only one aspect in the treatment of pressure ulcers it is of major concern that 83 people

with either a Stage 3 or 4 pressure ulcer had no devices in situ. In this group such devices are essential adjuncts to treatment plans. Strategies for 'stepping down' the use of pressure reducing/relieving devices as the patient's risk decreases need to be incorporated into organisational policies. Costs associated with the hire or purchase of this specialised equipment has significant financial implications for health services. While not assessed as part of PUPPS 2, anecdotally the impression gained from staff involved is that appropriate selection of support surfaces is based on availability rather than patient need, reinforcing the importance of linking risk assessment to an individual plan for intervention⁴⁷.

The US Agency for Healthcare Research and Quality found that the use of pressure relieving equipment to prevent pressure ulcers was one of only three clinical practices for improving patient safety to meet 'greatest level' criteria for strength of evidence regarding impact and effectiveness⁷². An important point to note in advocating the increased use of pressure reduction devices is that while they are an essential element of any prevention plan, particularly for any patient identified as medium risk or above, it should be remembered that they should be viewed as a supplement to frequent repositioning. Anecdotal reports, supported by published comment, suggest that the 'downside' of any staff education program tends to be an increase in the number of speciality beds ordered inappropriately⁵¹. This reinforces the notion that some staff tend to see these beds or devices as a solution, rather than a component of an individual prevention or management plan, including: regular turning and management of hydration and nutrition. One of the more successful approaches observed was in a metropolitan ICU who conducted a vigorous and sustained pressure ulcer prevention program which decreased their prevalence and incidence. This program incorporated clinical champions, staff education, active surveillance and regular audit feedback.

The large number of patients at high risk or with ulcers and no device insitu may reflect a lack of planning related to the absence of a guide to prevention strategies. Alternatively, the result could reflect the feedback from PUPPS 2 site coordinators, particularly in rural areas, who cite a lack of equipment to use even when a patient is assessed as being at increased risk. Many reported 'lack of available equipment' as the most frustrating aspect of the work they are undertaking in their health services in relation to pressure ulcer prevention programs. The rollout of the state-wide DHS Mattress Replacement Program, which was initiated from the PUPPS 1 recommendation to improve basic hospital mattresses, should alleviate this equipment shortage to some degree, with most health services replacing more than half their current mattresses with high quality static pressure reduction foam mattresses⁷³. This should allow health services to more appropriately target high risk patients with more specialised equipment. A third state-wide survey would be required to track the influence of this initiative on state-wide pressure ulcer prevalence.

Documentation

PUPPS 2 demonstrated a gap between health service policy and clinician practice in the area of documentation in relation to pressure ulcers. Only 45.0% of patients with a pressure ulcer had any documentation detailing the management of that ulcer within the 5 days prior to the day of survey. The PUPPS 1 report identified a much higher rate of documentation (over 90%), which differed from the published literature^{13,14,74}. This may have been due to a Hawthorne effect secondary to the long lead time and project timeframe of over 20 weeks. Preparation time for PUPPS 2 was much shorter with all education and surveys being completed over 7 days. As previously discussed, the energy required to sustain prevention and management programs for pressure ulcers may also have combined to produce this result. The purpose of health documentation is to provide essential data on the patient's medical history and current diagnosis, clinical

parameters, results of examinations and the plan of care⁷⁴. Documentation of patient care is a legal requirement that records health professionals clinical decision-making, care provided and outcomes of clinical care should litigation occur. That the documentation was found to be so poor around such a potentially litigious condition is of concern, as 'quality and clarity of medical records is an essential ingredient in good risk management'⁶. The PUPPS 2 surveyors were not asked to determine the degree of detail and appropriateness of documentation, only to note if there was any evidence of pressure ulcer management and classification.

Appropriate documentation is also critical to state-wide planning, funding and research. The Australian Classification of Diseases and Procedures (ICD 10AM) introduced L89 codes in July 2004, which align to the AWMA guidelines for pressure ulcer classification⁴². This should assist with ongoing identification of the extent and severity of the pressure ulcer issue. Poor documentation, however, leads to less efficient coding resulting in the potential for less funding.

Poor documentation of pressure ulcers is not a problem unique to Victorian health services^{14,75}. A recent Swedish study found that 'patient records did not present valid and reliable data about pressure ulcers', and additionally that even where documentation had occurred it was poor, failing to detail much information beyond the presence and location of the ulcer⁷⁴. There is a demonstrable need to emphasise the importance of medical nursing and allied health documentation during an episode of care. Further education of the salient points to be recorded in relation to the prediction, prevention and management of pressure ulcers should be a priority of health care services. The integration of organisational policy and documentation with clinical practice requires considerable reinforcement.

Wound management staff

The benefit of dedicated staff positions in wound management or tissue viability nationally and internationally are well documented⁵⁰. Less than 38% of health services that participated in PUPPS 2 employ wound management consultants or tissue viability nurses. Those that did undertake these roles in either a designated position or as part of a clinical portfolio reported lack of resources, and time in particular, as the greatest hindrance to implementing the key recommendations from PUPPS 1. This contextual factor demonstrated the least improvement since PUPPS 1; no improvement in the PUPPS CG and a decrease of 8.8% across PUPPS 2. In comparison improvements with other contextual factors ranged from 19.3% to 39.2%. Cost and availability of experienced staff to fill this type of position were most often quoted as reasons for not creating these roles. However, given conservative estimates of the direct and indirect costs associated with Stage 4 pressure ulcers being up to \$100,000, it would seem sensible to invest in a clinical leader whose role it would be to assist an organisation to formulate policy and educate staff and patients in the prediction, prevention and management of pressure ulcers. The prevention of 1 or 2 Stage 4 pressure ulcers would see the investment realised with interest.

Some rural health services reported that they did have funding for these positions but were unable to recruit staff to fill them. The availability of wound management resources are especially important for rural and regional staff as these areas are often isolated from continuing education opportunities geographically, and smaller numbers of staff within their health service reduces opportunities for vocational learning and sharing of knowledge and experiences within the clinical environment.

Historically, pressure ulcer prevention and management has been considered a 'nursing problem and nurses have been defensive about their occurrence'³³. Multidisciplinary teams can work together to address all aspects of pressure ulcer prevention and management

across the spectrum of care settings. The benefits of a multi-disciplinary approach in improving clinical outcomes for patients with pressure ulcers is well documented^{3,76-78}. One solution therefore to address the dearth of appropriately skilled staff in rural health services would be to include and develop the role of allied health staff in pressure ulcer prevention and management programs.

There is no expectation that allied health will replace the nurse's role in monitoring and managing patients with pressure ulcers. Allied health staff, however, can assist nurses with the more complicated high risk patients through the addition of specialist knowledge. Dietitians for instance can assist in establishing patients' nutritional status and develop a plan to reduce any deficits found, thereby playing an important role in the prevention and management of pressure ulcers⁶³. Occupational therapists can assist with appropriate pressure relieving devices, as well as aids and appliances to minimise pressure over vulnerable areas or existing pressure ulcers, both in the acute/subacute setting or at home. Physiotherapists can assist with educating patients on self-repositioning regimens for the bed or chair, as well as exercise programs that prevent stasis, loss of muscle tone and minimises pressure on bony prominences. Podiatrists have a role in assisting team members to develop appropriate pressure relieving devices for the lower limb, as well as managing pressure ulcers particularly on the feet of patients with diabetes. Medical staff have an important role in managing primary illnesses and co-morbidities that can affect the development or healing of pressure ulcer.

The myth that pressure ulcer prevention and management is solely a nursing responsibility is just that; pressure ulcer prevention and management is everybody's responsibility from the point of admission until discharge. Comprehensive risk management programs that are supported by executive and clinical leadership and a multi-disciplinary approach that does not attempt to accrue blame to any one person or discipline are therefore vitally important in reducing the prevalence and incidence of pressure ulcers.

Staff education

Successful pressure ulcer prevention programs are dependent on staff knowledge, skill and attitude⁷⁶. Many health services (66.7%) that participated in PUPPS 2 have subsequently implemented staff pressure ulcer education programs. Less than 30% of health services include non-clinical staff in these programs, but even those that do report a poor uptake by this group. Considering many non clinical staff such as personal care attendants assist with repositioning or transferring patients to and from the bed, awareness of the aetiology of pressure ulcers and the ability to recognise the early signs of skin damage from pressure would be beneficial to patient outcomes.

It is often assumed that all clinical staff have adequate and current knowledge regarding the prevention and management of pressure ulcers, yet feedback from the PUPPS 1 surveyors highlighted concerns around the lack of undergraduate education on pressure ulcers in all health disciplines. Prentice and Stacey found that knowledge of pressure ulcer prevention and management was low among nursing and junior medical staff, and, that these staff believed their undergraduate education in this area was inadequate³. The lack of staff knowledge may be addressed somewhat by having clinical personnel and other resources available mentor and empower staff in this area. Even where less experienced staff have sound of knowledge and skill levels, they may lack the confidence to implement this knowledge, especially when confronted by some senior staff who may still support outmoded practices. Concerns also arise where staff who do not have adequate knowledge in pressure ulcer prevention and management, seek to direct the care for patients against the advice of staff with current expertise. Anecdotal reports of inappropriate practices are endemic. The conflict that arises from lack of consensus between health professionals both within and between disciplines, from health service to health service, state to state and across international boundaries is not only detrimental to the implementation of best practice,

but also places stress on staff, patients, carers and health services. Compounding this is that pressure ulcers are not a topic that engenders a great deal of interest for many clinicians, with the flow on effect a lack of motivation to keep abreast of new developments⁷⁹.

