

Pressure ulcer prevention

Pressure ulcer risk assessment and prevention, including the use of pressure-relieving devices (beds, mattresses and overlays) for the prevention of pressure ulcers in primary and secondary care*

This guideline is part of a suite of woundcare guidelines

* Incorporates the recommendations in *Inherited Clinical Guideline B* published by the Institute in April 2001

Clinical Guideline 7

October 2003

Developed by the National Collaborating Centre for
Nursing and Supportive Care

Clinical Guideline 7

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Pressure ulcer risk assessment and prevention, including the use of pressure-relieving devices (beds, mattresses and overlays) for the prevention of pressure ulcers in primary and secondary care

Issue date: October 2003

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Copies of this guideline can be ordered from the NHS Response Line; telephone 0870 1555 455 and quote reference number N0330. A version for people who want to understand what NICE has told the NHS, called *Pressure Ulcers: Prevention and Pressure-relieving Devices*, is also available from the Response Line; quote reference number N0331 for an English only version and N0332 for an English and Welsh version.

This document has been circulated to the following:

- Primary care trust (PCT) chief executives
- Local health board (LHB) chief executives
- NHS trust chief executives in England and Wales
- Strategic health authority chief executives in England and Wales
- Medical and nursing directors in England and Wales
- Clinical governance leads in England and Wales
- Audit leads in England and Wales
- NHS trust, PCT and LHT libraries in England and Wales
- Patient advice and liaison coordinators in England
- Consultants in the care of the elderly in England and Wales
- Orthopaedic consultants in England and Wales
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- Medical Director & Head of NHS Quality – Welsh Assembly Government
- Community health councils in England and Wales
- Commission for Health Improvement
- NHS Clinical Governance Support Team
- Patient advocacy groups
- Representative bodies for health services, professional organisations and statutory bodies, and the Royal Colleges

This guidance is written in the following context:

This guidance represents the view of the Institute, which was arrived at after careful consideration of the evidence available. Health professionals are expected to take it fully into account when exercising their clinical judgment. The guidance does not, however, override the individual responsibility of health professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or guardian or carer.

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The following guidance is evidence based. The recommendations in this document are derived from two clinical guidelines, *Pressure Ulcer Risk Assessment and Prevention and Clinical Practice Guideline for Pressure-relieving Devices: the Use of Pressure-relieving Devices (Beds, Mattresses and Overlays) for the Prevention of Pressure Ulcers in Primary and Secondary Care* (see Section 5), which use different grading schemes. In the guideline on pressure ulcer risk assessment and prevention, evidence grading was 1, 2 and 3; in the guideline on pressure-relieving devices, recommendations were graded A, B, C and D. The grading schemes are described in Appendix A. Summaries of the evidence on which the guidance is based are provided in the full guidelines (see Section 5).

The guideline on pressure ulcer risk assessment and prevention was published in 2001*. Its recommendations have been incorporated into this document, but the evidence used to develop it was not reviewed or updated during the development of the guideline on pressure-relieving devices.

1 Guidance

The recommendations in this document are relevant to:

- those who are vulnerable to or at elevated risk of developing pressure ulcers
- families and carers
- healthcare professionals who share in caring for those who are vulnerable to or at elevated risk of developing pressure ulcers
- those with responsibility for purchasing pressure-relieving devices.

* The recommendations were published by NICE in April 2001: National Institute for Clinical Excellence (2001) Pressure ulcer risk management and prevention. *Inherited Clinical Guideline B*. London: National Institute for Clinical Excellence.

1.1 Risk assessment and prevention

1.1.1 Identifying individuals vulnerable to or at elevated risk of pressure ulcers

- 1.1.1.1 Assessing an individual's risk of developing pressure ulcers should involve both informal and formal assessment procedures. 3
- 1.1.1.2 Risk assessment should be carried out by personnel who have undergone appropriate training to recognise the risk factors that contribute to the development of pressure ulcers and know how to initiate and maintain correct and suitable preventative measures. 3
- 1.1.1.3 The timing of risk assessment should be based on each individual case. However, it should take place within 6 hours of the start of admission to the episode of care. 3
- 1.1.1.4 If an individual is considered not to be vulnerable to or at elevated risk of pressure ulcers on initial assessment, reassessment should occur if there is a change in an individual's condition that increases risk (see Section 1.1.3). 3
- 1.1.1.5 All formal assessments of risk should be documented/recorded and made accessible to all members of the interdisciplinary team. 3

1.1.2 Use of risk assessment tools

- 1.1.2.1 Risk assessment tools should only be used as an *aide memoire* and should not replace clinical judgment. 1

1.1.3 Risk factors

- 1.1.3.1 An individual's potential to develop pressure ulcers may be influenced by the following intrinsic risk factors, which therefore should be considered when performing a risk assessment: 2
- reduced mobility or immobility
 - sensory impairment
 - acute illness
 - level of consciousness

