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# Executive Summary

## Executive Summary

The Pressure Ulcer Point Prevalence Survey (PUPPS) Report 2003 is a key initiative of the Victorian Quality Council (VQC). Conducting a state-wide pressure ulcer point prevalence survey is one component of a strategic approach to reducing the risk of harm and improving health care safety and quality in Victoria, including: Establishing a Safety and Quality Framework, Providing Improved Access to Better Data, Educating on Safety and Quality and Responding to Known Problems and Risks.

VQC was formed in 2001 as an expert, strategic, Ministerial advisory council whose primary role is to improve safety and quality in health care. The study and report were undertaken in response to VQC identifying pressure ulcers as an internationally recognised problem in clinical safety, which is largely preventable. A "pressure ulcer" is defined as any lesion caused by unrelieved pressure resulting in damage of the skin and underlying tissue <sup>1</sup>.

Growing concern regarding the prevalence and incidence of pressure ulcers in Australian healthcare facilities has been expressed by a number of national peak bodies <sup>1-3</sup>. Hospital acquired (iatrogenic) tissue injuries that result in pressure ulcers impact significantly on hospital length of stay <sup>4</sup>, the cost of care <sup>5</sup>, quality of life <sup>6</sup> and the morbidity and mortality of individuals affected <sup>7,8</sup>.

VQC's primary objective was to investigate and establish the prevalence of pressure ulcers in Victorian acute and subacute healthcare facilities. The mean prevalence of pressure ulcers identified was 26.5% (range 5.6% to 48.4%). Hospital acquired pressure ulcers accounted for 67.6% of ulcers identified. A total of 2,676 ulcers were identified on 1,367 patients with 56.9% of these ulcers involving tissue damage beyond the superficial layer of the skin (dermis).

Evidenced-based best practice indicates patients should be assessed for their level of risk of developing a pressure ulcer <sup>1</sup>, 40.9% of health services complied with this accepted practice. Pressure relieving equipment was used for 66.1% of patients with pressure ulcers.

The primary associative risk factor for developing pressure ulcers in the cohort studied was immobility.

The results indicate that the prevalence of pressure ulcers in these facilities is significant and higher than international studies with similar methodologies<sup>9-11</sup> or previously reported in earlier Victorian surveys<sup>12,13</sup> but are equivalent to data collected in a national survey in 2000<sup>14</sup>.

Secondary findings indicate diverse practices in pressure ulcer management exist in the facilities surveyed. This is accentuated in many instances by lack of organisational policy, access to wound care consultants, staff knowledge and appropriate pressure relieving devices.

The PUPPS process stimulated strong interest and awareness of the problem in the majority of facilities surveyed and has been the impetus for initiating immediate improvements in organisational processes in many hospitals to prevent and manage patients with pressure ulcers.

A number of recommendations are proposed by VQC, as a consequence of conducting this survey, for consideration by the Minister for Health. These include action in the areas of: pressure reducing equipment resources, wound management staff resources, education for staff and patients, risk assessment, monitoring and reporting. A number of these recommendations will be supported by inclusion in the Department of Human Services (DHS) Policy and Funding Guidelines for 2004 – 2005.

VQC has achieved its initial objective by quantifying the prevalence of pressure ulcers in Victorian acute and subacute healthcare facilities at 26.5%. Secondary aims such as identifying associated factors and organisational practices, have also been established. The prevalence ascertained is higher than previously identified but comparable to the national average. The findings of this study indicate the need for both a state-wide strategy, and for an individual health service organisation-wide approach to address this issue.



## Pressure Ulcers in Australia

The Victorian Quality Council (VQC) was formed in 2001 as an expert, strategic, Ministerial advisory council whose primary role is to improve safety and quality in health care. A key section of the VQC strategic plan for 2002-2005 addresses six internationally recognised problem areas in clinical safety and quality: medication error, hospital-acquired infection, falls, appropriateness of care, blood and blood product use and pressure ulcers <sup>15</sup>. VQC Working Groups were set up to address each of these known problems identified in the VQC strategic plan.

Pressure ulcers are largely preventable hospital acquired (iatrogenic) injuries of the skin and underlying tissues of fascia, muscle and bone. In the majority of cases they can be regarded as an adverse outcome of a healthcare admission <sup>16-19</sup>. Many national and international health care agencies acknowledge that pressure ulcers not only affect the health of the individual but also place a significant drain on already stretched health resources <sup>1,16,17,20-22</sup>.

Claims of medical negligence against individuals or organisations, who have failed to prevent the development of a pressure ulcer(s) have been common for some time in both the United States <sup>23,24</sup> and the United Kingdom <sup>25</sup>. Although this trend has not occurred to the same extent in Australia, one example of litigious action in favour of the complainant has been successfully brought at a cost of \$630,000 <sup>19</sup>.

Pressure ulcers are known to occur at unacceptable levels within Australian health care settings; a growing trend since the 1980's with the prevalence of pressure ulcers in tertiary Australian healthcare facilities ranging from 3.4 – 37% <sup>26</sup>. In a national study in 2000 the baseline prevalence was established at 26.5% (range 13 to 37%). Overall prevalence was subsequently reduced to 22% (range 16-31%) following the introduction of national clinical guidelines for pressure ulcers.

Prior to the survey in 2000 all reported studies had been conducted under differing methodologies, making comparison of the data difficult, for example, inclusion or exclusion of Stage 1 pressure ulcers and skin inspection of the total population versus skin inspection of patients known to have an existing pressure ulcer <sup>16,21,22,26</sup>. Interrater reliability testing of surveyors was either highly variable or not conducted at all <sup>26</sup>.

The incidence of pressure ulcers in Australia ranges from 5.4 – 11%; this data having been collected from three published studies in a Melbourne intensive care unit (5.4%); a suburban base hospital (10%), and in an orthopaedic setting in Western Australia (11%) <sup>16</sup>.

In addition to the above, the consequences of pressure ulcers from the perspective of mortality, morbidity, quality of life and cost to Australia need to be considered. For the period 1997-2000, the Australian Bureau of Statistics recorded that 1,293 people had died with pressure ulcers identified as either the primary or secondary cause of death <sup>7</sup>. In 1999, pressure ulcer morbidity was estimated to affect 60,000 people per annum <sup>8</sup>.

In 1997, pressure ulcers were reported by the Federal Minister for Health to cost \$350 M per annum <sup>27</sup>. A recent study in South Australia estimated costs in a major teaching hospital attributed to the additional care required for patients who developed a pressure ulcer was \$6.2M per annum. These patients stayed on average, 7.1 days longer than the expected length of stay for their diagnostic related group <sup>28</sup>. The cost of care in patients undergoing total hip replacement and coronary artery bypass graft surgery has been

shown to rise substantially following the development of a pressure ulcer. Appropriate prevention and intervention strategies in this cohort reduced both incidence and associated costs <sup>4</sup>.

#### Victorian Quality Council Role

VQC developed a comprehensive proposal to investigate the prevalence of pressure ulcers in the acute and subacute populations of Victorian healthcare facilities. This survey became known as the Victorian Pressure Ulcer Point Prevalence Survey, or "PUPPS".

PUPPS had two essential aims:

- To ascertain the prevalence of pressure ulcers in Victorian public hospitals and;
- To provide comparable data for benchmarking pressure ulcer prevalence against national and international data.

Subsequent desirable aims included:

- To initiate dialogue amongst key stakeholders regarding the development of an appropriate state-wide plan to reduce the prevalence, incidence and cost of pressure ulcers and;
- To use the PUPPS process to identify strategies, resources or factors which influence an organisation's ability to address the problem of pressure ulcers.

Both prevalence and incidence data can provide information on the scope of the issue of pressure ulcers. Prevalence studies are a valuable and constructive aid to identifying the extent of a problem and planning effective use of health resources <sup>20,21,29,30</sup>. For VQC the main benefits of a state-wide 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 outcomes <sup>26</sup>.

### **Evidence Base for Conducting the Survey**

The Appraisal of Guidelines for Research and Evaluation (AGREE) instrument was used to decide which pressure ulcer guidelines would be used to inform the Victorian study<sup>31</sup>. The Australian Wound Management Association's (AWMA) "Clinical Practice Guidelines for the Prediction and Prevention of Pressure Ulcers" scored well in all six domains and were employed as the evidence base for PUPPS<sup>1</sup>. The AWMA guidelines were developed under the National Health and Medical Research Council level of evidence recommendations.

Other guidelines that were reviewed in this process were: Victoria University – Pressure Injury Prevention<sup>32</sup>, Royal Nurses Association of Ontario – Nursing Best Practice Guideline: Risk Assessment & Prevention of pressure ulcers<sup>33</sup>, Crest Guidelines for the prevention and management of pressure sores<sup>34</sup> and the Royal College of Nursing/National Institute of Clinical Effectiveness (NICE) Clinical Practice Guidelines – Pressure ulcer risk assessment and prevention<sup>35</sup>.

Essential elements for achieving successful prevalence survey outcomes are the adoption of a proven methodology, validated data collection tools and a common language pertaining to study definitions<sup>17,21,22,26</sup>. The tools and methodology chosen for this survey had been validated and used successfully in previous Australian prevalence surveys<sup>26,36</sup>. By replicating this methodology, comparisons between the data obtained by VQC and existing national and international studies provide a sound baseline to assist with developing strategies to improve the quality of preventive pressure ulcer care thereby reducing the prevalence and incidence of pressure ulcers.

Permission was obtained from to adapt and utilise the survey tool and methodology developed for her national multicentre pressure ulcer point prevalence survey conducted in 2000<sup>26</sup>. In addition, agreed to provide assistance and support to VQC in modifying her tools, survey processes and education program.

### **Project Management**

A project manager with a background in nursing and project management experience was recruited to develop and manage the project. The project was planned and implemented utilising a rigorous project management framework. The eight functional steps in this framework were: Scope, Time, Communication, Cost, Quality, Human Resource, Risk and Contract/Procurement Management<sup>37</sup>. These eight functional steps were integrated operationally.



# Definitions

A “Pressure Ulcer” is defined as any lesion caused by unrelieved pressure resulting in damage of the skin and underlying tissue <sup>1</sup>.

Prevalence is the number of **existing** cases of a particular disease or condition in a given population at a designated time <sup>1</sup>.

Incidence is the number of **new** cases of a particular disease or event in a population during a specific time period <sup>1</sup>.

Interrater 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 (AWMA) Clinical Practice Guidelines for the Prediction and Prevention of Pressure Ulcers <sup>1</sup>.

*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.

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## Methodology

# Methodology

### Survey Criteria

Following discussion regarding logistics, published data and previous survey experience, a number of criteria were chosen for the study:

#### Inclusion

- All consenting adult inpatients on the site on the day of the survey (including Emergency Department patients flagged for admission);
- Patients in acute and subacute beds only.

#### Exclusion

- Paediatric, psychiatric, hospital in the home, day surgery and day procedure patients.

### Survey Tools

#### 1. Survey Tool (Appendix A)

The key data points captured were:

- Patient demographics;
  - Primary medical specialty;
  - Use of a pressure ulcer risk assessment tool;
  - Pre-disposing risk factors (cancer, pressure ulcer, drug or alcohol disorder, diabetes, chronic renal failure, acquired brain injury, smoking, mobility);
  - Skin colour;
  - Use of pressure reducing/relieving devices;
  - Evidence of pressure ulcer including anatomical location, severity (stage) and number;
  - Documentation of pressure ulcer on admission and subsequent management.
- #### 2. Staging system for pressure ulcers and limitations to staging (Appendix B)
- #### 3. Pressure Points Diagram (Appendix C)

### Survey Protocol and Guidelines

The key points included:

- Teams of two surveyors per 40-45 beds (additional teams were allocated if the site had an ICU and/or Emergency Department or if sites within the same health service were geographically distant);
- Full body skin inspection of consenting patients;
- Documentation of findings;
- Audit of medical record for relevant documentation;
- In the presence of reactive hyperaemia patients were repositioned off the affected area and re-checked 30 minutes later for evidence of a Stage 1 pressure ulcer;
- Any ulcer of dubious aetiology was discussed with a member of the PUPPS Core Team;
- Any finding of 5 or more pressure ulcers on one patient was checked by the site co-ordinator.

See Appendix D for details of the Survey Protocol and Guidelines.

### Pilot Study

A pilot survey was undertaken at a major metropolitan health service consisting of three campuses. Evaluation of the outcomes of the pilot led to the following improvements being made to the survey process:

- Minor alterations to documentation including the survey tool, protocol and guidelines, worksheet, pre-reading package and site co-ordinator instructions to allow for easier reading and completion;
- Streamlining the contents of the pressure ulcer education program and timetabling to facilitate effective learning;
- Replacement of several slides used in the testing process due to the quality of the slide or debate over the stage of the slide depicted;

- The introduction of revision and practice slides prior to interrater reliability testing;
- The addition of an interactive demonstration of the survey protocols and guidelines which included slides that showed surveyors how to complete the survey form.

### Data Analysis

Data was cleaned and scanned electronically by an optical mark and character recognition program ReadSoft (Eyes and Hands Forms Version: 5-2 SP 2, Sollentuna, Sweden). Data analysis was conducted by the Clinical Epidemiology & Health Services Evaluation Unit (Melbourne Health) using Intercooled Stata 7.0 for Windows 98/95/NT, Stata Corporation, USA, Copyright 1985-2001.

Additional contextual data were collected by interviewing the site co-ordinator of each health service. Information was keyed into a database (Microsoft Access 2000 9.0.7616 SP-3) and analysed by the Clinical Epidemiology & Health Services Evaluation Unit (Melbourne Health) using Intercooled Stata 7.0 for Windows 98/95/NT, Stata Corporation, USA, Copyright 1985-2001.

### Ethical Considerations

PUPPS was designed as a quality improvement audit. Health services were notified accordingly and approval to conduct the audit was requested from appropriate organisational committees. VQC supplied project and ethics related information to assist the approval process, including:

- Skin inspection as a non-invasive fundamental nursing function;
- Trained staff from each participating organisation assessing and accessing their own patients and medical records;
- Confidentiality and security of patient information;
- The patient consent process.



