CLN/P1

PORTSMOUTH HEALTHCARE TRUST

CLINICAL POLICY

POLICY FOR THE PREVENTION AND MANAGEMENT OF PRESSURE ULCERS

1. BACKGROUND

Pressure ulcers represent a major burden of sickness and reduce quality of life for patients and their carers. The financial costs to the NHS are also substantial. It has been estimated that preventing and treating pressure ulcers in a 600 bed general hospital costs between £600,000 and £3 million a year.

2. PURPOSE

That within each service systems are in place to ensure appropriate action is taken for

- early identification of patients/clients at risk of developing pressure ulcers
- preventative intervention
- effective management of pressure ulcers if present.

2. SCOPE and DEFINITION

Pressure ulcers also known as pressure sores, decubitus ulcers and bedsores, are areas of localised damage to the skin and underlying tissue. The majority of pressure sores are thought to be caused by a combination of unrelieved pressure, shear and friction. (Allman, 1997). Collier, 1996 defined them as: " Skin ulceration as a result of pressure in combination with the effects of other variables." Pressure Ulcers usually occur over bony prominence and should be graded. Within PHCT to classify the degree of tissue damage observed the European grading score will be used.

This policy provides a framework for all staff working within the Trust who are directly or indirectly involved with care delivery. It is supported by the local implementation guidance based on the RCN Clinical Practice Guidelines 2000 'Pressure Ulcer Risk Assessment and Prevention', the European grading score and PHCT guidance on the principles of general wound management

3 RESPONSIBILITY

It is the responsibility of all professionals and support staff involved directly or indirectly in care to ensure that all patients / clients have a co-ordinated approach to pressure ulcer management. *Nurses* are responsible for reducing the incidence and severity of pressure ulcers, the grading of pressure ulcers and for the ongoing effective management.

3.1 **Nurses are responsible for:**

- risk assessment
- planning
- implementation of action plans
- evaluation
- documentation
- liaison with multiprofessional team

Service Agreement /Planning groups are responsible for:

- ensuring that necessary resources and equipment is available

3.2

- ensuring that systems are in place to determine and access appropriate training / updating, for all staff and that qualified nurses can evidence their competence.
- ensuring that systems are in place to audit performance against the recommended RCN guidelines

4 REQUIREMENTS

4.1 Risk Assessment

On initial contact with the health care system all patients must have an informal risk assessment based on their clinical presentation with consideration to 'risk' factors. Formal assessments must take place in under six hours of admission to an episode of care and should be routine for all in - patients and patients seen on domiciliary visits. If considered not at risk on the initial assessment, reassessment should occur if there is a change in an individuals condition.

Nurses are required to

- undertake a formal assessment risk by exercising professional judgement, knowledge and skill and by using as an aide memoir the Waterlow Scale.
- document/record the formal risk assessment and to plan the appropriate care and intervention with the patient
- educate the patient/carers to inspect their own skin and encourage them to take any preventative measures, identifying the appropriate resources required
- share information with the inter - disciplinary care team to enable a multi professional approach to prevention and management.

Care Planning

- systems should be place to ensure that all appropriate staff have the required skill to deliver the plan of care
- care plans should reflect the interdisciplinary approach to care
- care should be planned with the patient / carer ensuring their understanding and their agreement to compliance
- care plans must state clear action points and review dates to allow for continuity of care
- the use and care of appropriate pressure relieving equipment should be discussed with the patient and carer as necessary .

4.3 Equipment and Resources

Systems must be in place to ensure that:-

- all clinical areas have a nominated link nurse/resource nurse who is able to update colleagues and act as a resource.
- all link nurses/resource nurses attend appropriate basic and advanced wound care training plus 2 days per year update sessions and regularly attend link nurse meetings.
- staff receive training for replacement, maintenance, safe storage and cleaning of all pressure relieving equipment
- qualified nurses attend an introductory and thereafter an annual tissue viability study session
- support staff attend training during induction and thereafter demonstrate their competence by taking action to prevent pressure ulcer formation and/or minimise further damage and promote healing
- training and updating of staff should be identified and planned for through individual performance reviews

4.4 Review, prevalence/incident monitoring

Systems must be in place to ensure that

- care plans show evidence of clear reviews and of ongoing risk assessments
- prevalence and incident monitoring is undertaken annually

4.5 Patients, relatives and carers

Nurses are responsible for the education of patients/clients regarding their potential to develop pressure ulcers and on preventative measures. They must ensure the patients understanding and document/ record the patients agreement or not to comply with the planned care. Relatives and carers especially in the home must also have appropriate education, and training regarding the use of any special equipment in place.

5 AUDIT/CLINICAL GOVERNANCE

The systems to support this policy should be subject to an annual audit based on the requirements of this policy and should feature in annual Clinical Governance plans and reports

POLICY PRODUCED BY: Wendy Inkster, Nursing Policy Manager

POLICY PRODUCED February 2001

APPROVED BY: Trust Board May 2001

TO BE REVIEWED: May 2003

References:

RCN Pressure ulcer risk assessment and prevention guidelines '2000'
European Grading Score
PHCT guidance on the principles of general wound management

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PORTSMOUTH HealthCare NHS TRUST

RCN Pressure ulcer risk assessment and prevention guidelines '2000'

The RCN Pressure ulcer risk assessment and prevention guideline is an evidence - linked clinical guideline which is to be adopted in totality with local specific additions for Portsmouth HealthCare Trust.

The overall aim of the guideline is to help reduce the occurrence of pressure ulcers and to provide health care professionals with recommendations to:

- help early identification of patients at risk of developing pressure ulcers
- suggest preventative interventions
- point out practice that may be harmful or ineffective.

The RCN guideline is only for pressure ulcer risk assessment and prevention it doesn't include treatment for wounds. A separate 'local approved' guideline for the assessment and management of wounds is also incorporated.

Local specific additions to the recommendations

1.0 Identifying individuals at risk

1.0 to 1.5 will be accepted in totality

2.0 Use of risk assessment scales

2.1 accepted in totality with the addition of:-

2.1 The waterlow risk assessment scale will be used and a score of 14 is recommended as cut off point.

3.0 Risk factors

3.1 to 3.3 will be accepted in totality

4.0 Skin inspection

4.1 to 4.6 will be accepted in totality

5.0 Pressure redistributing devices

5.1 to 5.7 will be accepted in totality

6.0 Use of aids

6.1 will be accepted in totality

7.0 Positioning

7.1 to 7.7 will be accepted in totality with the addition of:-

7.7 When a using mechanical hoist to move a patient/client a green sheet must be used to protect their heels. Recommended by the Handling Advisor

8.0 Seating

8.1 to 8.4 will be accepted in totality with the addition of:-

Link nurses / resource nurses should assume the expert role

9.0 Education and training

9.1 to 9.6 will be accepted in totality

improving practice: *improving care*

CLINICAL PRACTICE GUIDELINES

Pressure ulcer risk assessment and prevention

Recommendations

2000

The Department of Health commissioned the RCN Institute to develop a Pressure Ulcer Guideline Prior to the establishment of the National Institute for Clinical Excellence. This is one of the inherited guidelines on the Institute's programme. The Institute seeks stakeholder involvement in its guideline development process. For further information on this please go to the NICE website http://www.nice.org.uk

This document is the first version of the final draft which is out for consultation until 15th September. Following that period, it will be re-drafted in light of comments and the NICE review. The expected date of publication of the revised final draft is December, 2000.

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Contents

Introduction

"I had an operation on my gall bladder. I told the staff I was prone to getting pressure sores. They assured me I would not get any while in their care. Low and behold when I came around from the anaesthetic, they found a beauty...it is now six and a half years old"

(person with a spinal injury)

Background

Pressure ulcers represent a major burden of sickness and reduced quality of life for patients and their carers (Franks *et al.* 1999). The financial costs to the NHS are also substantial (Cullum *et al.* 1995). It has been estimated that preventing and treating pressure ulcers in a 600-bed general hospital costs between £600,000 and £3 million a year (Touche Ross, 1993). Collier, 1999a, applying a similar formula to Hibbs, 1988, calculated the cost of treating a patient with a Grade IV pressure ulcer as £40,000.

Pressure ulcers, also known as pressure sores, decubitus ulcers and bedsores, are areas of localised damage to the skin and underlying tissue. They are thought to be caused by a combination of pressure, shear and friction (Allman, 1997). Collier, 1996 defines them as:

"...skin ulceration as a result of pressure in combination with the effects of other variables"

Acute illness/ trauma and immobility are key variables but others identified in the proceeding recommendations, are also believed to play a part

Pressure ulcers usually occur over bony prominences and should be graded or staged to classify the degree of tissue damage observed. Unfortunately they are a common occurrence. An well quoted study found new pressure ulcers occuring in 4%-10% of patients admitted to a UK District General Hospital (Clark and Watts, 1994), dependent upon the patient case mix

The human and financial cost of pressure ulcers, together with a variation in practice across the UK and a growing body of knowledge about effectiveness, have highlighted the need for recommendations for practice.

In response, the NHSE no commissioned the Royal College of Nursing (RCN) to produce an evidence-linked clinical guideline on risk assessment and prevention of pressure ulcers. The guideline complements and builds on the work of others, such as the European Pressure Ulcer Prevention Guidelines (EPUAP,1999).

The guideline

The guideline provides health care professionals with recommendations:

- to help early identification of patients at risk of developing pressure ulcers
- suggest preventive interventions
- point out practice that may be harmful or ineffective.

The guideline's overall aim is to help reduce the occurrence of pressure ulcers. It comprises six sections:

- **Quick reference guide** and summary of recommendations
- **Philosophy of care** which makes suggestions about the environment within which the recommendations should be implemented
- **Evidence-linked recommendations** for:
  - identifying individuals at risk
  - use of risk assessment scales
  - recognising risk factors
  - skin inspection
  - pressure redistributing devices
  - use of aids
  - positioning
  - seating
  - education and training.
- **Essentials of care** which identifies the practice issues of nutrition, continence management and hygiene and their role in pressure ulcer development
- **Quality improvement** which includes a quality improvement cycle, monitoring, discharge planning, and audit information
- **Glossary of terms.**

The guideline does not cover the epidemiology of pressure ulcers or make recommendations for wound care and/ or the surgical management of pressure damage.

Intended users of the guideline

To provide a co-ordinated approach, risk assessment and prevention of pressure ulcers should be seen as an inter-disciplinary issue.

