Decreasing pressure injury prevalence in an Australian general hospital: a 10-year review

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ABSTRACT

Pressure injuries (PIs) are adverse events associated with health care that can cause significant patient harm and discomfort, and have been identified as a cause of death. Some governments have established penalty funding for the occurrence of Stage 3 or 4 hospital-acquired PI; indicating that quality health care should prevent their occurrence. Auditing the prevalence of PI using a standardised methodology is a well-established way of comparing quality of health care across facilities. This paper reports the results of 10 years of PI prevalence auditing at a tertiary facility in Brisbane, Australia, and the nurse-led initiatives which led to a reduction in hospital-acquired PI prevalence from 13.7% in 2002 to 4.0% in 2012. Ongoing education and a whole-team approach to PI prevention, led by the hospital's Quality Effectiveness Support Team, have been key factors in achieving this reduction. Executive support, continuing education and staff awareness campaigns, and judicious purchase of effective PI prevention devices are also considered critical to success. Additionally, a program of nursing research was established with PI prevention as a strategic priority. In the 2013 ACHS Accreditation Survey, the hospital was awarded a 'Met with Merit' rating for NSQHC Standard 8 — Preventing and Managing Pressure Injury.

Key points

What is already known:

PIs are adverse events associated with health care. PI prevention is an important aspect of health care to prevent the discomfort and morbidity associated with these injuries, as well as reducing health care costs.

What this manuscript contributes:

This paper reports on the results of 10 years of PI prevalence audits from an Australian tertiary hospital. Key practice development initiatives are tabled to highlight the significance of a sustained and strategic focus on education and use of appropriate PI prevention devices and strategies, together with committed executive support, to reduce PI prevalence.

INTRODUCTION

This paper presents the results of 10 years of pressure injury (PI) point prevalence audit data and describes the key nurse-led initiatives employed during this period that have resulted in a sustained reduction in hospital-acquired PI.

BACKGROUND

The setting for this paper is The Prince Charles Hospital (TPCH), a large tertiary facility situated in north Brisbane, Queensland. The hospital's focus on PI prevention commenced as a nurse-led quality improvement activity in 1993, which gained impetus, and is now supported by an established Quality Effectiveness Support Team (QuEST). PI prevention is governed by the hospital's multidisciplinary Tissue Viability Committee and is a major area of work within its Clinical Effectiveness program. Key performance indicators are identified within the Nursing Services Strategic Plan[1], which also identifies PI prevention as a priority research area. Over recent years there has been an increasingly concerted effort to decrease PI incidence. Annual PI point prevalence data collection commenced in March 2002, when hospital-acquired prevalence was measured at 13.73%. The hospital's most recent hospital-acquired PI point prevalence, in November 2012, was audited at 4.0%.

PRESSURE INJURY

PIs cause significant patient harm[2], impact on quality of life[3], and increase the cost of health care[4-6]. Between 2001 and 2003 they led to 920 Australian deaths[2]. Hospital-acquired PI is regarded as a key performance indicator of the quality of care provided by health facilities: National Safety and Quality Healthcare (NSQHC) Standard 8, compulsory from 2013, requires health care facilities to ensure that PIs are monitored and reported to the highest organisational level[7]. Furthermore, PI prevention and management is a non-mandatory criterion by which organisations may be assessed for performance[8]. In Queensland, hospital-acquired PI is classified as an adverse event that incurs funding penalties of $30,000 and $50,000 for Stage 3 and Stage 4 injuries, respectively[9]. These sums are based on national and international costs of treating patients with PI.

PREVALENCE

In Queensland, hospitals are required to conduct annual point prevalence audits with a target of 10% or less hospital-acquired PI set in the Patient Safety and Quality Plan 2008–2012[2]. In order to measure prevalence, consistent definition of terms is required. The National Pressure Ulcer Advisory Panel and The European Pressure Ulcer Advisory Panel define a pressure ulcer as a "localised injury to the skin and/or underlying tissue usually over a bony prominence, as a result of pressure, or pressure in combination with shear and/or friction"[10]. This definition is used by the Australian Wound Management Association[11] (AWMA) to define the term *pressure injury*. Use of this term is preferred[7,11] instead of former terms such as *pressure ulcer* or *pressure sore,* as it indicates that PI is considered to be preventable. Furthermore, injury occurs in recognised stages; only *some* are ulcers, but *all* are injuries[11].