### Population

VQC invited all public metropolitan, rural and regional health services in Victoria to take part in a pressure ulcer point prevalence survey scheduled for the second half of 2003. Forty eight Victorian health services elected to participate. This equates to approximately 77% or just over 7,000 potential beds available for the survey. Over the period of the survey a combination of fluctuations in bed occupancy and survey exclusion criteria reduced the potential survey population to 6,003 patients.

The participating health services reflected a broad cross-section of size, casemix and location for the state. The division according to location was: metropolitan 62%, regional 18% and rural 20% of total beds involved (Appendix E).

Health services were requested to nominate an onsite co-ordinator to work with VQC project staff to prepare for the survey as well as providing staff to act as surveyors.

### Training of Surveyors

Prior to attending the education day each surveyor was issued with a 'Surveyor's Toolkit' which contained:

- **PUPPS General Project Information Sheet** (Appendix F);
- **Pre-reading manual** which included:
  - A covering note encouraging staff to read the contents of the tool kit and take particular note of the interrater reliability testing process;
  - 5 articles outlining the broad issues around pressure ulcers, prevalence surveys and pressure ulcer classification;
- **[NPUAP pressure ulcer staging system]** (National Pressure Ulcer Advisory Panel of America), which combined the NPUAP's method of classifying pressure ulcers with the AWMA (Australian Wound Management Association) schematic representation of each pressure ulcer stage and limitations to staging as well as incorporating a clinical slide of each stage of pressure ulcer (Appendix B);

- **PUPPS Pressure Points**, an anatomical diagram to assist surveyors to define the location of pressure ulcers found which corresponded with a legend of anatomical sites on the Survey Tool (Appendix C);
- **Pressure Ulcer Point Prevalence Survey Tool** (Appendix A);
- **PUPPS Survey Protocol & Guidelines** (Appendix D);
- **PUPPS Patient Information (English)** (Appendix G).

17 host sites held an education day, 8 metropolitan and 9 rural. Attendance was required for all surveyors and site co-ordinators. The education sessions covered:

- Purpose of the PUPPS project;
- Pressure ulcer epidemiology in Australia;
- Anatomy and physiology of the skin;
- Pressure ulcer aetiology;
- Pressure ulcer staging (NPUAP system)
  - Limitations to staging
  - Healing pressure ulcers;
- Other tissue damage which may be mistaken as being pressure induced and;
- Survey protocols, guidelines and practicalities.

### Interrater Reliability

Interrater reliability testing was performed utilising the testing tool developed by Prentice<sup>26</sup>. This involved:

- Correctly identifying 4 definitions of pressure ulcer stages according to the NPUAP staging system and adopted by the AWMA and;
- Appropriately staging 16 clinical slides of pressure ulcers.

The required pass rate was 85% and surveyors had two formal opportunities to achieve this. Clinical assessments and testing was not possible for surveyors due to the large numbers involved, limited timeframe for the study and cost.

# Results

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Results

The key findings of this survey are summarised below in Table 1. These findings and further results are expanded in the following sections.

## Key Findings

Table 1. Key findings

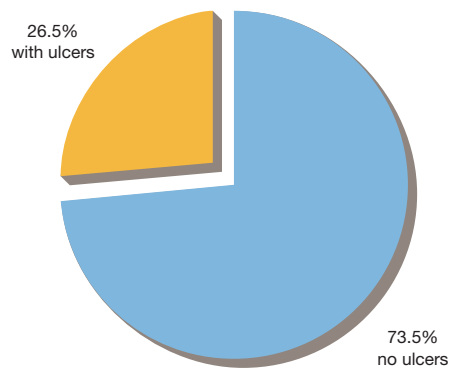
Finding	Result
Pressure ulcer point prevalence	26.5%
Pressure ulcer risk assessment tool completed	40.9%
Primary associative risk factor	Immobility
Use of devices in patients with a pressure ulcer	66.1%
Hospital acquired pressure ulcers	67.6%
Documentation of pressure ulcer management	90.2%
Provision of information to patients regarding pressure ulcers	4.2%

# 1. Pressure Ulcer Point Prevalence

## 1.1 State-wide prevalence

The prevalence of pressure ulcers identified was 26.5% as seen in Graph 1 and Table 2a below.

*Graph 1. Victorian state-wide prevalence*



*Table 2a. Victorian state-wide prevalence*

Patient population	Refused	Seen	Patients with ulcers	Prevalence	95% confidence interval of prevalence
6,003	853	5,150	1,367	<b>26.5%</b>	25.3% - 27.7%

Some international pressure ulcer prevalence studies do not include Stage 1 pressure ulcers. Details of the VQC PUPPS results within these parameters are presented below in Table 2b.

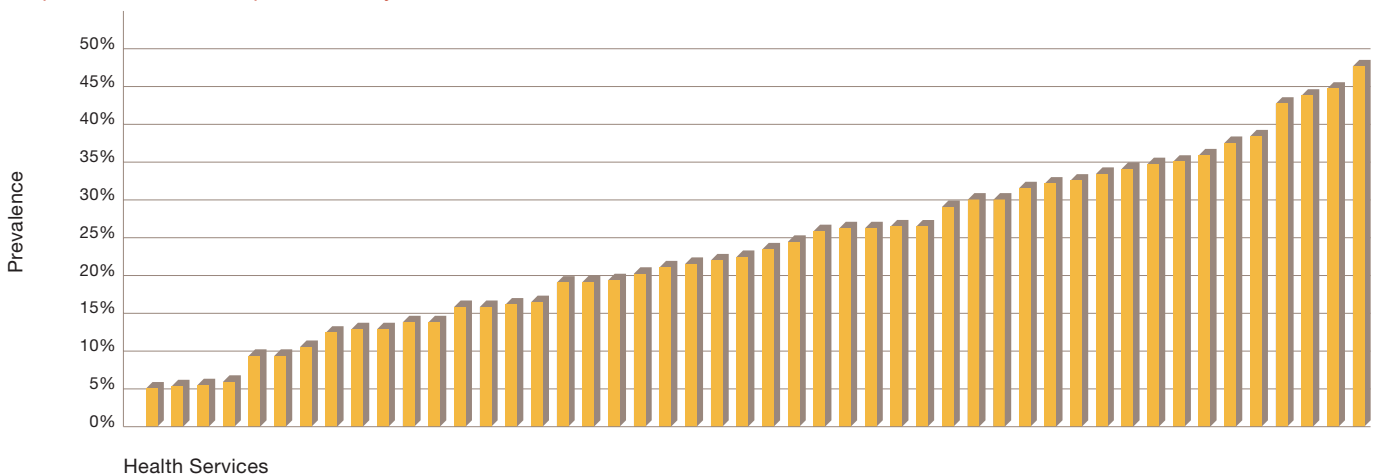
*Table 2b. Victorian state-wide prevalence (excluding Stage 1 pressure ulcers)*

Patient population	Refused	Seen	Patients with ulcers	Prevalence	95% confidence interval of prevalence
6,003	853	5,150	882	<b>17.1%</b>	16.1% - 18.2%

### 1.2 Pressure ulcer prevalence by health service

The state-wide mean was 26.5% with a range of 5.6% to 48.4%. For 22 out of 48 participating health services (45.8%) pressure ulcer prevalence was above the state mean. See Graph 2 below.

*Graph 2. Pressure ulcer prevalence by health service*

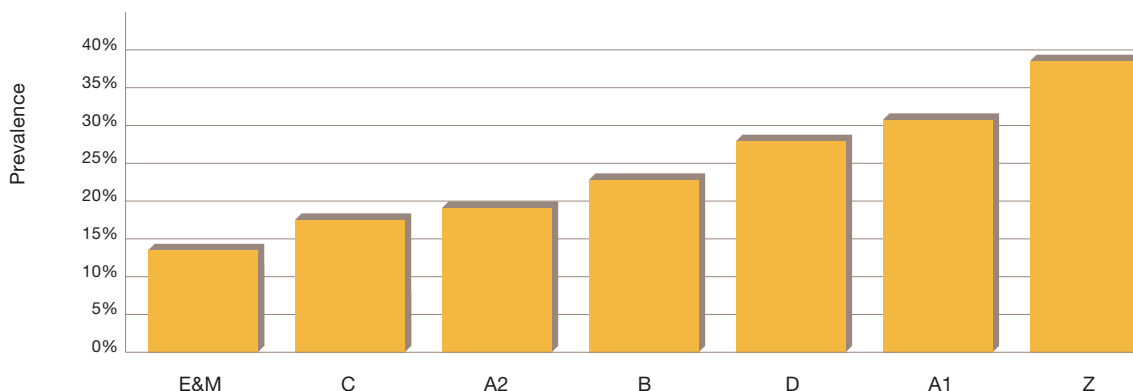


### 1.3 Pressure ulcer prevalence by comparative groups

Graph 3 benchmarks the Department of Human Services (DHS) comparative groups (see Key below). Each value is represented by the mean of each group as described in Table 3.

Three groups were above the mean, range 1.5% to 12.5% and four below, range 2.7% to 11.7%.

*Graph 3. Pressure ulcer prevalence by DHS comparative groups*



**Table 3. Pressure ulcer prevalence by DHS comparative groups**

Comparative Group	Number refused	% of total refused	Number seen	% of total seen	Number with ulcers	Prevalence %	95% confidence interval of prevalence
A1	243	28.5	1,379	26.8	428	31.0	28.6 - 33.5
A2	243	28.5	1,250	24.3	247	19.8	17.6 - 22.0
B	191	22.4	1,308	25.4	311	23.8	21.5 - 26.1
C	38	4.5	313	6.1	57	18.2	13.9 - 22.5
D	42	4.9	228	4.4	64	28.1	22.2 - 33.9
E&M#	7	0.8	47	0.9	7	14.9	4.7 - 25.1
Z	89	10.4	625	12.1	253	40.5	36.6 - 44.3
<b>Total</b>	<b>853</b>	<b>100</b>	<b>5,150</b>	<b>100</b>	<b>1,367</b>		

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

**Key: DHS Comparative Groups**

ID	Description	Criteria
A1	Teaching Hospitals – Large	
A2	Teaching Hospitals – Other	
B	Large Regional Base and Suburban Hospitals	
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

Graph 4 & Table 4 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).

Five groups were above the mean, range 1.3% to 21.2% and four groups were below, range 4.1% to 25.4%. Data was missing from 13 patients which accounted for 0.5% (n = 7) of all ulcers found.

Graph 4. Pressure ulcer prevalence by medical specialty

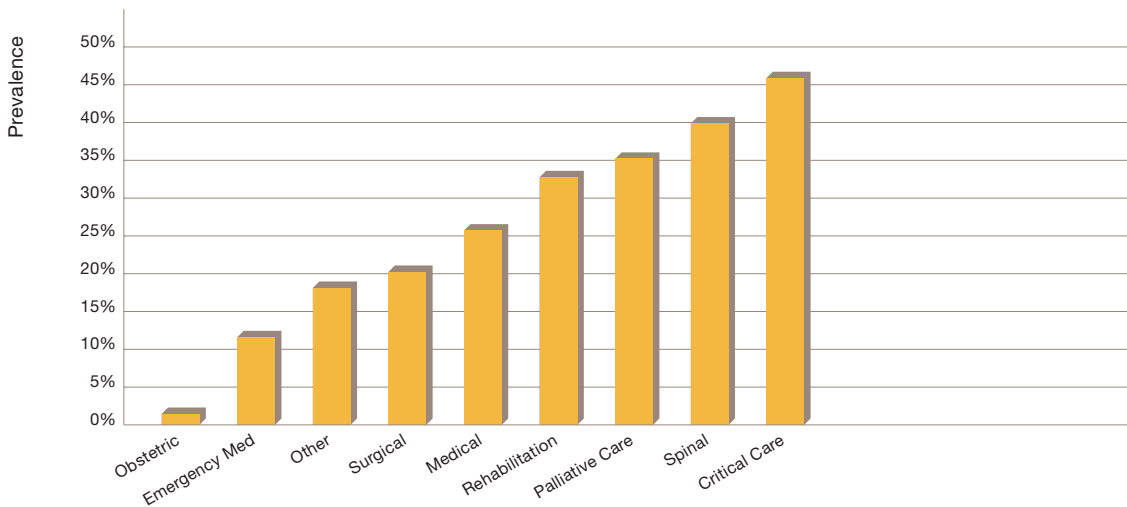


Table 4. Pressure ulcer prevalence by medical specialty

Medical specialty	Number refused	Number consenting	Number with ulcers	% prevalence within specialty	95% confidence interval of prevalence	% prevalence over total population	% of all patients with ulcers
Critical Care	11	130	62	47.7	39.1 - 56.3	1.2	4.5
Spinal	7	29	12	41.4	23.5 - 59.3	0.2	0.9
Palliative Care	40	133	50	37.6	29.4 - 45.8	1.0	3.7
Rehabilitation	61	585	175	29.9	26.2 - 33.6	3.4	12.8
Medical	439	2,821	783	27.8	26.1 - 29.4	15.2	57.3
Surgical	169	1,176	264	22.4	20.1 - 24.8	5.1	19.3
Other	1	10	2	20.0	#0 - 44.8	0.0	0.1
Emergency Medicine	16	76	10	13.2	5.6 - 20.8	0.2	0.7
Obstetric	85	177	2	1.1	#0 - 2.7	0.0	0.1
Missing data	24	13	7	53.8	26.7 - 80.9	0.1	0.5
<b>Total</b>	<b>853</b>	<b>5,150</b>	<b>1,367</b>			<b>26.5</b>	<b>100.0</b>

# Negative values have no meaningful interpretation in this context and so have been set at 0.

**Key: Medical specialty groups**

Group	Sub groupings
<b>Medical</b>	Cardiology, Cardiovascular, Endocrinology, Gastroenterology, General Medical, Geriatric Medicine, Haematology, Infectious Diseases, Neurological, Oncology, Renal & Respiratory Medicine. And from the 'other' category - Dermatology, Detoxification, Drug & Alcohol/Withdrawal, Hepatobiliary, HTH, Radiotherapy & Telemetry.
<b>Surgical</b>	Ear Nose & Throat, General Surgical, Gynaecology, Neurosurgical, Ophthalmology, Orthopaedic, Plastic Surgery, Thoracic Surgery, Transplant, Urological & Vascular. And from the 'other' category - Burns & Professorial Surgical Unit.
<b>Obstetric</b>	Obstetric
<b>Palliative Care</b>	Palliative Care
<b>Emergency Medicine</b>	Emergency Medicine
<b>Spinal</b>	Spinal
<b>Rehabilitation</b>	Rehabilitation
<b>Critical Care</b>	Critical Care, High Dependency Unit & Intensive Care Unit.
<b>Other</b>	All other medical specialties
<b>Missing data</b>	No medical specialty allocated