Staff education requires consistent and ongoing commitment of resources. VQC has facilitated 3 state-wide basic education programs on pressure ulcers. Individual health services committed to improving pressure ulcer prevention have invested time and resources in pressure ulcer education, creating pockets of excellence around the state. VQC's ongoing commitment to reducing pressure ulcers is currently demonstrated by the development of a competency program for pressure ulcer education that may be used by health services or as part of a state-wide strategy to ensure dependable dissemination of information regarding pressure ulcer prevention and management.

Surveyor education program

As with PUPPS 1, PUPPS 2 used inter-rater reliability testing to ensure all surveyors were able to consistently and accurately stage pressure ulcers ensuring the data collected was robust, reliable and able to be compared between the two surveys.

The results from the inter-rater reliability testing suggested that surveyor knowledge of pressure ulcers had improved in the 12 months since the first survey with 73.7% achieving a first time pass for PUPPS 2 compared to 60.5% for PUPPS 1. This may be accounted in part by the proportion of PUPPS 2 surveyors who had also participated in PUPPS 1, or that the surveyors who volunteered to participate may have had a greater knowledge base because pressure ulcers were their area of clinical interest. It is also possible that the increased number of health services with a pressure ulcer prevention and management program in place by the time PUPPS 2 occurred resulted in increased clinician knowledge. Only 43.8% of health services in PUPPS 1 had such a program, a figure that has increased to 68.2% in

PUPPS 2 or to 74.7% for PUPPS CG. Alternatively, the greater number of core team providing the education sessions may have resulted in slight variability in the education and testing process and affected the results accordingly. The most likely scenario is that the apparent increase in clinician knowledge seen from PUPPS 1 to PUPPS 2 was due to a combination of the above factors.

PUPPS 2 surveyor feedback on the education program indicated that staff appreciated changes to the program resulting from PUPPS 1 feedback. The addition of a short session on basic pressure ulcer prevention and management strategies was particularly valued. In addition, surveyors enjoyed opportunities to discuss evidence based best practice, especially in regard to challenging myths that exist in relation to pressure ulcers and felt better equipped to return to their clinical areas to act as clinical champions. Some reflected that though they thought their knowledge was current they were pleased to have the opportunity to update their knowledge.

Patient/carer education

Reviews of patient's experiences of living with a pressure ulcer have been undertaken. It was found that 'pressure ulcers had a profound impact upon the subjects' lives' across the emotional, physical and practical spectrum⁶⁷. These studies highlight patients' need for knowledge regarding their pressure ulcer and a feeling of being excluded from discussions around their care and concerns around staff attitudes to patients who developed pressure ulcers^{24,80}.

Both patients and staff have an active role to play in pressure ulcer prevention. Patients should feel part of the 'team' when plans for preventing and managing their pressure ulcers are developed⁷⁶. This can be achieved by enabling patients to report any sore or tender areas to clinical staff so that action can be taken prior to permanent tissue damage occurring. Anecdotal feedback suggests that many patients, when asked why they have not done this, will report 'the staff were too busy' or 'I did not want to bother anyone'. Failure to report a pressure ulcer in its

earliest stage can result in much greater inconvenience in the long term for both patients and the clinical team. It is also important to ensure that patients do not feel that they caused their pressure ulcer as many have reported they do²⁴.

The value of educating patients, families and carers and including them in the development of pressure ulcer prevention and management plans is well-documented^{53,76,77,81}. This is critical to patients, families and carers being more involved and responsible for their own care and ensures greater collaboration between clinicians and patients in understanding and adhering to the plan of care. Successful patient education motivates patients to take responsibility for their own health within the limits of their own ability and aims to change their behaviour in a positive way⁸¹.

Creating an environment where personal accountability for maintenance of one's health is desired requires that specific consumer-focussed information is made available to allow participants to make informed choices. Approximately 25% of health services stated they provided their patients with some type of education regarding pressure ulcer prevention on admission (Table 16). This is a significant improvement from PUPPS 1 (4.2%). Whilst this has not met VOC expectations post PUPPS 1, it may be that many health services preferred to wait for patient education brochures being developed by VOC to be released. These publications, in eleven alternate languages, have been available on VOC website since December 2004^{17,18}. Shared responsibility for the prevention and management of pressure ulcers between the health service, all members of the clinical team and the patient creates the best opportunity for a comprehensive and effective approach.

Sustainability

The key message of PUPPS 2 is that, while there has been across the board improvement in pressure ulcer prevention, there is a need to further "implement, focus and sustain" pressure ulcer prevention and treatment strategies.

The recommendations developed for PUPPS 1 still stand as a strong framework to efficiently and effectively prevent and manage pressure ulcers. Health services should take comprehensive and systematic action to reduce the prevalence and incidence of pressure ulcers. A small number of health services had long term pressure ulcer prevention programs in place and their lower prevalence identified through PUPPS 2 justifies the long-term commitment. The majority of health services show evidence of an intention to change. The individual results identified for PUPPS 2 give health services an opportunity to focus their resources on the areas of greatest need in their organisation. This may equate to health services targeting the 'big 2' medical specialities (medical and rehabilitation) or the 'big 2' anatomical locations (sacrum and heel) or a more specific combination of both such as sacral pressure ulcers in the medical unit or heel ulcers in the orthopaedic unit. Changes required to target these areas could be the inclusion of a 'heel check' as part of 4 hourly observations, or targeting allied health staff to document the condition of a patient's heels and sacrum each time they are reviewed. Piloting targeted resources, sharing quick wins (such as a decreased incidence or prevalence) and communicating the change and implementation experience with the larger organisation should assist with planning whole of organisation implementation strategies.

It is important to remember to identify with what staff value and communicate results related to this. For example, clinical staff value positive improvements in patient outcomes, so showing them audits of compliance for completing and documenting risk assessment processes may make them less likely to reiterate concerns about paperwork taking them away from the bedside if it can be demonstrated that their efforts have resulted in changes in pressure ulcer development. Managers with financial accountability may find a reported reduction in pressure ulcer prevalence linked to increased cost due to the hire of specialised pressure reduction devices more balanced

if they are also shown any associated reduced length of stay and a reduction in severity of pressure ulcers with subsequent reduction in the use of wound dressing products.

Another targeted opportunity for improvement is risk assessment. The benefits of undertaking a risk assessment on admission have been previously discussed. Health services may benefit from starting small with one speciality or ward that is keen to implement the changes. Again, sharing the small wins in a pilot such as this will identify the successful elements of the implementation and highlight any barriers to change that need to be addressed for an organisational rollout. Alternatively, health services may look to where they will get the best value for money. Organisations may decide to implement the key recommendations across the general medical specialities, where the greatest numbers of patients develop pressure ulcers.

If an improvement, and subsequent saving in patient days and costs, can be demonstrated in a small area through the use of focussed and sustained change, then it should be easier to expand the change program to other areas within the health service. PUPPS 1 and PUPPS 2 have provided health services with prevalence data; health services now need be collecting their own incidence data to identify local specific causative factors. An example of this is a health service that identified their fractured neck of femur (#NOF) patients as being at particular risk for developing pressure ulcers. The #NOF clinical pathway was launched with a requirement to hire an alternating pressure reduction mattress as soon as a diagnosis was made. This small change in practice almost halved the number of patients that developed an ulcer and reduced average LOS from 24 to 15 days. Based on the reduced LOS only, a saving of \$20,000 was made after the cost of hiring the mattresses was taken into account⁶⁰. This is an excellent example of what can be achieved through the focus of resources on a targeted at risk population.

In the interest of providing workable solutions for health services, it may be that a decision is made to risk assess those patients who have been previously identified at risk, perhaps through an admission screening tool or discharge risk assessment, and linking this to the implementation of a proactive prevention plan.

Another simple strategy is to engage the patient, their family and carers into acting in their own interest by providing them with an information brochure outlining what a pressure ulcer is, simple strategies they can undertake to minimise their risk and the importance of letting clinical staff know if they have any sore areas.

Pressure ulcers are an area of clinical risk and strategies for managing risk should include a reporting, communication and feedback loop, and should occur both formally and informally. It is important at both health service and state-wide level that pressure ulcer prevalence continue to be collected, and results are communicated with all stakeholders (patients, carers, clinical staff, managers, government). It has been demonstrated that this process of monitoring and providing feedback can result in a decrease in prevalence and an increase in the use of preventative measures⁷⁹.

The value of participation

PUPPS 2 has provided a comprehensive baseline data set which will assist health services to plan quality improvement activities to address the problem of pressure ulcers, measure progress towards an agreed goal and be used as a benchmark for future data. It has also continued to raise awareness of the problem and facilitated a broad education program across the state. Data from PUPPS 2 provides health services with the evidence they need to continue with or to develop pressure ulcer prevention and management strategies to support the key recommendations of PUPPS 1 and 2. Positive action emanating from participation alone has also been noted in other studies^{82,83}.

As a result of the experience of PUPPS, some health services that also provide aged care services have undertaken prevalence surveys in these units based on the PUPPS methodology. Staff have taken their PUPPS experience back to their own work areas and used this increased knowledge to drive strategies for preventing and managing pressure ulcers on a broader scale.