This guideline is intended to be used by all health care staff including: managers, professionals allied to medicine, nurses, doctors, equipment suppliers and academincs. It could also be adapted for use by patients and carers.

Patients and settings

The recommendations are for patients (adults and children) who have no pressure ulcers, seen in hospital, nursing homes, supported accommodation and at home. They do not include treatment of existing pressure ulcers.

However in cases where a patient has a pressure ulcer, they will be useful in preventing pressure ulcers on other areas of the body. Patients (adults and children) are referred to as individuals, persons or users throughout the guideline.

Overview of guideline development method

A project officer developed the guideline in collaboration with an inter-disciplinary group, including users and carers.

See Appendix 1 for a brief overview of the method.

Full details about the development of the guideline can be found in the *Technical Report* (Rycroft-Malone and McInness, 2000), the definitive document which includes method and recommendations.

Evidence considered for this guideline has come from a number of sources:

- the Agency for Health Care Policy and Research (AHCPR, 1992) evidence-linked guideline Pressure ulcers in adults: prediction and prevention
- an update of sections of their research base (Rycroft-Malone and McInnes, 2000)
- the Effective Health Care Bulletin *The prevention and treatment of pressure sores* (EHCB, 1995)
- a systematic review of the effectiveness of pressure redistributing devices (Cullum *et al*, 2000)
- a systematic review of the effectiveness of risk assessment tools (McGough, 1999)
- the results of a formal consensus process (Rycroft-Malone 2000).

As the above indicates, two clinical issues have recently been the subject of systematic review: risk assessment scales (McGough, 1999) and pressure redistributing devices (EHCB, 1995; Cullum *et al*, 2000). Their results provided some evidence that could be translated into recommendations. Both authors reported on the poor quality of the studies available for review and highlighted the need for good quality research in these areas.

The AHCPR guideline (1992) included a literature review of topics such as skin care, positioning and education. An updated literature review of these areas (1991-1998) revealed little good research evidence had emerged in the interim period (Rycroft-Malone and McInnes, 2000). In the light of this, a formal consensus development process was used to integrate the different evidence sources and, where there was a weak research base, agree recommendations based on current best practice.

Evidence base

The guideline is evidence-linked, rather than evidence-based. As there was insufficient evidence to guide all clinical decisions, a number of recommendations for practice were solely or partially based on consensus expert opinion. The recommendations were graded as follows:

I Generally consistent finding in multiple acceptable studies

II Either based on a single acceptable study, or a weak or inconsistent finding in multiple acceptable studies

III Limited scientific evidence which does not meet all the criteria of acceptable studies or absence of directly applicable studies of good quality. This includes expert opinion.

(adapted from Waddell *et al*, 1996)

('acceptable' for this guideline refers to those that have been subjected and approved by a process of critical appraisal, see Technical Report for more details).

Additionally, some recommendations have figures next to them. These show the results of the formal consensus process – for example: (m 9, iqr 1.25). They refer to the median (m) and inter-quartile range (iqr) calculated from the consensus ratings. In this example, 9 was median (or average) rating, and an inter-quartile range

of 1.25 tells us that not everyone rated 9 – that is there was a distribution of scores. If everyone rated 9 the inter-quartile range would be 0. The larger the inter-quartile range , the lower the level of agreement within the group. Although these are consensus-rating scores, the group did consider research evidence together with their clinical opinion/expertise to make these judgements.

The evidence grade shows the type of evidence supporting each recommendation though it does not indicate the strength of each recommendation. All recommendations are endorsed equally and none are regarded as optional.

Guidance is provided for local application for recommendations where there is little available research, or where a review of the research has been inconclusive in its findings. For example, because the systematic review of risk assessment scales suggested a limited use and did not identify the superiority of one scale over another for predicting pressure ulcer development, the choice whether or not to use one is left up to individual health care delivery services.

Updating of the guideline

The guideline was completed in Spring 2000. Resources permitting, the guideline would be reviewed and updated on a two-yearly basis by the RCN. The first revision would therefore begin in 2002.

Audit

Simple audit criteria are included in the section on Quality Improvement. They have been developed from the recommendations and may help in developing a local audit tool. The criteria require further development work and piloting.

Disclaimer

As with any clinical guideline, recommendations may not be appropriate for use in all circumstances. Clearly a limitation of a guideline is that it simplifies clinical decision-making (Shiffman, 1997). Decisions to adopt any particular recommendations must be made by the practitioner in the light of:

- available resources
- local services, policies and protocols
- the patient's circumstances and wishes
- available personnel and equipment
- clinical experience of the practitioner
- knowledge of more recent research findings.

Quick Reference Guide

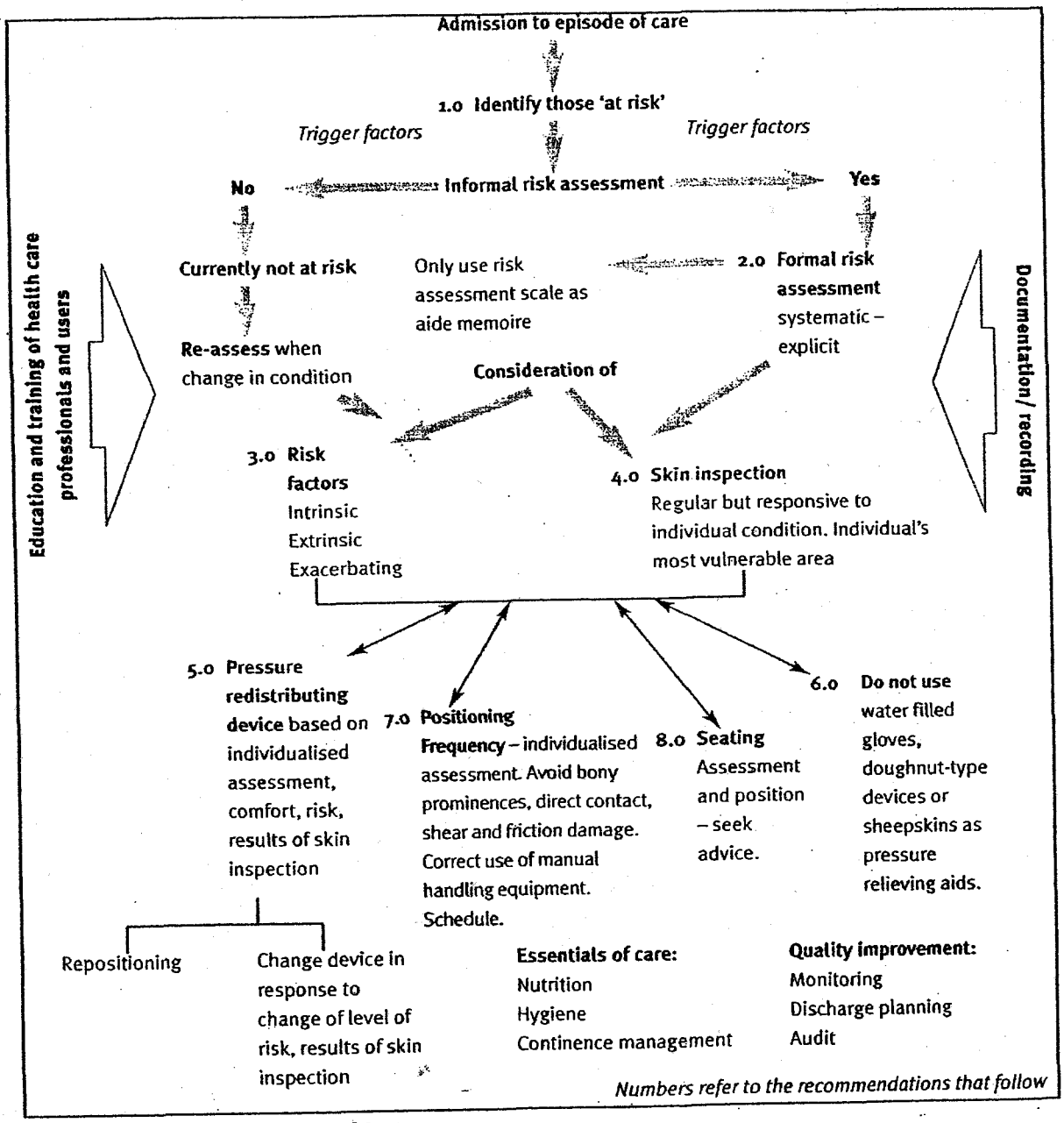

Figure 1. Quick Reference Guide

Summary of recommendations

1.0 Identifying individuals 'at risk'

1.1 Assessing an individual's risk of developing pressure ulcers should involve both informal and formal assessment procedures. III

1.2 Risk assessment should be carried out by personnel who have undergone appropriate and adequate training to recognise the risk factors that contribute to the development of pressure ulcers and how to initiate and maintain correct and suitable preventive measures. III

1.3 The timing of risk assessment should be based on each individual case. However, it should take place in under six hours of the start of admission to the episode of care. III

1.4 If considered not at risk on initial assessment, reassessment should occur if there is a change in an individual's condition. III

1.5 All formal assessments of risk should be documented/recorded and made accessible to all members of the inter-disciplinary team. III

2.0 Use of risk assessment scales

2.1 Risk assessment tools should only be used as an aide memoire and should not replace clinical judgement. I

2.2 If use of a risk assessment tool is preferred, it is recommended that a scale that has been tested for use in the same speciality is chosen. III

3.0 Risk factors

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: reduced mobility or immobility; sensory impairment; acute illness; level of consciousness; extremes of age; vascular disease; severe chronic or terminal illness; previous history of pressure damage; malnutrition and dehydration. II

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.

3.3 An individual's potential 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.

4.0 Skin inspection

4.1 Skin inspection should occur regularly and the frequency determined in response to changes in the individual's condition in relation to both deterioration or recovery. III

4.2 Skin inspection should be based on the individualised assessment of the most vulnerable areas of risk and therefore may include different or more areas which require inspection than those identified here: heels; sacrum; ischial tuberosities; parts of the body affected by anti-embolic stockings; parts of the body where pressure, friction and 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 clothing; elbows; temporal region of skull; shoulders; back of head and toes.

4.3 Individuals who are willing and able should be encouraged, following education, to inspect their own skin.

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.

4.5 Health care professionals should to be vigilant to the following signs which may indicate incipient pressure ulcer development: persistent erythema; 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 which, if tissue becomes damaged, is replaced by coolness; localised oedema and localised induration.

