

Evaluating the effectiveness of pressure-redistributing equipment for the best clinical and financial outcomes

The recent National Institute of Health and Care Excellence (NICE) guidelines on pressure ulcer (PU) prevention and management highlight the importance of appropriate use of medical devices, including pressure-redistributing equipment, as part of robust, evidence-based care strategies (NICE, 2014). Moreover, the National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance (NPUAP, EPUAP, and PPIA, 2014) state that provision of specialist pressure-redistributing support surfaces, regular repositioning and training of healthcare professionals are all important aspects of PU prevention and management. However, appropriate selection and use of pressure-redistributing mattresses to achieve positive clinical and financial outcomes is a challenge for organisations and staff alike.

This meeting report details results of evaluations undertaken across two centres that assessed pressure-redistributing equipment prescription patterns. These results were presented at the Wounds UK conference in Harrogate in November 2016. The extent of over-prescription of pressure-redistributing devices is discussed, along with the financial and clinical implications, particularly in terms of over-prescription of dynamic and low air loss systems. This report also includes more detail in the form of two case studies of patients nursed on pressure-redistributing surfaces, specifically the Softform Premier Active (SPA2) hybrid mattress (Case Study 1 and Case Study 2).

EVALUATING THE SPA2 MATTRESS

Jackie Stephen-Haynes, Annie Allsopp and Hayley Jones presented results from a series of evaluations exploring the use of the SPA2 mattress within two NHS Trusts:

▶ **Worcestershire Health & Care Trust (WHCT)** has an estimated population of 600,000, covering approximately 560sq miles and six community hospitals. WHCT has been purchasing the

SPA2 for 7 years and uses an algorithm to guide prescribers' pressure-redistributing equipment selection. As recommended in the NICE guidelines (2014), the equipment selection criteria are based on risk, mobility and skin integrity.

▶ **Medway Maritime Hospital** is a general hospital within the Medway NHS Foundation Trust and the largest hospital in Kent, with an estimated 400,000 patients treated at the hospital each year. A recent project entitled 'Gearing Up for Change' saw the SPA2 introduced across 600 beds within the organisation. Adams (2014) demonstrated that this installation would lead to cost savings in excess of £1.85 million over a 7-year period. Medway Maritime Hospital also uses an algorithm to guide prescribers' equipment selection. This states that patients at high risk of pressure damage according to the Braden score (<12) should be nursed on the SPA2 mattress with a pump and a profiling bed, or upgraded to a low air loss system if a patient has specific complications.

WHCT

Online survey

An online survey was undertaken with prescribers of pressure-redistributing equipment over a 7-week period to explore use of the SPA2 mattress within WHCT (Stephen-Hayes et al, 2015). The survey considered the following areas:

- ▶ Rationale (i.e. whether the mattress was prescribed for prevention or treatment)
- ▶ The main medical diagnosis
- ▶ Level of mobility
- ▶ Waterlow score
- ▶ Grade and location of the PU (if present)
- ▶ Level of effectiveness to include comfort, ease of use and repositioning
- ▶ Cleaning and patient transfer
- ▶ Any staff training requirements for use of the SPA2 mattress system.

JACKIE STEPHEN-HAYNES
*Professor & Consultant
Nurse in Tissue Viability,
Worcestershire Health and
Care Trust & Birmingham
City University, Birmingham*

ANNIE ALLSOPP
*Honorary TVN,
Worcestershire Health and
Care Trust and Clinical
Specialist, Invacare® Ltd*

HAYLEY JONES
*Clinical Nurse Specialist
Tissue Viability, Medway
Maritime Hospital, Gillingham*

Case Study 1: Worcestershire Health & Care Trust

A 54-year-old gentleman with a complex past medical history, who has spastic quadriplegia, developed a grade 4 PU to his sacrum (*Figure 1*). The constraints of his condition and lifestyle choices, including frequent trips away, made treatment challenging. Coupled with faecal incontinence and the position of the PU, a positive clinical outcome was expected to be slow. Despite provision of appropriate advice, dressings and an alternating air mattress, the wound deteriorated and an alternative mattress was requested to improve comfort and sleep. The patient was prescribed a SPA2. He described the effect of the mattress and its benefits as instantaneous: his sleep improved as there was no noise from the mattress and he did not experience gravitational shift from his initial position. The patient went on to say: *“there is no way this mattress is going to be taken away”*. The grade 4 PU showed substantial signs of healing following prescription of the SPA2 (*Figure 2*) and the patient’s pressure areas continue to be managed successfully.

Results

Twenty-two surveys were completed by prescribers. The SPA2 had been prescribed for many patients who were seriously compromised, with eight receiving palliative care, six with motor/sensory issues, three with single or multiple organ failure, two with terminal cachexia, two who were elderly/frail and one orthopaedic patient. Six patients had existing PUs, grade 2 ($n=3$) and grade 3 ($n=3$), for which a 100% positive effect was seen across the study. Indeed, a 50% healing response was seen within 2 weeks.