Many health services have made comprehensive advances towards improving their pressure ulcer prevalence by implementing the key recommendations of PUPPS 1, some in addition to their existing prevention programs. Sustaining these strategies will continue the improvement^{60,79,84,85}.



PUPPS 2

Now in its second year of use, the PUPPS dog mascot was key to raising staff and patient awareness of the project and assisted with facilitating introductions and communicating processes.

07

Limitations of the study

The limitations of PUPPS 2 remain similar to those of PUPPS 1. As previously noted, interrater reliability testing was limited to theoretical assessment as it was deemed logistically impractical and costly to have all surveyors clinically assessed.

The risk to data collection presented by this limitation was reduced by several factors. The protocols ensured the presence of a member of the Core Team of pressure ulcer experts on survey day, which supported clinical decisions regarding staging, particularly if there were 5 or more pressure ulcers found on one patient. Surveyors also repositioned patients with reactive hyperaemia off the affected area and re-assessed the area 30 minutes later for signs of residual non-blanchable erythema.

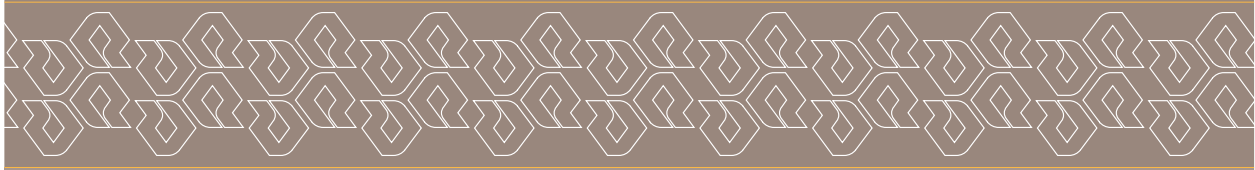
PUPPS 2 used 3 additional educators to roll out the education program. The educators delivered all sessions for the Education Day including the survey protocols and guidelines session, which in PUPPS 1 had been delivered at all sites by the

PUPPS project manager. These factors may have altered the emphasis placed on different areas of the education sessions and had the potential to impact on interrater reliability. However, the influence of this factor is not immediately apparent in the outcome of the interrater reliability assessment.

Limitations to staging within the AWMA definitions:

- All blisters were staged as Stage 2 irrespective of whether tissue within or surrounding the blister showed evidence of necrosis;
- In the presence of eschar (black, dry, necrotic tissue) the pressure ulcer was staged as a Stage 4 pressure ulcer as opposed to being defined as unstageable⁸⁶.

Limitations of the study



08

Conclusion

Conclusion

Victorian public hospitals have reduced the prevalence of pressure ulcers in their acute and subacute facilities. The 21.5% decrease in prevalence from 26.5% to 20.8% represents a significant improvement. However, pressure ulcers are a largely preventable event and much work is still to be done in Victorian health services to reduce this risk.

One in five patients have a pressure ulcer at some point in their acute or subacute admission and two out of three develop these ulcers during that admission. Pressure ulcers were identified in 20 paediatric patients. Pressure ulcer development adversely affects the quality of life, morbidity and mortality of patients. The associated increased length of stay, and financial costs related to managing pressure ulcers, are a considerable burden not only for inpatient services but also for outpatient and community based health care services.

Decreases in pressure ulcer prevalence are possible through the implementation of comprehensive programs that incorporate: evidence based clinical guidelines, risk assessment, multi or interdisciplinary approach, organisational risk management processes, and education and information sharing for patients, carers and staff^{51,53,77,79}. On the whole, health services appear to have improved their organisational planning and commenced a multifaceted approach, but few have a comprehensive program in place incorporating all of the above factors.

The development of pressure ulcer policies and adoption of clinical guidelines alone does not lead to improvement in the clinical setting. This gap between policy and practice needs to be targeted with specific improvement planning, active surveillance and regular feedback. Practical strategies driven and supported by executive management and clinical leaders are required to facilitate implementation, awareness and daily use of policies and guidelines. An effective way of doing this is to focus on an area of greatest need in order to realise small successes that lead to greater organisational gains. Acquisition and allocation of resources should be driven by patient need and the risk status of individual or clustered patient populations. Education should be inclusive of all staff, and be embedded into all hospital orientation programs, annual competency programs, and a constant feature within in-service education programs. Clinical improvements and ongoing management can be facilitated through the appointment of wound care consultants, tissue viability nurses or staff from a range of disciplines trained specifically in pressure ulcer prevention and management.

Barriers to implementation should be identified and action taken to manage competing clinical priorities, negative staff attitudes and limited resources.

A systematic approach can achieve sustained improvement.

Early detection and appropriate intervention will lead to a decrease in pressure ulcer development. Early detection can be aided by increased use of a risk assessment tool to identify a patient's status on admission and when the risk status of the patient alters. Immobility remains the strongest predisposing factor for pressure ulcer development in PUPPS 2. Individual preventative plans, patient, carer and staff education should be focused on reinforcing the critical importance of frequent position changes and maximising mobility in preventing pressure ulcers. Preventative plans should be developed using multidisciplinary expertise and, as well as scheduling repositioning and mobilisation, aim to maintain skin integrity with regular skin assessment and hygiene, optimise nutritional status and reduce shear and friction by appropriate use of support surfaces and other pressure relieving devices.

Commitment to an ongoing mattress replacement program and provision of access to more specialised pressure reduction equipment for patients at higher risk is required to meet patient needs. An increased focus on appropriate and regular documentation is also recommended to record risk and skin assessments, communicate plans and track management and progress of care and meet reporting and audit requirements.

Pressure ulcer prevalence and incidence should be collected as part of all health services' minimum data set. Regular reporting on pressure ulcer data should be maintained at a state-wide level. Main-streaming of an annual prevalence survey utilising the PUPPS methodology is recommended to co-ordinate and encourage state-wide active surveillance, track improvement in prevalence and progress on the implementation of recommended strategies.

PUPPS 2 has added to a comprehensive baseline data set provided by PUPPS 1 and has tracked improvement in prevalence and organisational approaches to preventing and managing pressure ulcers. These data assist health services to build on sound information and plan focused quality activities aimed at reducing the problem of pressure ulcers. The findings of this audit indicate there is still a need for a coordinated state and organisation-wide commitment to improve the prevention and management of pressure ulcers. The key message, derived from both PUPPS 1 and PUPPS 2, is the need to develop evidence-based, targeted strategies and to "implement, focus and sustain".

09

Recommendations

Recommendations

In the VQC State-wide PUPPS 1 Report – 2003, VQC developed eight recommendations aimed at improving the prevention and management of pressure ulcers. These recommendations remain relevant and useful for pressure ulcer prevention and management in light of the findings of PUPPS 2¹³.

VQC recommend an additional three initiatives, summarised in Table 18, which are based on the PUPPS 2 results, current best practice and available literature on successful quality improvement strategies in this area.

Table 18. Summary of key recommendations PUPPS 2

Summary of key recommendations for health services:

Implement a comprehensive pressure ulcer management program with risk assessment, individual prevention plans, patient, carer and staff education, supported by organisational policies based on best practice clinical guidelines.

Focus improvement strategies and resources on the 2 areas of greatest need as indicated in individual organisational PUPPS 2 reports and the State-wide PUPPS 2 Report-2004.

Sustain improvement in pressure ulcer prevention and management through clinical risk reporting, regular review of data and outcomes, evaluation of the program and feedback to all stakeholders.

IMPLEMENT

Health service organisational elements

Health services should have a comprehensive and multifaceted program of pressure ulcer prevention and management. Zero tolerance for pressure ulcer development is recommended as an organisational aim.

Organisation-wide policies founded on best practice clinical guidelines such as the AWMA guidelines² should be the starting point for the program. Policies should be developed or reviewed with input from all disciplines involved in pressure ulcer prevention and management and incorporate consumer collaboration⁸⁷ and associated reporting. To encourage staff to embrace these policies in practice, the policies need to articulate the program aims, encompassing the planned change or improvement in patient outcome aligned to the values of the staff undertaking them. The program should aspire to pro-actively implement prevention strategies rather than to reactively manage pressure ulcers that develop. Care should be taken to ensure the program is not initiated in isolation but incorporated into other clinical improvement programs to ensure sustainability.

Leadership for the pressure ulcer prevention program is required, including executive support and a specific role in the form of a staff member qualified in wound management with knowledge and skills in pressure ulcer prevention and management. This role should incorporate strategic planning for the program, education, management of existing pressure ulcers and reporting of pressure ulcer data. The position could be filled from a number of health disciplines (allied health and nursing) and in the case of rural facilities, potentially shared over a number of sites or geographical areas to assist with recruitment.

Health services should have in place an ongoing commitment to a mattress replacement program. The DHS Mattress Replacement Program has given health services considerable assistance in this area with the recent funding of static pressure reduction foam mattresses. Health services should upgrade the remaining standard beds and trolleys with static pressure reduction foam mattresses and make arrangements for access to more specialised equipment such as alternating mattresses for high risk patients to be available when required.

Working with patients

The patient oriented component of the program should contain a risk assessment element to identify patients at risk of developing a pressure ulcer^{37,71}. This risk assessment should form the basis for an individual patient prevention plan. Health services need to ensure each individual risk assessment outcome and intervention plan correlates to the implementation of evidence based recommendations for preventative measures³⁷.