Where surveyors identified the primary medical specialty as 'other' some patients were re-allocated to nominated groups:

- General Surgical – Fascio-maxillary/dental (4 patients), Trauma (30 patients)
- General Medical – Rheumatology (3 patients)
- Geriatric Medicine – Awaiting placement (21 patients), Respite (4 patients)
- Neurology – Stroke (21 patients)
- Gastroenterology – a new grouping was created for 46 patients nominated in this specialty

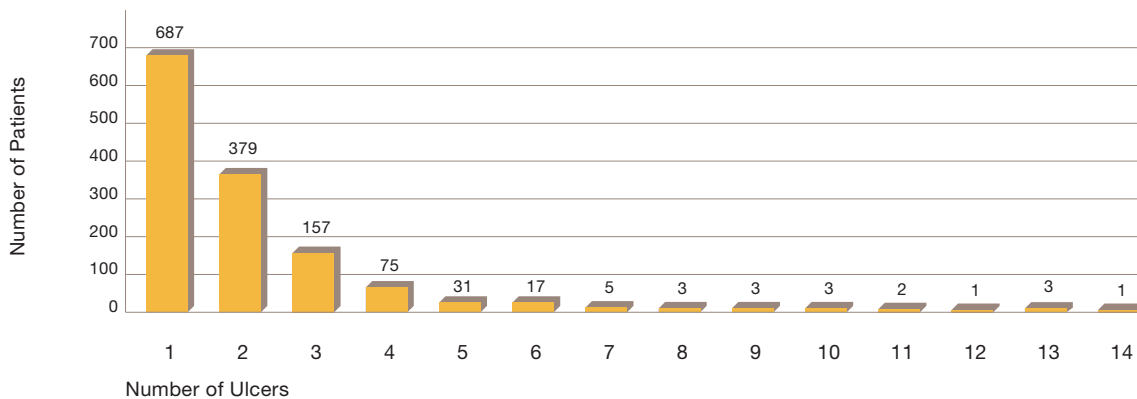
Once the sub groupings were allocated to the broader categories the following primary medical specialties identified as 'other' were also allocated as follows:

- Medical – Dermatology (3 patients), Detoxification (2 patients), Drug & Alcohol/Withdrawal (4 patients), Hepatobiliary (1 patient), HTH (1 patient), Radiotherapy (2 patients), Telemetry (2 patients)
- Surgical – Burns (3 patients), Pain Management (1 patient), Professorial Surgical Unit (2 patients)

### 1.5 Distribution of pressure ulcers per patient

Approximately 50% of patients had more than one ulcer and 22% had more than 2. In this population 10 patients had 10 or more ulcers, as per Graph 5 and Table 5 below.

*Graph 5. Distribution of pressure ulcers per patient*



*Table 5. Distribution of pressure ulcers per patient*

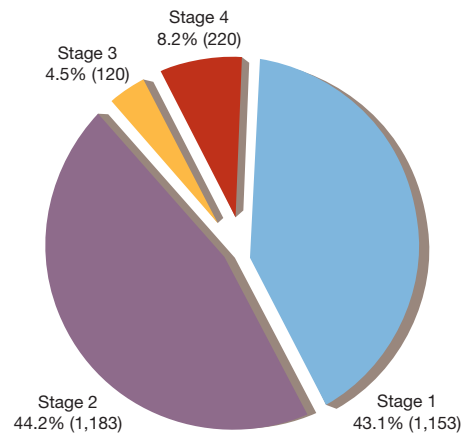
Number of pressure ulcers per patient	Patients with pressure ulcers	Number of pressure ulcers	% of all patients with pressure ulcers
1	687	687	50.3
2	379	758	27.7
3	157	471	11.5
4	75	300	5.5
5	31	155	2.3
6	17	102	1.2
7	5	35	0.4
8	3	24	0.2
9	3	27	0.2
10	3	30	0.2
11	2	22	0.1
12	1	12	0.1
13	3	39	0.2
14	1	14	0.1
<b>Total</b>	<b>1,367</b>	<b>2,676</b>	<b>100.0</b>

### 1.6 Severity of pressure ulcers

#### Severity of pressure ulcers by stage

The total number of pressure ulcers found in this survey was 2,676. Approximately 87% (n = 2,336) of these ulcers were classified as Stage 1 or Stage 2 pressure ulcers. Pressure ulcers classified as Stages 3 and 4 represented 13% (n = 340) of ulcers found (refer to definitions of pressure ulcer staging page 9 and schematic Appendix B). Graph 6 shows the percentage and number of each stage of ulcer.

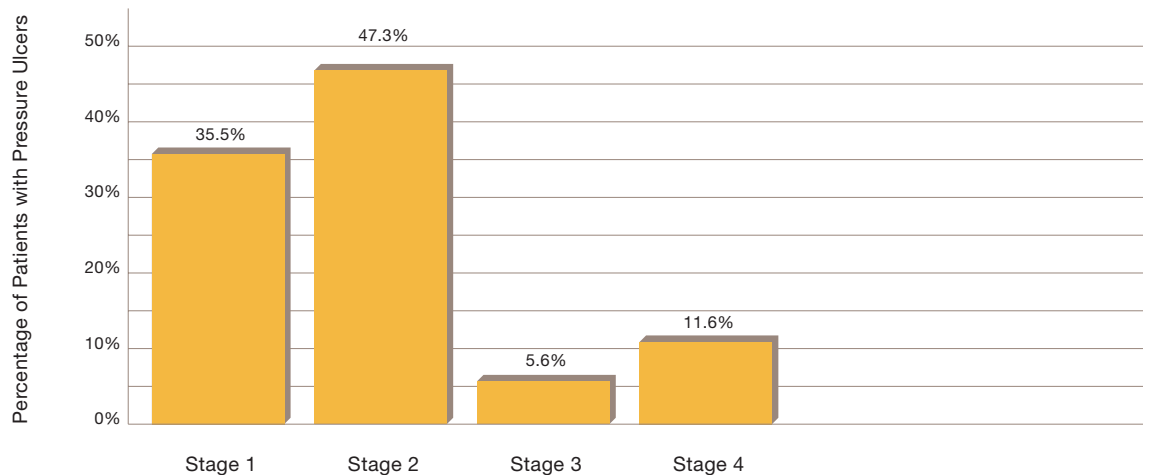
Graph 6. Severity of pressure ulcers by stage



#### Severity of pressure ulcers by highest stage

Pressure ulcers were found in 1,367 patients. Graph 7 shows the proportion of patients noting the severity of the highest stage of ulcer per patient. The severest forms of pressure ulcer (Stages 3 or 4) occurred in 236 patients or 17% of the cohort. The majority of patients, however, had less severe ulcers either a Stage 1 or 2 (83% n = 1,131).

Graph 7. Severity of pressure ulcers by highest stage of pressure ulcers



### 1.7 Hospital acquired pressure ulcers

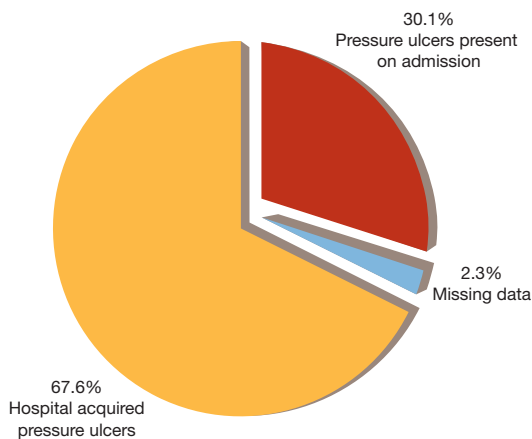
In order to ascertain the number of hospital acquired pressure ulcers within the survey population an audit of the medical record of patients with pressure ulcers was completed. The pressure ulcer was defined as being hospital acquired if there was no documentation referring to the presence of a pressure ulcer within the first 24 hours of admission.

Therefore 67.6% (n = 924) of patients were defined as having acquired their pressure ulcers during their hospital admission whereas 30.1% (n = 412) were noted to have a pressure ulcer on admission. Data was missing for 2.3% (n = 31) of patients. See Graph 8.

It is difficult to precisely determine the number of patients who were admitted with a pressure ulcer to a particular health service when inter-health service patient transfers do not differentiate the presence of a pre-existing pressure ulcer as being hospital-acquired or non-hospital acquired on admission to the receiving site.

Patients who had a pressure ulcer on admission had higher stages of highest ulcer.

**Graph 8. Hospital acquired pressure ulcers**

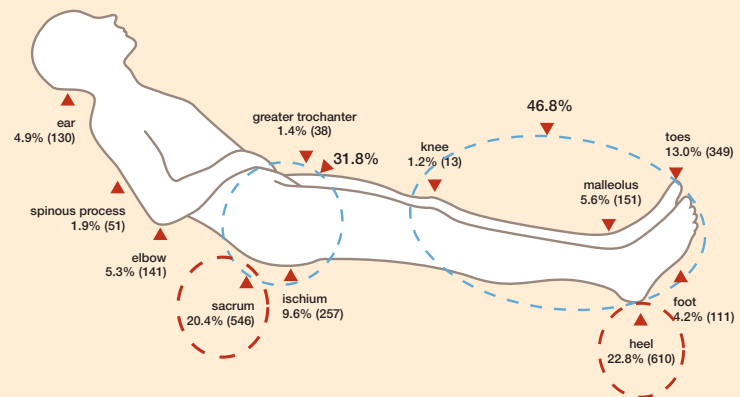


### 1.8 Anatomical distribution of pressure ulcers

Figure 1 and Table 6 represent the percentage and number of pressure ulcers found at each anatomical location for the 2,676 pressure ulcers found in 1,367 patients. The following locations accounted for 71.1% (n = 1,903) of the ulcers found: heel (22.8% n = 610 ulcers), sacrum/coccyx (20.4% n = 545), toes (13.0% n = 349), ischium/buttocks (9.6% n = 256).

Utilising broader anatomical groupings pressure ulcers found on the lower limb account for 46.8% of all ulcers found (n = 1,252) and pelvic girdle ulcers for 31.8% (n = 852).

**Figure 1. Anatomical distribution of pressure ulcers**



For Figure 1 all remaining locations accounted for 9.7% of pressure ulcers (n = 249).

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

**Table 6. Anatomical distribution of pressure ulcers**

Anatomical location	Number of ulcers at this location	% of all ulcers observed	Number of patients with ulcer at this location	% of patients with ulcers
Heel	610	22.8	446	32.6
Sacrum/Coccyx	546	20.4	496	36.3
Toe(s)	349	13.0	223	16.3
Ischium/Buttocks	257	9.6	187	13.7
Elbow	141	5.3	119	8.7
Ear	130	4.9	101	7.4
Lateral Malleolus	111	4.1	100	7.3
Foot (dorsum)	58	2.2	47	3.4
Foot (plantar)	53	2.0	40	2.9
Spinous Process	51	1.9	45	3.3
Medial Malleolus	40	1.5	35	2.6
Greater Trochanter	38	1.4	30	2.2
Knee (medial & lateral condyle)	31	1.2	27	2.0
Nose	23	0.9	20	1.5
Scapula	17	0.6	14	1.0
Finger(s)	13	0.5	8	0.6
Iliac Crest	8	0.3	8	0.6
Chin	4	0.1	4	0.3
Occiput	3	0.1	3	0.2
All Other Locations	193	7.2	117	8.6
<b>Total</b>	<b>2,676</b>		<b>1,367</b>	

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

Tables 7a and 7b detail the relationship between various clinical and demographic variables and the presence of a pressure ulcer. The variables assessed were chosen on the basis of previous literature reports and pragmatic assessment of their value in relation to available project resources.

This data indicates patients with a pressure ulcer are more likely to be older, female, have an emergency admission, lighter skin colour, diabetes, renal failure or an acquired brain injury, and be unable to independently reposition themselves.

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 dichotomous predictors 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. Due to the ambiguity in interpreting the “unsure” group for the smoking variable, the unsure group was dropped and a chi square test was performed on the difference in prevalence rates between the smoking and non-smoking groupings. An independent t-test was used to determine if patients with an ulcer had a different age to those who did not.

**Table 7a. Pressure ulcer prevalence by demographic variables**

Variable	Number consenting	Number with ulcer	Prevalence %	P value
<b>Age</b>				<b>0.000**</b>
18 - 19	18	2	11	
20 - 29	239	17	7	
30 - 39	316	38	12	
40 - 49	334	42	13	
50 - 59	446	108	24	
60 - 69	729	160	22	
70 - 79	1,347	385	29	
80 - 89	1,349	462	34	
90 - 99	353	149	42	
100+	1	0	0	
<b>Gender</b>				<b>0.020*</b>
Female	2,319	652	28	
Male	2,776	700	25	
<b>Admission Type</b>				<b>0.000**</b>
Elective	1,640	381	23	
Emergency	3,415	955	28	
<b>Skin Colour</b>				<b>0.000**</b>
White	4,051	1,130	28	
Olive	1,047	225	22	
Black	27	2	7	

\* $p < 0.05$ , \*\* $p < 0.01$

Pressure ulcer prevalence by age group is shown in Graph 9 below.