4.6 Any skin changes should be documented/recorded immediately.

5.0 Pressure redistributing devices

5.1 Decisions about which pressure redistributing device to use should be based on an overall assessment of the individual and not solely on the basis of scores from risk assessment scales. Holistic assessment should include level of risk, comfort and general health state. I

5.2 At risk' individuals should not be placed on standard foam mattresses. I

5.3 Patients at very high risk of developing pressure ulcers should be placed on alternating pressure mattresses or other high-tech pressure redistributing systems. II

5.4 Pressure redistributing overlays should be used on the operating table of individuals assessed to be at high risk of pressure ulcer development. I

5.5 To ensure continuity of preventive care, post-operative management of at risk individuals should include the use of pressure redistributing mattresses. III

5.6 Repositioning should occur when individuals are on pressure redistributing devices. III

5.7 The benefits of a pressure redistributing device should not be undermined by prolonged chair sitting. III

6.0 Use of aids

6.1 The following should not be used as pressure relieving aids: water filled gloves; synthetic sheepskins; genuine sheepskins and doughnut-type devices. III

7.0 Positioning

7.1 Individuals who are 'at risk' of pressure ulcer development should be repositioned and the frequency of reposition determined by the results of skin inspection and individual needs not by a ritualistic schedule. III

7.2 Repositioning should take into consideration other aspects of an individual's condition – for example, medical condition, comfort, overall plan of care and support surface.

7.3 Individuals who are considered to be acutely at risk of developing pressure ulcers should sit out of bed for less than two hours.

7.4 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.

7.5 A written/recorded re-positioning schedule agreed with the individual, should be established for each person 'at risk'.

7.6 Individuals/carers who are willing and able should be taught to redistribute their own weight.

7.7 |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.

8.0 Seating

8.1 Seating assessments for aids and equipment should be carried out by trained assessors who have the acquired specific knowledge and expertise (for example, physiotherapists/occupational therapists). III

8.2 Advice from trained assessors with acquired specific knowledge and expertise should be sought about correct seating positions.

8.3 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.

8.4 No seat cushion has been shown to out-perform another, therefore no recommendation can be made about which type to use for pressure redistribution purposes.

9.0 Education and training

9.1 Health care professionals should be trained/educated in pressure ulcer risk assessment and prevention. II

9.2 Health care professionals with recognised training in pressure ulcer management should cascade their knowledge and skills to their local health care teams.

9.3 An inter-disciplinary approach to the training and education of health care professionals should be adopted.

9.4 Training and education programmes should include: 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 redistributing equipment : use of pressure redistributing equipment; maintenance of pressure redistributing 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 inter-disciplinary team members in pressure ulcer management; policies and procedures regarding transferring individuals between care settings; patient education and information giving

9.5 Patients who are able and willing should be informed and educated about risk assessment and resulting prevention strategies. This strategy where appropriate should include carers. III

9.6 Patient/carer education should include providing information on the following: the risk factors associated with them developing pressure ulcers; the sites that are of the greatest risk to them of pressure damage; how to inspect skin and recognise skin changes; how to care for skin; methods for pressure relief/reduction; where they can seek further advice and assistance should they need it; emphasise the need for immediate visits to a health care professional should signs of damage be noticed.

Philosophy of Care

This philosophy of care describes the ideal context in which to implement the recommendations in this guideline.

Person-centred care

The rights of patients and their carers to be fully informed and share in decision-making is a central tenet of a number of recent policy documents – for example The New NHS. Modern. Dependable (DoH, 1997); Our Healthier Nation (DoH, 1999); and, specifically about the rights of the child, the United Nations convention (United Nations, 1991).

Involvement and partnership in care are central to the delivery of a service which responds to users' individual needs.

- users should be made aware of the guideline and its recommendations
- users should be involved in all aspects of pressure ulcer risk assessment and prevention, from involvement in assessment to shared decision-making about pressure redistributing 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
- users should be informed of their risk of developing pressure ulcers, especially when they are transferred between care settings or discharged home.

A collaborative inter-disciplinary approach to care

Pressure ulcer risk assessment and prevention should be seen as an inter-disciplinary issue. Adopting a team approach requires each member of the team to take responsibility for facilitating and improving communication, sharing care and responsibility for care. Such an approach requires health care professionals to understand and respect each other's roles in the delivery of that care.

- all members of the inter-disciplinary team should be aware of the guideline and its recommendations
- health care teams need to articulate the role of each member in the management of risk assessment and prevention of pressure ulcers.

Organisational issues

Organisational issues influence the quality of pressure ulcer risk assessment and prevention. Health care service providers need to ensure:

- an integrated approach to pressure ulcer prevention with clear strategy and policy supported by management
- care 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 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 are cared for by trained staff, and that staffing levels and skill mix reflect the needs of patients.

Recommendations

1.0 Identifying individuals 'at risk'

One of the first activities in preventing pressure ulcers is the early identification of individuals who are susceptible to developing them. If a person is identified as susceptible or 'at risk', it is the health care professional's duty to ensure that preventive measures are implemented. The earliest phases of pressure ulcer development may show no outward visible signs of damage. Therefore it is important that individuals at risk are given an immediate prevention plan.

1.1 Assessing an individual's risk of developing pressure ulcers should involve both informal and formal assessment processes

On initial contact with the health care system:

- all individuals should have an informal risk assessment, based on their clinical presentation and consideration of risk factors

Trigger factors which identify a susceptible individual – for example immobility, acute illness or trauma, altered level of consciousness (see 3.0 Risk factors for further triggers) –will alert practitioners to conduct a full:

- formal assessment, where an individual's risk is systematically and explicitly conducted via a structured risk assessment framework. Formal assessments should be routine for all in-patients (m9, iqr 1.5) and all those seen on domiciliary visits (m7, iqr 4.5).

1.2 Risk assessment should be carried out by personnel who have undergone appropriate and adequate training to recognise the risk factors that contribute to the development of pressure ulcers and how to initiate and maintain correct and suitable preventive measures.

Traditionally, the preferred member of the team to perform the risk assessment has been a trained nurse who has the acquired specific knowledge and expertise (m 9, iqr 0). However, if training has been completed, and knowledge and expertise acquired, risk assessment should also be carried out by doctors (m 9, iqr 2), ambulance personnel (m 9, iqr 3), therapists (m 8.5, iqr 3.75), health care assistants (m 8.5, iqr 3.75) and/ or carers.

1.3 The timing of risk assessment should be based on each individual case. However, it should take place in under six hours of the start of admission to the episode of care (m 9, iqr 1).

It should be recognised that in some situations – for example acute and critical care – risk assessment should be carried out immediately so as not to delay appropriate preventive measures.

1.4 If considered not at risk on initial assessment, reassessment should occur if there is a change in an individual's condition (m 9, iqr 0.25).

Risk assessment should be regarded as a dynamic process. Individuals, regardless of their initial admission status, could become 'at risk' during their contact with the health care system – for example because of a general deterioration in condition or undergoing surgery.

1.5 All formal assessments of risk should be documented/recorded (m 9 iqr 0) and made accessible to all members of the inter-disciplinary team (m 9, iqr 0).

Good documentation provides an accurate record of an individual's progress and risk status, and is key for accountability, responsibility, risk management and evaluation.

Strength of Evidence III

These recommendations are based on principles of good practice and the nominal group's clinical experience and opinion.

2.0 Use of risk assessment scales

2.1 Risk assessment scales should only be used as an aide memoire and should not replace clinical judgement.

Various scales have been developed to identify individuals at risk of developing pressure ulcers. Most scales have been developed in an ad hoc fashion based on opinions of the relative importance of possible risk factors (EHCB, 1995).

A recently completed systematic review (McGough, 1999) revealed that only the Braden scale has been tested for its predictive validity in comparison to nursing clinical judgement (Salvadalena *et al*, 1992; VandenBosch *et al*, 1996, cited McGough, 1999). These two clinical trials did not demonstrate the scale to be of greater predictive value than clinical judgement.

There is insufficient evidence to recommend one risk assessment scale as unambiguously superior to another, or a scale that is appropriate for use in all care settings (McGough, 1999). As the predictive validity of the six risk assessment scales (Anderson, Braden, Knoll, Norton, Pressure Sore Prediction Scale and Waterlow) is variable, both in comparison with each other and in relation to assessments made of the same scale, on evidence to date it is not possible to make valid comparisons.

Strength of Evidence I

McGough (1999) selected 18 studies which met the criteria for inclusion in her systematic review of the effectiveness of risk assessment tools. Findings from prospective cohort studies led her to conclude risk assessment scales may be useful 'aide memoires' for staff but should not replace clinical judgement (see Appendix 2 for table of included studies). McGough found:

- 61% of the scales that have been the subject of study are modifications of original scales, where the risk factors included in the original versions have never been questioned
- 86% of the scales had not been tested for their reliability and validity
- many of the studies reviewed were of poor quality in respect of methodological rigour, sample sizes and populations, and outcome measurement, resulting in them being susceptible to bias.

2.2 If use of a risk assessment tool is preferred, it is recommended that a scale that has been tested for use in the same speciality is chosen.

If a risk assessment tool is to be used to assist with clinical judgement, McGough suggests that local testing should establish an appropriate cut-off point to indicate risk ('threshold'), that is, the score at which an individual falls into the 'at risk' category.

Strength of Evidence III

This recommendation is based on the opinion of the systematic review author (McGough, 1999).

3.0 Risk factors

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:

Reduced mobility or immobility (m 8, iqr 2.5) A key factor in the development of pressure ulcers is reduced mobility or immobility. A number of studies have identified reduced mobility as an independent risk factor in pressure ulcer development.

In a prospective inception cohort study of patients fulfilling certain criteria admitted to a US tertiary university teaching hospital, Allman *et al*, 1995, found that a significant risk factor in patients who went on to develop sores was immobility.

Sensory impairment (m 9, iqr 0) For example neurological disease results in reduced sensation and thus insensitivity to pain or discomfort. This results in a reduced or lacking stimulus to move to relieve pressure. There are certain groups of individuals that may suffer from sensory neuropathy, for example those with diabetes and spinal injuries.

Acute illness (m 9, iqr 1) Clinical experience, observation and emerging research suggests that acutely ill patients are vulnerable to developing pressure ulcers. This is because of heart failure, vasomotor failure, vasoconstriction due to shock, pain, low blood pressure (Bliss, 1990) and temperature change – for example during and after anaesthesia (Scott, 2000).