Consumer-focused information on pressure ulcer prevention and management should be available for all patients and carers prior to, on or during their admission. This information should form part of patient and carer education which allows them to participate in planning their own care. VQC has developed two pressure ulcer prevention patient information publications for organisations to integrate into their patients information. These are available in 11 languages and can be downloaded at www.health.vic.gov.au/qualitycouncil.

Staff responsibilities

All direct care and clinical staff (allied health, medical and nursing) should have access to a basic pressure ulcer education program. Education on the organisation's pressure ulcer prevention, management and reporting should be incorporated into staff orientation programs and be part of an annual competency program for clinical staff. All clinical staff should take responsibility for the prevention and detection of pressure ulcers.

FOCUS

Health services should identify their two areas of greatest need using the VQC State-wide PUPPS 2 Report – 2004, their individual health service reports and internally reported incidence data. The areas could be a particular unit, a medical specialty, patients with a particular condition or of a certain age group. Within these groups specific anatomical areas of risk should be targeted, such as the sacrum and/or heels. Strategic planning should then be undertaken for these priority areas to resource implementation of recommendations and achieve specific improvement targets. The experience and lessons learned from these pilot areas can then be used to plan organisation-wide rollout of prevention and management strategies.

Focused action towards improving pressure ulcer prevention and management is expected in all health services. The expectation is that within 12 months each health service should be able to demonstrate a 50% reduction in prevalence in their two areas of highest need. This should then be reflected in a similar state-wide reduction.

Change and implementation, particularly in healthcare, requires a step-wise approach which incorporates both people and business dimensions. Carefully phased planning towards a well-defined and agreed goal, with input from all stakeholders is essential to achieve sustainability. 'Quality programs are iterative and require constant development by the organisation to meet changing internal and external contexts, expectations and stakeholder needs'⁸⁸.

Health services may find it useful to use the sample action plans at the end of this section to assist in the formulation of their own strategies. VQC have included sample action plans for both organisation-wide and local unit level. Smaller facilities may find a combination of these strategies suitable.

SUSTAIN

Health services should have a program of active pressure ulcer surveillance. This should be achieved through regular clinical risk reporting of a minimum data set and involve prevalence, incidence and documentation audit as well as clinical coding. A multidisciplinary committee responsible for clinical risk management should support and drive the activities. Organisation-wide data on pressure ulcers should be a component of an organisation's quality minimum data set.

Regular written and verbal feedback of activities, results and improvements should be communicated to staff at all levels of the organisation, patients and other stakeholders. Feedback should incorporate combinations of process and outcome data such as compliance with use of a risk assessment linked to a reduction in pressure ulcer incidence.

Annual state-wide prevalence surveys, utilising the PUPPS methodology, should be mainstreamed to track the progress of implementation and the influence of these initiatives on reducing pressure ulcer prevalence.

Pressure ulcer prevalence should be identified at a state-wide level in aged care, residential and community facilities.

Sample action plan

Sample action plan to implement PUPPS 2 recommendations

The sample action plan can be used as a checklist to plan the implementation or review of the PUPPS 2 recommendations in your organisation. Quality improvement strategies should be planned with a targeted aim and a timely and agreed outcome. Implementation progress should be tracked through regular review of project Key Performance Indicators. Consultation and regular communication with all stakeholders prior to, during and after the implementation is critical to achieving improvement. Communication should include information sharing on plans, activities, lessons learned and successes.

Recommendation	Organisation level	Ward/Unit level
IMPLEMENT		
A. Health service elements		
Leadership	<ul style="list-style-type: none"> Allocate executive sponsor to pressure ulcer program Recruit wound management staff or provide additional training for existing staff in wound management 	<ul style="list-style-type: none"> Allocate ward/unit pressure ulcer portfolio or project leader
Clinical guidelines	<ul style="list-style-type: none"> Identify appropriate clinical guidelines (e.g. AWMA www.awma.com.au) endorse and distribute 	<ul style="list-style-type: none"> Provide copy of 'pocket guide' AWMA guidelines to all direct care staff Discuss guidelines with all staff Integrate guidelines into pathways and protocols
Policy	<ul style="list-style-type: none"> Develop or review existing pressure ulcer policy with multidisciplinary input with the aim of improving patient outcomes by reducing pressure ulcers Support the policy implementation via the appropriate committee 	<ul style="list-style-type: none"> Review pressure ulcer policy and discuss local application with staff
Mattress replacement program	<ul style="list-style-type: none"> Develop or review mattress replacement program ensuring timely auditing and replacement 	<ul style="list-style-type: none"> Monitor mattress replacement program locally with annual audit (download sample audit tool from www.hpv.org.au) Discuss with all staff the signs of mattress wear or damage
Reporting	<ul style="list-style-type: none"> Set up regular incidence and incident monitoring and reporting to quality committee and Board as part of a minimum dataset 	<ul style="list-style-type: none"> Educate, train and encourage staff on identification and reporting
B. Working with patients		
Risk assessment tool	<ul style="list-style-type: none"> Via the committee identify relevant risk assessment tool, develop patient pressure ulcer prevention plan and adapt patient education to include pressure ulcer information 	<ul style="list-style-type: none"> Pilot risk assessment tool, prevention plan and patient information (download patient information from www.health.vic.gov.au/qualitycouncil) Review use of tool, plan and information, change as required and put into general practice
Prevention plans		
Patient information		
C. Staff responsibilities		
Pressure ulcer education	<ul style="list-style-type: none"> Include education on pressure ulcers and clinical risk reporting as part of new staff orientation program and annual competency for all clinical staff 	<ul style="list-style-type: none"> Ensure all staff attend pressure ulcer education annually Provide updates on current practice at ward/unit meetings and articles of interest for all staff to read

Recommendation	Organisation level	Ward/Unit level
FOCUS		
Identify target areas	<ul style="list-style-type: none"> Identify 2 target areas from PUPPS Reports (State-wide and Individual) and define goal and timeframe (e.g. reduce prevalence by 50% in medical and orthopaedic wards within 3 months) 	<ul style="list-style-type: none"> Create a sense of the 'need to change' by sharing information from PUPPS Reports and local pressure ulcer data
Baseline information	<ul style="list-style-type: none"> Set Key Performance Indicators (KPI) for program and obtain baseline information on these (e.g. pressure ulcer incidence, coding, length of stay and wound dressing costs) 	<ul style="list-style-type: none"> Collect and discuss local baseline data with staff
Consult widely	<ul style="list-style-type: none"> Plan pilot program with input from all staff disciplines and incorporate consumer perspective 	<ul style="list-style-type: none"> Plan pilot program with input from all staff disciplines and a consumer representative
Implement program pilot/s	<ul style="list-style-type: none"> Support pilot program with launch by executive sponsor at organisation wide forum/meeting to explain aim, activities and anticipated outcomes 	<ul style="list-style-type: none"> Communicate aims, activities and anticipated outcomes to all staff via verbal and written information
Review program pilot/s	<ul style="list-style-type: none"> Review pilot, incorporate lessons learned, alter plan and rollout organisation-wide Share activities, successes and lessons learned with staff at all levels, patients and carers 	<ul style="list-style-type: none"> Encourage staff feedback and incorporate suggestions following review Share activities, successes and lessons learned with staff, patients and carers
Roll out across organisation	<ul style="list-style-type: none"> Support organisation-wide rollout with launch and regular updates on activities and outcomes 	<ul style="list-style-type: none"> Support other wards/units with information and resource sharing
SUSTAIN		
Multidisciplinary committee	<ul style="list-style-type: none"> Develop or review existing multidisciplinary committee responsible for clinical risk to include pressure ulcer program planning and outcome review 	<ul style="list-style-type: none"> Have a representative on the multidisciplinary committee
Pressure ulcer reporting	<ul style="list-style-type: none"> Continue a range of pressure ulcer data as part of a minimum dataset which is reported regularly 	<ul style="list-style-type: none"> Collect and discuss pressure ulcer data as part of regular clinical risk reporting
Regular feedback	<ul style="list-style-type: none"> Share information at meetings, through reports, newsletter and intranet updates up and down the organisation Contribute articles to professional journals on project activities, outcomes and lessons learned 	<ul style="list-style-type: none"> Share local and organisational data at ward/unit meetings and newsletters



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Appendix A

Appendix A Static Pressure Reduction Foam Mattress Technical Specifications

Technical specification for static pressure reduction foam mattresses were developed for the Department of Human Services Mattress Replacement Program and are useful for health services to consider prior to any purchase of this type of equipment.

These specifications should be considered in the context of other relevant business, occupational health and safety and supply factors.