For 75% of respondents, the SPA2 had been prescribed to improve patient comfort, while in 73% of cases, the SPA2 was selected to prevent PU development. These choices led to over-prescription of the mattress, since the Trust algorithm suggested a high specification foam surface was sufficient for PU prevention. It was also noted that 86% of prescribers said they required no further training for use of the SPA2.

Retrospective audit

In response to these results, a retrospective audit was conducted to review the appropriateness of SPA2 allocation within WHCT. The SPA2 had been prescribed for 411 patients over a 12-month period (2014–2015). Of these, 198 patients had PUs at grade 1 ($n=76$), grade 2 ($n=95$), grade 3 ($n=21$) and grade 4 ($n=6$).

Results

Effective healing results were seen for many patients with severe PUs nursed on the SPA2. Of the 21 patients with grade 3 PUs, eight healed, five were healing and seven were maintained (one was transferred onto an air mattress). The six patients with grade 4 PUs also achieved positive healing results. In addition, the

data showed that, in line with the Trust’s equipment selection algorithm, patients were often allocated the SPA2 mattress as they were unable to tolerate alternating pressure systems.

These results prompted a review of the Trust’s algorithm, specifically for treatment of grade 4 PUs and for patients unable to tolerate alternating systems. Accordingly, the algorithm has now been amended to include the SPA2.

MEDWAY MARITIME HOSPITAL

Retrospective audit

Similar investigations were conducted at Medway Maritime Hospital. A 12-month audit reviewed use of the SPA2 for severe PUs at the hospital, showing it to be clinically effective in this population. During the study, three grade 4 PUs were documented, all of which healed. Positive results were also seen for grade 3 PUs: of 19 patients, 12 were transferred, four healed, and two were healing (one patient died). These results prompted the Trust to question whether an alternative to the SPA2 was really needed. A review of rental low air loss systems recommended on the Trust algorithm was initiated as a result.

Review of low air loss systems:

Data were gathered for a period of 1 month, detailing the ward, prescriber, patient’s age, sex and medical history, reason for admission, level of mobility, Braden score, weight, grade and location of PU, continence status and presence of moisture lesions.

Results

Seventeen patients (11 males and six females) aged 32 to 94 years (average: 76 years) were prescribed low air loss systems. Medical history, comorbid conditions



Figure 1: Sacral pressure ulcer prior to being nursed on the SPA2 mattress



Figure 2: Sacral pressure ulcer showing signs of healing following prescription of the SPA2 mattress

This meeting report was supported by Invacare Ltd.



Figure 3: Healed sacral pressure ulcer following prescription of the SPA2 mattress



Figure 4: Healed hip pressure ulcer following prescription of the SPA2 mattress

Case Study 2: Medway Maritime Hospital

An unresponsive 67-year-old female was admitted to hospital from a care home. She had been diagnosed with a cerebrovascular accident, was bedbound, PEG-fed, catheterised and had faecal incontinence. She also had type 2 diabetes, advanced frailty, likely aspiration pneumonia and hypernatremia. She had a grade 4 PU to her sacrum, a grade 2 PU to the right foot and a moisture lesion to the buttocks. On admission, she was prescribed an SPA2. Healing was achieved to the sacrum within 1 month (*Figure 3*), and she was discharged 1 week later with intact skin. Within the month, the patient was readmitted from the care home with multiple pressure ulcers, including grade 3 damage to the right hip and grade 2 damage to the right foot. Again, she was prescribed a SPA2 and catheterised to manage her urinary incontinence. In less than 2 weeks, the patient was discharged with pressure areas intact (*Figure 4*). Approximately 1 month later, she was readmitted from the care home with a grade 2 PU to the buttocks. The patient passed away during this stay.

and reasons for admission varied: 100% of patients were bed- or chair-bound, 71% were incontinent, 18% had a moisture lesion and 24% had grade 2 PUs (in various locations). Braden scores varied between 11 and 18, with no 'very high-risk' scores. Patients varied in weight, with one weighing <40kg. In total, 65% of patients had intact skin and 89% had superficial pressure damage.

Results confirmed that only four patients required use of a low air loss system based on the algorithm's criteria: end-of-life/palliative care or weight <40 kg. These data suggest a 76% over-usage of low air loss systems in 1 month, leading to unnecessary patient disturbance, increased staff time and additional financial burden.

Questionnaire

Further analysis was needed to fully understand the over-prescription of low air loss systems at Medway Maritime Hospital and the potential for cost savings if this could be corrected. As such, a questionnaire was given to 52 prescribers, asking why they would choose a low air loss mattress: to improve comfort, to improve skin integrity, the patient is underweight, the patient is receiving end-of-life care, or for another reason.