*Graph 9. Prevalence by age group*

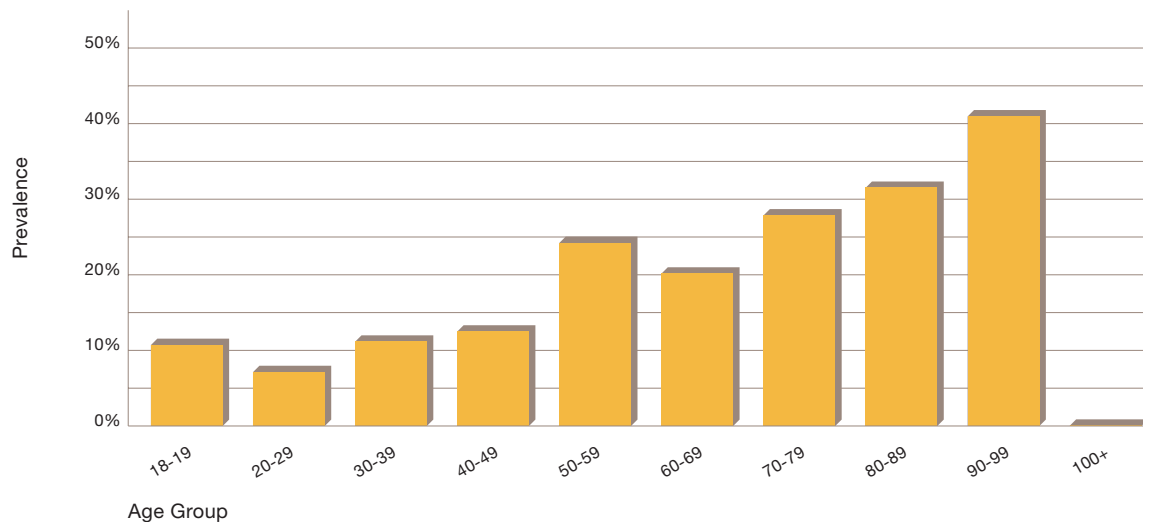




Table 7b. Pressure ulcer prevalence by clinical variables

Variable	Number consenting	Number with ulcer	Prevalence %	P value
<b>Principal Diagnosis</b>				<b>0.794</b>
Cancer	514	136	27	<b>0.709</b>
No Cancer	4,164	1,070	26	
Drug or Alcohol	74	18	24	<b>0.773</b>
No Drug or Alcohol	4,604	1,188	26	
<b>Co-morbidities</b>				
Diabetes	890	285	32	<b>0.000**</b>
No Diabetes	3,749	908	24	
Renal Failure	307	130	42	<b>0.000**</b>
No Renal Failure	4,371	1,076	25	
Acquired Brain Injury	391	125	32	<b>0.002**</b>
No Acquired Brain Injury	4,287	1,081	25	
<b>History of Smoking</b>				<b>0.053</b>
Smoker	1,373	321	23	
Non-Smoker	3,289	858	26	
Unsure	384	146	38	
<b>Risk Assessment</b>				<b>0.063</b>
Done	2,157	600	28	
Not Done	2,968	757	26	
<b>Independent Repositioning</b>				<b>0.000**</b>
Able	4,005	802	20	
Unable	1,051	531	51	

\* $p < 0.05$ , \*\* $p < 0.01$

### 1.10 Prevalence benchmarked with international studies

The Victorian prevalence of 26.5% is higher than international pressure ulcer prevalence studies in acute care facilities (teaching and general hospitals) with similar data collection methodologies, survey criteria and staging systems, see Table 8 below.

*Table 8. Prevalence compared with international studies*

Country/year/author	Number of facilities	Exclusion (E) and inclusion (I) criteria	Study method Interrater reliability	Staging system	Study numbers	Prevalence %	Severity of ulcers	Anatomical distribution of ulcers
Victoria/2003/VQC	82	E – Paediatric, Psychiatric, Hospital in the home, Day surgery and Day procedure I – All adult inpatients in acute and subacute areas	Skin inspection Education Interrater reliability	NPUAP	6,003	<b>26.5%</b>	Stage 1 43.1% Stage 2 44.2% Stages 1 & 2 87.3%	22.8% Heel, 20.4% Sacrum/ coccyx
Europe/2000/EPUAP <sup>9</sup>	26	I – all inpatients	Skin inspection	EPUAP#	5,947	<b>18.1%</b>	Stage 1 42.1%	28.6% Sacrum
USA/2000/Whittington <sup>10</sup>	116	E - Short/long stay unit, Obstetric, Paediatric, Rehabilitation I - Adults in Medical, Surgical & ICU	Skin inspection Education Post test	NPUAP	17,560	<b>15.4%</b>	Stages 1 & 2 74%	26% Sacrum/ coccyx
USA/2001/Amlung <sup>11</sup>	356	I - Ulcers on bony areas only, Adults only	Skin inspection Training session	NPUAP	42,817	<b>14.8%</b>	Stages 1 & 2 76%	37% Sacrum, 30% Heel

# EPUAP – European Pressure Ulcer Advisory Panel Staging System is similar to that of the NPUAP with pressure ulcers classified as Stages 1-4.

## 2. Pressure ulcer risk assessment

### 2.1 Frequency of assessment

Graph 10 and Table 9 show the use of pressure ulcer risk assessment tools in the health services surveyed. Under half of all patients assessed (40.9% n = 2,420) had evidence of a pressure ulcer risk assessment being performed. The tool used was spread between three internationally recognised and validated tools (Braden, Waterlow and Norton <sup>1</sup>) and in-house tools. The recorded risk was medium to very high in 35.8% (n = 867) of the population with 55.9% (n = 1,352) assessed as having low or no risk. Risk class data was missing from 8.3% (n = 201) of the risk assessments performed.

Graph 10. Risk class

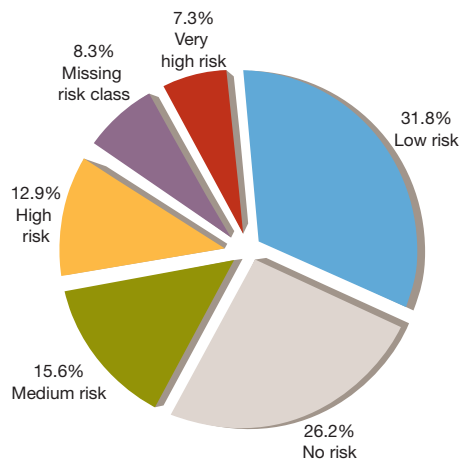


Table 9. Pressure ulcer risk assessment

	Number of patients	Proportion
<b>Risk assessment performed</b>	2,420	40.9% of the cohort#
<b>Tool used</b>		% of those with a risk assessment
Validated Tool	1,842	76.1
Other tool (includes in-house)	578	23.9
<b>Total</b>	<b>2,420</b>	<b>100.0</b>
<b>Risk Class</b>		% of those with a risk class score
No risk	582	24.1
Low	770	31.8
Medium	378	15.6
High	312	12.9
Very high	177	7.3
Missing data	201	8.3
<b>Total</b>	<b>2,219 (91.7%) class reported</b>	<b>100%</b>

# This is for the full cohort including refusals, where it is known if an assessment was done (n = 5,911).

### 2.2 Risk assessment and pressure reducing/relieving devices

Results indicate that the higher the risk assessed on the screening tool, the more likely that a pressure reducing/relieving device was found insitu, see Table 10. Patients who had a risk assessment tool completed were more likely to have a pressure reducing/relieving device insitu than the population as a whole. This may indicate that patients who had the screening test performed had been subjectively deemed to be at a higher risk than other patients, or that hospital sites where screening was regularly performed were also more likely to regularly use pressure reducing/relieving strategies.

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

Risk class	Number of patients	Number with pressure reducing /relieving device insitu	% with pressure reducing /relieving device insitu
<b>Risk assessment performed</b>			
No risk	519	225	43.4
Low	682	388	56.9
Medium	339	217	64.0
High	261	210	80.5
Very high	162	144	88.9
Missing data (assessment done, but no class recorded)	183	127	69.4
<b>Total risk assessment performed</b>	<b>2,146</b>	<b>1,311</b>	<b>61.1</b>
No risk assessment performed	2,944	1,302	44.2
Missing data (not known if assessment done)	23	11	47.8
<b>Total all patients</b>	<b>5,113#</b>	<b>2,624</b>	<b>51.3</b>

# Of the patients who consented to a skin inspection, the presence or absence of a pressure reducing/relieving device was not recorded for 37 patients. These patients are not included in this analysis.

Table 11 represents information on risk assessment, presence of a pressure reducing/relieving device and the presence of a pressure ulcer. For 423 patients assessed in the “high or very high risk” category 69 (16.3%) had no device insitu yet 24 (5.7%) of these patients had at least one pressure ulcer. There are no clear differences in the proportion of patients with the various highest stages of ulcers between the patients with devices in situ and those without devices.

Patients who were assessed as “no risk or low risk” of developing a pressure ulcer were still at risk of having a pressure ulcer identified, 17.4% (n = 207) in both the device insitu and no device insitu groups. 44.3% (n = 1,302) of patients who did not have an assessment had devices which may indicate some form of clinical assessment had been performed.

For patients in the “no devices insitu” group there appears to be some increase in the rates of pressure ulcer in patients who have higher risk screening scores, but this effect is not seen in the very high risk group, (although there are small numbers in this category).

For each risk class the patients with a pressure-reducing device have a higher rate of ulcers than patients without a device. This suggests that the presence of a device is more a reaction to the presence of an ulcer than an action taken as a result of the risk assessment score. However, a prospective cohort study is required to confirm this hypothesis.

**Table 11. Risk assessment, devices and pressure ulcers**

Risk Class	Total	Devices insitu			No devices insitu		
		Number with device	Number with ulcer	Prevalence	Number with no device	Number with ulcer	Prevalence
No risk	519	225	44	19.6%	294	29	9.9%
Low	682	388	88	22.7%	294	48	16.3%
Medium	339	217	84	38.7%	122	27	22.1%
High	261	210	100	47.6%	51	19	37.3%
Very high	162	144	79	54.9%	18	5	27.8%
Not recorded	183	127	57	44.9%	56	15	26.8%
No assessment	2,944	1,302	446	34.3%	1,642	309	18.8%
Missing assessment data	23	11	6	54.5%	12	3	25.0%
<b>Totals</b>	<b>5,113#</b>	<b>2,624</b>	<b>904</b>		<b>2,489</b>	<b>455</b>	

# Of the patients who consented to a skin inspection, the presence or absence of a pressure reducing/relieving device was not recorded for 37 patients, which included 8 patients with pressure ulcers. These patients are not included in this analysis.

# 3. Devices

## 3.1 Pressure reducing/relieving devices

No devices were in place for 455 patients (33.3%) who had ulcers including 55 (4.0%) who had either a Stage 3 or a Stage 4 as their highest stage of pressure ulcer, see Table 12. The majority of patients with pressure ulcers had a device insitu 66.1% (n = 904). This result may indicate a lack of planning and intervention in the presence of a pressure ulcer or

a lack of resources to comply with the appropriate guidelines for each patient. Data was missing for 0.7% of patients (n = 37).

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

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	816	(15.9)	85 (28.5)	151 (50.7)	27 (9.1)	35 (11.7)	298	(100)
Cushions & Overlays Static	642	(12.5)	88 (35.1)	117 (46.6)	15 (6.0)	31 (12.4)	251	(100)
Cushions & Overlays Dynamic	179	(3.5)	16 (20.5)	35 (44.9)	10 (12.8)	17 (21.8)	78	(100)
Replacement Mattresses Static	1,129	(21.9)	129 (41.5)	136 (43.7)	18 (5.8)	28 (9.0)	311	(100)
Replacement Mattresses Dynamic	344	(6.7)	52 (25.1)	91 (44.0)	21 (10.1)	43 (20.8)	207	(100)
Specialty Beds	27	(1.3)	3 (23.1)	8 (61.5)	2 (15.4)	0 (0.0)	13	(100)
<b>Total device insitu</b>	<b>2,624</b>	<b>(51.0)</b>	<b>300 (33.2)</b>	<b>424 (46.9)</b>	<b>63 (7.0)</b>	<b>117 (12.9)</b>	<b>904</b>	<b>(100)</b>
Number of patients with no device insitu (%)								
No device	2,489	(48.3)	182 (40.0)	218 (47.9)	14 (3.1)	41 (9.0)	455	(100)
Missing data	37	(0.7)	3 (37.5)	4 (50.0)	0 (0.0)	1 (12.5)	8	(100)
<b>Total</b>	<b>5,150</b>	<b>(100)</b>					<b>1,367</b>	<b>(100)</b>

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

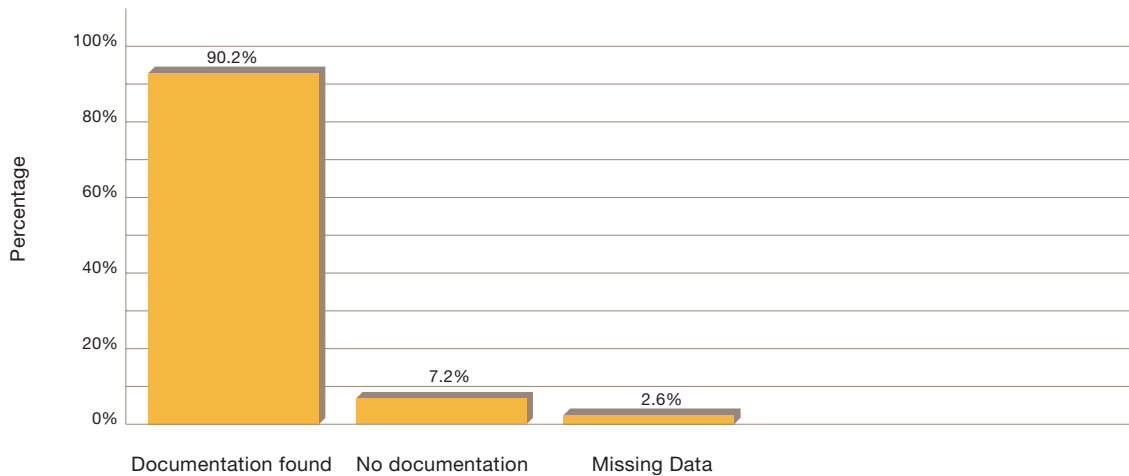
## 4. Documentation of pressure ulcer management

In order to ascertain 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 11 below.

Documentation related to the progress and management of pressure ulcers was found in 90.7% (n = 1,233) of patients, no documentation was found in 7.2% (n = 98) of patients and data was missing in 2.1% (n = 28).

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

*Graph 11. Documentation of pressure ulcer management*



# 5. Demographic and Clinical Variables



## 5.1 Demographic & Clinical Variable Frequency Tables

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.