The key technical criteria included:

COVERS

Must:

- Waterproof
- Infection control features to prevent ingress of fluid such as waterfall or similar zips and welded seams (not sewn)
- Compatible with cleaning using hypochlorite and alcohol based solutions

Preferred:

- 2-way stretch to minimise shearing forces
- Moisture Vapour Transmission Rate (MVTR) between 250-500g/m²/24hrs
- Bed base surface more durable material than patient surface
- Company, product and foam particulars noted on the cover

FOAM

Must:

- All new materials
- Classification should be H (conventional resilience, heavy duty), HR (high resilience) and/or LR (low resilience)
- Density and hardness should be expressed together e.g. 35/130
- Density minimum 35kg/m³ for single layer and all layers of multilayered mattress
- Hardness single layer 130 Newtons and multilayer may increase for base layer and decrease for other layers
- Side walls of 50mm and of H or HR foam if multilayered
- Depth of 150mm for beds and 100mm for trolleys
- Support a load of 150kg

Preferred:

- Double or triple layered
- A profile or hinging system which adapts the mattress to a variety of bed positions e.g. head of the bed raised
- Castellations that assist with spread of pressure

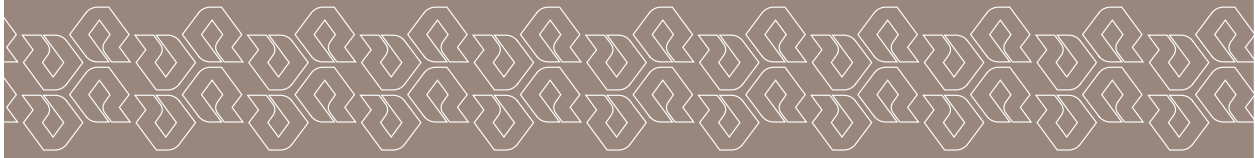
GENERAL

Must:

- Minimum 2 year warranty on cover and foam
- Fire retardant properties

Preferred:

- Cover and foam treated with antifungal and antibacterial compounds



Appendix B

Appendix B
National Pressure
Ulcer Advisory Panel
Staging System

Pressure ulcers are classified by the depth of tissue damage present

For the purpose of this survey staging of pressure ulcers will be that recommended for use by the Australian Wound Management Association, which is consistent with the recommendations of the National Pressure Ulcer Advisory Panel (NPUAP) U.S.A.

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 1



*Please note:
heel pressure
ulcer covered with
a film dressing*

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 2



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 3



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.

Stage 4



Limitations to Staging System

There are limitations to any staging system and the following points should be noted:

1. Reactive hyperaemia may easily be confused with a Stage 1 pressure ulcer. Reactive hyperaemia is a normal compensatory mechanism following an episode of reduced perfusion from localised pressure. Relief of this pressure results in a large and sudden increase in blood flow to the affected tissue.

NB For the purpose of this survey, patients who are identified as having an area of reactive hyperaemia will need to be repositioned off the affected area; the skin will then need to be re-inspected thirty minutes later for evidence of a Stage 1 pressure ulcer.

2. Identification of Stage 1 pressure ulcers may be difficult in individuals with darkly pigmented skin.
3. When necrotic tissue (eschar or slough) is present the true extent of tissue damage is masked. Accurate staging of the pressure ulcer is not possible until the necrotic tissue has sloughed or the wound has been debrided. Pressure ulcer staging systems should be used to document the maximum anatomic depth of tissue involved in the ulcer after necrotic tissue has been removed.

NB For the purpose of this study, the presence of necrotic tissue within or covering a pressure ulcer shall automatically indicate that the ulcer will be classified as Stage 4.

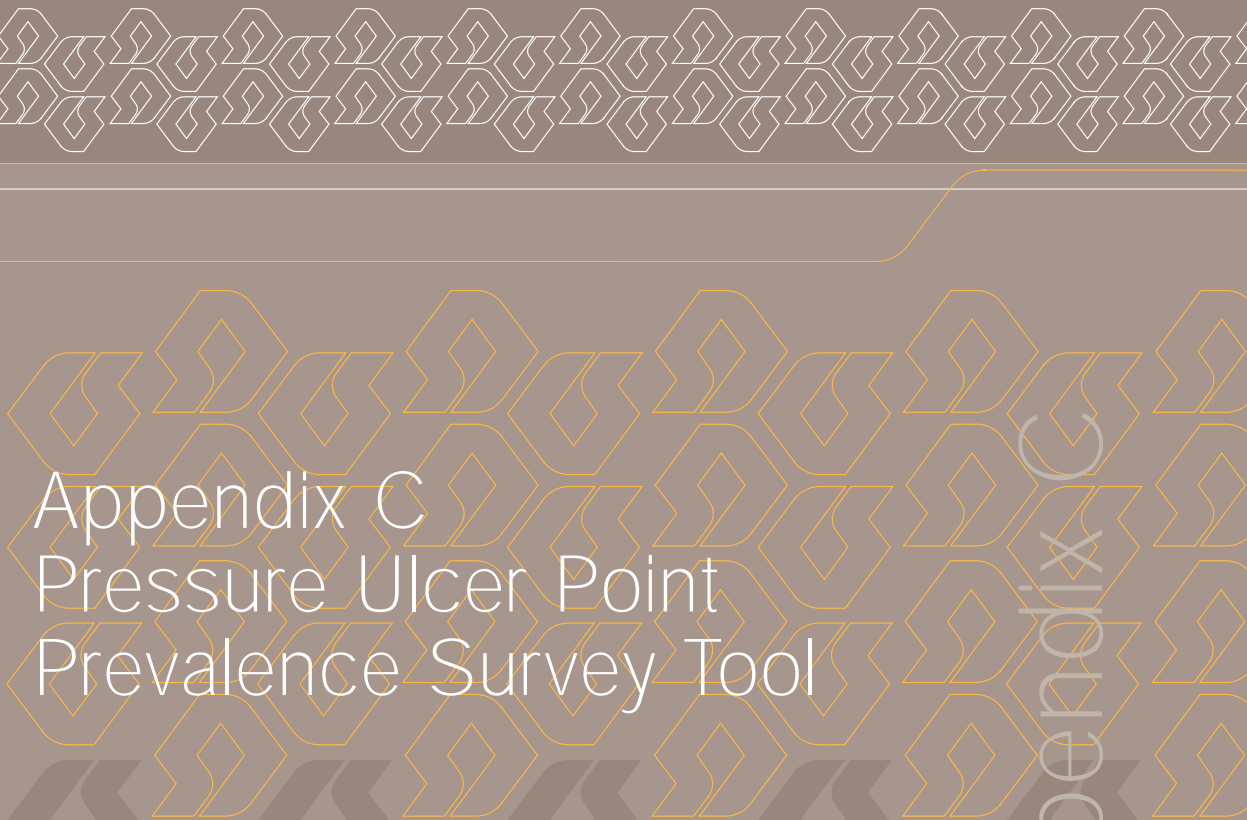
The presence of dense or deep slough over all or a portion of the ulcer shall also mean that the ulcer will be classified as Stage 4.

4. Staging of healing pressure ulcers (reverse staging) remains controversial (as the healing of a Stage 4 pressure ulcer is not equivalent to a Stage 2 pressure ulcer) but a system may need to be developed for use in management protocols.
5. The NPUAP recommend that the progress of a healing pressure ulcer be documented by objective parameters such as; size, depth, amount of necrotic tissue, amount of exudate and the presence of granulation and epithelial tissue.

6. The staging system depends on visual observation of tissue involvement only. Health care professionals involved in individual care should also note the following factors: location; dimensions or surface area of the wound bed, wound edges and surrounding skin; the amount of exudate; severity of pain; and other factors which may impede wound healing.

Reference: Australian Wound Management Association. Clinical Practice Guidelines for the Prediction and Prevention of Pressure Ulcers. West Leederville, Perth, Australia: Cambridge Publishing, 2001.

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Appendix C
Pressure Ulcer Point
Prevalence Survey Tool

Appendix C



PRESSURE ULCER POINT PREVALENCE SURVEY TOOL

Instructions: Please fill in the appropriate circle(s) using a dark pen e.g. ● DO NOT TICK THE CIRCLE.

1. Date of Survey: / /
2. Hospital Name:
3. Unit Record No:
4. Ward/Unit:
5. Date of Admission: / /
6. Age: years months days
7. Type of Admission: Elective Emergency/Non-elective
8. Gender: Male Female

9. Primary Medical Speciality (*choose 1 only*):

<input type="radio"/> Cardiovascular/Cardiology	<input type="radio"/> Haematology	<input type="radio"/> Rehabilitation
<input type="radio"/> Critical Care	<input type="radio"/> Infectious Diseases	<input type="radio"/> Renal
<input type="radio"/> Endocrinology	<input type="radio"/> Neurological	<input type="radio"/> Respiratory Medicine
<input type="radio"/> ENT	<input type="radio"/> Neurosurgical	<input type="radio"/> Spinal Injury
<input type="radio"/> Emergency Medicine	<input type="radio"/> Obstetric	<input type="radio"/> Stroke
<input type="radio"/> Gastroenterology	<input type="radio"/> Oncology	<input type="radio"/> Thoracic Surgery
<input type="radio"/> General Medicine	<input type="radio"/> Ophthalmology	<input type="radio"/> Transplant
<input type="radio"/> General Surgical	<input type="radio"/> Orthopaedic	<input type="radio"/> Urological
<input type="radio"/> Geriatric Medicine	<input type="radio"/> Palliative Care	<input type="radio"/> Vascular
<input type="radio"/> Gynaecology	<input type="radio"/> Plastic Surgery	
<input type="radio"/> Other (Please State)		

10.(a) Is there documented evidence of an assessment of the patient's level of risk for developing a pressure ulcer using a *risk assessment tool* between the first and third day of admission?

- Yes No If Yes complete Questions 10(b) and 10(c). If No go to Question 11.

10.(b) If a risk assessment score or category of risk has been identified, which assessment tool was used?

- Braden Norton Waterlow Other (Please State)

10.(c) If an initial risk assessment was completed state the category of risk documented.

