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

NICE guideline

Second draft for consultation, April 2003

If you wish to comment on the recommendations, please make your comments on the full version of the draft guideline.
GUIDELINE UNDER DEVELOPMENT: DRAFT FOR CONSULTATION

The following guidance is evidence based. The grading scheme used for the recommendations (A, B, C, D) is described in Appendix A; a summary of the evidence on which the guidance is based is provided in the full guideline (see Section 5).

The recommendations in this document are not designed to be used as a stand-alone product and should be used in conjunction with Pressure ulcer risk assessment and prevention (NICE 2001). This can be found on the NICE website at: http://www.nice.org.uk/Docref.asp?d=16477

1 Guidance

The guideline is of relevance 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.

This guideline makes graded recommendations about the use of pressure-relieving devices (beds, mattresses and overlays) for the prevention of pressure ulcers in primary and secondary care. However, it was the view of the Guideline Development Group (GDG; see Appendix B) that the gradings do not differentiate the recommendations in terms of their importance to the guideline as a whole – all recommendations are endorsed equally by the GDG.

1.1 Decisions about which pressure-relieving device to use should be based on an overall assessment of the individual. Holistic assessment should include:

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- identified levels of risk
- comfort
- skin assessment
- general health state
- lifestyle and abilities
- critical care needs, and
- acceptability of the proposed pressure-relieving equipment to the patient and/or carer

and should not be based solely on scores from risk assessment scales. [D]

1.2 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]

1.3 Where patients are assessed as having an elevated risk of developing pressure ulcers, consideration should be given to the use of equipment such as alternating pressure mattresses or other high-tech pressure-relieving systems. [D]

1.4 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]

1.5 The provision of pressure-relieving devices needs a 24-hour approach. It should include consideration of all surfaces used by the patient. [D]

1.6 Support surface and positioning needs should be assessed and reviewed regularly and determined by the results of skin inspection, patient comfort, ability and general state. Thus repositioning should occur when individuals are on pressure-relieving devices. [D]
1.7 The management of a patient in a sitting position is also 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]

1.8 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]

1.9 Healthcare professionals should be educated about:
- pressure ulcer risk assessment and prevention
- selection, use and maintenance of pressure-relieving devices
- patient education and information giving. [D]

1.10 Individuals vulnerable to or at elevated risk of developing pressure ulcers, and their carers, should be informed verbally and in writing about:
- the prevention of pressure ulcers using pressure-relieving strategies
- the use and maintenance of pressure-relieving devices
- where they can seek further advice and assistance. [D]
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; 2002b). 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.

2 Notes on the guidance

2.1 Terminology

- 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 guideline, pressure-relieving is used as an umbrella term for all pressure-reducing and pressure-redistributing devices. The term is also consistent with recent guidelines (NICE 2001; RCN 2001) and the evidence review on which this guideline is partly based.
- Pressure ulcers have also been known previously as pressure sores, bed sores and decubitus ulcers.
- The GDG decided to use the terms ‘vulnerable to pressure ulcers’ and ‘at elevated risk of pressure ulcers’ rather than the commonly used 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 scale is better than clinical judgement for assessing risk or that allocation of pressure-relieving devices can be linked to risk assessment scales.

- **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: patients are 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.
2.2 Scope of the guidance

All NICE guidelines are developed in accordance with a scope document that defines what the guideline will and will not cover. The scope of this guideline was established at the start of the development of this guideline, following a period of consultation; it is available from http://www.nice.org.uk/article.asp?a=29296

The National Institute for Clinical Excellence (‘NICE’ or ‘the Institute’) commissioned the National Collaborating Centre for Nursing and Supportive Care to develop guidelines 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 to supplement the NICE guideline on pressure ulcer risk assessment and prevention published in 2001. 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.

The guideline recommendations apply to patients of all ages. However, no trials were identified that applied specifically to the paediatric population.

The main area examined by the guideline was:

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

Additional areas included:

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

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 guideline is relevant to – but does not cover – risk factors, skin inspection, seating, and general positioning of patients (unrelated to pressure-relieving devices). Although aspects of risk assessment related to the allocation of pressure-relieving devices are covered, the reader is referred to the detailed discussion of this topic in the NICE guideline on pressure ulcer risk assessment and prevention (NICE 2001).