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

*Table 13a. Demographic variables*

Demographic Variable	Consented (n = 5,150)	Number missing	Refused (n = 853)	Number missing	Total (n = 6,003)	P value
<b>Age (mean [sd])</b>	68.4 [18.6]	18	61.6 [21.2]	47	67.5 [19.3]	<b>0.000**</b>
<b>Gender (%female)</b>	54.5	55	57.6	48	54.9	<b>0.095</b>
<b>Emergency (vs Elective)%</b>	67.6	95	68.7	60	67.7	<b>0.503</b>
<b>LOS (median, [IQR])</b>	10 [3-34]	16	8 [2-30]	46	10 [3-34]	<b>0.006*</b>

\*p<0.05, \*\*p<0.01

*Table 13b. Clinical variables*

Clinical Variable	Consented (n = 5,150)	Number missing	Refused (n = 853)	Number missing	Total (n = 6,003)	P value
<b>Principal Diagnosis (%)</b>		23		44		
Cancer	11.0		15.1		11.6	<b>0.001**</b>
Pressure Ulcer	0.8		0.7		0.8	<b>0.750</b>
Drug or Alcohol	1.6		3.4		1.8	<b>0.001**</b>
<b>Co-morbidities (%)</b>		39		62		
Diabetes	19.0		15.0		18.4	<b>0.006**</b>
Renal Failure	6.4		6.4		6.5	<b>0.870</b>
Acquired Brain Injury	8.4		6.3		8.1	<b>0.047*</b>
<b>History of Smoking%</b>	27.2	104	21.3	165	26.5	<b>0.000**</b>

\*p<0.05, \*\*p<0.01



### 5.2 Reasons for refusal of skin inspection

Table 14 identifies the reasons why 853 patients refused a skin inspection. The percentage of total population who refused a skin inspection was 14.2%. Within the refusal group 159 (18.6%) were deemed too ill to participate and consent was declined by either the patient, carer or staff for 449 (52.6%). It is important to consider the reasons for the refusals and how this group may have influenced the final prevalence results of the entire cohort.

**Table 14. Reasons for refusal of skin inspection**

Reason	Number with each response	% of total refusals
<b>Too ill</b>	159	18.6
<b>Consent declined</b>	449	52.6
<b>Other#</b>	234	27.4
<b>Not recorded</b>	11	1.3
<b>Total</b>	853	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 Length of stay

Patients who have a pressure ulcer have a longer length of stay (LOS) than those who do not (Mann-Whitney U test). However 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 LOS, see Table 15 below.

The LOS analysis was rerun looking only at those patients who did not have a pressure ulcer on admission. This resulted in 412 patients with pressure

ulcers being dropped from the analysis (n = 30% of all patients with a pressure ulcer, and 65% of patients with a Stage 4 pressure ulcer). The result returned was similar to including all patients regardless of presence of a pressure ulcer on admission.

Patients with a hospital acquired Stage 3 or 4 pressure ulcer appear to stay somewhat longer than those patients with pressure ulcers present on admission.

**Table 15. Length of stay by stage of pressure ulcer**

Highest Stage	Mean LOS (days)	Standard deviation	Median LOS (days)	25th percentile	75th percentile	N #
No ulcer	27.0	78.2	8	2	29	3645
Stage 1	32.9	70.3	16	6	36	469
Stage 2	39.4	120.6	16	6	42.5	632
Stage 3	67.6	129.8	38	12.5	78.5	76
Stage 4	43.8	71.8	22.5	9	55	154
<b>Total</b>	<b>30.3</b>	<b>85.1</b>	<b>10</b>	<b>3</b>	<b>34</b>	<b>4936</b>

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

## 6. Education Program

### 6.1 Interrater reliability

The PUPPS education program was delivered to 428 surveyors (including site co-ordinators). An 85% pass rate on the first interrater reliability test was achieved by 60.5% of the surveyors (n = 259). For the second test 89.3% (n = 150) achieved a pass with 10.7% (n = 18) scoring less than 85%. See Appendix H for PUPPS Survey Interrater Reliability Tool.

### 6.2 Education program evaluation

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

## 7. Contextual data

Of the 48 health services 2 were using patient specific pressure ulcer literature (4.2%). The AWMA Clinical Practice Guidelines for the Prediction and Prevention of Pressure Ulcers <sup>1</sup>, which use designated levels of evidence as recommended by the National Health and Medical Research Council, were being used in the strategies or policies of 43.5% of health services (n = 23).

Some degree or program of mattress replacement was occurring in 47.9% of health services (n = 23).

There were no strong associations identified between pressure ulcer prevention strategies and ulcer prevalence although there was a trend towards a positive association between use of pressure reduction foam mattresses and lower pressure ulcer prevalence, see Table 16 below. For this analysis there were 48 units of data each representing a single health service.

**Table 16. Quantitative contextual data**

Factors or strategies	Number of health services who have these factors	Proportion of health services who have these factors	Average prevalence for sites with this factor	Average prevalence for sites without this factor	95 % confidence interval of difference between average Prevalence		P value
Existing protocols and policies on pressure ulcers in place	18	37.5	23.8	24.9	-5.7	8.0	0.738
Education or program on pressure ulcer prevention and management in place	21	43.8	21.6	26.7	-1.4	11.6	0.122
AWMA clinical guidelines in use	23	47.9	25.0	24.0	-7.7	5.6	0.751
Patient literature regarding pressure ulcers used	2	4.2	13.5	25.0	-4.8	27.7	0.163
Pressure reduction foam mattress replacement program	23	47.9	21.6	27.1	-0.9	11.9	0.092
Specialist wound management staff with allocated time	21	43.8	24.9	24.1	-7.5	5.9	0.815
Wound care or pressure ulcer committee active	25	52.1	22.8	26.3	-3.1	10.0	0.293
Pressure ulcer data collected as part of clinical risk management program	20	41.7	21.8	26.4	-1.9	11.3	0.159
Previous collection of pressure ulcer prevalence	15	31.3	25.7	24.0	-8.8	5.4	0.633
Previous collection of pressure ulcer incidence	17	35.4	22.6	25.5	-4.0	9.8	0.398

## Discussion

The primary aim of this quality audit was to establish the prevalence of pressure ulcers in Victorian public hospitals between August and December 2003 by examining consenting patients' skin for signs of pressure induced tissue injury.

The deleterious effects of pressure ulcers are widely documented, as are their causes (aetiology) and associated risk factors. They predominantly affect young neurologically impaired persons, the elderly and those who are immobile for long periods of time, irrespective of age and the presence or absence of concomitant co-morbid conditions. The results of pressure ulcer prevalence surveys conducted in accordance with best practice standards are accepted as being strongly indicative of the scope of the problem.

Examination of the results of this audit may assist healthcare clinicians and managers to identify and deal more effectively with the multiple dilemmas that pressure ulcers create in relation to detection, prevention and treatment.

### Prevalence

The prevalence of pressure ulcers identified in PUPPS was 26.5% (range 5.6% to 48.4%). Within this cohort this translates to more than 1 in 4 Victorian public hospital patients having a pressure ulcer at some point during their acute or subacute hospital stay.

In comparing variations in these results it should be noted that "inconsistencies...in the populations studied contribute to these differences and make comparisons and analyses of trends problematic"<sup>21</sup>. And although "comparison between studies remains complex and must be viewed with a degree of caution"<sup>2</sup>, the use of a consistent, validated methodology allows these results to be compared with international and national prevalence data.

International prevalence studies which utilised comparable methodologies incorporated many of the following elements: primarily acute care, adult in-patients, some form of surveyor education with or without interrater reliability testing, skin inspection and NPUAP or similar staging system provide an opportunity for benchmarking. Pressure ulcer prevalence results in these studies included: Europe – 18.1% (2000)<sup>9</sup>; the United States – 15.4% (2000)<sup>10</sup> and 14.8% (2001)<sup>11</sup>. Pressure ulcers appear to have had a higher profile in these and other countries resulting in the implementation of a range of strategies designed to lower prevalence and incidence over time<sup>38</sup>. It is important that Victoria learns from their experience.

In 2000, Prentice et al's Australian study of 5 tertiary teaching hospitals identified a baseline prevalence of 26.5% (range 13% to 37%). Prentice's methodology conforms to international methods as described above and addresses biases identified within prior Australian studies<sup>26</sup>. The prevalence ascertained by PUPPS is highly comparable with this study as the methodology employed by VQC for PUPPS was adapted from Prentice. Similarly, PUPPS data will be able to be benchmarked with data from Queensland Health's Pressure Ulcer Prevention Project when it is published<sup>39</sup>. The data collection methods employed by Queensland Health were also adapted from Prentice.

Although previous prevalence surveys in two Victorian hospitals found prevalence of 6.7% (1993)<sup>12</sup> and 5.4% (1994)<sup>13</sup> the methodology used in these studies was neither consistent between the two facilities nor with that used for PUPPS. The same level of critique can be applied to data found within the Joanna Briggs Institute pressure ulcer study<sup>2</sup>. For instance, measures of interrater reliability if performed were not stated in the methodology described. The data from these studies is also considerably lower than that identified in two Western Australian teaching hospitals 15%<sup>40</sup> and 12%<sup>22</sup> over the same period where the surveillance methods were comparable to the international standards described above.

#### **Hospital acquired pressure ulcers**

Hospital acquired pressure ulcers accounted for 67.6% of the ulcers found in PUPPS. A greater understanding by health service staff of the aetiology of pressure ulcer development, combined with a thorough risk assessment linked to the use of appropriate devices is central to early detection, prevention, or subsequent treatment of pressure induced tissue injury. Assessment and accurate documentation of each 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 in this area.

Patient or carer education that identifies and discusses the individual's risk status for developing pressure ulcers at the point of or soon after admission is another successful method used to combat pressure ulcer occurrence.

#### **Severity and distribution of pressure ulcers**

The severity of pressure ulcers identified in the PUPPS data showed that 47.3% of patients (n = 646) had a Stage 2 ulcer as their highest stage of pressure ulcer. This suggests that non-blanchable erythema particularly over bony prominences is not being recognised as a Stage 1 pressure ulcer or the precursor to deeper damage within the dermis which then manifests as a Stage 2 pressure ulcer. In this study 43.1% (n = 1,153) of pressure ulcers were Stage 1 ulcers, the significance of this being that approximately half of these ulcers most likely deteriorated into a Stage 2 pressure ulcer<sup>11</sup>. This then raises a number of issues in relation to the cost of care over and above that of the Diagnosis Related Group (DRG) for which the patient was admitted<sup>4</sup>. The effect of the development of a pressure ulcer at Stage 2 and beyond on an individual's ability to self-care is an unknown and most likely underestimated social and fiscal cost.

It is widely accepted that early detection and appropriate intervention to relieve the pressure from non-blanchable tissue will lead to restoration of the blood supply and tissue recovery. Conversely, unrelieved pressure or repeated reperfusion injury of the tissue will lead to irreversible tissue injury<sup>41,42</sup>. This level of hospital acquired (iatrogenic) tissue injury therefore is quite avoidable. For instance good clinical care and the use of simple but effective measures such as using a soft pillow to elevate a heel off a mattress will reduce the number of heel ulcers<sup>1</sup>.

Within PUPPS, the severest forms of pressure ulcers (Stages 3 or 4) were identified in 17% of patients. International studies identified results of 26%<sup>10</sup> and 24%<sup>11</sup> and an Australian national study 6%<sup>14</sup> for this criteria. However, over 22% of patients had 2 or more ulcers, 159 had 1 or more Stage 4 ulcers, 10 patients had 10 or more ulcers, and overall 2,676 ulcers were identified on 1,367 patients.

The anatomical distribution of pressure ulcers identified in PUPPS is similar to the national and international studies previously identified. The sites where the most pressure ulcers were found were the heels, sacrum, toes and buttocks (ischium). (See Table 6.)

#### Comparison of results across health service categories

Despite being of similar size (bed numbers) and casemix there was a broad range of prevalence within each of the DHS health service comparative groups. For example within the A1 group prevalence ranged from 25.2% to 37.4% and the prevalence in the Z group ranged from 26.0% to 64.9%. Analysis of the data did not indicate a relationship between casemix and pressure ulcer prevalence. Health services are encouraged to use the data for benchmarking and to share their strategies for improvement.

Health services that deal effectively with pressure ulcer prevention and management employ a broad range of strategies including executive leadership, multidisciplinary input, wound management staff and a commitment to resourcing education and pressure reducing equipment. The effectiveness of similar strategies internationally is well documented and has been seen to reduce pressure ulcer incidence by up to 30%<sup>43,44</sup>. Effective strategies which improve prediction and prevention of pressure ulcer development are complex and multifactorial and sustainable initiatives for improving the management of pressure ulcers are “all characterised by comprehensive pressure ulcer programs involving multifaceted implementation strategies”<sup>45</sup>. Improvement often occurs incrementally and requires “extraordinary effort and dedication”<sup>46</sup>.

Successful improvement programs used: national and international clinical practice guidelines, targeted educational sessions, monitoring and reporting of progress<sup>45,46</sup> appointment of specialised staff and a dedicated working party to “oversee the implementation of guidelines and to promote best practice and champion evidence-based skin care”<sup>45</sup>. Prentice et al found Australian clinical guidelines for pressure ulcers to be effective in reducing pressure ulcer prevalence [26.5% to 22% ( $p < 0.01$ )] when implemented with an education program and were effective in influencing changes to hospital policy, clinical practice and deployment of material resources<sup>14</sup>.

Quality improvement in the area of pressure ulcers is enhanced in these organisations through the adoption of organisation specific pressure ulcer management policies and regular reporting of prevalence, incidence and incident data as part of a minimum dataset.

Ongoing monitoring of pressure ulcer data by health services, following this baseline prevalence report is indicated. Some health services had initiated incidence studies or identified pressure ulcers as part of their regular clinical incident reporting systems prior to PUPPS and other health services commenced further data collected after their participation. Post-survey evaluations received from a number of health services indicate that through further audit these health services were able to identify some causal factors in areas found to have a high prevalence in PUPPS for their health service. Anecdotal statements from several site co-ordinators note their health services have been able to alter and improve clinical practice or use of pressure reducing equipment with subsequent reduction in pressure ulcer development and improvement in the management of existing pressure ulcers<sup>47</sup>.

Wound management resources were not readily available in many health services. A “lack of leadership in the area of pressure ulcer management” can contribute “to confused and often fragmented care”<sup>6</sup>. To plan and implement definitive strategies requires the commitment of a human resource to lead

and manage the initiative <sup>6,45</sup>. Health services that allocated wound management resources were able to initiate education of staff, assist with planning and management of care for patients with existing pressure ulcers as well as co-ordinating a program of quality improvement that included a range of reporting and internal benchmarking.