- No risk Low Medium High Very High

11. Is the patient's principal diagnosis?

- Cancer Pressure Ulcer Drug or Alcohol disorder None of these

12. Does the patient have any of the following?

- Diabetes Chronic Renal Failure Acquired Brain Injury None of these

13. Select one category to indicate patient's smoking history:

- Current smoker Smoked in the last 10 years? Never smoked or >10 years ago?

14. Was skin inspection refused

15. Select refusal reason: Too ill Consent declined Other

COMPLETE PHYSICAL SKIN EXAMINATION AS PER GUIDELINES

16. Skin Colour: White Light Olive Dark Olive Black

17. Can the patient independently reposition himself or herself? Yes No

18. Are pressure reducing/relieving device(s) currently insitu? Yes No

If pressure reducing/relieving device(s) are present, please indicate TYPE of device(s) in use:

19. Comfort and/or Adjunct Devices
20. Cushions & Overlays STATIC DYNAMIC
21. Replacement Mattresses STATIC DYNAMIC
22. Specialty Beds

23. Is there evidence of a pressure ulcer on skin examination? Yes No

If you answered Yes to Question 23 please continue over the page...Otherwise, thank you for your assistance with this survey.

ONLY complete Questions 24 – 27 if you have identified that the patient has a pressure ulcer(s).

24. State SITE and STAGE of ALL pressure ulcers present on examination.

Fill in the appropriate circle(s) for the SITE AND Left or Right or Both where applicable i.e. Both Elbows

Fill in the circle for the appropriate STAGES 1, 2, 3 or 4

Site	Ulcer present				Stage			
	Ulcer present	Left	Right	Both	1	2	3	4
a. Occiput	<input type="radio"/>				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Chin	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Ear	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Nose	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Scapula	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Spinous Process	<input type="radio"/>				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Elbow	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Finger(s)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Finger(s)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. Sacrum / Coccyx	<input type="radio"/>				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j. Iliac Crest	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k. Ischium/Buttocks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
l. Greater Trochanter	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
m. Knee (medial & lateral condyle)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
n. Medial Malleolus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
o. Lateral Malleolus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
p. Leg (other)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
q. Heel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
r. Toe(s)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
r. Toe(s)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
s. Foot (other)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
t. Other (State site below)								
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

25. Total number of pressure ulcers present following a skin examination.

26. Were any of these pressure ulcers present on admission? (Check first 24 hours documentation)

Yes No If yes, how many pressure ulcers were present on admission

27. Is there documentation related to the progress or management of the pressure ulcer within the last 5 days?

Yes No

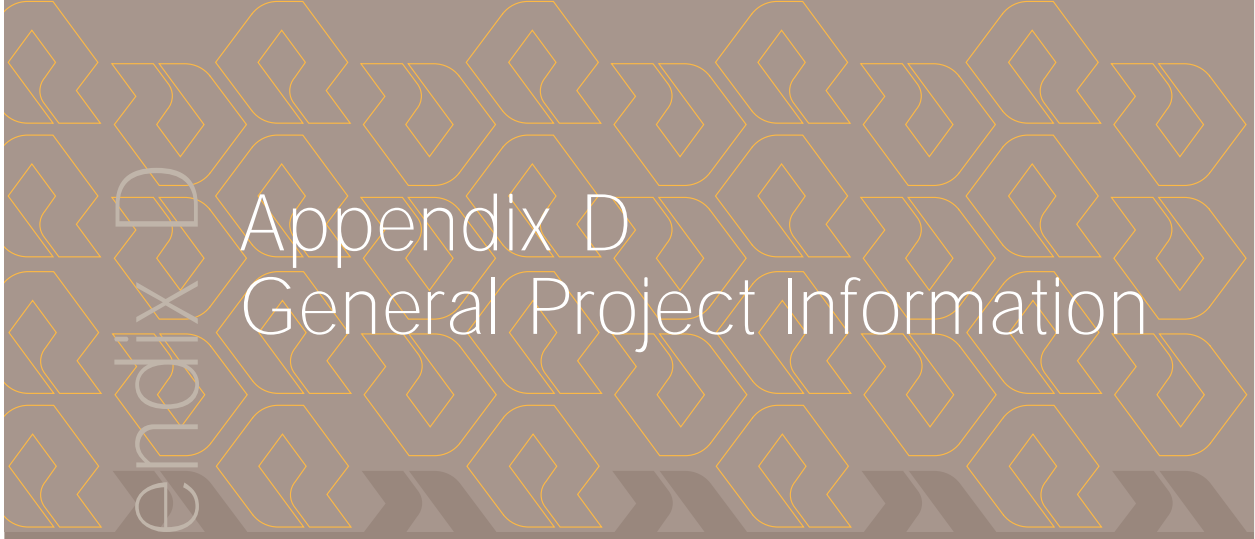
Thank you for your assistance with this survey.

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Appendix D

Appendix D
General Project Information



The Second Victorian State-wide Pressure Ulcer Point Prevalence Survey (PUPPS 2)

Background

The Victorian Quality Council (VQC) has invited metropolitan, rural and regional health services to take part in the second Pressure Ulcer Point Prevalence Survey (PUPPS 2) to take place over November & December 2004.

The project will provide data on the prevalence and severity of pressure ulcers in Victorian health services, allow comparison across Victorian hospitals in like settings and enable individual health services to better understand their own pressure ulcer management. It will track improvements in prevalence and pressure ulcer management for the state and for those health services who participated in the first PUPPS in 2003. In addition, data will be collected on the implementation of several of the recommendations suggested in the VQC State-wide PUPPS Report 2003¹.

Pressure ulcers are acknowledged as a significant health problem within Australian and international health care settings. The reduction of hospital-acquired pressure ulcers is a VQC priority area. Results from VQC PUPPS 2003 identified a mean prevalence of 26.5% (range 5.6% to 48.4%) in a population of 5,150 acute and subacute patients. Hospital acquired pressure ulcers accounted for 67.6% of ulcers identified. A total of 2,676 ulcers were identified on 1,367 patients. Other results identified ulcer severity, the use of pressure ulcer risk assessment tools, support surfaces, documentation and practices in pressure ulcer management.

In response to recommendations in the VQC State-wide PUPPS Report 2003, the Minister for Health announced funding of \$2million for a mattress replacement program for acute and subacute services of Victorian public hospitals, which is currently being tendered. Selected recommendations were also included in the Department of Human Services Policy & Funding Guidelines 2004-2005², specifically, the facilitation of PUPPS 2 where the guidelines state "...all health services will be expected to participate".

Definition

A "Pressure Ulcer" is defined as any lesion caused by unrelieved pressure resulting in damage of the skin and underlying tissue³.

Project Outline

The proposed survey group will include all acute and subacute adult and paediatric inpatients on the day of the point prevalence survey who verbally consent to a full body skin inspection for evidence of pressure ulcers, and a medical record audit for documentation on pressure ulcer management. Psychiatric, hospital in the home, day surgery and day procedure patients will be excluded.

The project will run over several weeks due to the number of participating health services.

The survey process occurs over two single days with one education day and one survey day. The survey for each individual health service will generally take place across all sites in that health service on a single day.

The surveyors will receive education on staging pressure ulcers and training in the use of the survey tool.

Health services will receive a state-wide report and an individual comparative data report.

On the survey day survey teams will examine the skin of all patients participating in the survey, document any evidence of pressure ulcers, then audit the medical records for documentation of risk factors, risk assessment and pressure ulcer management.

Ethical Considerations

Patient participation in the survey is entirely voluntary and verbal consent will be sought from each patient. Participation will not interfere in any way with the patient's current treatment.

Skin inspection is a non-invasive clinical observation, and the proposed approach will involve hospital staff performing any patient handling involved in the inspection. On the survey day survey teams will check



with the shift co-ordinator for patients who are to be excluded according to the survey criteria or due to consent not given.

Patient information sheets will be distributed to all patients by hospital project staff in the days prior to the point prevalence survey being undertaken. Hospital staff involved in the survey will check with each patient that they received and understood the information sheet and consent to participate in the survey, prior to the skin inspection being undertaken.

Data generated by the survey will be kept under secure conditions and individual data will not be kept beyond an initial check for completeness at the hospital site.

How to be involved

Health service participation involves:

- Nominating an onsite co-ordinator to work with VQC project staff,
- Appropriate planning and preparation to ensure valid and reliable data collection, and
- Provision of staff to act as surveyors.

Each site co-ordinator will recruit hospital staff to act as surveyors and assist with other planning tasks. Most sites will need approximately 2 surveyors for every 40 patient beds.

VQC regards this survey as an important contribution to improving safety and quality and will fund health services to assist in backfilling staff involved in the project. VQC will provide training and support during the data collection period.

VQC Project Support

Kerry May (VQC PUPPS 2 project officer) will be responsible for liaison with health services, preparation and dissemination of information for planning and data collection as well as ongoing evaluation and management of the project.

Further information can be obtained from your site co-ordinator.

References:

1 Victorian Quality Council. *Victorian Quality Council State-wide PUPPS Report - 2003*: www.health.vic.gov.au/qualitycouncil

2 Victorian Government Department of Human Services. *Victoria - Public hospitals and mental health services: Policy and funding guidelines 2004-05*, Melbourne, Victoria.

3 Australian Wound Management Association. *Clinical Practice Guidelines for the Prediction and Prevention of Pressure Ulcers*. West Leederville, Perth, Australia: Cambridge Publishing, 2001.