According to International Guidelines[12], the most common method used to measure prevalence is point prevalence, which is defined as "the proportion of a defined set of people who have a PU [PI] at a particular moment in time … It therefore includes those admitted to the healthcare facility with a PU and those who have developed one between admission and the time of the study". However, hospital-acquired PI prevalence excludes PI acquired prior to admission, with the Queensland Health[13] KPI 11 indicator defined as the percentage of hospital inpatients, and residents of residential aged care facilities (RACF), within its facilities, who at the time of audit have acquired a PI during the current admission.

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METHODS

Measure

The formula used to calculate prevalence was (numerator/denominator) x 100% where: numerator = number of consenting hospital inpatients/residents with one or more PI (all stages) which develops post admission and prior to discharge, and denominator = total number of consenting hospital inpatients/residents[13]. This is equivalent to the formula set by national[14] and international[12] consensus.

Data collection

PI prevalence data were collected annually on a single day, hospital-wide audit, with over 100 multidisciplinary staff members involved. All auditors received a minimum of three hours of training, which increased to four hours in 2011 to address a more comprehensive bedside audit. Auditors worked in pairs, undertaking individual full skin inspection on each of their allocated patients. All PIs at all stages on any area of the body were recorded using a standardised paper-based audit tool, which from 2005 included a Waterlow risk assessment and a malnutrition screening tool. From 2002 to 2011, the 4-stage NPUAP[15] system recommended by AWMA[16] was used, while from 2012, the six-stage system[10,11] was used.

Data were entered manually into a word-processing table or an electronic spreadsheet for statistical analysis, while from 2011 data were entered electronically with the use of scannable audit tools. For the purposes of this report, data were counted and checked manually from all sources. Until 2011, data were collected annually in March. In November 2011, data were collected again in November in order to align with the statewide Queensland Health PI prevalence and Queensland Bedside Audit. From 2012, data were collected in November only. Data were not collected in 2004 and 2007 due to major hospital building work and renovations.

Sample

All inpatients that provided verbal consent on the day of the audit participated. Mental health inpatients were not included in the audits of 2002–2006 but were included from 2008 onwards. From 2009 onwards, no children were included in the audit, whereas previously paediatric cardiac intensive care and ward patients were included. Because the hospital has no maternity services, this patient group was not included. Increasingly, more general and aged patients were audited over the 10-year period as the facility expanded from a cardiothoracic specialty to a general hospital.

RESULTS

Sample

During the 10-year period of audit, the number of patients in the annual sample increased from 260 to 415, while those consenting

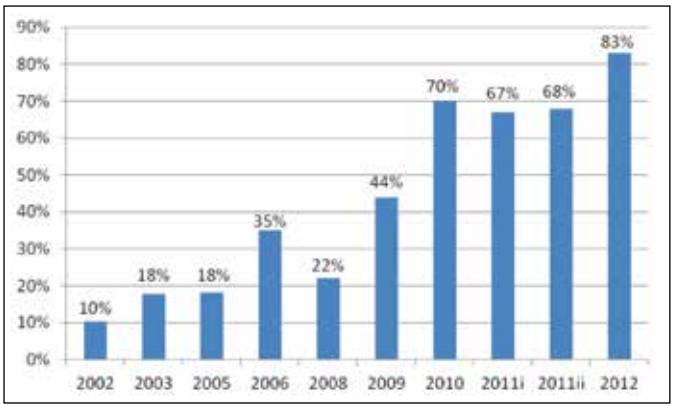
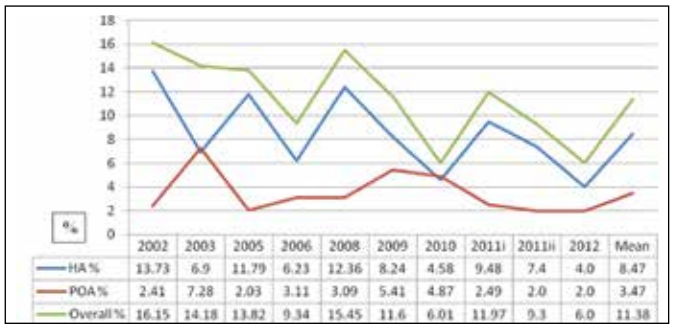


