

Putting patients first: reducing the human and economic costs of wounds

This article proposes a systematic, measured and disciplined approach to wound care in order to maximise efficiency and reconcile the apparently conflicting issues of dwindling resources and increasing demand for quality care. This integrated approach to wound care would use advanced wound care techniques and products in accordance with best practice guidelines and support appropriate use through a programme of education and training. The effectiveness of this approach in changing practice would be underpinned via an ongoing process of monitoring and evaluation.

Jackie Stephen-Haynes, Alistair Bielby, Richard Searle

KEY WORDS

Quality of care
Human cost
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Wounds of one form or another affect a substantial proportion of the population and impose a considerable financial burden on the healthcare system. Estimates of the number of individuals affected run into the hundreds of thousands at any one time within the UK alone (Posnett and Franks, 2007). However, in the authors' opinion, the care and management of wounds is diverse and highly variable across healthcare providers in the UK. As Edwards et al (2005) identified, many nurses have a limited knowledge of wound management. It is probable that such inconsistencies in knowledge will be reflected in a variability in practice.

Jackie Stephen-Haynes is Professor in Tissue Viability, Professional Development Unit, Birmingham City University and Consultant Nurse, Worcestershire Health Care NHS Trust; Alistair Bielby is Clinical Project Manager, Smith and Nephew Healthcare Ltd; Richard Searle is Health Economics Manager, Smith and Nephew Healthcare Ltd, Hull

This article proposes a systematic, measured and disciplined approach to wound care to maximise efficiency. In the authors' opinion, this can be achieved through collaboration, best practice, appropriate product use, education and measurement. In this way, tissue viability practitioners can demonstrate that it is possible to both increase the quality of care and optimise the use of resources.

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While many wounds heal in a timely fashion without incident, a proportion will fail to follow the normal wound healing trajectory to attain wound closure within the anticipated time-frame (World Union of Wound Healing Societies [WUWHS], 2008). This includes chronic wounds such as leg ulcers, pressure damage and diabetic foot ulcers. However, even the healing of a planned wound created deliberately by

a healthcare professional, e.g. a surgical incision, may be disrupted as a result of complications such as surgical site infection (SSI) (Downie et al, 2010). With the incidence of wounds being fragmented across various different subsets of the population, their impact remains largely hidden and the human and economic burden imposed by wounds is under-appreciated and poorly understood by policy makers (Posnett and Franks, 2007).

The human cost of wounds

The human cost of wounds is substantial, as individuals who live with a wound will testify. When reviewing the literature, Persoon et al (2004) found 37 studies identifying leg ulceration as a threat to physical functioning, with a negative impact on psychological and social functioning including pain, sleep disturbance, reduced energy, limited work and leisure, worries, frustration and a lack of self-esteem. Moffatt et al (2009) in a study of 95 patients with leg ulceration identified that patients experience poor psychological health with a greater risk of depression, less perceived social support and greater social isolation, and concluded that systems of care should offer an environment that reduces social isolation and increases support to this patient group.

The impact of pressure ulceration on patients was researched by Hopkins et al

(2006), who identified the significance of pressure ulceration for patients as having three key themes:

- ▶▶ Pressure ulcers produce endless pain
- ▶▶ Pressure ulcers produce a restricted life
- ▶▶ Coping with a pressure ulcer.

Similarly, Spilsbury et al (2007) noted the impact of pressure ulceration on patients and reported that:

- ▶▶ 91% (n=21) indicated that the pressure ulcer and its treatment affected their lives emotionally, mentally, physically and socially
- ▶▶ Concerns were pain (experienced by 91%), appearance, smell and fluid leakage
- ▶▶ Patients received a varying quality of care, and described the levels of comfort of dressings and pressure-relieving equipment and the timing of interventions
- ▶▶ Patients were largely dependent on others to treat, manage and care for their ulcer
- ▶▶ Pain, discomfort and distress of pressure ulcers were not acknowledged by nursing staff
- ▶▶ Pressure ulcers could be pivotal in preventing full recovery, were perceived to increase hospital stays and resulted in ongoing treatments.