<ul style="list-style-type: none"> • extremes of age • vascular disease • severe chronic or terminal illness • previous history of pressure damage • malnutrition and dehydration. 	2
<p>1.1.3.2 The following extrinsic risk factors are involved in tissue damage and should be removed or diminished to prevent injury: pressure, shearing and friction.</p>	2
<p>1.1.3.3 The potential of an individual to develop pressure ulcers may be exacerbated by the following factors, which therefore should be considered when performing a risk assessment: medication and moisture to the skin.</p>	2
<p>1.1.4 Skin inspection</p>	
<p>1.1.4.1 Skin inspection should occur regularly and the frequency determined in response to changes in the individual's condition in relation to either deterioration or recovery.</p>	3
<p>1.1.4.2 Skin inspection should be based on an assessment of the most vulnerable areas of risk for each patient. These are typically: heels; sacrum; ischial tuberosities; parts of the body affected by anti-embolic stockings; femoral trochanters; parts of the body where pressure, friction or shear is exerted in the course of an individual's daily living activities; parts of the body where there are external forces exerted by equipment and/or clothing; elbows; temporal region of skull; shoulders; back of head and toes.</p>	3
<p>Other areas should be inspected as necessitated by the patient's condition.</p>	
<p>1.1.4.3 Individuals who are willing and able should be encouraged, following education, to inspect their own skin.</p>	3
<p>1.1.4.4 Individuals who are wheelchair users should use a mirror to inspect the areas that they cannot see easily or get others to inspect them.</p>	3

1.1.4.5 Healthcare professionals should be aware of the following signs, which may indicate incipient pressure ulcer development: persistent erythema; non-blanching hyperaemia previously identified as non-blanching erythema; blisters; discolouration; localised heat; localised oedema and localised induration. In those with darkly pigmented skin: purplish/bluish localised areas of skin; localised heat that, if tissue becomes damaged, is replaced by coolness; localised oedema and localised induration.

3

1.1.4.6 Skin changes should be documented/recorded immediately.

3

1.2 Pressure ulcer prevention

1.2.1 Positioning

1.2.1.1 Individuals who are vulnerable to or at elevated risk of pressure ulcer development should be repositioned and the frequency of repositioning determined by the results of skin inspection and individual needs, not by a ritualistic schedule.

3

1.2.1.2 Repositioning should take into consideration other relevant matters, including the patient's medical condition, their comfort, the overall plan of care and the support surface.

3

1.2.1.3 Positioning of patients should ensure that: prolonged pressure on bony prominences is minimised, bony prominences are kept from direct contact with one another, and friction and shear damage is minimised.

3

1.2.1.4 A re-positioning schedule, agreed with the individual, should be recorded and established for each person vulnerable to pressure ulcers.

3

1.2.1.5 Individuals or carers, who are willing and able, should be taught how to redistribute weight.

3

1.2.1.6 Manual handling devices should be used correctly in order to minimise shear and friction damage. After manoeuvring, slings, sleeves or other parts of the handling equipment should not be left underneath individuals.

3

1.2.2 Seating

- | | | |
|---------|--|---|
| 1.2.2.1 | Seating assessments for aids and equipment (otherwise known as assistive technologies) should be carried out by trained assessors who have the acquired specific knowledge and expertise (for example, physiotherapists or occupational therapists). | 3 |
| 1.2.2.2 | Advice from trained assessors with acquired specific knowledge and expertise should be sought about correct seating positions. | 3 |
| 1.2.2.3 | Positioning of individuals who spend substantial periods of time in a chair or wheelchair should take into account distribution of weight, postural alignment and support of feet. | 3 |
| 1.2.2.4 | The management of a patient in a sitting position is important. Even with appropriate pressure relief, it may be necessary to restrict sitting time to less than 2 hours until the condition of an individual with an elevated risk changes. | D |
| 1.2.2.5 | No seat cushion has been shown to perform better than another, so this guideline makes no recommendation about which type to use for pressure redistribution purposes. | 3 |

1.2.3 Use of aids

- | | | |
|---------|---|---|
| 1.2.3.1 | The following should not be used as pressure-relieving aids: water-filled gloves; synthetic sheepskins*; doughnut-type devices. | 3 |
|---------|---|---|

1.2.4 Pressure-relieving devices (beds, mattresses and overlays)

- | | | |
|---------|---|---|
| 1.2.4.1 | Decisions about which pressure-relieving device to use should be based on cost considerations and an overall assessment of the individual. Holistic assessment should include all of the following: <ul style="list-style-type: none">• identified levels of risk• skin assessment• comfort | D |
|---------|---|---|

* Since the guideline on pressure ulcer prevention and assessment was published (see Section 5) a study in Australia has suggested that natural sheepskin may be effective in pressure ulcer prevention.

	<ul style="list-style-type: none"> • general health state • lifestyle and abilities • critical care needs • acceptability of the proposed pressure-relieving equipment to the patient and/or carer <p>and should not be based solely on scores from risk assessment tools.</p>	D
1.2.4.2	All individuals assessed as being vulnerable to pressure ulcers should, as a minimum provision, be placed on a high-specification foam mattress with pressure-relieving properties.	B
1.2.4.3	<p>Although there is no research evidence that high-tech pressure relieving mattresses and overlays are more effective than high-specification (low-tech) foam mattresses and overlays, professional consensus recommends that consideration should be given to the use of alternating pressure or other high-tech pressure-relieving systems:</p> <ul style="list-style-type: none"> • as a first-line preventative strategy for people at elevated risk as identified by holistic assessment • when the individual's previous history of pressure ulcer prevention and/or clinical condition indicates that he or she is best cared for on a high-tech device • when a low-tech device has failed. 	D
1.2.4.4	All individuals undergoing surgery and assessed as being vulnerable to pressure ulcers should, as a minimum provision, be placed on either a high-specification foam theatre mattress or other pressure-redistributing surface.	D
1.2.4.5	The provision of pressure-relieving devices needs a 24-hour approach. It should include consideration of all surfaces used by the patient.	D
1.2.4.6	Support surface and positioning needs should be assessed and reviewed regularly and determined by the results of skin inspection, and patient comfort, ability and general state. Thus repositioning should occur when individuals are on pressure-relieving devices.	D

1.2.4.7 A pressure ulcer reduction strategy should incorporate a coordinated approach to the acquisition, allocation and management of pressure-relieving equipment. The time elapsing between assessment and use of the device should be specified in this strategy.