The guideline recommendations do not cover aids such as water-filled gloves, sheepskins, doughnut-type devices, cushions, or limb protectors because recommendations about their use have already been issued by NICE (NICE 2001).

2.3 Principles of practice

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

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-relieving devices (beds, mattresses and overlays) for the prevention of pressure ulcers in primary and secondary care. The review should consider the resources required to implement fully the recommendations set out in Section 1 of this guideline, the people and processes involved, and the timeline over which full implementation is envisaged. Clearly, it is in the interests of patients, carers and healthcare professionals that the implementation timeline, as determined by each local health community, is as rapid as possible.

This guideline is not detailed a procedural protocol. Relevant local clinical guidelines and protocols should be reviewed in the light of this guidance and revised accordingly.

3.2 Audit

Suggested audit criteria are listed in Appendix E. 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 Group’s full set of research recommendations is detailed in the full guideline produced by the National Collaborating Centre for Nursing and Supportive care (see Section 5).

- Comparisons, 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 patients.

- Investigation of the impact of pressure ulcers on the quality of life of patients 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.

- The need for and frequency of manual repositioning, including:
  - requirement for repositioning on any pressure-relieving device
  - methods of repositioning patients on different pressure-relieving devices
  - nursing time involved in repositioning.

- Large-scale prospective epidemiological studies to improve understanding of risk factors and the relative contribution they make to the development of pressure ulcers, to facilitate the development of risk assessment scales based on adequate prospective research.

5 Full guideline

The National Institute for Clinical Excellence commissioned the development of this guidance 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). [Note: these details will apply to the published full guideline.]

The members of the Guideline Development Group are listed in Appendix B. Information about 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

NICE has published a guideline on pressure ulcer risk assessment and prevention:


NICE is developing the following clinical guideline:

- Pressure ulcers: the management of pressure ulcers in primary and secondary care (This guideline is expected to be published early in 2004.)

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.
Appendix A: Grading scheme

The grading scheme and hierarchy of evidence used in this guideline (see Table) is from Eccles and Mason (2001).
<table>
<thead>
<tr>
<th>Recommendation grade</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Directly based on category I evidence</td>
</tr>
<tr>
<td>B</td>
<td>Directly based on:</td>
</tr>
<tr>
<td></td>
<td>• category II evidence, or</td>
</tr>
<tr>
<td></td>
<td>• extrapolated recommendation from category I evidence</td>
</tr>
<tr>
<td>C</td>
<td>Directly based on:</td>
</tr>
<tr>
<td></td>
<td>• category III evidence, or</td>
</tr>
<tr>
<td></td>
<td>• extrapolated recommendation from category I or II evidence</td>
</tr>
<tr>
<td>D</td>
<td>Directly based on:</td>
</tr>
<tr>
<td></td>
<td>• category IV evidence, or</td>
</tr>
<tr>
<td></td>
<td>• extrapolated recommendation from category I, II, or III evidence</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Evidence category</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>I:</td>
<td>Evidence from:</td>
</tr>
<tr>
<td></td>
<td>• meta-analysis of randomised controlled trials, or</td>
</tr>
<tr>
<td></td>
<td>• at least one randomised controlled trial</td>
</tr>
<tr>
<td>II:</td>
<td>Evidence from:</td>
</tr>
<tr>
<td></td>
<td>• at least one controlled study without randomisation, or</td>
</tr>
<tr>
<td></td>
<td>• at least one other type of quasi-experimental study</td>
</tr>
<tr>
<td>III:</td>
<td>Evidence from non-experimental descriptive studies, such as comparative studies, correlation studies and case–control studies</td>
</tr>
<tr>
<td>IV:</td>
<td>Evidence from expert committee reports or opinions and/or clinical experience of respected authorities</td>
</tr>
</tbody>
</table>

Appendix B: The Guideline Development Group

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GUIDELINE UNDER DEVELOPMENT: DRAFT FOR CONSULTATION

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Acknowledgements

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Appendix C: The Guideline Review Panel

The Guideline Review Panel is an independent panel that oversees the development of the guideline and take 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 were as follows.