Physical effects such as pain, odour and immobility are compounded by psychosocial issues (Persoon et al, 2004), particularly where wounds have remained unhealed over months, and in some cases, years. Patients may become depressed and feel that their dignity is compromised, and in some cases withdraw from participation in society (Moffatt et al, 2009). In addition, complications may have severe consequences such as limb amputation and may increase mortality risk. When applied to the significant proportion of the population who live with a wound, these effects represent a considerable burden on society, for example:

- ▶▶ The annual incidence of venous leg ulcers has been estimated as at least 100,000 (Posnett and Franks, 2007). Venous ulceration arises as a consequence of underlying venous

insufficiency, a chronic condition. In the absence of appropriate and effective management, patients may experience recurrent episodes of ulceration over a protracted period of time (Moffatt et al, 2009)

- ▶▶ In the case of pressure-related skin breakdown, over 400,000 individuals develop a pressure ulcer each year in the UK (Posnett and Franks, 2007). Pressure ulceration may arise over a short period of time, and yet result in increased susceptibility to infection, which may ultimately threaten the life of the patient
- ▶▶ A conservative estimate of the numbers of diabetic foot ulcers (DFUs) suggests that at any one time 64,000 people have active ulceration. Among patients with DFUs, over 2,000 foot amputations are performed annually in the UK (Posnett and Franks, 2007)
- ▶▶ Surgical site infections (SSIs) are one of the most important causes of healthcare-associated infections (HCAIs), accounting for about 14% of all HCAIs (National Institute for Health and Clinical Excellence [NICE], 2008). The clinical impact of an SSI is likely to be considerable (Department of Health [DH], 2008a), and further consequences such as increased length of inpatient stay can result. Coello et al (2005) estimated that for those individuals that present with an SSI pre-discharge, the length of post-operative hospital stay is likely to double.

The economic cost of wounds

Wound care accounts for a substantial proportion of the NHS budget. Posnett and Franks (2007) estimated the annual expenditure for the care of chronic wounds to be £2.3–3.1 billion at 2005/6 prices, representing approximately 3% of the NHS budget at the time. It has been calculated that the cost of treating an episode of grade 4 pressure ulceration is approximately £10,500 (Bennett et al, 2004). The annual economic impact of SSIs on the NHS in the UK is likely to be around £700 million (Leaper et al, 2010), each SSI costing the health service £3,500 (NICE, 2008). The cost of a day's hospital stay for wound-related

admissions is estimated to be £288 (Vowden et al, 2009), and for treatment in high-dependency or intensive therapy units, this cost will clearly be higher. Any delay in discharge from hospital will therefore have a significant cost impact. Wound complications can also lead to emergency admissions to hospital and their associated costs. For example, the national reference cost for an amputation with major complications is £12,131, with 31 days' length of stay. Foot procedures for diabetes or arterial disease are costed at £4,803, with 13 days' length of stay (DH, 2010a). In community care, some wounds continue to be treated for many years as a consequence of non-healing. This has wide-reaching cost implications, especially if dressings are changed frequently in the patient's home by nursing staff. It is important to take these labour costs into consideration, since they represent the value of the opportunity cost of nursing time.

For individual healthcare providers within the NHS, the annual cost attributable to wound care has been shown to be substantial. For example, in Bradford and Airedale Primary Care Trust in 2006–7, covering both acute and community healthcare providers, this cost was estimated to be £9.89 million (£2.03 million per 100,000 population) (Vowden et al, 2009). A similar earlier estimate in Hull and the East Riding showed the cost attributable to wound care in 2005–6 to be £2.5–3.1 million per 100,000 population (Drew et al, 2007). These important studies illustrate the financial impact of wounds within the NHS. However, notwithstanding these estimates, the crucial contribution which effective wound management can make to patient care remains largely unrecognised.

Challenges facing wound management within the NHS

The NHS is faced with the challenge of delivering the highest quality of care while improving efficiency (DH, 2010b). This challenge stems from the discrepancy between the increasing level of demand for healthcare resources due to demographic and

technological change (such as increased prevalence of chronic disease and availability of information about new technologies), and the ability of the NHS to meet this demand. In England, the recent White Paper, *Equity and Excellence: Liberating the NHS*, outlined the government strategy to address these issues which is centred upon efficiency improvements (DH, 2010b). Although a short-term increase in healthcare expenditure has been pledged, the government has stated its intent to make savings in England through enhanced efficiency of up to £20 billion by 2014, while simultaneously achieving an improvement in patient experience and outcomes for all (DH, 2010b). The White Paper sets out a framework approach in which the delivery of improved outcomes is supported via a system of quality standards (DH, 2010b). In the authors' opinion, attaining these goals while maintaining the fundamental principles of the NHS, such as equity of access to healthcare resources, represents a significant challenge.