Some health service staff found the awareness and baseline information generated by participating in PUPPS acted as a springboard for launching new quality improvement programs or re-focusing existing improvement strategies.

### Risk factors

Some sources propose that all patients with reduced mobility or activity should be considered 'at risk' of developing a pressure ulcer <sup>1,48</sup>. Additional intrinsic and extrinsic factors, are chronic illnesses such as diabetes, metastatic cancer and renal disease; nutrition; demographics; oxygen delivery; skin temperature; moisture; friction; shear and impaired sensory perception <sup>1</sup>.

A limited number of demographic and clinical variables were documented in PUPPS. These were chosen on the basis of previous literature reports and pragmatic assessment of their value in relation to available project resources. Several variables demonstrated an association with a univariate analysis. A causal association with incident ulcers would need to be explored in a prospective study design. Immobility was demonstrated as the most important associative factor in this cohort and may also explain the apparent relationship between some of the other variables and pressure ulceration. For many patients a period of inactivity during a hospital admission is indicated either for diagnostic, therapeutic or palliative reasons.

To decrease the risk associated with immobility or reduced activity and other pre-disposing risk factors, evidence-based pressure ulcer guidelines suggest a comprehensive preventative management plan is indicated for these patients. The components of this

plan should include: regular skin assessment, hygiene/skin care, a turning/re-positioning regimen, appropriate nutrition and maximising opportunities to mobilise combined with pressure reducing support surfaces <sup>1,35</sup>. PUPPS data identify staff interventions as reactive once a pressure ulcer is identified, rather than pro-active to prevent ulcers developing.

The medical specialties with the highest specialty prevalence within this study were Critical Care (47.7%), Spinal (41.4%) and Palliative Care (37.6%). However, the specialties of Medical, Surgical and Rehabilitation accounted for 89.4% of all patients with ulcers (See Table 4). Margolis et al propose that more importance should be placed on using medical conditions as an indicator of risk particularly for physicians who normally describe patients by their condition. The medical conditions that Margolis et al found to be significantly associated with the development of a pressure ulcer in patients over the age of 65 were Alzheimer's disease, congestive heart failure, chronic obstructive pulmonary disease, cerebral vascular accident, diabetes mellitus, deep venous thrombosis, hip fracture and hip surgery, limb paralysis and malignancy <sup>49</sup>.

Approximately 50% of patients had 2 or more pressure ulcers, 301 patients had 3 or more. This suggests staff have a less than optimal understanding of the influence of intrinsic or extrinsic factors in pressure ulcer development. Recognition of these pre-disposing risk factors should trigger assessment and preventative intervention to reduce the risk of a pressure ulcer developing or worsening. For example from the findings of this cohort if a patient were to present as over 70 years of age, with renal failure, diabetes and have a degree of immobility, they would need careful and regular monitoring to maintain their skin integrity.

Both staff and patients have a role to play in prevention. Patients are increasingly encouraged to be more involved in their own care. Participating in informed choices and accountability for their health requires specific, consumer-focused information be available. By explaining the causes of pressure ulcers to patients they can be involved in planning care which encourages them to mobilise or increase their activity as soon as is practical. Individual plans of pressure relief can target areas such as caring for dependent limbs. With the majority of ulcers found on the heels, sacrum, toes and buttocks (ischium) patient education to focus on these areas alone could influence a reduction in the development of pressure ulcers.

#### **Risk assessment**

Best practice indicates a risk assessment should be used in combination with clinical assessment to identify individuals 'at risk' of developing pressure ulcers<sup>1,45</sup>. This recommendation is currently based on expert opinion. There are a number of risk assessment tools in use and they exhibit variability in predictability, validity and reliability<sup>1,2,50</sup>. Risk assessment tools were utilised in 40.9% of health services in this study. Within the cohort who were risk assessed, the group classed as 'no risk' or 'low risk' had a pressure ulcer prevalence of 17.4%. Whilst the study did not look at the predictability of the risk assessment tools used, some authors have proposed that an evidence-based risk assessment tool based on prospectively gathered and weighted data should be developed<sup>50,51</sup>.

The fact that patients assessed as 'no risk' or 'low risk' were found to have pressure ulcers strengthens confidence in the methodology used in this study which undertook a skin inspection of all consenting patients. Other studies suggest completing a skin inspection only on patients identified 'at risk'. In any given population there is the potential to underestimate the prevalence if only the 'at risk' population are examined.

Carrying out a risk assessment without putting an action plan in place is counterproductive. A risk assessment tool, which identifies pre-disposing risk factors such as immobility, incontinence and nutritional status, can be a useful and 'ready framework' in which to plan care<sup>2</sup>. Patients in the PUPPS cohort who were screened were more likely to have a pressure reducing/relieving device in situ than the sample as a whole. This may indicate that patients who had the screening test performed had been deemed to be at a higher risk than other patients, or that hospital sites where screening was regularly performed were also more likely to regularly use pressure reducing/relieving strategies.

For each risk class the patients with a pressure-reducing device insitu have a higher pressure ulcer prevalence than patients without a device insitu. This suggests that the presence of a device is more a reaction to the presence of an ulcer than an action taken as a result of the risk assessment classification. However, a prospective cohort study is required to confirm this hypothesis.

#### **Pressure relieving devices**

Of the patients identified with a pressure ulcer 33.3% had no pressure relieving device insitu. Of these 455 patients 60% had ulcers more severe than a Stage 1. This may indicate a lack of assessment, planning and intervention or a lack of equipment resources to comply with the appropriate guidelines for each case in order to manage an existing ulcer.

Information gained on the severity and distribution of pressure ulcers can assist health services to more effectively allocate existing pressure reducing or relieving devices and prioritise the purchase of additional equipment. Whilst potential risks associated with pressure ulcers in these anatomical locations can be minimised by reducing the periods of immobility, improving the quality of standard hospital mattresses and other support surfaces such as trolleys, operating theatre tables, chairs and wheelchairs will also mitigate the risk. Although there is currently no minimum standard for pressure relieving and reducing support surfaces internationally or within Australia



there is adequate evidence to suggest a superior quality pressure reduction foam mattress is effective in reducing the incidence of tissue damage<sup>2,52,53</sup>.

There is a plethora of pressure relieving devices available and the AWMA guidelines<sup>1</sup> make recommendations on the use of support surfaces according to a patient's degree of risk. However, currently there is no minimum standard on the quality or components of each group of devices. Recent research suggests a minimum foam mattress standard should be developed to comply with the following basic requirements:

- Classification – H/HR (heavy duty/high resilience);
- Density/hardness – 35/130;
- Support factor – 1.6-2.6;
- Depth 150mm;
- Interface pressure 30-50mmHg and;
- Covers should be 2-way stretch MVTR (moisture vapour transmission rate) 450-500g 24 hours<sup>54</sup>.

Other factors to take into consideration regarding pressure reduction foam mattresses are: side walls 5cm wide which allow increased firmness aiding bed mobility and transfers; fire retardant properties of the covers and hinging systems which make mattresses compatible with profiling beds. Some mattresses are constructed with multiple layers of foam and so will have a combination of varying densities and hardness types with the minimum standards described above as the middle layer. Multiple layering and castellations used to alter the design features to manage multiple risk factors may also alter the depth of each layer and impact on the upper weight limits and durability<sup>54</sup>.

Patients at increased risk also require a range of ancillary devices for pressure reduction and the use of pillows, wedges and gel devices can be used to decrease direct contact between bony prominences. Where an individual is identified as being high to very high risk an appropriate dynamic pressure support surface should be utilised.

PUPPS surveyors were not asked to assess the appropriateness of the devices in use.

### Documentation of existing pressure ulcers

Broad criteria for evidence of documentation of pressure ulcer management in the patient medical record were set for this survey. Documentation was deemed to be present if written notation regarding any of the ulcers identified was found in any part of the medical record on the survey day or during the 4 days prior. This documentation could be noted in general medical progress notes, nursing care plans, clinical pathway and wound care charts. Documentation related to the progress and management of pressure ulcers was found in 90.7% of cases. The data did not identify if the documentation noted one, some or all of the ulcers found on the patient on survey day, nor did it address the quality of the documentation.

Comparison to other literature which suggests clinician documentation regarding pressure ulcers is generally poor<sup>14,20</sup> indicates there may have been some degree of 'Hawthorne' effect associated with this result given all health services had prior knowledge of the timing of the survey. This is supported by the fact that a high percentage of documentation identified in this study does not seem to correlate to the prevalence of pressure ulcers found and seems to indicate a gap between knowledge of and response to pressure ulcers.

The introduction of pressure ulcer specific ICD-10 codes occurred in 1999 in Victoria. The National Centre for Classification in Health ICD-10-AM Fourth Edition, to be released in July 2004 contains expanded classification codes which incorporate ulcer staging according to the AWMA<sup>55</sup>. The AWMA clinical guidelines for the prediction and prevention of pressure ulcers were published in 2001<sup>1</sup> and the Australian Council on Health Care Standards (ACHS) clinical indicators specific to pressure ulcer incidence were included in Version 8 of the Hospital Wide Indicators in 2003<sup>18</sup>. Compliance with these guidelines and reporting commitments require unambiguous language to document assessments, care plans and management of pressure ulcers.

### Current knowledge base

A pass rate of 85% was achieved by 60.5% of the PUPPS surveyors in the first interrater reliability test. Following the second test 89.3% achieved a pass with 10.7% scoring less than 85%. The 18 surveyors who did not pass the second test were given additional training and assisted in the survey under the supervision of a Core Team member or the site co-ordinator, all of whom had passed their interrater test. Assessing surveyors' ability to classify pressure ulcers correctly ensured the data collected was reliable.

This process, however, identified that staff knowledge of pressure ulcers was lower than expected and supports the results found inasmuch as most staff had the greatest difficulty identifying Stage 1 and 2 pressure ulcers.

Surveyor feedback on the education program indicated basic education on pressure ulcers should be made available to all health service staff. Many staff (across all disciplines) voiced concern at the lack of education on pressure ulcers within their undergraduate programs, at orientation to a health service and within continuing education programs. Education will enable greater comprehension of the causes (aetiology), prevention and management of pressure ulcers. Staff will gain pressure ulcer specific language to create a common understanding of patients diagnosis and treatment in this area.

### The value of participation

PUPPS 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 raised awareness of the problem and introduced a comprehensive education program across the state. An initial evaluation completed by site co-ordinators several weeks after the survey but prior to the release of the state-wide data indicates many health services have utilised the impetus created by PUPPS to plan or implement strategies to better manage pressure ulcers. This positive action emanating from participation has also been noted in other studies <sup>56</sup>.



## PUPPS

*Branding of the PUPPS project with its mascot and colours was key to raising staff and patient awareness and understanding of the project.*

# 07

## Limitations of the study

As previously noted, interrater reliability testing was limited to theoretical assessment as it was deemed logistically impractical and very costly to have all surveyors clinically assessed. The risk to data collection presented by this limitation was reduced by several factors.

The survey protocols ensured the presence of a member of the Core Team of pressure ulcer experts on survey day, who 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.

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 unstageable <sup>21</sup>.



# Conclusions

Pressure ulcers are an internationally recognised problem in clinical safety and quality. They are largely preventable, and in the majority of cases are an adverse outcome of an admission to a healthcare facility. The development of a pressure ulcer adds to patients' length of stay, the cost of care and adversely affects patients' quality of life, morbidity and mortality. Zero tolerance should be the guiding principle of pressure ulcer prevention and management.

PUPPS has identified that within the populations surveyed (77% of the acute and subacute beds in Victoria) the state-wide prevalence of pressure ulcers is 26.5%. The high rate of prevalence found raises a number of issues to be addressed in order to reduce the prevalence of pressure ulcers.

The predisposing factors for pressure ulcer development are well documented. In this cohort, immobility was the strongest indicator. Further research to develop and validate a risk assessment tool is recommended. Increased compliance with the use of a risk assessment tool to identify patient's risk status on admission and when the risk status of the patient changes is also recommended. Reductions in pressure ulcer prevalence have been demonstrated when this has occurred <sup>57,58</sup>.

An executive led, multidisciplinary approach throughout health services is required if significant, ongoing improvements are to be made. This can be addressed via a number of strategies, as mentioned in the discussion, and should include patient and carer participation through information and shared decision making.

Wound management staff trained specifically in pressure ulcer prevention and management should be available to all health services. Further opportunities for basic pressure ulcer education for all direct care staff are warranted. An increased focus on pressure ulcer aetiology and prevention by tertiary institutions involved in the education of clinical staff (medical, nursing and allied health) is indicated.

A consensus needs to be reached regarding a number of factors such as: limiting the number of risk assessment tools used to those that are validated, stipulating timeframes for assessment, introduction of best practice clinical guidelines across Victorian health care providers, determining a mattress replacement policy and ongoing prevalence, incidence, and medical record audits, clinical coding of pressure ulcers and standardised pressure ulcer incident reporting.

PUPPS has provided a comprehensive baseline data set which can assist health services to plan quality improvement activities to reduce the problem of pressure ulcers, measure progress towards an agreed goal and be used as a benchmark for future data.

The findings of this study indicate the need for both a state-wide strategy, and for an individual health service organisation-wide approach.

# Recommendations

VQC recommend the following initiatives, summarised in Table 17 and detailed below, which are based on the analysis of results from PUPPS, current best practice <sup>1</sup> and available literature on successful quality improvement strategies in this area.

*Table 17. Summary of key recommendations*

Summary of key recommendations
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.

### Health service responsibility

Health services should develop or undertake a comprehensive and systematic approach to reduce the prevalence and incidence of pressure ulcers in their facilities. VQC proposes a principle of zero tolerance with regard to pressure ulcer development and expects health services will work towards a significant reduction in their prevalence and incidence. The expectation is that within 12 months the state-wide prevalence should be reduced by 50% from the initial study results.

To aid sustainability this plan should not be developed in isolation but incorporated with other clinical quality improvement programs, as there is potential that “the quality in one area of a health care organisation may suffer when resources and efforts are reallocated to another area of the organisation”<sup>59</sup>.