[NICE to add later]
Appendix D: Information for the public

This will be inserted by NICE before printing.
Appendix E: 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 patients 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) and the implementation points in *Pressure ulcer risk assessment and prevention* (NICE 2001).
- Equipment allocation cannot be driven by risk assessment alone, and percentages of patients 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 patients 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.

**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 ICU, orthopaedic, neurological, 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 scale 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 carers and patients 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 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 below suggests measures that could be used as a basis for audit.
<table>
<thead>
<tr>
<th>Criterion</th>
<th>Standard</th>
<th>Exception</th>
<th>Definition of terms</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Allocation of pressure-relieving devices (includes mattresses and overlays, both high-tech and low-tech)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• <strong>Recommendations 1,2,3,4,8</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. 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.</td>
<td>100%</td>
<td>The device is not appropriate for the individual (for example a high-tech device that may be unstable for patients with fractures).</td>
<td>The holistic assessment as described in recommendation 1.1 will assist with the identification of patients deemed vulnerable to or at elevated risk of developing pressure ulcers.</td>
</tr>
<tr>
<td>2. Individuals cared for on pressure-relieving devices are moved to an alternative device within an agreed timescale if their condition changes.</td>
<td>100%</td>
<td>The patient declines a particular device.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>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 patient</td>
<td></td>
</tr>
<tr>
<td><strong>Repositioning while being cared for on pressure-relieving devices</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• <strong>Recommendations 5,6,7</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Individuals cared for on a pressure-relieving device have their repositioning needs and sitting times determined by a regular review of individual needs.</td>
<td>100%</td>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>
### Patient/carer information

**Recommendation 10**

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 Appendix D).

<table>
<thead>
<tr>
<th>%</th>
<th>None</th>
<th>Trusts should agree on the type of information to be made available, when, and by whom</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>

### Staff education/knowledge

**Recommendation 9**

1. Staff caring for people vulnerable to or at elevated risk of pressure ulcers are educated in:
   - risk assessment
   - the safe use and operation of pressure-relieving devices
   - the monitoring of any adverse consequences associated with pressure-relieving devices.

<table>
<thead>
<tr>
<th>%</th>
<th>None</th>
<th>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)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>
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**Calculation of compliance**

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

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

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 F: The algorithm

Summary of recommendations for people vulnerable to pressure ulcers (all settings)

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
</table>
| Informal risk assessment identifies individual as vulnerable to pressure ulcers | Decide which pressure relieving device to use, based on an overall holistic assessment that considers:  
  - identified levels of risk  
  - comfort  
  - skin assessment  
  - general health state  
  - lifestyle and abilities  
  - critical care needs  
  - acceptability                                                             |
| Allocate pressure-relieving device (ward or theatre mattress or overlay) as appropriate | Repositioning should occur regularly when an individual is cared for on a pressure-relieving device  
  The frequency of repositioning should be determined by skin inspection, comfort, ability and general state  
  Review positioning and support surface needs regularly  
  Depending on the needs of the individual, it may be necessary to restrict sitting time to periods of < 2 hours  
  Change the pressure-relieving device in response to altered level of risk, condition or needs of the individual  
  Assess vulnerability to pressure ulcers throughout an individual’s episode of care |
Appendix G: References


Appendix H: Abbreviations and glossary

**Abbreviations**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDG</td>
<td>Guideline Development Group</td>
</tr>
<tr>
<td>NCC-NSC</td>
<td>National Collaborating Centre for Nursing and Supportive Care</td>
</tr>
<tr>
<td>NICE</td>
<td>National Institute for Clinical Excellence</td>
</tr>
</tbody>
</table>

**Glossary**

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

**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 single piece of polyurethane foam confined by 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 is 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).

Cochrane Collaboration: an international organisation in which people retrieve, appraise and review available randomised controlled trials. The Cochrane Database of systematic reviews contains regularly updated reviews on a variety of issues. The Cochrane library is the database for the collaboration, it is electronic and regularly updated.

Constant low pressure: devices that mould around the shape of the patient to distribute weight over a large area.

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.

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 OT 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.

Low-air-loss overlays/mattresses/beds: patients are 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 (Cullum et al. 2001).

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

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

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

Randomised controlled trial (RCT): a clinical trial in which the treatments are randomly assigned to subjects. The random allocation eliminates bias in the assignment of treatment to patients 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 patient or reposition the patient by motor-driven turning and tilting.