Wound management is subject to the same constraints currently confronting the wider NHS. Within any health system such as the NHS which has an allocated budget, wound management must compete for resources with other clinical disciplines. In consequence, funding allocated to wound management tends to be disproportionate to the considerable impact wounds exert both physically and financially, and in the authors' experience, there is considerable pressure to reduce wound care expenditure, including wound management products. Faced with the need to reconcile this disparity between funding and the increasing demand for quality care, it is understandable that practitioners may feel somewhat overwhelmed. However, they are supported by both advances in dressing technology and opportunities to work in closer collaboration with industry to support the delivery of optimal care and demonstrable outcomes. Such an approach affords the possibility

of solving the apparent dilemma of how to maintain quality of care, while responding to necessary cost pressures.

Economic drivers in wound care

Wound care is complex and practice is highly dependent on factors such as the specific wound aetiology, the setting for care delivery, and the wide range of clinical challenges which will be unique to each individual treated. A number of key drivers, related to clinical practice and its consequences, influence both the human and economic costs of wound care. These drivers of cost in wound care are common to the majority of wound care settings (Table 1), and have been discussed in previous literature (Drew et al, 2007; Posnett et al, 2009).

Various components contribute to the total cost incurred in the management of a wound, namely:

- ▶▶ Nursing and other labour costs incurred as a result of dressing changes and other face-to-face patient contact. These may involve home visits by district nurses, treatment in hospital, or treatment in outpatients departments, wound care clinics or GP practices
- ▶▶ Costs incurred as a result of admission to hospital, which may include surgical interventions, clinical investigations and so-called 'hotel costs' related to patient accommodation
- ▶▶ Dressings and other consumable items
- ▶▶ Use of equipment, such as specialised

Table 1
Drivers of cost in wound care

Cost driver	Effect on economic cost	Effect on human cost
Frequency of dressing change	<i>Higher frequency means:</i> Increased dressing cost per week Increased nursing costs May lead to an increased risk of complications due to increased frequency of wound exposure	<i>Higher frequency means:</i> Inconvenience of multiple appointments Physical and emotional impact of repeated dressing removal and application Increased risk of complications and their human consequences (see below)
Duration of treatment	<i>Longer duration means:</i> Increased nursing and dressing costs and may lead to increased risk of complications	<i>Longer duration means:</i> Psychological and emotional effects of a protracted treatment period Increased risk of complications and their human consequences (see below) Reduced quality of life for an indeterminate period (e.g. reduction in mobility, pain, inability to work)
Complications such as wound infection	<i>Complications may lead to:</i> ▶▶ Hospital admission ▶▶ Surgical intervention ▶▶ Extended period of treatment ▶▶ Increased use of other resources such as antibiotics	<i>Complications may lead to:</i> ▶▶ Reduced quality of life ▶▶ Pain ▶▶ Increased morbidity/mortality ▶▶ Lifelong consequences such as limb amputation ▶▶ Iatrogenic complications

beds, mattresses and offloading devices.

Although dressings represent a relatively small proportion of the total cost of wound care, the process of dressing selection and the way in which dressings are used can exert a disproportionately large influence on the other cost components. It is clear that dressing choice and practice are fundamental to optimal wound care, and even marginal deviations from appropriate dressing selection and practice may lead to substantial increases in other costs in both human and economic terms.

Given the above, a strategy aimed at reducing the overall cost of wound care which focuses solely on the acquisition cost of dressings and consumables is unlikely to succeed. This is largely due to the limitations (for example, fluid-handling capability) which low-cost non-advanced generic and derivative products will impose upon wound management practice. No one dressing is suitable for the management of all types of wounds, and few are ideally suited for the treatment of a single wound during all stages of the healing cycle. Successful wound management requires a holistic assessment, differential diagnosis, and a thorough and accurate wound assessment, with a flexible approach to the selection and use of products. This must be based upon an understanding of the healing process and an acknowledgement of the properties of the various dressings available. Without such knowledge and careful consideration, dressing selection is likely to be arbitrary, potentially ineffective, and wasteful both in terms of time and physical resources (Thomas, 1997).