D

1.2.5 Education and training

1.2.5.1 All healthcare professionals should receive relevant training or education in pressure ulcer risk assessment and prevention.

2

1.2.5.2 An interdisciplinary approach to the training and education of healthcare professionals should be adopted.

3

1.2.5.3 Training and education programmes for healthcare professionals should include:

3

- risk factors for pressure ulcer development
- pathophysiology of pressure ulcer development
- the limitations and potential applications of risk assessment tools
- skin assessment
- skin care
- selection of pressure relieving equipment
- use of pressure-relieving equipment
- maintenance of pressure relieving equipment
- methods of documenting risk assessments and prevention activities
- positioning to minimise pressure
- shear and friction damage including the correct use of manual handling devices
- roles and responsibilities of interdisciplinary team members in pressure ulcer management
- policies and procedures regarding transferring individuals between care settings
- providing education and information to patients.

- 1.2.5.4 Healthcare professionals with recognised training in pressure ulcer management should cascade their knowledge and skills to their local healthcare teams. 3
- 1.2.5.5 Individuals vulnerable to or at elevated risk of developing pressure ulcers who are able and willing should be informed and educated about risk assessment and resulting prevention strategies. This strategy should, where appropriate, include carers. 3
- 1.2.5.6 Education for individuals vulnerable to pressure ulcers, and their carers, should include providing information verbally and in writing on the following: D
- the risk factors associated with developing pressure ulcers
 - the sites that are of the greatest risk of pressure damage
 - how to inspect skin and recognise skin changes
 - how to care for skin
 - methods for pressure relief/reduction
 - the use and maintenance of pressure-relieving devices
 - where patients/carers can seek further advice and assistance
 - the need for immediate visits to a healthcare professional if signs of damage are noticed.

Equipment safety

Equipment safety is an important issue in relation to the use of pressure-relieving devices. In particular, cross-infection is possible where equipment is inadequately decontaminated between patients (Orr et al. 1994*) and injury is possible if users of such equipment (patients, carers and health professionals) have not been educated about appropriate use. Guideline users are therefore referred to the standards on medical devices management and decontamination of reusable medical devices (Medical Devices Agency 2002a,b[†]). Users of these guidelines are encouraged to familiarise themselves with the sections of these documents relevant to the use and decontamination of pressure-relieving devices. Anecdotal evidence suggests that if there is no access to adequate decontamination facilities it may be desirable to lease pressure-relieving devices. The advantage of leasing in these circumstances is that the devices can be returned to the manufacturer for thorough decontamination after each patient use.

* Orr KE, Gould FK, Perry JS et al. (1994) Therapeutic beds: the Trojan horses of the 1990s? *Lancet* 344: 65–66.

† Medical Devices Agency (2002a). *Medical devices management*. London: Medical Devices Agency.
Medical Devices Agency (2002b). *De-contamination of re-usable medical devices*. London: Medical Devices Agency.

2 Notes on the guidance

2.1 Terminology used in the guidance on pressure-relieving devices

- Where the term 'carer' is used, this refers to unpaid carers as opposed to paid carers (for example, careworkers).
- There is much debate in the literature and amongst experts about the appropriateness of the term 'pressure-relieving'. For the purposes of this guidance, 'pressure-relieving' is used as an umbrella term for all pressure-reducing and pressure-redistributing devices.
- Pressure ulcers have also been known previously as pressure sores, bed sores and decubitus ulcers.

- The terms 'vulnerable to pressure ulcers' and 'at elevated risk of pressure ulcers' are used in this guideline rather than the terms 'at-risk' and 'at very high risk'. The latter terms imply that there are reliable cut-off points for identifying risk, yet there is little evidence to show that using a pressure ulcer risk assessment tool is better than clinical judgment for assessing risk, or that allocation of pressure-relieving devices can be linked to risk assessment tools.
- Pressure-relieving devices (from Cullum et al. 2001*)

Low-tech devices: these provide a conforming support surface that distributes the body weight over a large area. They include the following.

- Standard foam mattress.
- Alternative foam mattresses/overlays (for example, high-specification foam, convoluted foam, cubed foam); these are conformable and aim to redistribute pressure over a larger contact area.
- Gel-filled mattresses/overlays.
- Fluid-filled mattresses/overlays.
- Fibre-filled mattresses/overlays.
- Air-filled mattresses/overlays.

High-tech devices: these are dynamic systems that include the following.