Figure 1: Annual audited PI prevalence (hospital-acquired and present on admission) reconciled with incidence recorded via AIMS



	2002	2003	2005	2006	2008	2009	2010	2011i	2011ii	2012	Mean
HA%	13.73	6.9	11.79	6.23	12.36	8.24	4.58	9.48	7.4	4.0	8.47
POA%	2.41	7.28	2.03	3.11	3.09	5.41	4.87	2.49	2.0	2.0	3.47
Overall %	16.15	14.18	13.82	9.34	15.45	11.6	6.01	11.97	9.3	6.0	11.38

Figure 2: Ten-year PI point prevalence. HA = hospital-acquired; POA = present on admission

to skin inspection increased from 260 to 327, as shown in Table 1. The incidence of PI is recorded via the hospital's Adverse Incident Monitoring System (AIMS). Reconciliation of the audit data with the hospital's reported incidence reveals that incident reporting of all PIs has increased significantly from 10% to 83% (Figure 1).

Hospital-acquired PI

Over the decade of data collection, the audited occurrence of all PIs decreased from 87 in 2002 to 30 in 2012, with the occurrence of hospital-acquired PI decreasing from 44 in 2003 to 18 in 2012 (Table 1). During this period, the number of patients with PI ranged between 21 and 55, with no consistent trend evident across the 10-year period.

The point prevalence data from 2002–2012 are presented in Figure 2. Hospital-acquired PI point prevalence fell from 13.73% in 2002 to 4.00% in 2012. The mean hospital-acquired PI prevalence for this period was 8.47% and the trend is shown in Figure 3.

Stage of PI

The audited number of all PI by stage is presented in Figure 4. During the 10 years of audit, the number of each PI stage was variable. It is only since 2009 that audit data cross-referenced PI stage with those present on admission and those acquired in hospital. Trend data from these four years show that Stages 2, 3 and 4 hospital-acquired PI have all decreased slightly over time, with Stages 3 and 4 hospital-acquired PI rare, while Stage 1 hospital-acquired PIs have decreased significantly (Figures 5a, 5b).

Site of PI

Figure 6a shows the prevalence of the main sites for hospital-acquired PI over the last four years. It is only since 2009 that audit data cross-referenced PI stage with those present on admission (POA) and those acquired in hospital. Trend data for four years show that the heel site has decreased significantly over this time, with most other sites steadily decreasing, except for the sacral site which has increased significantly (Figure 6b).

Key practice development initiatives

Over the past decade, many nurse-led initiatives have been implemented with the goal of reducing PI incidence. Table 2 summarises the successful strategies and education foci implemented to resolve particular PI problems noted from each PI point prevalence audit, along with the reason for their success. Other continence, skin care and nutritional strategies implemented by the hospital are published elsewhere[17]. Table 3 details the major PI prevention strategies, pressure relieving/support equipment, and major education foci undertaken each year in response to the main issues identified in

Table 1: Audit summaries. NDA = no data available

	2002	2003	2005	2006	2008	2009	2010	2011i	2011ii	2012
Total number of patients	260	261	NDA	317	427	405	356	433	497	415
Consented to skin inspection	NDA	251	246	289	356	388	349	401	408	327
Declined skin inspection	NDA	10	NDA	28	71	17	7	32	NDA	86
Total number of patients with PI	21	NDA	34	27	55	45	21	48	38	21
Number of patients with hospital-acquired PI	NDA	NDA	NDA	18	44	32	12	38	30	13
Number of patients with PI present on admission	NDA	NDA	NDA	9	11	13	10	10	8	8
Total number of PI	87	62	55	38	85	69	33	63	51	30
Hospital-acquired PI	NDA	44	NDA	27	70	48	16	46	40	18
PI present on admission	NDA	18	NDA	11	15	21	17	17	11	12