Level of consciousness (m 8, iqr 2) A reduced level of consciousness may reduce an individual's awareness of the need to relieve pressure. Likewise an anaesthetised person has no independence to reposition themselves.

Extremes of age (up to 65, less than 5 years of age) (m 7, iqr 3.25) Advancing age is associated with an increase in cardiovascular and neurological disease, and changes to the resilience and elasticity of the skin. Individuals over 65 years of age are at greater risk than the general population of developing pressure ulcers (Verluysen 1986; Bergstrom *et al*, 1996; Bergstrom, Braden 1992).

Neonates and very young children are also at a greater risk. Their skin is still maturing and their head-to-body weight is disproportionate. It is currently thought that the factors that place children (m 8, iqr 3) and neonates (m 7, iqr 3.5) at risk are the same that place adults at risk, but the sites of greatest risk for pressure damage and the nature of the injury may differ. For example, there is greater risk of pressure damage to points on the head, on the ears from repeated oxygen saturation measurement, from repeated heel pricks for blood monitoring and an increased risk from extravasation.

Previous history of pressure damage (m 9, iqr 2) places individuals at a greater risk of developing further ulcers than previously pressure ulcer free patients (Berlowitz and Wilking, 1990; Bergstrom and Braden, 1992; Clark and Watts, 1994).

Vascular disease (m 8.5, iqr 2) reduces total blood flow and impairs micro circulation potentially making patients more vulnerable to pressure necrosis.

Severe chronic or terminal illness (m 8, iqr 2.25) places individuals at greater risk because of, for example, multi-organ failure, poor perfusion and immobility.

Malnutrition (m 7.5, iqr 3.5) and dehydration (m 8.5, iqr 2.25) While not directly linked to pressure ulcer development, malnutrition may increase an individual's risk of organ failure and serious illness. Related to this is body weight, both emaciated (Allman *et al.* 1995) and obese individuals may be more vulnerable to pressure damage. Dehydration may reduce the elasticity of tissues and thus increase tissue deformability under pressure or friction (see Essentials of Care section).

3.2 The following extrinsic risk factors are involved in tissue damage and should be removed or diminished to prevent injury:

Pressure which causes compression and possible capillary occlusion, which if prolonged can lead to ischaemia. How high the pressure must be and how long it must be exerted to cause damage depends on the individual's tissue tolerance. The key factors are intensity and duration of pressure.

Shearing occurs when the skeleton and deep fascia slide downwards with gravity, whilst the skin and upper fascia remain in the original position. Deep necrosis can occur when the shearing between two layers of tissue leads to stretching, kinking and tearing of vessels in the subcutaneous tissues. Shearing forces should not be considered separately from pressure: they are an integral part of the effect of pressure. Shearing most often occurs when individuals slide down or are dragged up a bed or chair.

Friction occurs when two surfaces move across each other. It often removes superficial layers of skin. Friction damage often occurs as a result of poor lifting techniques. (Defloor, 1999)

3.3 An individual's potential to develop pressure ulcers may be exacerbated by the following factors which therefore should be considered when performing a risk assessment.

Medication (m 7.5, iqr 2.5) – for example:

- sedatives and hypnotics may make an individual excessively sleepy and thus reduce mobility
- analgesics may reduce normal stimulus to relieve pressure
- inotropes cause peripheral vasoconstriction and tissue hypoxia
- non-steroidal anti-inflammatory drugs impair inflammatory responses to pressure injury.

This medication list is not exhaustive, practitioners should refer to pharmacists for specialist advice.

Moisture to the skin (m7, iqr 1.75) – for example urinary and faecal incontinence, wound drainage and sweat (see section on Essentials of Care) are potential irritants to the skin.

Strength of Evidence II

These recommendations have been identified from cohort studies (Bergstrom and Braden, 1992; Papantonio *et al*, 1994; Brandeis *et al.* 1994; Allman *et al*, 1995; Bergstrom *et al*, 1996), the logic and principles of physiology, and are supported by opinion and experience. There is a need for further epidemiological research to improve our understanding of risk factors and the relative contribution they make to the development of pressure ulcers (McGough, 1999).

4.0 Skin inspection

Skin inspection provides essential information for both assessment and prevention. Although the precise role that skin inspection plays in decreasing the incidence of pressure ulcers has not been determined, regular assessment of the most vulnerable parts of the body will enable early detection of incipient pressure damage.

4.1 Skin inspection should occur regularly and the frequency determined in response to changes in the individual's condition in relation to both deterioration or recovery (m9, iqr0).

4.2 Skin inspection should be based on the individualised assessment of the most vulnerable areas of risk and therefore may include different or more areas which require inspection than the examples identified below:

4.3 Individuals who are willing and able should be encouraged, following education, to inspect their own skin (m 9 iqr 0)

4.4 Individuals who are wheelchair users should use a mirror to inspect the areas that they cannot see easily (m9 iqr 0) or get others to inspect them

4.5 Health care professionals should to be vigilant to the following signs which may indicate incipient pressure ulcer development:

- Heels (m 9, iqr 0)
- Sacrum (m 9, iqr 0)
- Ischial tuberosities (m 9, iqr 0)
- Parts of the body that are affected by the wearing of anti-embolic stockings (m 9, iqr 0)
- Trochanter (m 9, iqr 0)
- Parts of the body where pressure, friction or shear is exerted in the course of an individual's daily living activities e.g. on the hands of wheelchair users (m 9, iqr 1)
- Part of the body where there are external forces exerted by equipment and clothing e.g. endotracheal tubes, intravenous lines, sites of pulse oximetry, catheters, shoes, elastic clothing) (m 9, iqr 1)
- Elbows (m 7, iqr 1)
- Temporal region of the skull (m 7, iqr 1.25)
- Shoulders (m 7, iqr 2.25)
- Back of head (m 7, iqr 1.75)
- Toes (m 7, iqr 2.5)

**previously identified as 'non-blanching erythema' – see glossary.*

It may not be possible to see the redness/erythema associated with tissue damage in people with darkly pigmented skin. Health care professionals need to be vigilant to the following signs, which may indicate incipient pressure ulcer development in people with darkly pigmented skin (Bennett, 1995):

- Persistent erythema (m 9, iqr 0.25)
- *Non-blanching hyperaemia (m 8.5, iqr 2)
- Blisters (m 8, iqr 3.25)
- Discolouration (m 7.5, iqr 4)
- Localised heat (m 7, iqr 2.5)
- Localised oedema (m 7, iqr 1.5)
- Localised induration (m 7.5, iqr 2)

4.6 Any skin changes should be documented/recorded immediately (m 9, iqr 0) including a detailed description of what is observed and any action taken.

- Purplish/bluish localised areas of skin (m 6.5, iqr 4)
- Localised heat which, if tissue becomes damaged, is replaced by coolness (m 7, iqr 2.25)
- Localised oedema (m 7, iqr 1.5)
- Localised induration (m 7.5, iqr 1.5)

Strength of Evidence III

These recommendations are supported by principles of best practice and the nominal group's clinical experience and opinion.

5.0 Pressure redistributing devices

5.1 Decisions about which pressure redistributing device to use should be based on an overall assessment of the individual and not solely on the basis of scores from risk assessment scales.

A recent systematic review (McGough, 1999) concluded that there was insufficient evidence to recommend using risk assessment scale scores on which to base or support decisions about choices of pressure redistributing surfaces. It follows that if risk assessment scales should not be used in isolation to identify individuals at risk, they should not be used in isolation to instigate prevention strategies.

Decisions about support surfaces should be influenced by holistic assessment of an individual's risk (m 9, iqr 4), his/her comfort (m 8, iqr 2.25) and general health state (m 8.5, iqr 1.25). Interface pressure measurements should not be used to make decisions about pressure redistributing devices (m 8.5, iqr 5.25) because they have not been demonstrated to predict reliably the performance of support surfaces (Cullum *et al*, 2000). Assessment should be on-going throughout an individual's episode of care and the type of pressure relief support changed to suit any alteration in risk (m 7, iqr 5.5).

Strength of evidence I

Findings from prospective cohort studies led the reviewer to conclude that staff should not rely solely on risk assessment scale scores (McGough, 1999).

Strength of evidence III

This recommendation and suggested decision-making

practice regarding choice of pressure redistributing devices is also supported by the nominal group's clinical experience and opinion.

5.2 'At risk' individuals should not be placed on standard foam mattresses.

A recently completed systematic review (Cullum *et al*, 2000) concluded that standard foam mattresses have been consistently outperformed by a range of foam-based, low pressure mattresses and overlays, and also by 'higher-tech' pressure redistributing beds and mattresses. The results from four trials comparing foam alternatives with the standard hospital foam mattress (Gray and Campbell, 1994; Hofman, 1994; Santy, 1994 and Collier 1996, cited Cullum *et al*. 2000) were pooled to reveal that various foam alternatives can reduce the incidence of pressure ulcer development in at risk patients. Another randomised, controlled trial (RCT) (Andersen, 1982, cited Cullum *et al*. 2000) comparing alternating pressure surfaces to standard foam mattresses, also reported a reduction in the incidence of pressure ulcers. Cullum *et al*, 2000, note that 'standard' was poorly described in many of the studies included in their review. 'Standard' varies by country, setting and over time.

Other studies comparing alternating pressure devices with a variety of constant low-pressure devices have not shown significant benefits to using one device over another. At present the clearest recommendation is that at risk individuals should be placed on an alternative to the standard foam mattress.

Strength of evidence I

This recommendation is supported by the findings of a systematic review including 29 RCTs of support surfaces for pressure ulcer prevention (Cullum *et al*, 2000).

5.3 Patients at very high risk of developing pressure ulcers should be placed on alternating pressure mattresses or other high-tech pressure redistributing systems.

The EHCB (1995) advises that in the absence of clear evidence for an optimal strategy, patients at high risk such as those in intensive care, orthopaedic units or with neurological deficits should be placed on higher-tech surfaces. Cullum *et al*, 2000, report that the relative merits of alternating and constant low pressure, and of different alternating pressure devices are unclear. Many of the studies which compared devices did not adequately describe the equipment being used, and were small and thus under-powered to detect clinically important differences, even when studies were pooled. There is limited evidence to suggest that low air loss beds (compared to standard ICU beds) reduce the incidence of pressure ulcers in intensive care (Inman, 1993, cited Cullum *et al*, 2000).

Strength of evidence II

Advice from EHCB (1995) and one controlled trial.

Individuals undergoing surgery

5.4 Pressure redistributing mattresses/overlays should be used on the operating table of individuals assessed to be at high risk of pressure ulcer development.