- Alternating-pressure mattresses/overlays: the patient lies on air-filled sacs, which sequentially inflate and deflate and relieve pressure at different anatomical sites for short periods; these devices may incorporate a pressure sensor.
- Air-fluidised beds/mattresses/overlays: warmed air is circulated through fine ceramic beads covered by a permeable sheet; these allow support over a larger contact area.
- Low-air-loss overlays/mattresses/beds: the patient is supported on air-filled sacs inflated at a constant pressure, through which air is able to pass.
- Turning beds/frames (kinetic beds): beds that either aid manual repositioning of the patient or reposition the patient by motor-driven turning and tilting.

* Cullum N, Nelson EA, Sheldon T (2001) Systematic reviews of wound care management (5): pressure-relieving beds, mattresses and cushions for the prevention and treatment of pressure sores. In Cullum N, Nelson EA, Flemming K et al. Systematic reviews of wound care management: (5) beds; (6) compression; (7) laser therapy, therapeutic ultrasound, electrotherapy and electromagnetic therapy. *Health Technology Assessment* 5 (9).

2.2 Scope of the guidance

Pressure ulcers have a profound negative effect on the physical, social and financial realms of people's lives and are also distressing for their carers. Although the guideline does not cover treatment of existing pressure ulcers, its recommendations will be useful in preventing pressure ulcers on other areas of the patient's body and further pressure damage to existing pressure ulcers.

The recommendations in this document are derived from two sources: the guideline on pressure ulcer risk assessment and prevention, published by NICE in 2001, and the guideline on pressure-relieving devices, commissioned by NICE (see Section 5).

2.2.1 Pressure ulcer risk assessment and prevention

This section of the guideline was commissioned by the Department of Health from the RCN (Royal College of Nursing) before NICE was established. It followed closely the development brief that was agreed at the time of commissioning, and was originally published by NICE in 2001 as a stand-alone document.

The aim of the guideline on pressure ulcer risk assessment and prevention was to reduce the occurrence of pressure ulcers by giving healthcare professionals guidance on the early identification of patients vulnerable to developing pressure ulcers, the provision of preventative interventions, and by identifying practice that may be harmful or ineffective.

2.2.2 Pressure-relieving devices

The guideline on the use of pressure-relieving devices (specifically beds, mattresses and overlays) for the prevention of pressure ulcers for use in the NHS in England and Wales was commissioned to supplement the NICE guideline on pressure ulcer risk assessment and prevention. The scope of the guidance on the use of pressure relieving devices was established at the start of the development of this guideline, following a period of consultation; it is available from www.nice.org.uk/article.asp?a=29296. It was subsequently decided to combine the new guideline with the recommendations in the 2001 guideline to produce this document.

The recommendations on pressure-relieving devices apply to patients of all ages, but in developing the guideline no trials were identified that applied specifically to children.

The main area examined by this section of the guideline was:

- the most clinically and cost-effective beds, mattresses or overlays for preventing pressure ulcers.

Additional areas included:

- the evidence for linking risk assessment to the allocation of pressure-relieving devices
- differences in comfort and acceptability ratings, ease of use, and adverse events between the different devices
- whether quality of life varies with use of different pressure-relieving devices
- the groups at particularly high risk of developing pressure ulcers
- the costs of preventing pressure ulcers, including the costs of pressure relieving devices for both the health services and patients vulnerable to pressure ulcers and their carers.

The guideline presents recommendations for good practice based on the best available evidence of clinical and cost effectiveness. However, there was a lack of formal economic evaluations and quality-of-life data, and the clinical effectiveness data were of variable quality. Furthermore, very little published research relating to paediatric care exists. Consequently, not all areas examined could be fully addressed. Evidence published after October 2002 was not considered.

2.3 Principles of practice

The following principles are important in relation to these guidelines. These principles are based on those published by the Royal College of Nursing (RCN 2001*).

* Royal College of Nursing (2001) *Pressure Ulcer Risk Assessment and Prevention*. London: Royal College of Nursing. Available from www.rcn.org.uk and www.nice.org.uk/Docref.asp?d=16423

2.3.1 Person-centred care

- Patients and their carers should be made aware of the guideline and its recommendations and be referred to the version for the public.
- Patients and their carers should be involved in shared decision-making about pressure-relieving devices.
- Health professionals are advised to respect and incorporate the knowledge and experience of people who have been at long-term risk of developing pressure ulcers and have been self-managing this risk.
- Patients and their carers should be informed about their risk of developing pressure ulcers, especially when they are transferred between care settings or discharged home.

2.3.2 A collaborative interdisciplinary approach to care

- All members of the interdisciplinary team should be aware of the guidelines, and all care should be documented in the patient's healthcare records.

2.3.3 Organisational issues

- An integrated approach to pressure ulcer prevention is needed, with a clear strategy and policy supported by management.
- Care should be delivered in a context of continuous quality improvement, where improvements to care following guideline implementation are the subject of regular feedback and audit.
- Commitment to and availability of education and training are needed to ensure that all staff, regardless of profession, are given the opportunity to update their knowledge base and are able to implement the guideline recommendations.
- Patients should be cared for by personnel who have undergone appropriate training in recognising the risk factors that contribute to the development of pressure ulcers, and who know how to initiate and maintain correct and suitable preventative measures. Staffing levels and skill mix should reflect the needs of patients.