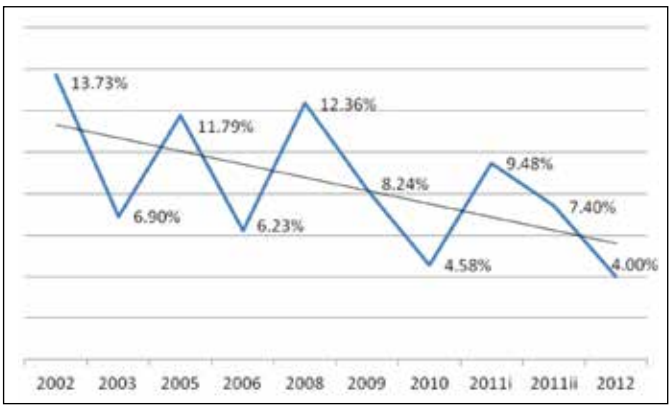


Figure 3: Hospital-acquired PI prevalence: 10-year trend

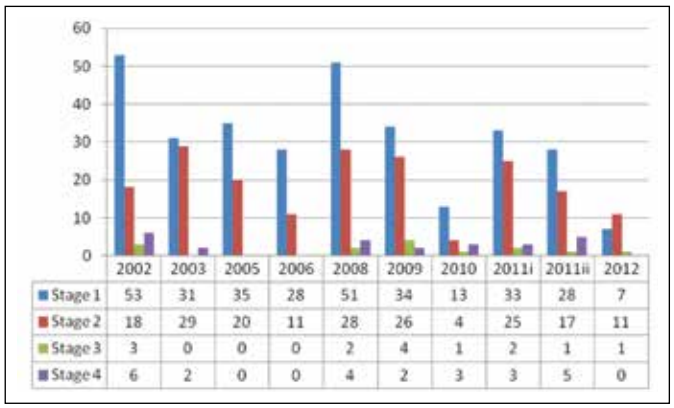


Figure 4: Audited PI by stage (n)

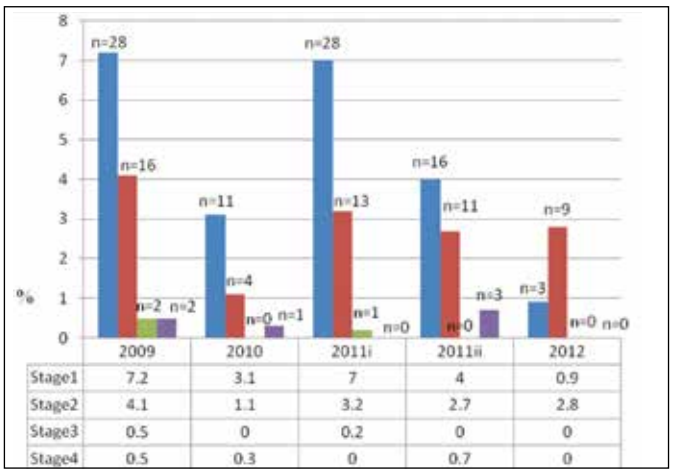


Figure 5a: Point prevalence of hospital-acquired PI by stage

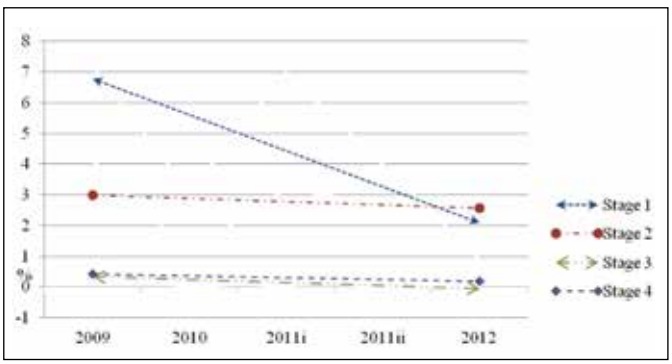


Figure 5b: Four-year trend in hospital-acquired PI by stage

the previous year's audit.

DISCUSSION

PI prevalence

Our data show that overall PI point prevalence has *decreased* significantly from 16.2% in 2002 to 6.0% in 2012. Of particular importance is the significant reduction in hospital-acquired PI from 13.7% to 4.0% over this period. This reduction is attributed to a sustained focus on PI prevention via strategic education, management and policy strategies (discussed below). Compared to similar peer groups (cited below), data indicate that our hospital is achieving very good PI prevalence reduction.