Three RCTs have evaluated different methods of pressure relief on the operating table (Nixon *et al*, 1998; Aronovitch, 1998; Dunlop, 1998, cited Cullum *et al*, 2000). Their results suggest that a reduction in post-operative pressure ulcers can be achieved using an alternative support surface to a standard operating table.

The three RCTs evaluated different methods of pressure relief, however it is currently unclear which type is the most effective (Cullum *et al*, 2000). Nixon *et al*, 1998, found dry visco-elastic polymer pads (Action Products Inc.) to be more effective than a standard table. Whilst Aronovitch, 1998, and Dunlop, 1998, reported in favour of the Micropulse system (an alternating pressure overlay) in comparison to gel pads during surgery and a standard mattress post-operatively.

Some laboratory research has suggested that the 'standard' operating table mattress may be difficult to define and that any pressure redistributing properties are dependent on each product's construction (Scott *et al*, 1999). Individuals that may be at a high risk are those undergoing vascular surgery (m 8, iqr 2.25), orthopaedic surgery (m 9, iqr 3.25), surgery classed as major (m 8.5, iqr 1.5) and those with one of more risk factors (m 7.5, iqr 3.25).

Strength of evidence I

This recommendation is supported by the findings of a systematic review (Cullum *et al*. 2000) including three RCTs that evaluated support surfaces for pressure ulcer prevention on the operating table.

Strength of evidence III

Identified individuals based on the nominal group's clinical experience and opinion.

Post-operative care

5.5 To ensure continuity of preventive care, post-operative management of at risk individuals should include the use of pressure redistributing mattresses (m 9, iqr 1.25)

Strength of evidence III

This recommendation for practice is supported by the nominal group's clinical experience.

General issues

5.6 Repositioning should occur when individuals are on pressure redistributing devices (m 8.5, iqr 0.25). Frequency of repositioning should be determined by the results of skin inspection (m 9, iqr 1.25), patient comfort (m 8, iqr 1.25) and general state (m 8, iqr 1.25). A change of support surface and/or a change in the frequency of repositioning may be necessary.

5.7 The benefits of a pressure redistributing device should not be undermined by prolonged chair sitting (m 8.5, iqr 6.5) (EHCB, 1995)

Strength of evidence III

These recommendations for practice are supported by the nominal group's clinical experience and opinion, and the EHCB (1995).

6.0 Use of aids

6.1 The following should not be used as pressure relieving aids:

- water-filled gloves (m 9 iqr 0)
- synthetic sheepskins (m 9, iqr 2)
- genuine sheepskins (m 5, iqr 2.25).
- doughnut-type devices.

Doughnut-type devices are believed to adversely affect lymphatic drainage and circulation, and thus are likely to cause rather than prevent pressure ulcers (AHCPR, 1992). Water-filled gloves under heels are not effective because the small surface area of the heel means it is not possible to redistribute pressure by this localised method. Sheepskins do provide comfort to some individuals, but they are not pressure relieving or redistributing aids. If sheepskins are used for comfort rather than perceived pressure relief, care is needed with regard to cross-infection and correct laundering processes.

Strength of Evidence III

This recommendation is based on the nominal group's clinical experience and opinion, AHCPR recommendations (1992 M9 p26) and one trial. Cullum *et al*, 2000, reviewed one small trial of a standard hospital mattress with and without sheepskin overlays (Ewing *et al*, 1964). The trial was of poor quality and the results inconclusive.

7.0 Positioning

7.1 Individuals who are 'at risk' of pressure ulcer development should be repositioned (m 9, iqr 0.25).

The frequency of repositioning should be determined by the results of skin inspection and individual needs (m 9, iqr 1.25) not by a ritualistic schedule. This will help to determine and ensure a responsiveness to the time it takes for an individual to show signs of incipient damage.

Repositioning should entail adequate position changes avoiding an individual's vulnerable areas. In cases where individuals have determined their own routine to prevent the development of pressure ulcers, for example those with spinal injury, their knowledge and routine should be respected by health care professionals.

7.2 Repositioning should take into consideration other aspects of an individual's condition – for example breathing and medical condition (m 9, iqr 0.25), their comfort (m 9, iqr 1.25), how it fits into their overall plan of care (for example in relation to other activities such as physiotherapy or occupational therapy, meal times, attending to personal hygiene) (m 8, iqr 2.25) and the surface they may be lying or sitting on.

7.3 Individuals who are considered to be acutely at risk of developing pressure ulcers should restrict chair sitting to less than two hours (m 8.5, iqr 0.5) until their general condition improves.

7.4 Positioning of patients should ensure that:

- prolonged pressure on bony prominences is minimised (m 8, iqr 1.25)
- bony prominences are kept from direct contact with one another (m 9, iqr 0.25)
- friction and shear damage is minimised.

7.5 A written/recorded re-positioning schedule agreed with the individual should be established for each person at risk (m 9, iqr 1.25). This record should also include actual position changes.

7.6 Individuals/carers who are willing and able should be taught to redistribute their own weight (m 9, iqr 1).

7.7 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 (m 8, iqr 4) , as this practice may result in tissue damage. Correct lifting and handling techniques will also reduce the risk to carers' backs.

Strength of Evidence III

These recommendations are supported by the nominal group's clinical experience and opinion and some of the AHCPR (1992) guideline recommendations (M1 p22, M6 p24, M11 p27).

While manual repositioning is an established part of pressure ulcer prevention practice, there is little research demonstrating its effectiveness or the optimal frequency for manual repositioning (EHCB, 1995). However, the nominal group felt that repositioning where appropriate, should form part of pressure relieving practice and should incorporate the principles identified in the above recommendations.

Additionally, a study conducted by Gebhardt and Bliss (1994) compared the outcomes of two groups of elderly orthopaedic patients – one group sat out for unlimited periods and the other sat out for no more than two hours. They found a positive correlation between pressure ulcer development and length of time sitting in a chair.

There is an increasing body of knowledge about the use of the 30 degree lateral tilt (Defloor, 1997; Colin *et al*, 1996). A study of a small sample of healthy volunteers (n=20) found an impairment of oxygen supply to the skin in the 90 degree laterally inclined individuals but not in the 30 degree laterally inclined position (Colin *et al*, 1996).

This is a promising approach to positioning that requires further systematic evaluation before it can be recommended as 'standard' practice. However it is a lying position that could be used for individuals who find it comfortable.

8.0 Seating

8.1 Seating assessments for aids and equipment should be carried out by trained assessors who have the acquired specific knowledge and expertise (for example, physiotherapists/ occupational therapists) (m 9, iqr 1.25).

8.2 Advice from trained assessors with acquired specific knowledge and expertise should be sought about correct seating positions (m 8, iqr 2).

8.3 Positioning of individuals who spend substantial periods of time in a chair or wheelchair should take into account:

- distribution of weight (m 9, iqr 1.25)
- postural alignment (m 9, iqr 1)
- support of feet (m 9, iqr 1).

8.4 No seat cushion has been shown to out-perform another, therefore no recommendation can be made about which type to use for pressure redistribution purposes.

Strength of Evidence III

These recommendations are supported by the nominal group's clinical experience and opinion.

Cullum *et al*. 2000, reviewed two RCTs that compared different types of seating cushions. Lim *et al*, 1988, compared a slab with a bespoke contoured foam cushion and found no difference in pressure ulcer incidence. The other trial (Conine *et al*, 1994) compared Jay gel and foam wheel chair cushion with a foam cushion. Although they reported a reduced incidence of pressure ulcer development, this was not found to be statistically significant.

9.0 Education and training

The education of staff and users should be an integral part of any pressure ulcer prevention strategy (Dealey, 1997).

The training and education of users and health care professionals should be tailored to the needs and requirements of the individual and particular professional group. However, there are generic components that should be included in all training programmes.

For all health care professionals

9.1 Health care professionals should be trained/educated in pressure ulcer risk assessment and prevention

9.2 Health care professionals with recognised training in pressure ulcer management should cascade their knowledge and skills to their local health care teams (m 9, iqr 0)

9.3 An inter-disciplinary approach to the training and education of health care professionals should be adopted (m 9, iqr 0)

9.4 Training and education programmes should include the following:

- risk factors for pressure ulcer development (m 9, iqr 2.25)
- pathophysiology of pressure ulcer development (m 9, iqr 0.5)
- the limitations and potential applications of risk assessment tools (m 9 iqr 2.25)
- skin assessment (m 9 iqr 0.5)
- skin care (m 9 iqr 2.25)
- selection of pressure redistributing equipment (m 9 iqr 0.25)
- use of pressure redistributing equipment (m 9 iqr 1)
- maintenance of pressure redistributing equipment (m 8.5 iqr 1.25)
- methods of documenting risk assessments and prevention activities (m 9 iqr 1)
- positioning to minimise pressure, shear and friction damage, including the correct use of manual handling devices (m 9 iqr 0.25) (m 8.5 iqr 1)
- roles and responsibilities of inter-disciplinary team members in pressure ulcer management (m 9 iqr 1.25)
- policies and procedures regarding transferring individuals between care settings (m 9, iqr 1)
- patient education and information giving. (m 9 iqr 1)

Strength of Evidence II

Findings from observational studies by Bergstrom *et al*, 1995, and Moody *et al*, 1988, citing McGough systematic review, 1999, suggest that education programmes may reduce incidence and prevalence of pressure ulcer development. A continuous quality assurance approach would advocate that increasing people's awareness about pressure ulcer risk assessment and prevention, via a co-ordinated and structured educational programme, is more likely to result in benefits for patients than providing no programme, although the effectiveness of educational programmes and what they consist of is currently lacking a reliable research base. These recommendations are supported by AHCPR guideline recommendations (1992, E2:p28), consensus opinion and principles of patient education.

For users and carers

9.5 Patients who are able and willing should be informed and educated about risk assessment and resulting prevention strategies. This strategy where appropriate should include carers. This information should be tailored to individual requirements. Written information can enhance verbal explanation. The education process should be two way, and patients'/carers' previous knowledge and experience respected.

9.6 Patient/carer education should include providing information on the following:

- risk factors that are associated with developing pressure ulcers (m 9 iqr 1)
- sites that are of the greatest risk of pressure damage (m 9 iqr 1)
- how to inspect skin and recognise skin changes (m 9 iqr 0.25)
- how to care for skin (m 9 iqr 0.25)
- methods for pressure relief/ reduction (m 9 iqr 0.25)
- where they can seek further advice and assistance should they need it (m 9 iqr 0)
- emphasis on the need for immediate visits to a health care professional should signs of skin damage be noticed.