These product-associated constraints are likely to result in an increase in total treatment costs and a concurrent reduction in the quality of patient care. For example, a non-advanced dressing which requires more frequent dressing changes than an advanced dressing may lead to increased nursing costs. This was demonstrated by Payne et al (2009), who compared the use of a modern foam dressing with non-advanced

wound care in the treatment of pressure ulcers. The average total cost per week was 56% lower in the foam dressing group compared with the comparator group. This reduction is largely driven by the lower dressing change frequency required for the use of foam dressings. Interestingly, in addition to a reduction in the cost of nursing time, there was a reduction in the average cost of materials per week (45% lower for the foam group compared with the non-advanced group).

A model for optimal wound care: practice, patient and product

If wound management were to be simplified to its constituent parts, it would comprise three key elements (Figure 1):

- ▶▶ The patient receiving treatment
- ▶▶ The products being employed in delivery of that treatment
- ▶▶ The practice within which the patient and products are encompassed.

While this does give an impression of simplicity, in reality there will be a highly complex interplay between these three interdependent elements upon which optimal wound care depends. However, this model of care serves to focus attention on those parts of the wound management process over which

individual clinicians are able to exert control, and hence affect change.

Patients

Patients cannot be seen as simply passive recipients of treatment, or as individuals who have care 'done to them'. There are patient-related factors such as attitudes, knowledge, behaviours and psychosocial considerations that can directly or indirectly influence the quality of care they experience. For example, patients may influence practice by requesting more frequent dressing changes than are necessary, because they equate a higher frequency of change with better care, since this entails the clinician attending to their wound on a more regular basis. In actuality, it is possible that leaving the dressing intact and in place for a longer period could have clinical benefits due to reducing dressing-change-associated trauma to the wound and avoiding any unnecessary exposure of the wound to the potential for external contaminants (European Wound Management Association [EWMA], 2002).

Products

Clinicians can choose from a diverse range of wound management products designed to suit different wound management objectives across a

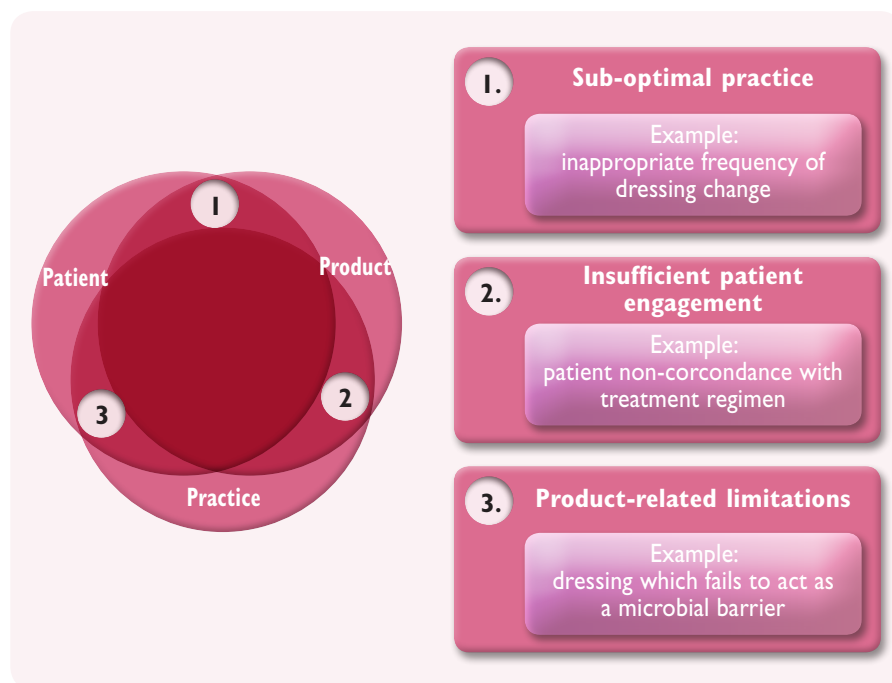


Figure 1: Optimising wound care: patient, practice and product.

variety of clinical circumstances. Experience shows that some may have considered wound management products to be 'commoditised' within each category, i.e. that they are essentially equivalent, and that as a consequence decisions can be made on unit price alone. The reality is that in general, wound management products are highly heterogeneous, each having their own set of features which give rise to benefits for the clinician and patient. This lack of uniformity in product performance means that product selection can exert a considerable influence on the patient experience. In addition, each product has the potential to constrain or limit practice, since it must be employed within the limitations imposed by its performance characteristics. For example, the performance characteristics of a foam dressing vis-à-vis fluid handling will be a key factor in dictating dressing wear-time (Figure 2), and hence practice, as regards frequency of dressing change, will largely be dictated by this product characteristic. This clearly has further implications in determining the use of resources, such as nurse time and the volume of dressings required.