3 Implementation in the NHS

3.1 In general

Local health communities should review their existing service provision for pressure ulcer risk assessment and prevention – including the use of pressure-relieving devices (beds, mattresses and overlays) for the prevention of pressure ulcers in primary and secondary care – as they develop their Local Delivery Plans. The review should consider the resources required to implement the recommendations set out in Section 1, the people and processes involved, and the timeline over which full implementation is envisaged. It is in the interests of patients that the implementation timeline is as rapid as possible.

Relevant local clinical guidelines and protocols should be reviewed in the light of this guidance and revised accordingly.

3.2 Audit

Suggested audit criteria for the use of pressure-relieving devices are listed in Appendix D. These can be used as the basis for local clinical audit, at the discretion of those in practice.

4 Research recommendations

The following research recommendations have been identified for this NICE guideline, not as the most important research recommendations but as those that are most representative of the full range of recommendations. The Guideline Development Groups' full sets of research recommendations are detailed in the full guidelines (see Section 5).

Because the evidence base for pressure ulcer risk assessment and prevention is poor, the potential research agenda is large.

Future primary research studies should adhere more closely to current methodological standards for the conduct and reporting of research. There is also a need for the researchers to adopt a structured approach to abstracts, which would help reviewers to focus on the essential detail.

Pressure ulcer risk assessment and prevention

Recommendations in the guideline on pressure ulcer risk and prevention* were as follows.

- On risk assessment, more epidemiological research needs to be conducted to better understand risk factors. It is recommended that the data, gathered by prospective cohort studies conducted in different healthcare settings, could generate an 'item pool' which might then be used to develop a new risk assessment scale. The effectiveness of such a scale would need to be evaluated.
- Further research about the effectiveness of other interventions such as re-positioning is needed. The practice of routine 2- and 4-hourly turnings is largely a historical artefact with very little quality research support. Studies on the effect of different turning intervals on the development of pressure ulcers may contribute to understanding this practice.
- Similarly, further research that systematically compares the 30 degree/lateral tilt with other positions, in differing patient groups and clinical contexts, including the collection of data on patient comfort as well as physiological measures, would be of value.
- Further research evaluating the effect of educational programmes is needed. Limited research suggests that educational programmes may have an effect in reducing pressure ulcer incidence. Clinicians' reported experiences indicate that education is key to effective pressure area management. However more conclusive research evidence is needed on what should be included in training, at what level, how training and education should be delivered, and how competency is assessed and updated.
- There is also a paucity of research exploring the perceptions and experiences of individuals vulnerable to pressure ulcers (and their carers), their involvement in pressure area care and their educational requirements. This information might be uncovered by well-designed studies using a mixture of qualitative and quantitative approaches to data collection through, for example, semi-structured interviews and focus groups, and pre-validated quality of life measures.

* National Institute for Clinical Excellence (2001) Pressure ulcer risk management and prevention. *Inherited Clinical Guideline B*. London: National Institute for Clinical Excellence.

Pressure-relieving devices

- Comparisons are needed, in groups at elevated risk, of alternating pressure devices with:
 - lower tech alternatives (for example, different types of high-specification foam mattresses and other constant low-pressure devices)
 - other high-tech devices (for example low-air-loss and air-fluidised devices).

Comparisons should include the cost and cost-effectiveness of devices, as well as the difference in relative risk of using the devices, for different groups of individuals.

- Investigation is needed of the impact of pressure ulcers on the quality of life of individuals and carers, and of the quality of life achieved with different forms of pressure relief.
- Evaluation of the impact and effectiveness of formal assessment at the point of entry into healthcare (including acute care, care homes and in the community) and the impact of delays to this process would be valuable.
- The need for and frequency of manual repositioning should be investigated, including:
 - requirement for repositioning on any pressure-relieving device
 - methods of repositioning individuals on different pressure-relieving devices
 - nursing time involved in repositioning.
- Large-scale prospective epidemiological studies are needed to improve understanding of risk factors and the relative contribution they make to the development of pressure ulcers, and to facilitate the development of risk assessment tools based on adequate prospective research.

5 Full guidelines

The recommendations in this document are derived from two guidelines.

The guideline on pressure ulcer risk assessment and prevention was a part of the Institute's inherited clinical guidelines work programme. It was commissioned by the Department of Health before the Institute was established in April 1999. The developers worked with the Institute to ensure, in the time available, that the guideline was subjected to validation and to consultation with stakeholders. However it was not possible to subject it to the full guideline development process that the Institute has now adopted. The full guideline – *Pressure Ulcer Risk Assessment and Prevention*, which was produced by the Royal College of Nursing (RCN) – is available on the NICE website (www.nice.org.uk) and the NICE website (www.nice.org.uk/Docref.asp?d=16423). The recommendations from the guideline were published by NICE in April 2001 (*Inherited Clinical Guideline B*).

The National Institute for Clinical Excellence commissioned the development of the guidance on pressure-relieving devices from the National Collaborating Centre for Nursing and Supportive Care. The Centre established a Guideline Development Group, which reviewed the evidence and developed the recommendations. The full guideline, *Clinical Practice Guideline for Pressure-relieving Devices: the Use of Pressure-relieving Devices (Beds, Mattresses and Overlays) for the Prevention of Pressure Ulcers in Primary and Secondary Care*, is published by the National Collaborating Centre for Nursing and Supportive Care; it is available on the NICE website (www.nice.org.uk) and on the website of the National Electronic Library for Health (www.nelh.nhs.uk).