### Best practice clinical guidelines

Best practice clinical guidelines such as the AWMA guidelines<sup>1</sup> should be used as the foundation framework from which local policies and strategies are developed. These guidelines were developed by a credible source as a multidisciplinary (medical, nursing and allied health) subcommittee, the Pressure Ulcer Interest Subcommittee (PUISC), of the AWMA drawn from national experts in pressure ulcer prevention or management. Committee members were nominated from a wide range of health care settings including: medical and surgical acute care; rehabilitation; aged care; community care; education; wound management; stomal therapy; infection control; pharmacy and quality management.

The AWMA guidelines were developed under the National Health and Medical Research Council level of evidence recommendations. The AWMA note it is “pertinent to acknowledge the serious gap in the evidential basis for pressure ulcer prevention”. Where there was an “absence of adequate research to support any of the guidelines expert opinion or professional judgement was sought from review articles, published guidelines, PUISC members and peer review”<sup>1</sup>. From these sources ‘consensus statements’ were developed.

### Wound management/tissue viability staff resource

Each health service should provide (or have available) a staff member qualified in wound management/tissue viability with knowledge and skills in pressure ulcer prevention and management. This person should lead education of staff, carers and patients, manage or provide supervision for planning the management of existing pressure ulcers, co-ordinate an improvement program and manage regular collection, analysis and reporting of pressure ulcer data.

Rural health services could share an expert staff resource for education and reporting. However an on-site staff member with wound management/tissue viability basic training should be available to facilitate local prevention strategies and management of patients with existing ulcers.

### Staff education

Education of all direct care and clinical staff (allied health, medical and nursing) in a basic pressure ulcer program should be undertaken as soon as practicable. This should be incorporated into an annual competency program for clinical staff.

Undergraduate and postgraduate programs for all clinicians (allied health, medical and nursing) should include at least the basic elements of pressure ulcer prevention and management.

### Patient Information

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**

Some form of documented risk assessment should be utilised for each patient admission and updated as necessary for any change in health status or on a regular basis for longer term patients. Accepting the inadequacy of currently available tools, if a risk assessment tool is being used it should be a validated tool as recommended in the AWMA guidelines <sup>1</sup>.

Each patient should have a skin care program documented. Patients identified as being at risk should have the appropriate interventions such as additional support surfaces or other devices, referral to a wound care specialist, allied health professional (for example podiatrist, dietician) or other clinicians as required.

An evidence-based risk assessment tool should be developed for use in the acute and subacute settings. In the first instance a systematic review of existing tools with assessment of the quality and extent of validation would be useful.

### **Pressure reduction equipment**

All health services should upgrade their standard hospital mattresses including those on emergency department trolleys and operating theatre tables. Standards for selecting pressure reduction foam mattresses for Victorian public hospitals need to be set. A minimum foam mattress standard should be developed to comply with the following basic requirements:

- Classification – H/HR (heavy duty/high resilience);
- Density/hardness – 35/130;
- Support factor – 1.6-2.6;
- Depth 150mm;
- Interface pressure 30-50mmHg and;
- Covers should be 2-way stretch MVTR (moisture vapour transmission rate) 450-500g 24/24 <sup>54</sup>.

Other factors to take into consideration regarding pressure reduction foam mattresses are: side walls 5cm wide which allow increased firmness aiding bed mobility and transfers; fire retardant properties of the covers; hinging systems which make mattresses compatible with profiling beds; castellations and multilayering of foam <sup>54</sup>.

Where an individual is identified as being high to very high risk an appropriate dynamic pressure support surface should be provided. Health services should also have a range of ancillary devices for pressure reduction or have a hiring/leasing program in place for additional equipment when it is required.

An annual program of appropriate replacement for standard mattresses and other pressure relieving devices should also be developed.

### **Monitoring and reporting processes**

All health services should have an organisational policy for management and reporting of pressure ulcers such as that proposed in the AWMA guidelines <sup>1</sup> and congruent with ACHS accreditation reporting requirements <sup>15</sup>. A multidisciplinary committee responsible for clinical risk should include in its activities organisational strategies including benchmarking, ongoing incidence reporting and annual prevalence to inform improvement activities.

A second state-wide survey should be done at the end of 2004 to track the influence of these initiatives.

Pressure ulcer prevalence should be identified in aged care, residential and community facilities.





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**Victorian Quality Council Pressure Ulcer Working Group**

- Mrs Kerry Bradley (Chair)
- Ms Ged Cowin (to March 2004)
- Dr Tony Weaver

**Associate Members**

- Ms Kerry May – State Representative, Australian Wound Management Association, (Victoria)
- Ms Sue Huckson – Project Manager, National Institute of Clinical Studies (NICS)

**Victorian Quality Council Management Group:**

- Ms Cathy Balding – Manager
- Mrs Veronica Strachan – PUPPS Project Manager
- Ms Lesley Thornton – Project Manager
- Mr Eddie Gibbons – Project Manager
- Ms Tania Gibson – Administrative Assistant

**Analysis of survey data completed with the assistance of:**

- Dr Caroline Brand – Clinical Epidemiology & Health Service Evaluation Unit, Melbourne Health
- Mr Adrian Lowe – Clinical Epidemiology & Health Service Evaluation Unit, Melbourne Health
- DHS Legislation Review Unit – Ms Anne Mullins for assistance with ethical and legal issues
- Ms Robyn Wright for practical advice regarding her survey experiences in Victoria, Southern Health pressure points diagram, ‘hands on’ experience with a survey at Dandenong Hospital and for presenting at the Prevalence to Practice Education Day

**Additional slides used in the education program:**

- Australian Wound Management Association
- Convatec – Mr Brian Andrews
- Coloplast – Mrs Maureen McKenzie
- Smith & Nephew – Mr Anthony Murray
- Silver Chain – Mrs Keryln Carville
- Woundscope – Ms Sandy Dean
- Victoria University – Mr Collin Torrance

*Report written for the Victorian Quality Council by Veronica Strachan with assistance from Jenny Prentice, Cathy Balding and the Clinical Epidemiology and Health Services Evaluation Unit, Melbourne Health.*

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A

Appendix

# Appendix A Pressure Ulcer Point Prevalence Survey Tool

## 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)
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"/> Plastic Surgery      |
| <input type="radio"/> Critical Care             | <input type="radio"/> Infectious Diseases | <input type="radio"/> Rehabilitation       |
| <input type="radio"/> Endocrinology             | <input type="radio"/> Neurological        | <input type="radio"/> Renal                |
| <input type="radio"/> ENT                       | <input type="radio"/> Neurosurgical       | <input type="radio"/> Respiratory Medicine |
| <input type="radio"/> Emergency Medicine        | <input type="radio"/> Obstetric           | <input type="radio"/> Spinal Injury        |
| <input type="radio"/> General Medical           | <input type="radio"/> Oncology            | <input type="radio"/> Thoracic Surgery     |
| <input type="radio"/> General Surgical          | <input type="radio"/> Ophthalmology       | <input type="radio"/> Transplant           |
| <input type="radio"/> Geriatric Medicine        | <input type="radio"/> Orthopaedic         | <input type="radio"/> Urological           |
| <input type="radio"/> Gynaecology               | <input type="radio"/> Palliative Care     | <input type="radio"/> Vascular             |
| <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. Does the patient currently smoke or have they smoked in the last 10 years?
- Yes  No  Unsure
14. 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 /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...

ONLY complete Questions 24 – 30 if you have identified that the patient has a pressure ulcer(s).

24. Hospital Name:    25. Ward/Unit:    26. Unit Record No.:

27. 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	Stage								
	Ulcer present	Left	Right	Both	1	2	3	4	
a. Occiput	<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"/>	<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"/>	<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"/>	<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"/>	<input type="radio"/>
f. Spinous Process	<input type="radio"/>				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Sacrum/Coccyx	<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"/>
h. Iliac Crest	<input type="radio"/>				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. 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"/>	<input type="radio"/>
j. 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"/>	<input type="radio"/>
k. 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"/>	<input type="radio"/>
l. 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"/>	<input type="radio"/>
m. 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"/>	<input type="radio"/>
n. 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"/>	<input type="radio"/>
o. 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"/>	<input type="radio"/>
p. 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"/>	<input type="radio"/>
p. 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"/>	<input type="radio"/>
q. 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"/>	<input type="radio"/>
q. 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"/>	<input type="radio"/>
r. Foot (dorsum)	<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"/>
s. Foot (plantar)	<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"/>
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"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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

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

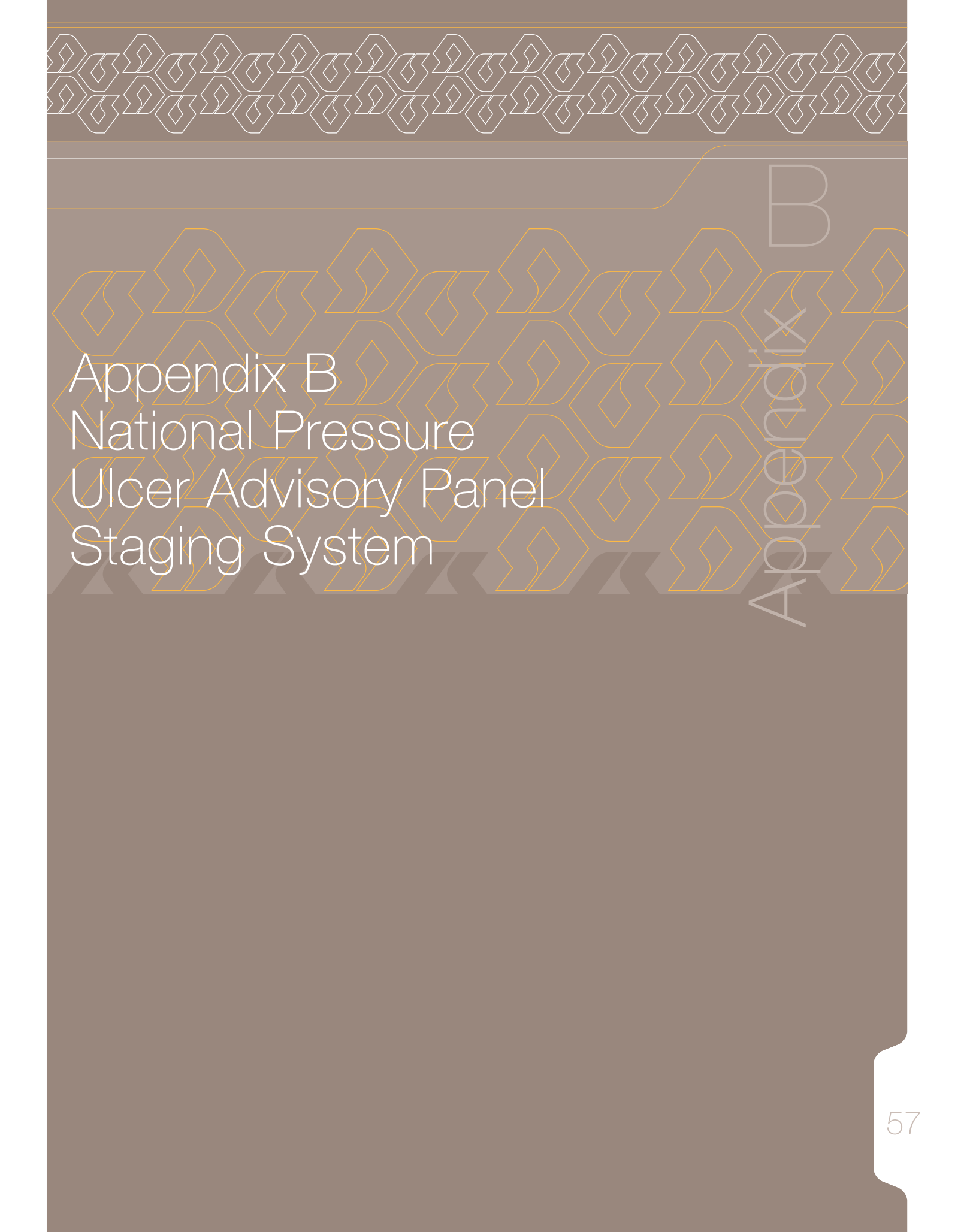
Yes  No

30. 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.





Appendix B  
National Pressure  
Ulcer Advisory Panel  
Staging System

Appendix  
B

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



#### 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.

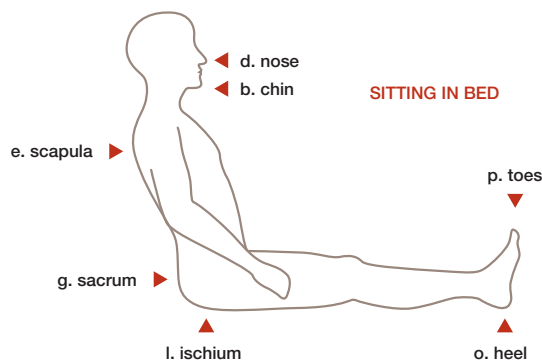
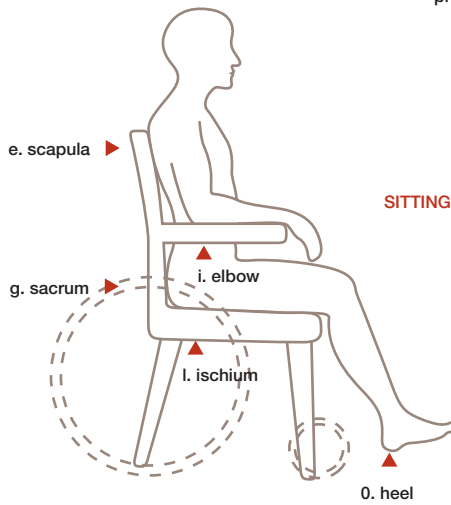
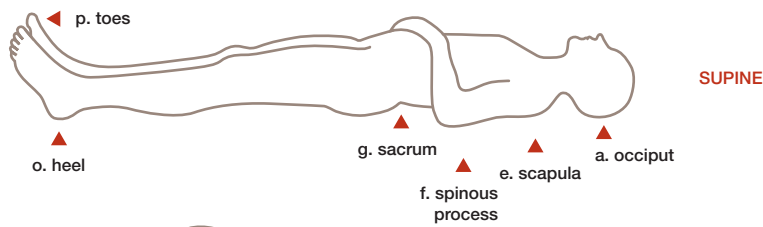
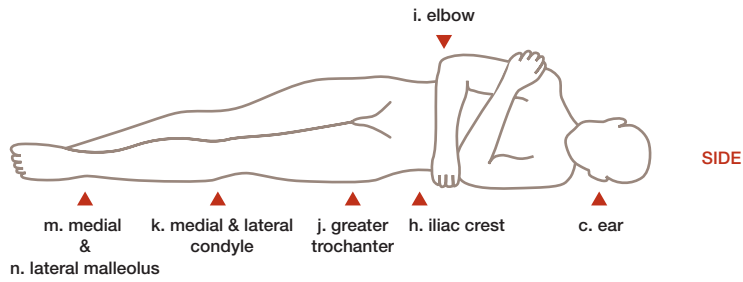
6. The staging system depends on visual observation of tissue involvement only. Health care professionals involved in individual care should also note the following factors: location; dimensions or surface area of the wound bed, wound edges and surrounding skin; the amount of exudate; severity of pain;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

Appendix C  
Pressure Points



# Appendix D 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.)

## APPROACHING THE PATIENT FOR SKIN INSPECTION

3. The surveyors may approach the patient, with or without the nurse (caregiver).
4. The surveyors will ask the patient if they have received and read a Patient Information Sheet regarding the PUPPS survey.
5. 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.
6. 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)?”