The decision-maker has to determine from the features and price whether the product represents value for money. These decisions should be made on the basis of the balance of clinical benefits and resources used, to ensure that both staff and patients have access to wound care products that are fit for purpose (Wounds UK, 2008). The use of the term 'resources' is important here, because the unit price of the dressing may not be an appropriate guide to the use of resources resulting from the selection of the product. The use of lower unit price products (usually, in the authors' opinion, with inferior performance characteristics) may appear good value for money, but this decision may actually result in increased resource as a result of, for example:

- ▶ Increased volume of dressings used when compared to a similar product with superior performance characteristics

- ▶ Increased nursing time
- ▶ Increased occurrence of complications and their associated resource
- ▶ Additional products being required to secure the dressing.

Practice

The practice of wound management is complex. The diversity of wound types of varying aetiologies and associated comorbidities, coupled with the multiplicity of factors which influence the progress of a wound necessitates a flexible approach to practice. Each wound presents a unique combination of challenges which the clinician must be able to recognise and develop an appropriate management strategy in response. As a result, there is considerable scope for diversity in practice and hence the associated quality of care. In consequence, the practice of wound management exerts a large influence on the quality of care and resources used.

Given its impact on quality and resources, it is essential that measures be taken which seek to optimise wound management practice. Factors which will influence wound management practice include:

- ▶ Organisational structures (e.g. guidelines)
- ▶ Education and training
- ▶ Experience and knowledge
- ▶ Availability of resources.

Optimal wound care: an integrated approach

The conclusion drawn from the above discussion is that the most important challenge for wound care in the 21st century is: how can both the human

and economic costs of wounds be reduced simultaneously?

In other words, how can the quality of wound care be optimised while at the same time minimising the cost to the health system?

It is important that decision-makers do not underestimate the implications of this challenge in the light of the changing NHS. For example, in England, fundamental changes in the way in which the NHS commissions and provides health care are under way, with 'any qualified provider' being able to provide services in an environment of 'effective competition' (DH, 2010b). As a consequence of these changes, tissue viability services are subject to increasing scrutiny. Though this may be seen by some as a daunting prospect, it provides an opportunity to re-evaluate and challenge current models of care, and perhaps now is an appropriate time to examine innovative solutions.

It may appear that the two elements of the above challenge (enhancing quality and minimising cost) are mutually incompatible. This may be the case if they are tackled individually and in isolation — for example, a focus solely on cost to the exclusion of all other considerations may be to the detriment of quality of care. Both elements need to be tackled simultaneously, with complementary approaches adopted to achieve them. Ensuring success in meeting this bi-partite challenge therefore requires a well-planned, structured approach encompassing the key elements

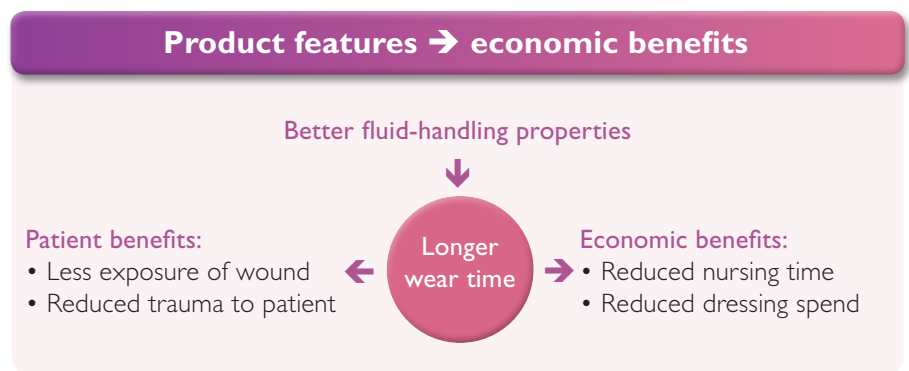


Figure 2. Product performance characteristics result in clinical and economic benefits.

which impact on the delivery of high quality cost-effective wound care. One proven approach to this challenge is summarised in *Table 2*.