Strength of Evidence III

These recommendations are supported by AHCPR guideline recommendations (E1:p27, 1992), consensus opinion, principles of patient education and one survey which found that individuals who waited longer to go to a clinic presented with more severe pressure damage (Garber *et al*, 1996).

Essentials of Care

Nutritional status, continence management and hygiene are essential aspects of care. Their association with pressure ulcer risk assessment and prevention is well documented but not fully understood from the current evidence base, including consensus opinion. Therefore separate recommendations about these issues have not been devised, but in recognition that they are key to raising standards of care (RCN, 1999), this section outlines some principles for practitioners to consider.

Nutritional status

Malnutrition is frequently cited as a risk factor for the presence, development and non-healing of pressure ulcers. Nutritional status influences the integrity of the skin and support structures, and a lack of vitamins and trace elements may predispose the patient to increased risk of pressure damage (Cullum and Clark, 1992). Emaciated and obese people have also been associated with being at a higher risk (Allman *et al*, 1995; Pope, 1999).

However the relationship between nutritional status and pressure ulcers is complex. For example, the poor nutritional status of a person with pressure ulcers may be as much a marker of poor overall health status than as a result of poor nutritional intake. In which case, improving nutritional status per se would not improve the outcome for the patient (Finucane, 1995).

Despite a general belief among health care professionals that there is a link between pressure ulcer development and nutritional status, there is currently no research evidence to make this causative association.

Best practice entails monitoring the nutritional status of individuals as part of a holistic assessment procedure and as an ongoing process throughout an individual's episode of care. Initially, this assessment should include documentation and monitoring of the following factors:

- current weight and height
- recent weight loss
- usual eating habits
- recent changes in eating habits and intake.

If nutritional risk is suspected, practitioners should undertake more detailed screening. A formal nutritional risk assessment scale may be preferred to help with this and nutritionally compromised individuals should be referred to a dietitian.

Continence management

Incontinence is often said to increase the risk of developing pressure ulcers. As with nutritional status, the relationship between incontinence and pressure ulcers is not as obvious as is presumed (Defloor, 1999). Some studies have supported the role of incontinence as a risk factor (Goldstone and Goldstone, 1982) and others have not (Berlowitz and Wilking, 1989).

The key factor is moisture to the skin, which puts it at greater risk from maceration, friction and shearing forces. Therefore the key practice issue is the presence or absence of wet skin (Defloor, 1999). As such, effective management of incontinence is an essential part of skin care and fundamental to maintaining a person's dignity and comfort.

Where the source of moisture cannot be controlled, the use of moisture-absorbing or continence aids could be considered. The use of such aids should not interfere with any pressure redistributing surface an individual may be placed on. Referral to a continence advisor should also be considered on an individual basis.

Hygiene

An individual's skin may be exposed to a variety of moist substances – urine, faeces, perspiration and wound drainage – which may make it more susceptible to injury. The AHCPR (1992) guideline recommends that: skin cleansing should occur at the time of soiling; mild detergents should be used and warm (rather than hot) water to minimise irritation and drying; and moisturisers should be applied to areas of dry skin. Skin rubbing and massage, particularly over bony prominences should be avoided (Dyson, 1978).

Quality improvement

Quality improvement is about constantly looking for ways to do things better (Morrell and Harvey, 1999). It is an iterative process, and requires the commitment of the whole organisation and its stakeholders to work effectively. Figure 2 (right) offers an example of a quality improvement cycle and related activities for pressure ulcer prevention.

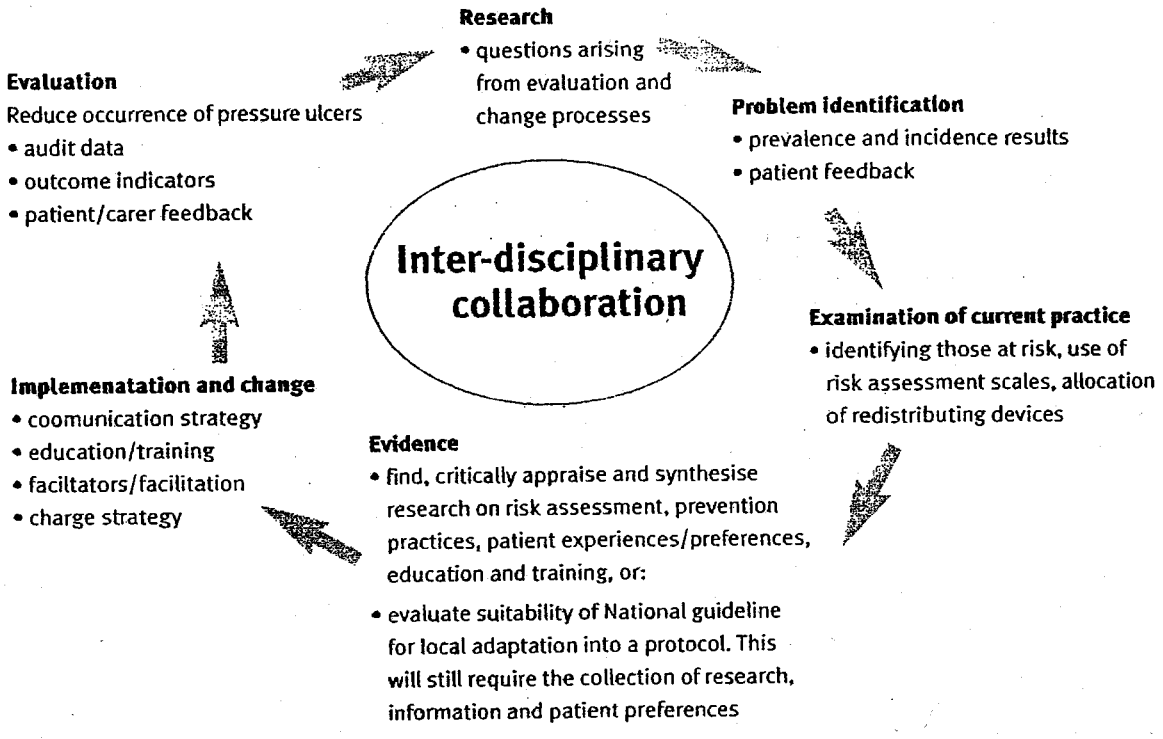

Figure 2. Quality improvement cycle for pressure ulcer prevention – an example

Monitoring pressure ulcers

The presence or absence of pressure sores is often seen as an indicator of quality of care and as such is high on the political agenda (Benchmarking DoH, 2000; Pressure sores: a key quality indicator DoH, 1993; and Health of the Nation, DoH, 1992).

Incidence and prevalence are the two ways to measure pressure ulcer frequency.

Prevalence is the proportion of people with pressure ulcers in a defined period of time. This is affected by for example people admitted with existing ulcers, patient healing rates, rates of discharge and successful treatment.

Incidence is the rate at which people initially admitted without an ulcer develop one during a specific period of time. This may be determined by the type of patients admitted (for example those at high risk) and the effectiveness of preventive care.

Comparisons of prevalence between and within care settings are difficult to interpret because they are affected by incidence, healing rates, admission and discharge policies. The measurement of incidence gives a more accurate picture of the success and effectiveness of risk assessment and prevention policies because it identifies those people who have developed ulcers over time and in a particular place of care. Measures of incidence need to be adjusted in the light of the type and number of at risk patients admitted into the particular care settings.

The Benchmarking Fundamental Aspects of Nursing Care project (NHSE, 2000) will also provide a staged approach for practitioners to facilitate the development of practice in pressure area care. Benchmarks are being developed based on opinion about best practice, with the intention that practitioners use them to score their own current practice and compare this with 'best practice', by sharing examples and networking with others.

Discharge planning

Effective, successful discharge depends on the setting up of care packages based on the needs of the individual. When transferring an at risk patient between care settings and/or to their home, the following factors need to be addressed and communicated:

- identification of a specific professional who will be responsible for the management of the patient following discharge
- assessment and indication of level of risk, including date of last assessment – if a risk assessment scale has been used, then the name of the scale should be documented not the score, as scores on one scale mean a different thing on another
- a description of the condition of the person's pressure areas
- details of any tissue damage, including size, grade, position and treatment
- preventive measures the person has required, including the type of pressure re-distributing device(s) used
- ensuring appropriate measures and equipment are in place prior to transfer or discharge
- written and verbal information for users/carers about assessment and prevention should be provided.

Audit criteria

Clinical audit should form an integral of organisations' clinical effectiveness activities. The principles and process of clinical audit are well documented (for greater detail see Morrell and Harvey, 1999). It has been defined as:

> *"...a clinically led initiative which seeks to improve the quality and outcome of patient care through clinicians examining and modifying their practices according to standards of what could be achieved, based on best evidence available or authoritative expert opinion where no objective research-based evidence exists." (Mann 1996)*

Clinical audit should be based on the best available evidence and where national guidelines exist they should be used as a basis for audit activity. The following table provides some evaluative and descriptive statements derived from the recommendations, which could be incorporated into an audit tool.

Those developing measurement tools need to consider and adapt these into structure, process and outcome criteria (see Morrell and Harvey, 1999). Any tools or frameworks developed from the guideline should suit the particular characteristics of the clinical environment and patient caseload(s), and be piloted.

Recommendations	Audit criteria	How to audit
Identifying at risk individuals Assess and record individuals' level of risk of developing pressure ulcers	✦ Has level of risk been assessed? On initial contact with the health care system: ✦ Has an informal risk assessment on all individuals been conducted? ✦ Has a formal assessment of risk been conducted on those people whose initial assessment highlighted factors (triggers) which place them at risk? ✦ Has a formal assessment of risk been conducted routinely for in-patients and those visited on domiciliary visits? ✦ Is the timing of risk assessment suitable for the patient's condition? ✦ In other cases has it taken place in under six hours of admission to the episode of care? ✦ Are the results of the assessment recorded/documented? ✦ Is an individual's level of risk accessible to all members of the inter-disciplinary team? ✦ Does reassessment of risk occur when an individual's condition alters?	Documentation/recording of process and results of risk assessment: time, date, personnel. If individual's condition alters, is there a record of reassessment? Is the documentation/records held in a place accessible to all members of the inter-disciplinary team?