Appendix E
Patient Information (English)

Appendix E



We invite you to participate in a survey of pressure ulcers that is to be conducted at this hospital.

If you decide to participate it is important that you understand the reason for the survey.

What is the reason for the survey?

Pressure ulcers (also known as pressure sores or bed sores) can occur in the elderly, immobile and acute or chronically ill person. Unrelieved pressure is the main cause.

The Victorian Quality Council is a group that works on behalf of the Victorian Minister for Health to help hospitals improve quality and safety. The Victorian Quality Council and Victorian public hospitals are working together to find out how many patients have pressure ulcers in order to help us reduce the problem.

What will the survey involve?

The survey will take place while you are in hospital and should take approximately 5 minutes of your time. All patients who are inpatients of the hospital on the day of the survey will be asked to take part.

On the day of the survey two hospital staff will check to see if you have received and understood this information sheet. Then they will ask if you have any questions about the survey and if you agree to participate.

If you do agree to participate in the survey:

1. One staff member will ask you if you have any area of discomfort where you have been sitting or lying, or when you move about in bed. Then the staff member will ask your permission to inspect your skin to see if you have any redness or breaks in the skin.
2. The second staff member will make notes of the inspection on the survey form.

3. The staff member will then ask if they may check your medical record to see if there is any documentation regarding pressure ulcers. Your medical record will not be removed from the ward.

Is there any risk involved?

Participation in this study will not in any way interfere with your current treatment.

Your participation is entirely voluntary and you are free to change your mind about participating at any time.

Your privacy and dignity are our first priority.

No survey information that can identify you will be kept.

Thank you for your time and consideration of this request.

Further information

For queries about this project ask your nurse to phone the Site Co-ordinator.



PUPPS 2



Appendix F
Survey Interrater
Reliability Tool

Appendix F



SURVEY INTERRATER RELIABILITY TOOL

Date: _____ Hospital: _____

Pressure ulcers are classified by the depth of the tissue damage present. For the purpose of this survey the staging of pressure ulcers will be consistent with the recommendations of the Australian Wound Management Association and the National Pressure Ulcer Advisory Panel, USA¹.

References:

1. Australian Wound Management Association. Clinical Practice Guidelines for the Prediction and Prevention of Pressure Ulcers. West Leederville, Perth, Australia: Cambridge Publishing, 2001.
2. Reid J & Morison M. Towards a Consensus: classification of pressure sores. J Wound Care 1994;3 (3):157-160.

Instructions: Please fill in the appropriate circle using a dark pen e.g. ● DO NOT TICK THE CIRCLE.

Question	Statement	Answer			
		A	B	C	D
Q1	Which statement best describes a Stage 1 pressure ulcer?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	A Inflammation with local heat, erythema, oedema and possible induration - more than 15mm diameter.				
	B Discolouration intact skin (light pressure applied to the site does not alter the discolouration).				
	C 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 or purple hues.				
	D Discolouration of skin, with persistent erythema after pressure is released. A blister may be forming.				
Q2	Which statement best describes a Stage 2 pressure ulcer?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	A Partial thickness loss of skin layers involving epidermis and possibly penetrating into but not through the dermis.				
	B Partial thickness skin loss or damage involving epidermis and/or dermis. The ulcer presents clinically as a blister, abrasion, shallow ulcer, without undermining of adjacent tissue. Any of these may have underlying blue/purple/black discolouration or induration.				
	C Epidermis and/or dermis ulcerated with no subcutaneous fat observed.				
	D Partial thickness skin loss involving epidermis and/or dermis. The ulcer is superficial and presents clinically as an abrasion, blister or shallow crater.				

Question	Statement	Answer										
		A	B	C	D							
Q3	Which statement best describes a Stage 3 pressure ulcer? A Full thickness tissue loss extending through dermis to involve subcutaneous tissue. Presents as a shallow crater unless covered by eschar. B Fat obliterated; limited by deep fascia; undermining of the skin. C 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. D Full thickness ulceration through to the junction with subcutaneous tissue.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>							
Q4	Which statement best describes a Stage 4 pressure ulcer? A Full thickness skin loss with extensive destruction, tissue necrosis or damage to muscle, or bone, or supporting structures (for example, tendon or joint capsule). B The lesion extends into the subcutaneous fat with lateral extension of the sore over the deep fascia. C Penetration of the skin (epidermis and dermis) with a clearly visible cavity (with or without necrotic tissue) more than 5mm at surface. D A lesion that extends into the subcutaneous tissue and may penetrate into the fascia and muscle.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>							
Q5	Identify the stage of the ulcer on each slide shown											
	Stages 1-4	1	2	3	4	Stages 1-4	1	2	3	4		
	Slide	1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Slide	9	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
		2	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		10	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
		3	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		11	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
		4	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		12	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
		5	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		13	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
		6	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		14	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
		7	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		15	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
		8	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		16	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Appendix G Protocol & Guidelines

SURVEY PROTOCOL

NOTE: If at any time you are concerned about the welfare or current treatment of any patient who you have surveyed please contact your Site Co-ordinator.

During the survey please ensure the patient's privacy and dignity are maintained at all times.

ON ENTERING THE WARD/UNIT

1. The surveyors will approach the shift co-ordinator, introduce themselves and remind the shift co-ordinator of the survey. Staff should identify patients who may require assistance with manual handling (e.g. spinal patients). They should also identify patients who are leaving the ward for diagnostic or surgical procedures or who are to be discharged and endeavour to survey these patients as a priority.
2. List all the patient Unit Record Numbers against their respective bed number on the Worksheet. (Include a line for any closed or empty beds.)
3. The surveyors will then audit all patients medical records to complete the first section (Questions 1 to 13) of page 1 of the Survey Tool (data collection sheet).

APPROACHING THE PATIENT FOR SKIN INSPECTION

4. The surveyors may approach the patient, with or without the nurse (caregiver).
5. The surveyors will ask the patient if they have received and read a Patient Information Sheet regarding the PUPPS 2 survey.
6. The surveyors will explain or remind the patient of the purpose for the survey, answer any questions and proceed to obtain verbal permission for participation.
7. Once verbal consent has been obtained the surveyors may ask the patient:

"Do you have any areas of discomfort where you have been sitting or lying, or when you move about in bed (e.g. tailbone, heels, elbows)?"
8. The surveyor's will conduct an examination of the patient's skin paying particular attention to bony prominences. During this process please remove and replace any anti-embolic stockings, or other items of clothing to gain full visibility of the skin. Please do not disturb intact wound dressings until you have checked with the nurse caring for the patient to identify if the dressing is covering a pressure ulcer.
9. The surveyors will ensure that the patient is left in a comfortable position after the skin inspection. Please thank the patient for their participation in the survey.
10. The surveyors will record their findings on the Survey Tool (data collection sheet) provided.

NOTE: If the survey team is unable to stage an ulcer or if more than 5 ulcers are found on one patient they should contact the Site Co-ordinator.

11. The survey team will then review the medical records of all patients who have a pressure ulcer to complete the data entry on the Survey Tool (data collection sheet).

BEFORE LEAVING THE WARD

12. The surveyors will ensure that all data entry is complete prior to leaving the ward. They should notify the shift co-ordinator when they have completed the survey and thank them for their assistance.

FINAL REVIEW

13. At the end of the day each team will check their forms to ensure all data is present and compare the information to their notes on the Worksheet.

GUIDELINES FOR DATA ENTRY

1. Use a dark pen (blue or black) to fill in the survey forms, do not use felt-tip pens.
2. Completely fill in circles eg
Correct ●
Incorrect ○○
Please DO NOT tick the circles.
3. If you fill in a circle in error place a cross over the top of the incorrect circle and fill in the correct response. e.g. Male ~~○~~ Female ●
4. Where a number is required ensure all boxes are filled, one number per box. Commence filling number boxes from the right hand side. Use '0' if the number does not fill all the boxes.
5. If you fill in a number box in error place a cross over the top of the incorrect number and put the correct number to the right of the target box. e.g. ~~0~~ 3 04.
6. **Question 6.** "Age" Newborn to 42 days of age record in the 'days' boxes, from 42 days to 12 months record in the 'months' boxes, children over 12 months and adults record in the 'years' boxes. Only fill in one group of boxes, i.e. there is no need to fill in months and days on adults or children over 1 year.



7. **Question 7.** "Emergency / Non-elective" means any patient admitted via the Emergency Department or other non-elective means such as via outpatients or inter-hospital transfer.
8. **Question 9.** Choose one "Primary Medical Specialty" only. "Critical Care" includes: Adult & Neonatal Intensive Care, Level 2 Special Care Nurseries, Coronary Care and High Dependency Units. "Rehabilitation" means an active program of restorative rehabilitation.
9. **Question 11.** Choose 1 "principal diagnosis" only.
10. **Question 12.** "Chronic Renal Failure" also includes evidence of chronic renal impairment.
11. **Question 14 & 15.** Indicate if the patient refuses a skin inspection and also note the reason.
12. **Question 18.** "Insitu" means in place, under or around the patient to assist with pressure reduction or relief. For example, a pillow between the knees preventing skin-to-skin contact or under the lower limb to elevate a heel free of the mattress surface means that a device is "insitu".
13. **Question 19 to 22.** Please state which types of device(s) were insitu. Multiple entries are OK if more than one type of device is in use. Use the table below to assist with the device classification.
14. **Question 24 to 27.** Only proceed to these questions if a pressure ulcer(s) is identified during the skin inspection.
15. **Question 24.**
 - If an ulcer is present colour in the "ulcer present" circle and the corresponding side or "both" (if applicable e.g. both elbows).
 - Then colour in the "stage" circle that corresponds to the ulcer. Note the "number" of ulcers in the box to the right of the stage circle if there is more than one ulcer present.
 - If a patient has multiple ulcers on a single site (e.g. sacrum) fill in each stage observed with the number of that stage present. For example if there are 2 stage 2 pressure ulcers, write 2 in the box on the right of the stage 2 circle.
 - If the patient has bilateral ulcers but these are at different stages please make a note next to the correct stage box to signify which stage is for each side.
16. Check all survey forms to ensure data is complete before leaving the ward area.
17. Return completed survey forms with the Worksheet to your Site Co-ordinator.

