

Reducing hospital-acquired pressure ulcers: the business case for purchasing new technology

KEY WORDS

- ▶ Clinical efficiency
- ▶ Financial efficiency
- ▶ Hospital-acquired pressure ulcers
- ▶ Pressure ulcer prevention
- ▶ Technology

There is considerable variation in the way pressure ulcer prevention and management are handled within individual organisations. In an effort to improve efficiency and make cost savings, an NHS Trust identified processes that could be simplified, reviewed its equipment contracts and assessed new technology to reduce hospital-acquired pressure ulcers. The decision was made to downgrade existing contracts to cover decontamination and maintain old equipment and to purchase hybrid mattresses, which it was estimated would prevent 17–39% of hospital-acquired pressure ulcers, returning cost efficiencies of £740,100–£1,694,29. Taking into account the cost of the downgraded contract, this could realise a cost saving of £1,400,731.50 over 7 years and enable the Trust to achieve its pressure ulcer reduction targets.

Healthcare in the UK faces increasing demands due to the complexity of individuals' health needs; significant changes in treatments, technologies and the way care is delivered; and, of course, ever-increasing financial pressures. Organisations are required to drive quality improvements without additional resources and frequently against a target of significant financial savings (Sustainable Improvement Team and Horizons Team, 2017).

The Carter report (Department of Health [DH], 2016) states that significant unwarranted variation in the NHS has resulted in both clinical and financial inefficiencies and specifically suggests that there is immaturity in Trusts' use of technology. One of the key recommendations of the report is that system structures should be simplified to maximise capacity. Trusts should also identify where there are quality and efficiency opportunities for better collaboration and coordination of clinical services across local health economies so that they can better meet the clinical needs of the local community. The Triple Aim first put forward in the *Five Year Forward View* (NHS England, 2014) focuses on how high-quality care is intimately related to better use of resources (including both staff and equipment), which will result in a better patient experience and ultimately lead to better outcomes.

PRESSURE ULCER PREVENTION

Pressure ulcer prevention is an area of high complexity, with staff often dealing with complex patients with complex needs in complex environments (Raine et al, 2016). There is considerable variation in the way prevention is managed and reported within individual organisations (Smith et al, 2016) despite ongoing focus on the reduction of pressure ulcer occurrence, for example with a national Commissioning for Quality and Innovation (CQUIN) target being in place for 3 years in England. Both the prevention and management of pressure ulcers result in high costs for organisations, with the bulk spend in acute care being on the provision of specialist mattresses and seating. Preventative actions are labour intensive and consume large amounts of clinical time due to the assessment of risk, obtaining equipment, patient repositioning, skin checks and maintaining comprehensive documentation. Many organisations see this clinical speciality as an area where quality improvements and efficiencies can be made.

IDENTIFYING INEFFICIENCIES WITHIN A LONDON TRUST

London North West Healthcare NHS Trust comprises three main hospital sites: Northwick

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Table 1. Hospital-acquired pressure ulcer costs (Dealey et al, 2012)

Pressure ulcer category	Cost
1	£1,214
2	£5,241
3	£9,041
4	£14,108
Average cost	£7,401

Park, Central Middlesex and Ealing. While the hospitals sit within the same organisation, the way they procure their pressure ulcer prevention equipment is not aligned despite all sites contracting their equipment from the same provider. This is a historical aberration, with the contracts having been agreed almost 20 years ago. Northwick Park and Central Middlesex joined in a single lease contract while Ealing took out a separate rental contract with different equipment and terms and conditions. These long-term arrangements were put in place without considering how advances in technology may be able to assist the Trust achieve quality targets.

The complex arrangements for obtaining static and dynamic equipment have resulted in unnecessary expenditure on resources, products and decontamination. Ealing has experienced escalating demand for equipment and Central Middlesex and Northwick Park have identified inefficiencies relating to the off-site decontamination of equipment and personnel specifically employed to move equipment around the hospitals. In addition to this, staff identified how cumbersome and inefficient processes were relating to patient and equipment moving and handling. These inefficiencies have been reported elsewhere (Jones and Fletcher, 2014). It was believed that these inefficiencies could be significantly improved with a change in technology.