Who carries out risk assessment	✦ Has a suitably trained member of staff carried out the risk assessment(s)?	Documentation/records to identify personnel carrying out risk assessment. Records of training and education/induction programmes reflect attendees carrying out risk assessment.
Risk assessment scales	✦ How has risk assessment been performed? – Is there evidence that clinical judgement has also been involved in risk assessment activities? – If a risk assessment tool is used – is it appropriate to the clinical speciality in which it is being used?	Documentation/recording of risk – – name of the scale? – evidence of scores? – evidence of consideration of broader issues/risk factors (intrinsic/extrinsic/exacerbating)? Ask health care personnel how level of risk has been assessed
Skin inspection	✦ Does skin inspection occur regularly and frequently in response to changes in an individual's condition? ✦ Does skin inspection focus on areas of known vulnerability and also on areas of the body that are susceptible based on individualised assessment? ✦ Are changes documented immediately?	Documentation/records show times, dates and results of skin inspection. Also documentation/records of action taken. Observation of practice. Ask health care professionals how skin inspection is performed and what signs they look out for. Ask patients if their skin was inspected.
Pressure redistributing devices	✦ Is the choice of pressure redistributing device based on an overall assessment of the individual? ✦ What other factors were taken into account? ✦ Are individuals assessed to be at risk on an alternative to a standard mattress? ✦ Are individuals assessed to be at high risk on an alternating pressure mattress or other high-tech device? ✦ Are support surfaces changed to meet alterations in an individual's condition? ✦ Are individuals at high risk placed on pressure redistributing overlays during surgical procedures? ✦ Does post-operative care for these individuals include similar support surfaces? ✦ Are individuals repositioned whilst on pressure redistributing devices?	Documentation/records to include decision trail and factors taken into account when making decisions about support surfaces, including documentation/recording of any organisational constraints. Accurate recording of what support surfaces individuals are on (e.g. care plans, records of hiring or equipment library records). Mattress and support surface audits.
Aids	✦ Is there any evidence to suggest that inappropriate aids such as: – water-filled gloves – synthetic/genuine sheepskins – donut type devices are being used?	Documentation/records and observation of practice.

Repositioning	✦ Is there evidence that individuals assessed to be at risk are being repositioned? ✦ Are repositioning schedules being tailored to individual needs and results of skin inspection? ✦ Do individuals have written repositioning schedules? ✦ Are correct lifting and handling procedures being adhered to? ✦ Is repositioning avoiding pressure on bony prominences?	Documentation/records to reflect individualised repositioning schedules. Observation of practice. Ask users about their involvement in care.
Seating	✦ Are seating assessments carried out by appropriately trained assessors? ✦ Does positioning take into account: – distribution of weight – postural alignment – support of feet? ✦ Is chair sitting limited to a maximum of two hours for those at risk of developing pressure ulcers?	Documentation/records to reflect advice and assessment by appropriate assessors? Asking staff about their practice. Observation of practice.
Education and training – health care professionals	✦ Are health care professionals trained in pressure ulcer risk assessment and prevention? ✦ What is included in this training? ✦ How is competence assessed? ✦ How is competence maintained/knowledge updated?	Induction/training and education records. Ask trainers. Ask health professionals about their training.
– users	✦ Are users a) informed and b) educated about a) pressure ulcer risk assessment and b) prevention strategies? ✦ What does this education include? ✦ How has understanding been assessed ?	Ask users if they have received a) information and b)education. What did this entail? Ask health care professionals about what information and education they gave users.

Glossary

Alternating pressure device: device that mechanically varies the pressure beneath the individual thus reducing the duration of applied pressure.

Bias: the deviation of results from 'the truth', due to systematic error(s) in the methods used.

Cellulitis: a spreading infection of connective tissue, especially subcutaneous tissue.

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

Critical appraisal: the process of assessing the validity, results and relevance of evidence, often in conjunction with a structured framework/tool.

Effectiveness: the extent to which an intervention does more good than harm.

Erythema: non-specific redness of the skin which can either be localised or general in nature and which may be associated with cellulitis, infection, prolonged pressure or reactive hyperaemia. *See Collier 1999b for more details.*

- **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:** is the distinct erythema caused by reactive hyperaemia, when the skin blanches or whitens if light finger pressure is applied, indicating that the patient's micro-circulation is intact.
- **Non-blanching hyperaemia** (previously identified as non-blanching erythema): is 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.

Extrinsic: not belonging, lying outside, in the case of pressure ulcer development, factors that are external to the individual

Incipient: initial stages, beginning to exist

Induration: the abnormal hardening of tissue (or organ)

Intrinsic: inherent, thus in the case of pressure ulcer development, factors present within the individual

Maceration: a softening or sogginess of the tissue caused by the retention of excessive moisture.

Necrosis: the local death of tissue, often black/brown in colour and leathery in texture.

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.

Predictive validity: a risk assessment tool would have high predictive validity if the predictions it makes of pressure sore development in a sample largely came true i.e. it has both high sensitivity and high specificity.

RCT: randomised controlled trial – a trial in which subjects are randomly assigned to either a group receiving an intervention that is being tested or another group receiving an alternative or no intervention. The results compare the outcomes of the different groups.

Search strategy: the method used for searching for articles to answer particular questions.

Sensitivity: what percentage of those who developed pressure ulcers in the study were predicted to be at risk by the score

Specificity: what percentage of participants were correctly predicted to be not at risk by the score (a specificity of 100% means that all the participants who did not develop ulcers had been predicted to be not at risk)

Systematic review: a review in which evidence on a topic has been systematically identified, appraised and summarised according to pre-determined criteria.

Validity: a study is valid if the way it is designed and carried out means that the results are unbiased.

30 degree lateral tilt: the patient is placed in the laterally inclined position, supported by pillows, with their back making a 30 degree angle with the support surface.

95% confidence intervals: while a study will give single values of sensitivity and specificity for a risk score, these are based on the experience of the handful of people in the study and are the best guesses as to what would happen if the study was to be repeated. Where sample sizes are small, there will be high imprecision in the estimates of sensitivity and specificity.

Sources: Collier ME, 1999b; Harding K, 2000; Baillière's Nurses Dictionary, 1997; Cullum *et al*, 2000; Heinemann Medical Dictionary, 1986.

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Appendix 1

Outline of consensus method

For full details of the guideline method refer to the Technical Report (Rycroft-Malone and McInness, 2000).

Figure 3 (right) summarises the consensus development process.

The formal consensus development process was based on a modified nominal group technique (see technical report for rationale and full details). Ten people, who reflected the full range of those to whom the guideline will apply, were recruited to the nominal group (see group membership in Appendix 5). Prior to a meeting, participants were asked to rate statements that had been devised from the AHCPR guideline recommendations, systematic reviews, other literature and current practice issues. They were asked to rate on a 1– 9 scale (where 1 represented least agreement and 9 most agreement) their agreement with these statements taking into account the research evidence and their clinical expertise. The first rating was conducted by post.

The nominal group met in November 1999. The distribution of responses to each statement was presented to group members during the consensus meeting alongside each member's response to that statement. This enabled participants to see the spread of views and how their response related to this.

At the nominal group meeting each statement was discussed and then re-rated privately by each participant. The median (measurement of central tendency or average) and inter-quartile range (measure of distribution) was calculated for each statement from the ratings of the second round.

The recommendations were drafted based on the panel's level of agreement about issues. If a statement's median was 7 – 9, it was developed into a practice recommendation.

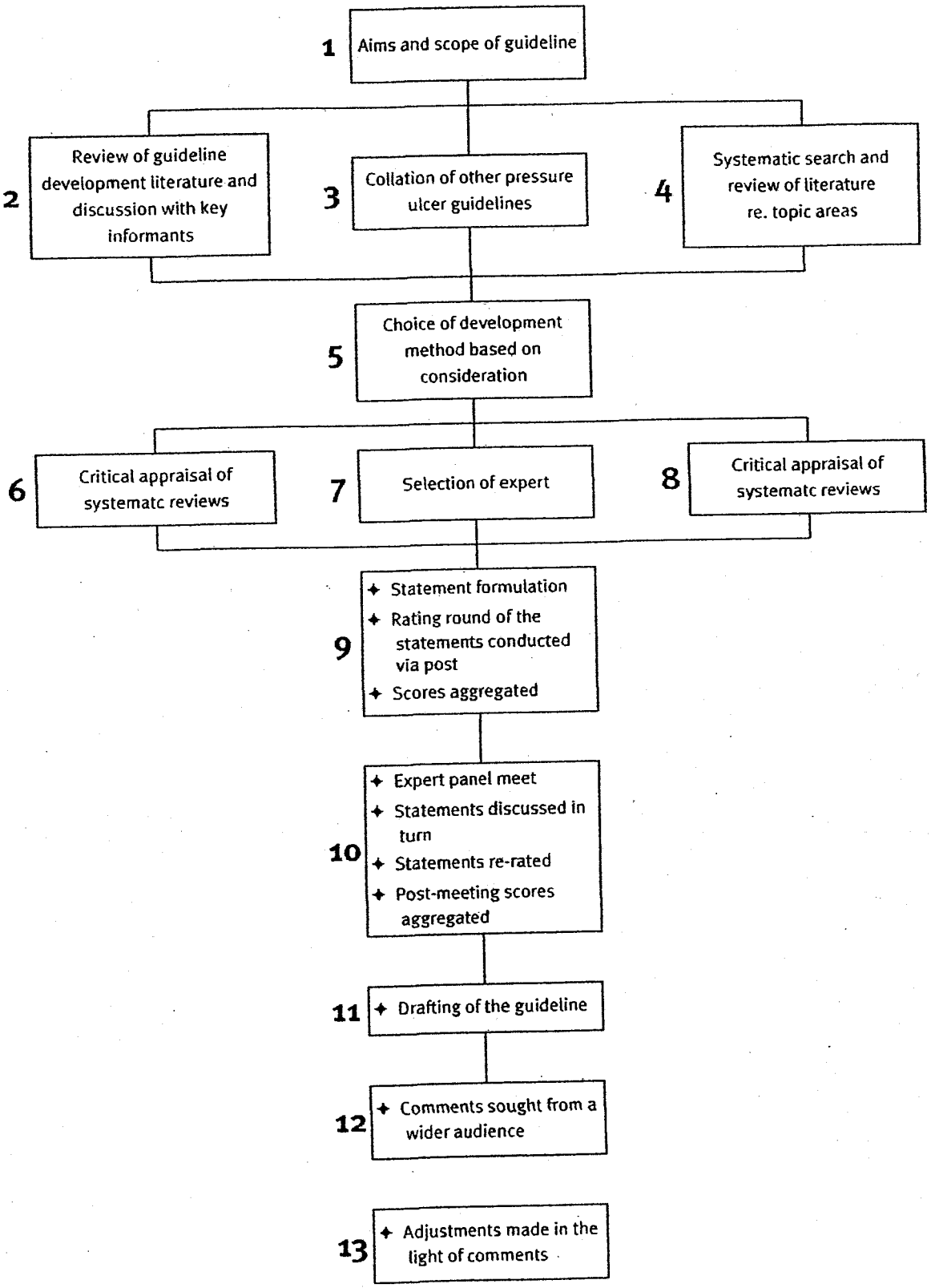


Figure 3. Consensus process for guidelines – summary

Appendix 2

McGough Systematic Review (1999)