When benchmarking across facilities, it is important that facility size and type, including patient acuity and risk, are taken into account[18]. Currently, our hospital is benchmarked against four other similarly sized hospitals in Queensland with the most recent Queensland Bedside Audit[19] providing data on four of the five hospitals in this peer group. At 4%, our hospital is leading its peer group, which has an aggregate hospital-acquired PI of 6.6% (6 to 7%); and is well below the statewide result of 7%[19]. The prevalence of PI present on admission, which is not within the locus of control of the hospital, has been variable, ranging between 2.0 and 7.3% (mean 3.5%). It is not readily comparable due to lack of reporting in other prevalence studies, though our hospital's peer group reported an aggregate present on admission point prevalence of 3% (2 to 4%), and statewide of 4%, with our hospital at 2% in the most recent Queensland Bedside Audit[19].

Some data are available to enable PI prevalence comparison nationally. Western Australia WoundsWest[20], using a comparable audit methodology, reported a statewide hospital-acquired PI prevalence of 7.7% in 2011 in Western Australian metropolitan hospitals, and a hospital-acquired PI prevalence of 9.2% in New South Wales; similar to Queensland statewide hospital-acquired PI prevalence of 8.8% at that time[21], when our hospital recorded 7.4% and its district recorded 7.6% hospital-acquired point prevalence. In 2006, Victoria[22] reported an overall PI prevalence of 17.6% of which 67.6% were hospital-acquired (prevalence 11.9%). During the same year, our hospital's overall and hospital-acquired PI prevalence were 9.3% and 6.2%, respectively.

Internationally, Gunninberg *et al.*[23] reported a PI point prevalence of 17.6% and 9.5% in two Swedish hospitals, compared with an average between 6.3 and 6.7% across a group of United States (US) hospitals; though Young *et al.*[6] from Nevada, US, cited an average PI prevalence of 10% in their acute hospitals. Gunningberg, Brudin and Idevall[24] found a PI prevalence of 7.7% in one Swedish county council and 11.3% in another. Phillips and Buttery[25] reported an

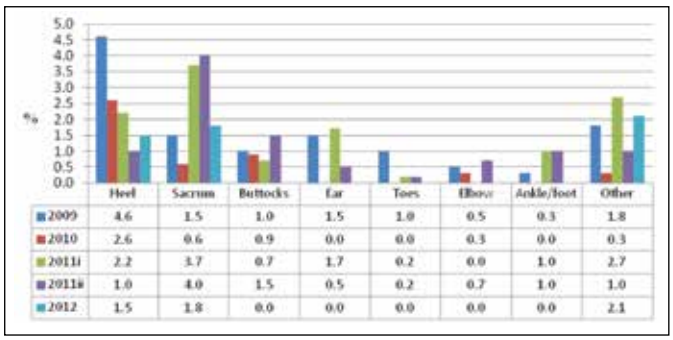


Figure 6a: Point prevalence of hospital-acquired PI by site

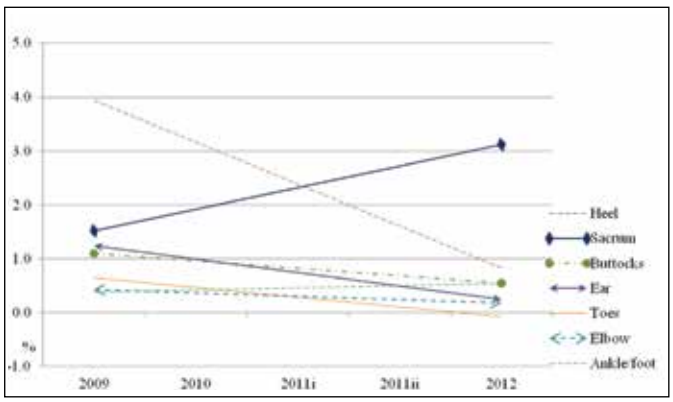


Figure 6b: Four-year trend in hospital-acquired PI point prevalence by site

overall prevalence of 10.2 to 10.3% over three years (2005–2007) from 44 acute hospitals across England and Wales; despite new guidelines on PI management and increased awareness, prevalence was relatively static, with no change in patient acuity[26].

Stage and site of PI

There are insufficient data to clearly interpret the 10-year results of PI stage. There are variable data regarding which PIs were hospital-acquired and which were present on admission. However, four years of complete data (Figures 5a and 5b) show a decreasing trend in Stages 1 and 2 PI, while there has been an increasing culture of recognising these stages within the facility due to education (Table 3). The number of Stage 3 PI remain low: 1–2 since 2009; while Stage 4 PI have remained at 5 or below since 2003 (Figure 4).