Audit results

A Trust-wide audit in 2015 identified that, despite the high spend, the Trust was not meeting its own target of a 10% reduction in the incidence of hospital-acquired Category 3 and 4 pressure ulcers. In fact, in 2016/17 the auditors were looking at a 61% increase against the previous year's data.

In January 2016, 81 patients had pressure ulcers of Category 3 and above and there was only sufficient equipment available for one-quarter of these individuals. In addition to this issue, much of the equipment was old (some pieces were over 15 years old) and not well maintained due to the lack of a maintenance contract. The 25-year contract that the Trust had previously entered into provided 80 dynamic overlays and 60 high-specification foam mattresses, but this was far from meeting the needs of the Trust's 700 patients.

TAKING ACTION

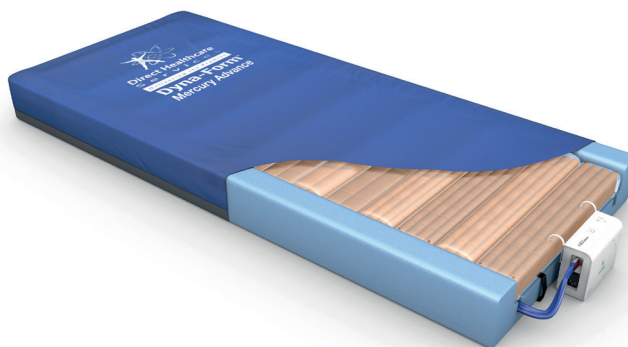
As with the majority of NHS organisations, the Trust faced severe financial pressures and there was no funding available to purchase additional equipment. A meeting was held between the lead tissue viability nurse and the finance team to discuss how pressure redistribution equipment could be funded within existing budget constraints. One option considered was to move from the existing rental contract to the purchase and use of hybrid mattresses. The existing specialist mattresses owned by the organisation would be allocated on a permanent basis to intensive care areas. While this would have a higher initial investment, the year-on-year costs for hybrid mattresses would be lower than incurred by the rental agreement and there would be cost saving within 5 years. This technology had been implemented in a neighbouring Trust and in other areas in the UK with great success (Jones and Fletcher, 2014; Fletcher et al, 2015; Selby, 2015).

It was not possible to change the contracts to provide hybrid mattresses as the existing supplier did not have hybrid technology within its portfolio. The contract was therefore downgraded to ensure the provision of decontamination and maintenance of equipment the Trust had previously purchased. An evaluation of several powered hybrid mattresses was carried out and a supplier day held at which all of the nine potential suppliers were questioned by the Trust staff about contracts, service provision and the level of evidence they had to support the use of their products.

The business case

Following the evaluation, a business case was put forward to replace the leased/rented alternating systems. Based on the data supplied (Jones and Fletcher, 2014; Fletcher et al, 2015; Selby, 2015) it was calculated that use of the hybrids could result in a 17–39% reduction in hospital-acquired pressure ulcers (HAPUs). If London North West Healthcare NHS Trust realised a reduction of the lower estimate of 17%, this would eliminate 100 HAPUs, returning cost efficiencies of £740,100 using the average cost of a HAPU (Dealey et al, 2012), see *Table 1*. A reduction based on the higher estimate of 39% would potentially eliminate 229 HAPUs, therefore saving £1,694,829. If the use of the

Box 1. The Dyna-Form® Mercury Advance (Fletcher et al, 2015)



Consisting of a series of foam and air cells, the Dyna-Form Mercury Advance is a powered hybrid mattress replacement system. The attachment of the pump effectively provides a layer of alternating cells above the foam. This allows the patient to be upgraded from a high-specification foam-replacement to an alternating mattress simply by attaching the pump.

hybrid mattresses reduced the number of patients developing pressure ulcers, there would also be a reduction in the number of patients with delayed transfers of care or extended lengths of stay due to their pressure ulcer, adding to these savings.