Thank you for your very valuable time and assistance with this survey.

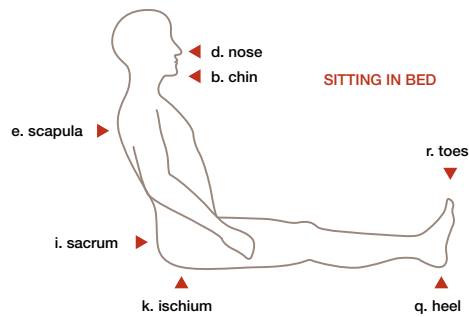
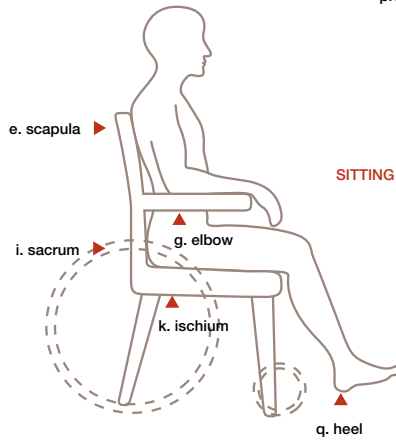
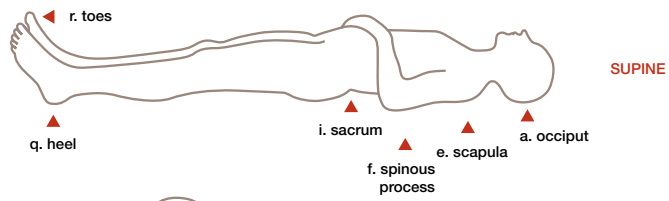
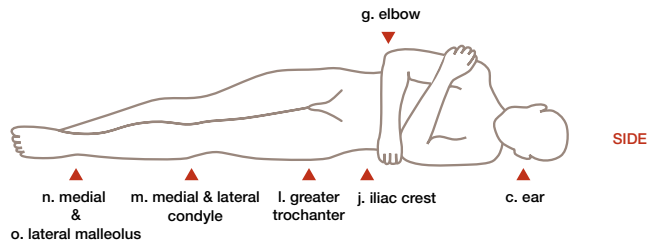
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Modified and used with permission by VOC 2004.

Pressure relieving/reducing devices	Examples
Comfort &/or adjunct	Sheepskin, (inc booties, heel or elbow protectors), pillows, Spenco fibre filled or dermal pads, foam wedges
Cushions & overlays - STATIC	Foam, eggshell foam, gel mats, static air cushion, static air overlays
Cushions & overlays - DYNAMIC	Alternating air cushion, alternating air overlays such as Alphaxcell
Replacement mattresses - STATIC	High specification foam, layered/cubed foam mattresses, static air replacement mattress
Replacement mattresses - DYNAMIC	Low air loss mattress such as Therakair, alternating air replacement mattress
Specialty beds	Low air loss beds, air fluidised beds such as Clinitron



Appendix H Pressure Points

Appendix H





Appendix I Site Contextual Information

Appendix I

The Victorian Quality Council (VQC) has invited metropolitan, rural and regional health services to take part in the second Pressure Ulcer Point Prevalence Survey (PUPPS 2) which is scheduled for November & December 2004. VQC and the Department of Human Services (DHS) regard this point prevalence study as an important contribution to improving safety and quality. This contextual survey will help provide valuable information for the state of Victoria, and your health service.

These contextual questions aim to:

1. Generate data for the VQC State-wide PUPPS 2 Report - 2004; and
2. Track improvements in pressure ulcer prevention and management since the VQC State-wide PUPPS Report 2003.

We would appreciate you completing and returning this form to VQC (via email, fax or mail - see back page for details) by Thursday 11 November 2004.

If you have any questions about the information requested, please don't hesitate to contact Kerry May or Veronica Strachan on 1300 135 427.



Health service: _____

Site: _____

Date this report completed: _____

The following questions are based around the recommendations in the VQC State-wide PUPPS Report 2003 which are stated below:

Key recommendation

Health services should take comprehensive and systematic action to reduce the prevalence and incidence of pressure ulcers.

Best practice clinical guidelines for the prediction and prevention of pressure ulcers should be used as the foundation framework from which local policies and strategies are developed.

A qualified wound management/tissue viability staff resource should be available to all health services to lead and manage pressure ulcer prevention and management programs.

Education for all direct care and clinical staff in pressure ulcer basics should be undertaken.

Written and verbal information on pressure ulcer prevention and management should be available for all patients and carers prior to, on or during their admission.

Risk assessment for skin integrity should be performed for all hospital admissions, updated as necessary for any change in health status or on a regular basis for longer-term patients and should lead to clinical intervention.

Basic hospital mattresses should be upgraded to pressure reduction foam as soon as practicable and an ongoing program of mattress replacement should be in place.

Clinical risk reporting on pressure ulcers should be regular and involve prevalence, incidence and documentation audit and clinical coding.

Key Recommendation: Comprehensive and systematic action to reduce prevalence and incidence

1. Is there an organisation wide strategy to reduce hospital acquired pressure ulcers?

Yes No

Comment: _____

2. Does your site have existing protocols and policies for the prevention and management of pressure ulcers?

Yes No

Comment: _____

3. Does your site have a Wound Management or Pressure Ulcer committee?

Yes No

Comment: _____

4. Is there an executive sponsor responsible for pressure ulcer prevention and management?

Yes No

Comment:

5. Are any of the following Allied Health disciplines actively involved in your pressure ulcer prevention and management strategy? (colour circle of all that apply)

Nutrition/Diabetes Occupational Therapy Physiotherapy Podiatry

Key Recommendation: Best practice clinical guidelines

6. Are your policies and strategic plan for preventing and managing pressure ulcers based on best practice clinical guidelines such as the Australian Wound Management Association Guidelines for the Prediction and Prevention of Pressure Ulcers?

Yes No

State which guidelines are used:

Key Recommendation: Qualified wound management/tissue viability staff resource

7. Does your site have specialist wound management staff with specific hours allocated to the provision of wound management education, prevention and management?

Yes No

Comment (include approximate hours allocated):

8. Have your specialist wound management staff undertaken additional training/education in wound management?

Yes No

Comment:

Key Recommendation: Education for all direct care and clinical staff

9. Does your site have a staff education programme on pressure ulcer prevention and/or management?

Yes No

Describe the format (e.g. web-based, lecture, workshop) and frequency of this programme:



10. Is the programme available for non-clinical staff such as personal service attendants and orderlies?

Yes No

Comment:

Key Recommendation: Information for patients and carers

11. Does your site provide patient/carer information on pressure ulcer prevention?

Yes No

What form does this take (e.g. written, video)?

Key Recommendation: Risk assessment for skin integrity

12. Does your site use a pressure ulcer risk assessment tool?

Yes No If yes, state which tool:

Braden Norton Waterlow

Other

13. Is this pressure ulcer risk assessment performed on admission?

Yes No

When is it repeated?

14. Does your site have any recommended interventions according to level of assessed risk? (e.g. for high risk order mattress X and perform 2/24 turning)

Yes No

Comment:

Key Recommendation: Replacement of basic hospital mattresses

15. Has your site undertaken any planning for the replacement of standard non-pressure reduction hospital mattresses?

Yes No

Comment:

Key Recommendation: Clinical risk reporting

16. Does your site collect data on pressure ulcers as part of your clinical risk management program? If yes, who is the data reported to? (i.e. hospital executive, board, units, all staff or other external organisations)

Yes No

Comment:

Influence and effectiveness of PUPPS 2003

17. What impact or influence have the key recommendations from the VQC State-wide PUPPS Report 2003 had on organisational strategies for the prevention and management of pressure ulcers at your site?

18. How has your organisation supported the implementation of the VQC State-wide PUPPS Report 2003 key recommendations?

19. Have there been any barriers to your site implementing the key recommendations of the VQC State-wide PUPPS Report 2003?

Yes No

Comment:

20. How was the information contained in the **VQC State-wide PUPPS Report 2003** disseminated to staff at your site? How widely was this information communicated? (e.g. Ward meetings, Management meetings, Executive meetings, Board meetings)



21. How was the information contained in the **VOC Individual Health Service PUPPS Report 2003** disseminated to staff at your site? How widely was this information communicated? (e.g. Ward meetings, Management meetings, Executive meetings, Board meetings)

Any other comments?

Thank you for your time and assistance.

Please return this survey via e-mail to vqc@dhs.vic.gov.au or fax to 1300 138 933.