The main sites for PI remain the sacrum or buttocks, heels, ears and toes. These are the main pressure points on the body and are consistent with sites reported by other comparable facilities[19]. Whilst there is a decreasing trend for PI on the heels, buttocks, ears and toes, as shown in Figure 6b, the sacral site shows an increasing trend. This is despite concerted efforts at education and prevention for this site, including the promoted use of a sacral border protection dressing for any at risk patient (Table 2). It is unclear if this may be due to a changing in classification of this site as sacrum, rather than being recorded as buttocks, as terminology has become more specific over the years of the audit with increasing staff education and audit training. Another possible source of increased sacral risk is the increase in numbers of bariatric patients over the years, requiring specialised bariatric equipment and even more concerted PI prevention strategies[27].

PI occurrence versus prevalence

The total number of PIs present on all patients is not a good measure for use in benchmarking, because occurrence needs to be related to the size of the sample, as well as the period of hospitalisation, in order to show incidence[12]. Incidence is measured over a sustained period of time, usually at least a year, and should include the whole population of interest. However, it is rare that complete data are available to report incidence. The advantage of measuring prevalence, is that it is possible to collect data from the whole population at a particular point in time. For this reason, point prevalence is used for comparison and benchmarking purposes[12]. However, in our dataset as well as decreased prevalence, there has been a decrease in the total number of hospital-acquired PI. This suggests that our PI prevention and education strategies have been effective. On the other hand, the number of PI present on admission has been relatively static over the years, emphasising the need to identify these injuries on admission to prevent confounding or misleading PI prevalence data[20] and subsequent penalties[9].

Incidence reporting

PI incident reporting has increased significantly at our hospital and demonstrates a culture of reporting that is conducive to improving patient outcomes. Table 3 shows that a concerted education campaign, plus changes to techniques for ensuring reporting have been implemented at the hospital to effect this improvement in reporting over the 10-year period. Due to incomplete incident reporting, prevalence is often higher than reported incidence. For example, Benbow[28] found that 14% of patients with a PI did not have a corresponding incident report after auditing a convenience sample of 311 patients in a UK hospital. International Guidelines[12] emphasise that accurate and complete incident data are more reliable than prevalence data. However, our audit results highlight the accuracy of the point prevalence survey compared to incidence as shown in a hospital incident monitoring system. Under-reporting must always be factored into any consideration of a hospital's incident reports for PIs. In our hospital, anecdotal reports suggest that there can be some confusion over whether or not a PI has been noted in an incident report. A sticker alert system was introduced in 2008 to address this issue (Table 3), and it continues to be a focus for staff education.

Key practice development initiatives

The executive and staff of our hospital attribute the significant reduction in hospital-acquired PI prevalence over the 10-year period to a concerted focus on PI prevention through education and practice development initiatives. Others have reported significant falls in hospital-acquired PI as a consequence of strategic prevention initiatives. For example, Lahmann, Halfens and Dassen[29] reported a drop in hospital-acquired PI from 26.3% in 2004 to 11.3% in 2011 on consecutive point prevalence studies as a consequence of conducting prevalence studies and education on PI prevention.

Our decade of prevalence audit results provide evidence for the effectiveness of our initiatives. The hospital undertook early initiation of PI point prevalence audits and continued to implement changes to practice and focused education based on the results of each

previous year's audit (Table 2). Executive support enabled funding for the nurse-led QuEST and various PI prevention strategies, such as the purchase of support surfaces, including profiling split side rail beds, heel elevators, head protectors, protective sacral dressings, chairs and standardised evidence-based skin care and continence products. Education strategies have included workshops, expositions demonstrating PI prevention equipment and skin care products, and orientation and ward-based sessions. A significant strategy was the implementation of QuEST staff visiting wards for consultation with staff to confirm the presence, staging and reporting of PI, to ensure documentation was completed and appropriate PI prevention strategies were implemented, as well as advising on the use of PI prevention equipment based on risk assessment and presence of PI. There has also been a strong focus on other skin care, continence and nutrition management strategies[17] and a team approach incorporating dietetics and podiatry services and consumer engagement.