Results

The main reason cited for choosing a low air loss mattress was to improve skin integrity (39 cases), followed by the patient being underweight (26 cases). End-of-life care and comfort were stated in 24 and 18 cases, respectively. Other reasons given included the patient being overweight, to relieve pressure and to prevent skin breakdown.

However, the data for monthly usage actually showed that 65% of patients had intact skin and only

one patient weighed <50kg. As such, the rationale for choosing low air loss systems did not correlate with the data collected. Indeed, there was a 95% rate of over-prescription based on the Trust's equipment selection algorithm.

COMPARISON OF EQUIPMENT CHOICES

To further explore the disparities between rationale and prescription of equipment across these two locations, questionnaires were provided to prescribers. Twenty-three questionnaires ($n=46$) were completed at each centre by prescribers including staff nurses, charge nurses, healthcare assistants, paediatric nurses and tissue viability nurses. *Table 1* and *Table 2* provide a comparison of equipment selection choices between WHCT and Medway Maritime Hospital.

Clinicians at WHCT considered the grade of PU and patient weight the most important factors for equipment choice. Less than half the respondents reported having received training in the past 2 years, but only a small proportion reported lack of confidence and competence in prescribing equipment. A high percentage reported they use the Trust algorithm to make equipment choices. Training and education have been available for several years and the low numbers of prescribers reporting to have received training in the last 2 years may reflect the recommended 3-year update period.

Similarly, prescribers at Medway Maritime Hospital considered grade of PU and patient weight the most significant factors affecting equipment choice. Despite 83% of respondents reporting they had received training within the past 2 years, around a third reported lack of confidence and competence prescribing equipment. Only 52% of

Table 1. Equipment selection comparison based on questionnaire feedback

	Medway	WHCT
Proportion of respondents who had received training in the last 2 years	83%	48%
Proportion who felt they were not <i>confident</i> to prescribe	26%	13%
Proportion who felt they were not <i>competent</i> to prescribe	30%	9%
Proportion who were aware of the available equipment choices	48%	87%
Proportion who use the equipment algorithm	52%	87%
Proportion who are aware of the NICE, EPUAP, and MHRA guidelines for PUs	48%	48%
Proportion who would go to a tissue viability nurse first when seeking advice	48%	39%

Table 2. Factors influencing equipment choice

	Medway	WHCT
First factor influencing choice	Grade of PU – 39%	Grade of PU – 43%
	Mobility – 9%	Mobility – 22%
	Risk assessment – 22%	Risk assessment – 13%
Other factors influencing choice	Weight – 48%	Weight – 31%
	Ease of repositioning – 22%	Ease of repositioning – 13%
	Comfort – 17%	Comfort – 9%

prescribers reported they used the Trust algorithm to make equipment choices, due to lack of awareness of the document.

CONCLUSION

The data presented in this article suggest that over-prescription of pressure-redistributing equipment is a problem for healthcare Trusts, which could have a dramatic effect on both clinical and financial outcomes. As discussed, at WHCT there is an estimated 73% over-prescription of the SPA2. If the correct piece of equipment was allocated, such as a high specification foam mattress, the Trust could reduce annual spend by 31%, **saving in excess of £41k per annum**. Furthermore, at Medway Maritime Hospital, there is an estimated 76% over-usage of rented low air loss mattresses, which are listed on the Trust algorithm. **Correcting this could save an estimated £91K per annum**.

To address issues of over-prescription of pressure-redistributing equipment, healthcare professionals must understand why it is important to prescribe appropriate equipment and how to make the right choice. The correct equipment should be selected on the basis of risk, mobility, skin condition, and grade and location of PU. Algorithms support sound decision-making in order to achieve effective outcomes.

Confirmation that guidance is being followed and monitoring of prescription patterns is paramount to ensure resources are being deployed appropriately; concern can be alleviated by ensuring that nursing staff are fully utilising the Trust algorithm. With regular reference and adherence to set criteria, equipment can be prescribed appropriately, ensuring improved patient outcomes and safeguarding financial outlay. 

REFERENCES

- Adams N (2014) *Gearing Up For Change*. Poster presented at Wounds UK. Available at: <http://bit.ly/11fx2mx> (accessed 26.01.17)
- National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance (NPUAP, EPUAP, PPIA) (2014) *Prevention and Treatment of Pressure Ulcers: Quick Reference Guide*. Emily Haesler (ed). Cambridge Media: Osborne Park, Western Australia
- National Institute for Health and Care Excellence (2014) *Pressure Ulcers: Prevention and Management [CG179]*. Available at: <https://www.nice.org.uk/guidance/cg179> (accessed 26.01.17)
- Stephen-Haynes J, Callaghan J, Allsopp A (2015) A retrospective analysis of the use of the Softform® Premier Active 2 in an NHS Trust. *Wounds UK* 11 (4): 82–8