The members of the Guideline Development Groups are listed in Appendix B. Information about the Guideline Advisory Committee and the independent Guideline Review Panel is given in Appendix C.

The booklet *The Guideline Development Process – Information for the Public and the NHS* has more information about the Institute's guideline development process. It is available from the Institute's website and copies can also be ordered by telephoning 0870 1555 455 (quote reference N0038).

6 Related NICE guidance

Woundcare suite

This document is part of a suite of clinical guidelines on woundcare management, including the prevention of skin breakdown. Other guidelines in the suite include:

- Infection control: prevention of healthcare-associated infection in primary and community care. Published June 2003. See www.nice.org.uk/cat.asp?c=71774
- Management of pressure ulcers – guideline under development, planned for publication in May 2005. For further details, see www.nice.org.uk/cat.asp?c=33925
- Management of patients with venous leg ulcers – guideline developed by the Royal College of Nursing (see www.rcn.org.uk/resources/guidelines.php) and being updated by the RCN at the time this NICE guideline was issued
- The management of surgical wounds – guideline under development, planned for publication April 2006. For further details, see www.nice.org.uk/cat.asp?c=33930
- General principles of the management of wounds – guideline under development.

7 Review date

The process of reviewing the evidence is expected to begin 4 years after the date of issue of this guideline. Reviewing may begin earlier than 4 years if significant evidence that affects the guideline recommendations is identified sooner. The updated guideline will be available within 2 years of the start of the review process.

Versions of this document written for people vulnerable to pressure ulcers, their families and carers, and the public are available from the NICE website (www.nice.org.uk) and from the NHS Response Line (telephone 0870 1555 455 and quote reference number N0331 for a version in English only and reference number N0332 for a version in English and Welsh).

Appendix A: Grading scheme

The grading scheme used in *Pressure Ulcer Risk Assessment and Prevention* (see Section 5) was adapted from Waddell G, Feder G, McIntosh A, et al (1996) *Low Back Pain Evidence Review*. London: Royal College of General Practitioners. Grading was as follows.

Evidence

- 1 Generally consistent finding in a majority of multiple acceptable studies.
- 2 Either based on a single acceptable study, or a weak or inconsistent finding in multiple acceptable studies.
- 3 Limited scientific evidence that does not meet all the criteria of acceptable studies or absence of directly applicable studies of good quality. This includes expert opinion.

'Acceptable' for this guideline refers to those that have been subjected and approved by a process of critical appraisal. For further details see: Rycroft-Malone J, McInnes E (2001) *Pressure Ulcer Risk Assessment and Prevention Guideline: Technical Report*. London: Royal College of Nursing. Available from www.rcn.org.uk

The grading scheme and hierarchy of evidence used in *Clinical Practice Guideline for Pressure-relieving Devices: the Use of Pressure-relieving Devices (Beds, Mattresses and Overlays) for the Prevention of Pressure Ulcers in Primary and Secondary Care* (see Table) is from Eccles and Mason (2001).

Recommendation grade	Evidence
A	Directly based on category I evidence
B	Directly based on: <ul style="list-style-type: none"> • category II evidence, or • extrapolated recommendation from category I evidence
C	Directly based on: <ul style="list-style-type: none"> • category III evidence, or • extrapolated recommendation from category I or II evidence
D	Directly based on: <ul style="list-style-type: none"> • category IV evidence, or • extrapolated recommendation from category I, II or III evidence
Evidence category	Source
I	Evidence from: <ul style="list-style-type: none"> • meta-analysis of randomised controlled trials, or • at least one randomised controlled trial
II	Evidence from: <ul style="list-style-type: none"> • at least one controlled study without randomisation, or • at least one other type of quasi-experimental study
III	Evidence from non-experimental descriptive studies, such as comparative studies, correlation studies and case-control studies
IV	Evidence from expert committee reports or opinions and/or clinical experience of respected authorities
Adapted from Eccles M, Mason J (2001) How to develop cost-conscious guidelines. <i>Health Technology Assessment</i> 5 (16)	

Appendix B: The Guideline Development Groups

Pressure ulcer risk assessment and prevention

Guideline Developers

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Appendix C: The Guidelines Advisory Committee and Guideline Review Panel

Guidelines Advisory Committee

At the time the guideline on risk assessment and prevention of pressure ulcers was published, the Guidelines Advisory Committee (GAC) was a standing committee of the Institute. It had responsibility for agreeing the scope and commissioning brief for clinical guidelines and for monitoring progress and methodological soundness. The GAC considered responses from stakeholders and advised the Institute on the acceptability of the guidelines it had commissioned. It has since been superseded by the Guideline Review Panel. Details of the membership of the GAC are shown in the NICE guideline on pressure ulcer risk assessment and prevention (see Section 5).

Guideline Review Panel

The Guideline Review Panel is an independent panel that oversees the development of the guideline and takes responsibility for monitoring its quality. The Panel includes experts on guideline methodology, health professionals and people with experience of the issues affecting patients and carers. The members of the Guideline Review Panel for the guideline on pressure-relieving devices were as follows.