Comparison of the education focus and practice initiative each year (Tables 2 and 3) shows that where a reduction in focus on a particular PI issue occurred, a corresponding increase in that issue followed in a subsequent year. For example, a reduced focus on heel PI from 2007 resulted in an increased heel PI prevalence in 2010. Thus, reinvigoration of focus is critical to maintain PI prevention.

In summary, based on 10 years' experience, we have found that a concerted whole-team approach with a committed staff and executive are key to reducing PI prevalence and improving prevention strategies; a finding supported by other studies[30-32].

Our hospital's 10 years of sustained effort and innovation were rewarded in the 2013 ACHS Accreditation Survey, which awarded a 'Met with Merit' rating for NSQHC[7] Standard 8 — Preventing and Managing PIs. A program of nursing research with PI prevention as a strategic priority[1] has contributed significantly to this result.

Limitations

Although there have been some improvements in audit processes over the past 10 years, our hospital has consistently used a standardised and accepted methodology for point prevalence audits[14,33], which helps to ensure that our data are valid and reliable. Our data are complete for the years 2006–2012, with fully comprehensive bedside audit data and reporting available from 2011 onwards. However, our data are incomplete for the years 2002–2005, with only summary reports now available. For the purposes of this paper, data were counted and checked manually from all available sources, with some discrepancies noted between published annual reports and complete data sets. Particularly during the earlier audits, some data are incomplete and existing records are inconclusive regarding the auditing of some sub-

Table 2: PI problems and successful PI prevention strategies and education

PI problem	Successful PI prevention strategy/education focus	Rationale
Sacrum	Use of protective sacral border dressing for all patients at risk or with noted Stage 1 PI	Prevention; sacrum second most common site in audit results
Ears	Use of rubber lugs on oxygen masks/devices	Prevention; hospital had large cardiothoracic population with very high use of oxygen devices
Toes	Increased use of bed cradles; cradles built into beds	Prevention; take weight of sheets/blankets off feet and allow for more position shift, as well as better access to view extremities
Heels	Purchase and emphasis on use of heel protectors and wedges	Prevention: heels second most common site in audit results
Nurse knowledge level low	Implementation of PI skills escalator program — all nurses must learn something and increase skill level according to nursing role and focus	All nurses required to have basic skill level then encouraged to increase knowledge and skills to appropriate level
Poor use of pressure-relieving devices and support surfaces	Displayed mattresses/beds/equipment yearly at exposition; provision of bedside consultancy service to troubleshoot devices with staff	Enables demonstration of how and why to choose appropriate bed/equipment
Use of PI prevention equipment wanes during each year	10-minute in-service sessions in wards	Short refreshers remind how to assess and prevent using equipment
Lack of knowledge and skills	Free short courses, longer workshops on PI prevention, tissue viability course linking PI with falls, nutrition and continence	Valuing of nurse knowledge demonstrated by paid attendance and backfilling of their role during their learning; enhancing understanding of factors contributing to PI

sets of the hospital population, especially paediatric and mental health patients. Also, early audits did not specify patients with multiple PIs.

It is important to also consider the possibility that seasonal variation may have been a factor[14,33] that contributed to the reduced PI prevalence since 2011 when the audit was moved from March to November.

CONCLUSION

These results suggest that our hospital's focused management and education strategies have had a positive effect on PI prevalence. However, there is a need to maintain a concerted effort in regard to education, PI prevention, risk assessment and reporting, use of PI prevention equipment and auditing of PI point prevalence. Education, monitoring, reminding and emphasising are able to be undertaken effectively by a nurse-led team, though ongoing executive support is essential for continuance of any team and its maintenance of focus.

The implementation of penalty funding[9,34] for hospital-acquired Stages 3 and 4 PI provides added impetus for early skin inspection and recognition of PI and early implementation of preventative strategies relevant to each patient's risk assessment result. Queensland Health[34] has set escalation key performance indicators of 5% of 2010–2011 actual for Stages 3 and 4 hospital-acquired PI, a 95% reduction, which sets a target of less than one Stages 3 or 4 PI for 2013. Our hospital reported only one Stage 3 PI, on a highly compromised intensive care unit patient, in 2012, which is close to this target. Expert consensus[35] is that some PIs are unavoidable, despite excellent care, especially at end of life and with skin compromise due to hypoperfusion and multi-system failure. Terminal ulcers have long been noted in literature, so funding should be adjusted in line with this unavoidable outcome[35]. However, the main impetus for PI prevention should always be improved patient outcomes and a reduction in adverse events associated with hospitalisation.