Theisen et al (2012) reported that patients who developed a pressure ulcer had a longer overall hospital stay (19.0 versus 9.9 days). This finding is supported by the National Institute for Health and Care Excellence 2014 costing statement for pressure ulcers, which suggests that by reducing the incidence of pressure ulcers, commissioners could make savings from a reduction in excess bed day payments to hospitals where patients' length of stay exceeds the Healthcare Resource Group trim point. Using these data and the DH's (2014) average excess bed day cost of £273 in London, it was concluded that each pressure ulcer avoided would free up 9 bed days, providing a cost efficiency of £2,457 per HAPU avoided. Using the lower estimate of a 17% reduction in HAPUs, this would release 990 bed days and deliver an associated cost saving of £270,270. Using the higher estimate of a 39% reduction in HAPUs, this would release 2,061 bed days and deliver an associated cost saving of £562,653. This would also allow the Trust to achieve its CQUIN target and draw down the associated payment.

Real cost reduction was predicted against changes to the existing contract, which was due to cost the organisation £2,135,731.50 in the 7 years remaining. A cost-benefit analysis was performed to ensure positive savings could be released. The outlay for the new technology would be £360,000, with a minimum of 2 years with no service costs. Within the first 2

years, there was a potential £610,209 saving to be made on service costs. The service costs for the 5 years remaining on the existing contract would amount to £3,051,045 in comparison to maintenance of the new technology at £375,000, offering a 5-year saving of £2,676,045. By making the change, the Trust would see an overall cost saving of £1,400,731.50 over 7 years.

Procurement

Once the business case had been agreed, the tissue viability nurse worked closely with the local procurement team to specify tender requirements. As it met the tender and had the strongest clinical evidence base, the contract was awarded to Direct Healthcare Group, and the Dyna-Form Mercury Advance mattress was purchased (Box 1).

Implementation

Installation of the new equipment took place in April 2017 across the three sites alongside supporting education and clinical support.

Ahead of the new mattress installation, staff education was provided in three ways:

- ▶▶ Ward-based training, where the tissue viability team and nursing director prepared clinical staff for the new equipment.
- ▶▶ Development and implementation of the pressure ulcer wheel, *Figure 2*, which assisted staff with categorisation and equipment selection.
- ▶▶ Large-scale training in the Trust's main auditorium, which was delivered to approximately 700 staff within the first week. This covered what equipment to use, how to

REFERENCES

Clancy MJ (2013) Pressure redistribution devices: what works, at what cost and what's next? *J Tissue Viability* 22(3):57–62

Dealey C, Posnett J, Walker A (2012) The cost of pressure ulcers in the United Kingdom. *J Wound Care* 21(6):261–2,264,266

Department of Health (2014) *NHS Reference Costs 2013 to 2014*. Available at: <http://bit.ly/2n6oudT> (accessed 26.10.2017)

Department of Health (2016) *Operational Productivity and Performance in English NHS Acute Hospitals: Unwarranted Variations. An Independent Report for the Department of Health by Lord Carter of Coles*. Available at: <http://bit.ly/2yN0rqV> (accessed 05.10.17)

Fletcher J, Gefen A, Jones L et al (2015) Hybrid support surfaces made easy. *Wounds International* (Suppl): 1–6

Fletcher J, Tite M, Clark M (2016) Real-world evidence from a large-scale multisite evaluation of a hybrid mattress. *Wounds UK* 12(3):78–85

Jones L, Fletcher J (2014) Improved patient experience and outcomes using Dyna-Form™ Mercury Advance mattress. *Wounds UK* 10(4):97–101