7. 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. If required ask the nurse caring for the patient to identify if the dressing is covering a pressure ulcer and if so to identify the stage of the ulcer.

*NOTE: 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 patient's skin will need to be re-inspected thirty minutes later for evidence of a Stage 1 pressure ulcer.*

8. 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.
9. The surveyors will record their findings on the Survey Tool (data collection sheet) provided. If the survey team are unable to stage an ulcer they should contact the Site Co-ordinator.

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

10. 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

11. 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

12. 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.
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. 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. ~~04~~ 04.
6. **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.



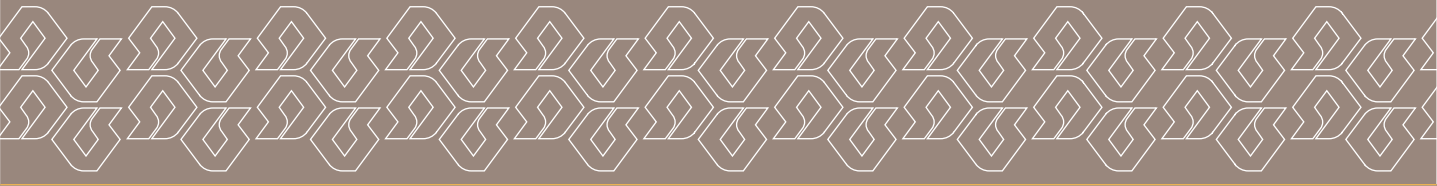
7. **Question 9.** Choose one “Primary Medical Specialty” only. “Critical Care” includes: Intensive Care, Coronary Care and High Dependency Units. “Rehabilitation” means an active program of restorative rehabilitation.
8. **Question 12** “Chronic Renal Failure” also includes evidence of chronic renal impairment.
9. **Question 14 & 15.** Please indicate on the data collection sheet if the patient refuses a skin inspection and also note the reason.
10. **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”.
11. **Question 19-22.** Please state which types of device(s) were used. Multiple entries are OK if more than one type of device is in use. Use the table below to assist with the device classification.
12. **Question 24-30.** Only proceed to these questions if a pressure ulcer(s) is identified during the skin inspection.
13. **Question 27.**
  - 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.
14. Check all survey forms for to ensure data is complete before leaving the ward area.
15. Return completed survey forms to your Site Co-ordinator.

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

**Pressure Relieving/Reducing Devices - Examples**

Device	
Comfort/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

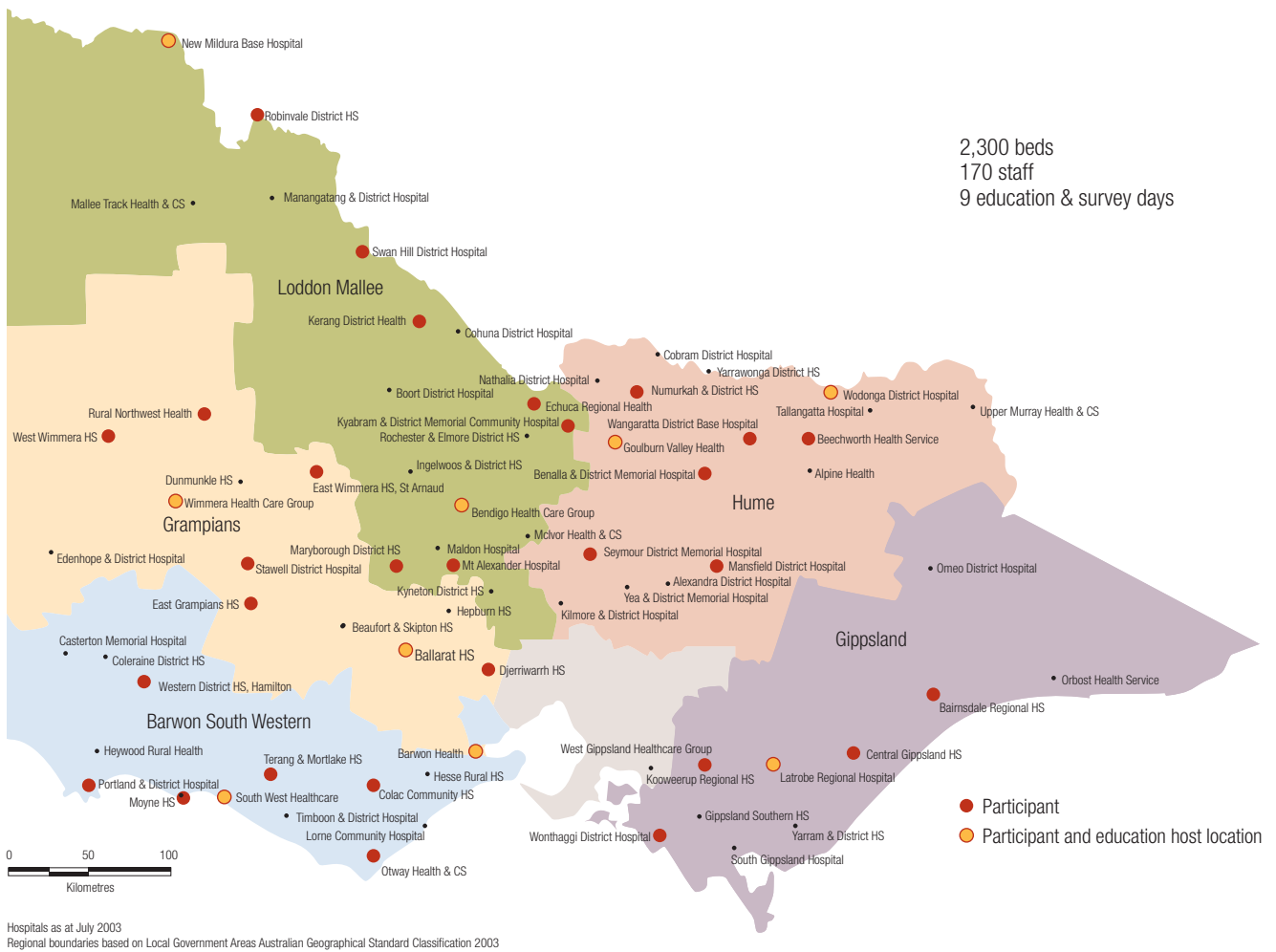




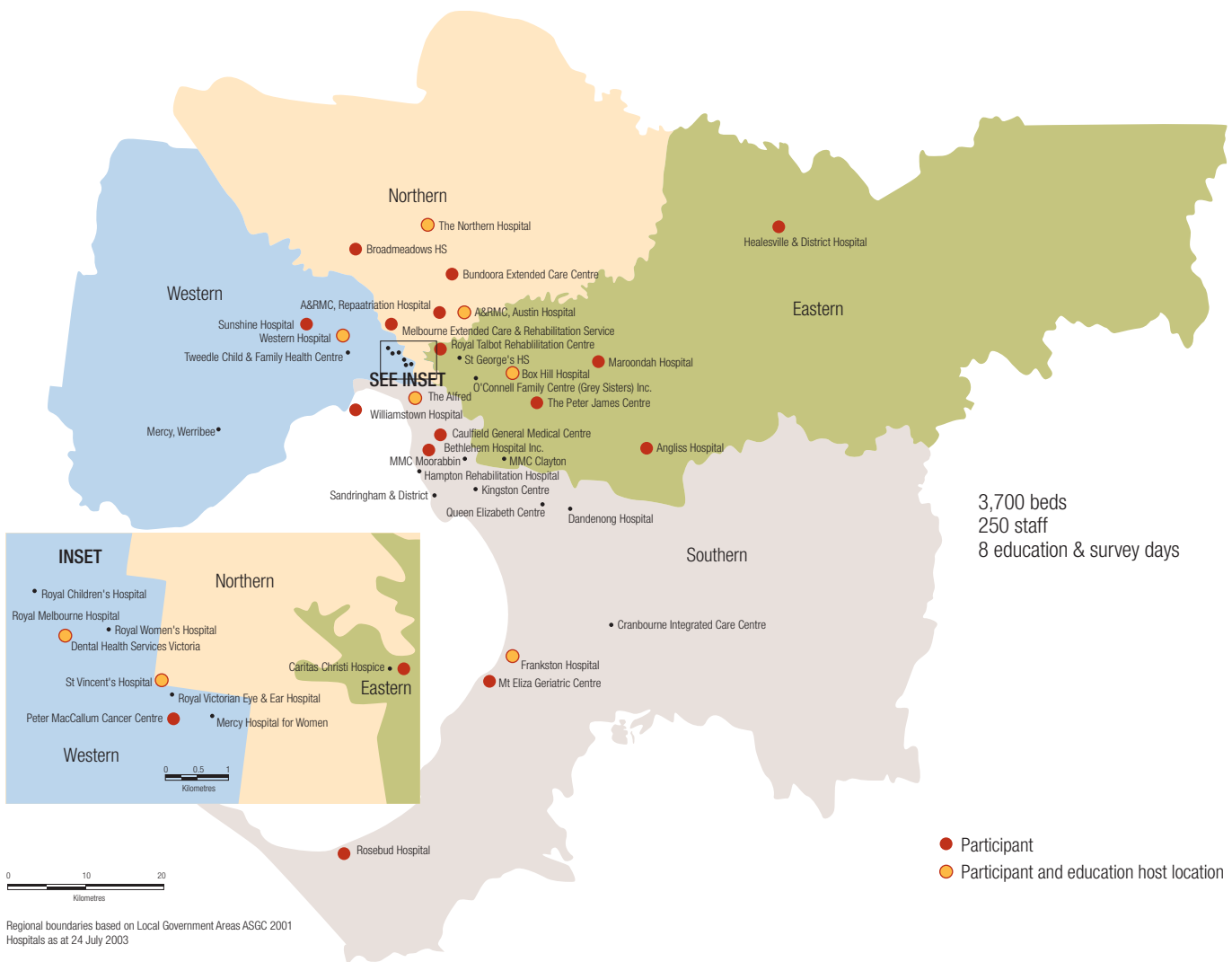
Appendix E  
PUPPS Participant  
Location Maps

Appendix E

## REGIONAL & RURAL HOSPITALS



## METROPOLITAN HOSPITALS



Appendix

F  
Appendix F  
General Project Information

# Statewide Pressure Ulcer Point Prevalence Survey

## Background

The Victorian Quality Council (VQC) has invited metropolitan, rural and regional health services to take part in a pressure ulcer point prevalence study to take place in the second half of 2003. The project will provide data on the prevalence and severity of pressure related tissue injury in Victorian health services at a particular point in time, allow comparison across Victorian hospitals in like settings and enable individual health services to better understand their own pressure ulcer management.

Pressure ulcers are acknowledged as a significant health problem within Australian health care settings. Prentice and Stacey (August 2001) concluded that pressure ulcers are thought to occur at unacceptable levels within Australian health care settings, despite the fact that they are a preventable cause of injury. The reduction of hospital-acquired pressure injuries is a VQC priority area.

Health service participation involves:

- Nominating an onsite coordinator 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.

The VQC will provide training and support during the data collection period. VQC will also fund health services to assist in backfilling staff involved in the project.

## Definitions

A "Pressure Ulcer" is defined as any lesion caused by unrelieved pressure resulting in damage of the skin and underlying tissue (Australian Wound Management Association Clinical Practice Guidelines, August 2001).

The European Pressure Ulcer Advisory Panel defines prevalence as a cross-sectional count of the number of pressure ulcer cases at a specific point in time (2002).

The purpose of a pressure ulcer point prevalence study is:

- To gain insight into the magnitude of the problem of pressure ulcers;
- To plan for appropriate health resources and facilities.

## Scope

The proposed survey group will include all adult 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 check for documentation on pressure ulcer management. Paediatric, psychiatric, hospital in the home, day surgery and day procedure patients will be excluded. The survey will include only patients in acute and subacute beds.

## Project Outline

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

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 45 patient beds.

The survey process occurs over two single days with one education day and one survey day. The survey for each individual health service will 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.

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



### **Ethical Considerations**

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.

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

### **VQC Project Support**

Veronica Strachan (VQC project manager) 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. Health services will receive a comparative data report comparing them to aggregate results and to other (non-identified) health service data.

Further information regarding this project can be obtained from your Site Co-ordinator.

### **References:**

*Prentice J. & Stacey M. Pressure Ulcers: the case for improving prevention and management in Australian health care settings. Primary Intention 2001; 9(3): 111-120.*

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

*Defloor T, Bours G, Schoonhoven L & Clark M. Draft European Pressure Ulcer Advisory Panel Statement on Prevalence and Incidence Monitoring. [http://www.epuap.org/review4\\_1/page6.html](http://www.epuap.org/review4_1/page6.html) 2002, Review Vol 4 Issue 1 [Accessed 10 July 2003].*



Appendix G  
Patient Information Sheet

Appendix G



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 adult 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**





Appendix H  
Survey Interrater  
Reliability Tool

Appendix  
H

## 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, USA<sup>1</sup>.

### 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?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	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.				

Q4	Which statement best describes a Stage 4 pressure ulcer?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	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.				

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"/>