Mrs Judy Mead

Head of Clinical Effectiveness, Chartered Society of Physiotherapy

Dr Marcia Kelson

Director, Patient Involvement Unit for NICE

Mrs Joyce Cormie

Patient representative

Mrs Gill Hek

Principal Lecturer, University of West of England

Mrs Karen Cowley

Practice Development Nurse, York Hospital

Mrs Jill Freer

Head of Clinical Governance and Quality Development, Leicestershire, Northamptonshire and Rutland Strategic Health Authority

Miss Amanda Wilde

Reimbursements and Outcomes Manager, Convatec Ltd

Appendix D: Technical detail on the criteria for audit of the use of pressure-relieving devices for the prevention of pressure ulcers in primary and secondary care

The audit criteria below are to assist with implementation of the guideline recommendations. The criteria presented here are considered to be the key criteria associated with the guideline recommendations. They are suitable for use in primary and secondary care, for all individuals vulnerable to or at elevated risk of developing pressure ulcers who are admitted to hospital for medical or surgical management or who are discharged to an extended care facility or home.

- Users of these guidelines are reminded that the criteria presented here should be used in conjunction with the audit criteria presented in *Pressure Ulcer Risk Assessment and Prevention* (RCN 2001*).
- Equipment allocation cannot be driven by risk assessment alone, and percentages of individuals within different risk groups who should be allocated specific equipment cannot be specified.
- As well as formal risk assessment, clinical judgment, patient condition, lifestyle and prior experiences of pressure-relieving devices require consideration when allocating devices.

Possible objectives for an audit

Audits can be carried out in different care settings to ensure that individuals who are vulnerable to developing pressure ulcers, or who are at elevated risk of developing pressure ulcers, are offered appropriate pressure-relieving devices, are involved in decisions about their care, and have been informed about the rationale and use of pressure-relieving devices.

Because the allocation of pressure-relieving devices is only one part of a pressure ulcer reduction strategy, pressure ulcer incidence is not an appropriate subject for audit to evaluate the implementation of this guideline.

* Royal College of Nursing (2001) *Pressure Ulcer Risk Assessment and Prevention*. London: Royal College of Nursing. Available from www.rcn.org.uk and www.nice.org.uk/Docref.asp?d=16423

People that could be included in an audit

An audit could be conducted in settings where people are at elevated risk of developing pressure ulcers – for example, intensive care unit, orthopaedic, neurological, and spinal injuries units and selected patients discharged to the community.

Data sources and documentation of audit

Systems for recording the necessary information (which will provide data sources for audit) should be agreed by Trusts.

Whatever method is used for documentation, the process and results of risk assessment and equipment allocation should be accessible to all members of the multidisciplinary team. In relation to risk assessment, this should include name of the risk assessment tool used, evidence of scores and evidence of holistic assessment prior to allocating pressure-relieving devices.

The factors taken into consideration when choosing the most appropriate pressure-relieving device for a patient, the devices allocated, and the reasons for any changes in devices should be documented.

The fact that patients vulnerable to pressure ulcers, and their carers, have been informed about pressure ulcer prevention using pressure-relieving devices and educated about the use, operation and management of the equipment should be documented. Patients vulnerable to pressure ulcers and carers should be directly questioned about their satisfaction with, and the adequacy of, the information provided and this should be documented in the patient notes or in another source as agreed by the Trust.

Trusts should establish a system to record when staff have been educated in pressure ulcer risk assessment and the handling of pressure-relieving devices and should implement a process to review education needs relating to risk assessment and pressure-relieving devices.

Measures that could be used as a basis for an audit

The table overleaf suggests measures that could be used as a basis for audit.

Criterion	Standard	Exception	Definition of terms
<p>Allocation of pressure-relieving devices (includes mattresses and overlays, both high-tech and low-tech)</p> <ul style="list-style-type: none"> Recommendations <ul style="list-style-type: none"> 1.2.4.1–1.2.4.4, 1.2.4.7 			
<ol style="list-style-type: none"> Pressure-relieving devices are offered to individuals vulnerable to, or at elevated risk of developing, pressure ulcers as determined by holistic assessment (the results of which are documented in the patient's healthcare notes), within an agreed time-scale. Individuals cared for on pressure-relieving devices are moved to an alternative device within an agreed timescale if their condition changes. 	100%	<p>The device is not appropriate for the individual (for example a high-tech device that may be unstable for patients with fractures).</p> <p>The patient declines a particular device.</p> <p>The device has been reported by the patient or their carer, or is known to the health professional to be harmful or unacceptable to that individual</p>	<p>The holistic assessment as described in recommendation 1.2.4.1 will assist with the identification of patients deemed vulnerable to or at elevated risk of developing pressure ulcers.</p>
<p>Repositioning while being cared for on pressure-relieving devices</p> <ul style="list-style-type: none"> Recommendations <ul style="list-style-type: none"> 1.2.2.4, 1.2.4.5, 1.2.4.6 			
<ol style="list-style-type: none"> Individuals cared for on a pressure-relieving device have their repositioning needs and sitting times determined by a regular review of individual needs. 	100%	None.	