NHS England (2014) *Five Year Forward View*. Available at: www.england.nhs.uk/wp-content/uploads/2014/10/5yfv-web.pdf (accessed 05.10.17)

National Institute for Care and Excellence (2014) *Costing Statement: Pressure Ulcers. Implementing the NICE guideline on Pressure Ulcers (CG179)*. Available at: www.nice.org.uk/guidance/cg179/resources/costing-statement-248688109 (accessed 05.10.17)

Pagnamenta F (2017) The provision of therapy mattresses for pressure ulcer prevention. *Br J Nurs* 26(6):S28–S33

Raine R, Fitzpatrick R, Barratt H et al (2016) Challenges, solutions and future directions in the evaluation of service innovations in health care and public health. *Health Serv Deliv Res* 4(16):xiii–xiv

Selby T (2015) *12 Month Follow up of Hybrid Mattress Technology*. Presented at: Wounds UK Conference, Harrogate, UK, 9–11 November

Smith IL, Nixon J, Brown S et al (2016) Pressure ulcer and wounds reporting in NHS hospitals in England part 1: Audit of monitoring systems. *J Tissue Viability* 25(1):3–15

Sustainable Improvement Team and the Horizons Team (2017) *Leading Large Scale Change: A Practical Guide*. NHS England. Available from www.england.nhs.uk/wp-content/uploads/2017/09/leading-large-scale-change-practical-guide.pdf (accessed 05.10.17)

Theisen S, Drabik A, Stock S (2012) Pressure ulcers in older hospitalised patients and its impact on length of stay: a retrospective observational study. *J Clin Nurs* 21(3-4): 380–7



Figure 2. The pressure ulcer wheel has assisted staff with ulcer categorisation and equipment selection

use it and why it was appropriate for particular groups of patients.

Feedback from clinical staff was positive, with demand for additional higher-specification equipment being made within a week. There was also positive feedback from ward staff. Staff are no longer reporting problems obtaining equipment and delays in equipment provision does not feature within root cause analysis processes. However, the implementation of the mattresses was not without challenges. On the advice of the infection prevention and control team, the equipment was cleaned with wipes that had inconsistent strengths of solution, which led to several covers becoming damaged and, therefore, exposed to potential strikethrough. This was quickly rectified through collaboration between the nursing director, tissue viability, infection prevention and control team, and the mattress company.

Currently, the Trust is on target for achieving the predicted pressure care equipment spend reduction, while closely monitoring pressure ulcer incidence. Anecdotally, it appears that the numbers are reducing but the first large-scale prevalence study is not scheduled until March 2018.

DISCUSSION

Driving down the number of HAPUs is an ongoing target across not only the NHS but healthcare organisations worldwide. Achieving year-on-year reductions becomes increasingly difficult as the patients that continue to develop HAPUs despite preventative action are among the most complex.

While the use of equipment is only one component of a good pressure ulcer prevention strategy, for many it is a key element. To function efficiently, the equipment must be in good working order and the process of use must be efficient. Many organisations over the past decade have invested heavily in high-specification equipment that has changed little in design or specification (Clancy, 2013; Pagnamenta, 2017). Challenging the traditional model of prevention has not been easy, however the new hybrid mattresses provide a logical mechanism with which to replace systems that rely on multiple pieces of equipment being selected and changed to meet patient requirements. Using the hybrids streamlines the approach, reducing staff decision making and workload. It also reduces the amount of disturbance to patients, thus reducing associated discomfort (Fletcher et al, 2016).

CONCLUSION

Preventing the occurrence of pressure ulcers in large organisations can be a complex activity. The use of long-term contracts, while initially appearing to be financially prudent, can result in cost inefficiencies over time and prevent an organisation from using innovative new products. In this instance, through negotiation and the development of a robust cost model the team were able to downgrade an existing contract and purchase new hybrid equipment for the total bed stock (with the exception of the small number that used the previously-purchased alternating systems). This has resulted in financial and clinical benefits across the board. **WUK**