RECOMMENDATIONS

Based on our experience, several recommendations are made that may be relevant to other similar facilities.

Firstly, we recommend the use of a standardised audit methodology, especially the staging system used to classify PI, as well as comparison of the size of a facility and the acuity of its patients are important aspects when considering comparability. Whilst it is important to conduct PI prevalence audits, in order to increase their relevance, data showing how PI prevention strategies are meeting current guidelines should also be collected, as well as data on completion of care plans and preventative strategies implemented as a result of risk assessment.

We also recommend the use of a continuing but reflexive education program, which is informed by audit data. Regular focused campaigns are essential to reinvigorate staff awareness of PI prevention. In particular, we have found that our PI skills escalator education program has been an effective means to encourage staff to continue to improve their skills commensurate with their experience and clinical grade.

Table 3: PI audit issue and subsequent PI prevention strategy/equipment/education focus

Year	Main PI issue identified in audit	Major PI prevention strategy/equipment purchased	Major education foci for the next year
2002	Heels, toes main sites	• Heel protectors implemented • Bed cradles purchased	• "Heels, heels, heels" education campaign
2003	Audit the use of sheepskins, egg shell mattresses	• Sheepskins, egg shell mattresses removed • Fleet of alternating mattresses purchased	• Do not use sheepskins, egg shell mattresses • Do a Waterlow risk assessment • Use alternating mattresses for high-risk patients
2005	Heels, ears main sites	• Promote use of PI prevention guidelines and equipment	• Incident reporting/documentation Waterlow risk assessment • Follow policy and guidelines
2006	Lack of 'present on admission' incident reporting and risk assessment	• Promote skin inspection • Purchase more heel protectors	• Focus on assessing "present on admission" PI • Focus on heels and use of heel devices
2007	No audit due to hospital expansion; many new staff	• Introduction of AIMS electronic incident monitoring system	• New staff education: do not use waterproof/ incontinence sheets on mattresses • How to use AIMS
2008	50% prevalence in rehabilitation and extended care units; confusion over which PIs had been reported via AIMS	• District-wide PI prevention committee formed with hospital Executive Nursing Director as chair • Hospital nursing directors required to develop PI prevention action plan for their program • Sticker alert system to note when AIMS report has been made	• Focus education on PI prevention for extended care and rehabilitation units • Continue "no waterproof" campaign and how to use AIMS
2009	High use of incontinence sheets	• Introduction of pH-neutral skin cleansers with built-in moisturiser and water-based barrier • Use of incontinence pads/pants • Elimination of inappropriate skin care and incontinence products	• Focus on standardising of perineal and body hygiene care and management of incontinence-associated dermatitis • Focus on nutrition and use of podiatry services • Introduce profiling beds with split side rails
2010	60% PIs on foot (36% on heel) Little evidence of heel protectors in use	• Review the use of heel protectors • Promote the use of profiling beds	• Promote full skin inspection on admission to hospital as part of routine care, with particular attention to the feet
2011 Mar	Lower prevalence with most being Stage 1 not recorded on incident reporting system	• Protected mealtimes (malnutrition and obesity are major risk factors)	• Promote skin inspection, recognition of Stage 1 and incident reporting • Skills escalator pathway (increasing levels of skill of staff)
2011 Nov	Increased prevalence from March; heels and sacrum again	• Use of heel wedges, sacral borders, gel cushions for head, devices for feet • Nursing directors asked to keep their PI prevention action plans 'alive'	• Skin Assessment: "Look, Listen, Feel" for PI campaign • Posters: o Head, hips and heels o Identifying PIs on foot o Avoiding PIs on foot o Be on the lookout

Finally, we recommend that funding, especially for purchase of equipment, is essential for PI prevention. However, when funding is based on penalties for hospital-acquired PI, then facilities should educate staff on the need to conduct and document skin inspection and risk assessment in a timely manner, and to document the relevant prevention strategies subsequently implemented.

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