Criterion	Standard	Exception	Definition of terms
<p>Patient/carer information</p> <ul style="list-style-type: none"> • Recommendation 1.2.5.6 <p>1. Individuals who are allocated pressure-relieving devices, and their carers, receive written and verbal information about the device, its operation and management and its role in the prevention of pressure ulcers. This information includes the lay version of this guideline (see page 21).</p>	100%	None	Trusts should agree on the type of information to be made available, when, and by whom.
<p>Staff education/knowledge</p> <ul style="list-style-type: none"> • Recommendation 1.2.5.3 <p>1. Staff caring for people vulnerable to or at elevated risk of pressure ulcers are educated in:</p> <ul style="list-style-type: none"> • risk assessment • the safe use and operation of pressure-relieving devices • the monitoring of any adverse consequences associated with pressure-relieving devices. 	100%	None	Trusts should ensure that each clinical setting has access to advice on handling pressure-relieving devices (including safety, decontamination and the reporting of adverse events).

Calculation of compliance

Compliance (%) with each measure described in the table above is calculated as follows.

$$\frac{\text{Number of patients whose care is consistent with the criterion *plus* number of patients who meet any exception listed}}{\text{Number of patients to whom the measure applies}} \times 100$$

Clinicians should review the findings of measurement, identify whether practice can be improved, agree on a plan to achieve any desired improvement and repeat the measurement of actual practice to confirm that the desired improvement is being achieved.

Appendix E: Glossary

Partially based on *Clinical Epidemiology Glossary* by the Evidence Based Medicine Working Group, www.ed.ualberta.ca/ebm; *Information for National Collaborating Centres and Guideline Development Groups* (NICE 2001)*, guidelines on pressure ulcer risk assessment and prevention (NICE 2001; RCN 2001)* and Cullum et al. (*Health Technology Assessment* 2001; **15** (9)).

*Available from www.nice.org.uk

Air-fluidised beds/mattresses/overlays: warmed air is circulated through fine ceramic beads covered by a permeable sheet; these allow support over a larger contact area.

Alternating-pressure mattresses/overlays: the patient lies on air-filled sacs, which sequentially inflate and deflate and relieve pressure at different anatomical sites for short periods; these devices may incorporate a pressure sensor.

Basic 'old-style' hospital mattresses: usually a single piece of polyurethane foam confined by a non-stretch plastic or nylon cover which has few pressure-relieving properties.

Case-control study: a study in which the effects of a treatment or management approach in a group of patients are compared with the effects of a similar group of people who do not have the clinical condition (the latter is called the control group).

Clinical effectiveness: the extent to which an intervention (for example, a device or treatment) produces health benefits (that is, more good than harm).

Cost effectiveness: the cost of an intervention per unit of benefit. In cost-effectiveness analysis, the outcomes of different interventions are converted into health gains for which a cost can be associated – for example, cost per additional pressure ulcer prevented.

Economic evaluation: comparative analysis of alternative courses of action in terms of both their costs and consequences.

Effectiveness: the extent to which interventions achieve health improvements in real practice settings.

Epidemiological study: a study that looks at how a disease or clinical condition is distributed across geographical areas.

Erythema: non-specific redness of the skin which can be localised or general in nature and which may be associated with cellulitis, infection, prolonged pressure or reactive hyperaemia.

Fibre filled overlays/mattresses: synthetic fibres in a series of connected cushions. The fibre may be silicone coated, or formed into balls to reduce shear and friction.

Fluid-filled overlays or mattresses: the fluid conforms to the micro-contours of the body, consistently moving and reducing shear as well as providing overall pressure relief.

Gel (viscoelastic) filled pads: frequently used on operating theatre tables to protect head, heels and ankles.

Health technology assessment: the process by which evidence on the clinical effectiveness and the costs and benefits of using a technology in clinical practice is systematically evaluated.

High-specification foam pressure-relieving devices ('foam alternatives'): for example, high-specification foam, convoluted foam, cubed foam; these are conformable and aim to redistribute pressure over a large contact area.

High-tech devices: an alternating support surface where inflatable cells alternately inflate and deflate.

Induration: the abnormal hardening of tissue (or organ).

Hyperaemia

Reactive hyperaemia: the characteristic bright flush of the skin associated with an increased volume of the pulse on the release of an obstruction to the circulation, or a vascular flush following the release of an occlusion of the circulation which is a direct response to incoming arterial blood.

Blanching hyperaemia: the distinct erythema caused by reactive hyperaemia, when the skin blanches or whitens if light finger pressure is applied, indicating that the patient's microcirculation is intact.

Non-blanching hyperaemia (previously identified as non-blanching erythema): indicated when there is no skin colour change of the erythema when light finger pressure is applied, indicating a degree of microcirculatory disruption often associated with other clinical signs, such as blistering, induration and oedema.

Low-air-loss overlays/mattresses/beds: the patient is supported on air-filled sacs inflated at a constant pressure, through which air is able to pass.

Low-tech devices: a conforming support surface that distributes the body weight over a large area.

Meta-analysis: a statistical method of summarising the results from a group of similar studies.

Oedema: increase in fluid in inter-cellular space, swelling.

Overlay: term used to describe surfaces placed on top of a standard mattress or operating table.

Pressure-relieving: equipment that removes pressure from different areas of the body.

Randomised controlled trial (RCT): a clinical trial in which the treatments are randomly assigned to participants. The random allocation eliminates bias in the assignment of treatment to individuals and establishes the basis for the statistical analysis.

Systematic review: a way of finding, assessing and using evidence from studies (usually RCTs) to obtain a reliable overview.

Turning beds/frames (kinetic beds): beds that either aid manual repositioning of the individual or reposition the patient by motor-driven turning and tilting.



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