The authors propose that adopting this structured approach to wound care enables the interaction between product, practice and patient to be optimised. Put simply, this means using the right product for the right patient at the right time for the right duration. Clear, systematic clinical decision-making combined with measurement and monitoring tools are powerful methods to secure this. In order to achieve high-quality care, it is important to explore innovative ways of working, including enhanced collaboration between publicly-funded healthcare services and commercial bodies.

The NHS recognises the value of joint working with external stakeholders, and has published guidance to encourage such collaboration (DH, 2008b). This not only helps to ensure that products are used appropriately, but also has mutual benefits for both parties. In practice however, there is wide variation in the support that industry offers, and the extent to which they are prepared to use their resources to work collaboratively with clinicians (Timmons, 2005). This access to necessary resources is one among a range of factors which must be considered if this approach is to be successfully implemented.

In the authors' experience, additional prerequisites for this approach to be successful include:

- ▶▶ Most importantly, clinicians should possess strong clinical leadership skills and be empowered by their organisation to make changes in clinical practice where they are needed
- ▶▶ There must be clearly defined objectives agreed between all stakeholders, with consensus that an appropriate plan of action will be implemented
- ▶▶ There must be mutual trust and respect between the clinicians and any collaborating parties

Table 2

An integrated approach to optimising wound care

- ▶▶ Adopt a collaborative approach which makes use of the resources available within both the publicly-funded healthcare services and commercial bodies
- ▶▶ Implement clear, straightforward and well-understood decision-making tools (such as care pathways of treatments, algorithms, alongside clinical guidance)
- ▶▶ Use advanced wound care techniques and products in accordance with best practice guidelines
- ▶▶ Ensure products are used appropriately
- ▶▶ Support appropriate use through a programme of education and training
- ▶▶ Measure and monitor wound management practice

▶▶ Any commercial collaborator needs to have both the capacity and the willingness to offer the necessary support.

Achieving appropriate use and optimal wound care

There are several examples where a similar approach to the one outlined above has been employed and achieved the desired improvement in practice.

The examples summarised in *Table 3* illustrate that using an integrated

approach to optimising wound care tends to reduce costs at the same time as enhancing quality of care. This is a fascinating finding, and illustrates that the effort put into engendering change is likely to be repaid both in terms of clinical and economic benefits. Improving practice in this way is likely to reduce rather than increase cost, simply because best practice tends to be highly efficient. Clinical and economic decision-makers can take heart that both clinical and economic challenges can be met using approaches of this type.

Table 3

Examples of an integrated approach to changing wound care practice

Paper	Setting	Focus	Outcomes
Fletcher et al, 2009	Primary care	Antimicrobial usage	More appropriate use of antimicrobial dressings in line with new guidelines
Hurd et al, 2008	Primary care	Wound care	Improved wound management practice and associated cost reduction
Roberts et al, 2010	Secondary care	Postoperative dressings	Change in postoperative dressing practice to align with national guidance and reduction in costs
Smith et al, 2010	Secondary care	Dressing selection and practice	Improved dressing practice and reduction in costs of wound care

Conclusions

By using an integrated approach to wound care, it is possible to reconcile the apparently conflicting issues of dwindling resources and increasing demand for quality care. An approach is needed which gives due consideration to the three key elements, practice, product and patient, and addresses all three in a simultaneous and complementary manner.

It may be tempting to address this issue and try to achieve a balance through product selection only, without attempting to influence practice. For example, the use of lower unit price products (usually with inferior performance characteristics) may appear good value for money, but this decision may actually result in increased use of resources, and an associated impact on the quality of care.

An integrated approach to optimising wound care would adopt collaborative working between publicly-funded healthcare services and commercial bodies. It would use advanced wound care techniques and products in accordance with best practice guidelines, and support appropriate use through a programme of education and training. The effectiveness of this approach in changing practice would be underpinned via an ongoing process of monitoring and evaluation. **WUK**

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Key points

- ▶▶ The NHS is faced with the challenge of delivering the highest quality of care while improving efficiency.
- ▶▶ Although dressings represent a relatively small proportion of the total cost of wound care, the process of dressing selection and the way in which dressings are used can exert a disproportionately large influence on the other cost components.
- ▶▶ Adopting a structured approach to wound care enables the interaction between product, practice and patient to be optimised.
- ▶▶ The effectiveness of this approach in changing practice should be underpinned via an ongoing process of monitoring and evaluation.