See Technical Report for table of excluded studies. Studies included in review

Authors	Title	Reference
Andersen scale		
Andersen KE, Jensen O, Kvorning SA and Bach E	Prevention of pressure sores by identifying patients at risk	British Medical Journal 1982 284: 1370-1
Braden scale		
Barnes D and Payton RG	Clinical application of the Braden scale in the acute care setting	Dermatology Nursing 1993 5 (5): 386-88
Bergstrom N and Braden B	Prospective study of pressure sore risk among institutionalised elderly	Journal of American Geriatric Society 1992 40 (8): 747-58
Bergstrom N, Braden BJ, Laguzza A and Holman V	The Braden scale for predicting pressure sore risk	Nursing Research July/August 1987 36 (4): 205-10
Bergstrom N, Demuth PJ and Braden BJ	A clinical trial of the Braden scale for predicting pressure sore risk	Nursing Clinics of North America June 1987 22 (2): 417-28
Braden BJ and Bergstrom N	Predictive validity of the Braden scale for pressure sore risk in a nursing home population	Research in Nursing and Health 1994 17: 459-70
Capobianco ML and McDonald DD	Factors affecting the predictive validity of the Braden scale	Advances in Wound Care 1996 9 (6): 32-6
Halfens RJ	The reliability and validity of the Braden scale	Proceedings of the 1st European Pressure Ulcer Advisory Panel 1997
Langemo DK, Olson B, Hunter S, Hanson D, Burd, C and Cathcart-Silberberg T	Incidence and prediction of pressure ulcers in five patient care settings	Decubitus 1991 4 (3): 25-36
Ramundo JM	Reliability and validity of the Braden scale in the home care setting	Journal of Wound Ostomy and Continence Nursing 1995 22 (3): 128-34
Salvadalena G, Snyder ML and Brogdon KE	Clinical trial of the Braden scale on an acute care medical unit	Journal of Enterostomal Therapy 1992 19: 160-65
VandenBosch T, Montoye C, Satwicz M, Durkee-Leonard K and Boylan-Lewis B	Predictive validity of the Braden scale and nurse perception in identifying pressure ulcer risk	Applied Nursing Research 1996 May 9 (2): 80-86
Knoll scale		
Towey AP and Erland SM	Validity and reliability of an assessment tool for pressure ulcer risk	Decubitus 1988 1 (2): 40-48

Norton scale Norton D, McLaren R, Exton-Smith AN	An investigation of geriatric nursing problems in hospital	The National Corporation for the Care of Old People London 1962
Stotts NA	Predicting pressure ulcer development in surgical patients	Heart and Lung 1988 17 (6) 1: 641-47
Pressure Sore Prediction Score Lowthian P	Identifying and protecting patients who may get pressure sores	Nursing Standard 1989 4 (4) : 26-29
Waterlow scale Edwards M	The levels of reliability and validity of the Waterlow Pressure Sore Risk Calculator	Journal of Wound Care 1995 4 (8): 373-378
Waterlow and Norton scales Wai-Han C, Kit-Wai C, French P, Yim-Sheung L and Lai-Kwan T	Which pressure sore risk calculator? A study of the effectiveness of the Norton scale in Hong Kong	International Journal of Nursing Studies 1997 34 (2): 165-9

Appendix 3

Cullum *et al* (2000) Systematic Review

See Technical Report for table of excluded studies. Studies included in review

Authors	Title	Reference
Allman RM, Walker JM, Hart MK, Laprade CA, Noel LB, and Smith CR	Air-fluidized beds or conventional therapy for pressure sores – a randomised trial	Annals of Internal Medicine 1987 107(5): 641-648
Andersen KE, Jensen O, Kvorning SA and Bach E	Decubitus prophylaxis: a prospective trial on the efficiency of alternating pressure air mattresses and water mattresses	Acta Dermatovener (Stockholm) 1982 63: 227-230
Aronovitch SA	A comparative, randomized, controlled study to determine safety and efficacy of preventive pressure ulcer systems; preliminary analysis	Acquired Pressure Ulcers, Advances in Wound Care (Supplement) 1998
Caley L, Jones S, Freer J	Randomised prospective trial of two types of low air loss therapy	Unpublished conference paper
Clark M and Donald IP	A randomised controlled trial comparing the healing of pressure sores upon two pressure-redistributing seat cushions	Proceedings of the 7th European Conference on Advances in Wound Management, Harrogate 1999 London: Macmillan Magazines
Collier ME	Pressure-reducing mattresses	Journal of Wound Care 1996 5(5): 207-211
Conine TA, Daechsel D and Lau MS	The role of alternating air and silicore overlays in preventing decubitis ulcers	Journal of Rehabilitative Research 1990 13: 57-65

Conine TA, Hershler C, Daechsel D, Peel C, and Pearson A	A pressure sore prophylaxis in elderly patients using polyurethane foam or Jay wheelchair cushions	International Journal of Rehabilitative Research 1994 17: 123-137
Cooper PJ, Gray DG and Mollison J	A randomised controlled trial of two pressure reducing surfaces	Journal of Wound Care 1998 7(8): 374-376
Daechsel D and Conine TA,	Special mattresses: effectiveness in preventing decubitus ulcers in chronic neurological patients	Archives of Physical Medicine and Rehabilitation 1985 66: 246-248
Devine B	Alternating pressure air mattresses in the management of established pressure sores	Journal of Tissue Viability 1995 5: 94-98
Dunlop V (1998) (Micropulse Inc. reference in original review)	Preliminary results of a randomised, controlled study of a pressure ulcer prevention system	Acquired Pressure Ulcers, Advances in Wound Care (Supplement)
Economides NG, Skoutakis VA, Carter CA and Smith VH	Evaluation of the effectiveness of two support surfaces following myocutaneous flap surgery	Advances in Wound Care 1995 8:49-53
Ewing MR, Garrow C, Presley TA, Ashley C and Kinsella NM	Further experiences in the use of sheep skins as an aid in nursing	The Australian Nurses' Journal 1964 Sept 215-219
Exton-Smith AN, Overstall PW, Wedgewood J and Wallace G	Use of 'air wave system' to prevent pressure sores in hospital	Lancet 1982 ii:1288-1290
Ferrell BA, Osterweil D and Christenson P	A randomised controlled trial of low air loss beds for treatment of pressure ulcers	JAMA 1993 269: 494-497
Gebhardt K	A randomised trial of alternating pressure (AP) and constant low pressure (CLP) supports for the prevention of pressure sores	Journal of Tissue Viability 1994 4(3):93
Gentilello L, Thompson DA, Tonnesen AS, Hernandez D, Kapadia AS, Allen SJ, Houtchens BA and Miner ME	Effect of rotating bed on the incidence of pulmonary complications in critically ill patients	Critical Care Medicine 1988 16: 783-786
Goldstone L, Norris M, O'Reilly M, White J	A clinical trial of a bead bed system for the prevention of pressure sores in elderly orthopaedic patients	Journal of Advanced Nursing 1982 7: 545-548
Gray DG and Campbell M	A randomised clinical trial of two types of foam mattresses	Journal of Tissue Viability 1994 4: 128-132
Hampton S	Evaluation of new Cairwave Therapy System in one hospital trust	British Journal of Nursing 1997: 6(3): 167-170
Hofman A, Geelkerken RH Hamming JJ	Pressure sores and pressure-decreasing mattresses: controlled clinical trial	Lancet 1994 343: 568-571
Inman KJ Sibbald WJ and Rutledge FS	Clinical utility and cost-effectiveness of an air suspension bed in prevention of pressure ulcers	Journal of the American Medical Association 1993 269: 1139-1143

Kemp MG, Kopanke D, Tordecilla L *et al*	The role of support surfaces and patient attributes in preventing pressure ulcers in elderly patients	Research in Nursing and Health 1993 16: 89-96
Laurent S	Effectiveness of pressure decreasing mattresses in cardiovascular surgery patients: a controlled clinical trial	3rd European Conference for Nurse Managers Brussels October 1997
Lazzara DJ, Buschmann MBT	Prevention of pressure ulcers in elderly nursing home residents: are special support surfaces the answer?	Decubitius 1991 4: 42-26
Limm R, Sirettt R, Conine TA *et al*	Clinical trial of foam cushions in the prevention of decubitis ulcers in elderly patients	Journal of Rehabilitation Research 1988 25: 19-26
Munro BH, Brown L, Heitman BB	Pressure ulcers: one bed or another?	Geriatric Nursing 1989 10: 190-2
Nixon J, McElvenny D, Mason S, Brown J, Bond S	A sequential randomised controlled trial comparing a dry visco-elastic polymer pad and standard operating table mattress in the prevention of postoperative pressure sores	International Journal of Nursing Studies 1998 35: 1932-3
Santy JE, Butler MK, Whyman JD	A comparison study of six types of hospital mattresses to determine which most effectively reduces the incidence of pressure sores in elderly patients with hip fractures in a District General Hospital	Report to Northern & Yorkshire Regional Health Authority 1994
Sideranko S, Quinn A, Burns K, Froman RD	Effects of position and mattress overlay on sacral and heel pressures in a clinical population	Research in Nursing & Health 1992: 15: 245-251
Stapleton M	Preventing pressure sores – an evaluation of three products	Geriatric Nursing 1986 6: 23-25
Strauss MJ, Gong J, Gary BD, *et al*	The cost of home air-fluidized therapy for pressure sores A randomised controlled trial	Journal of Family Practice 1991 33: 52-59
Summer WR, Curry P, Haponikm EF, Nelson S, Elston R	Continuous mechanical turning of intensive care unit patients shortens length of stay in some diagnostic-related groups	Journal of Critical Care 1989 4: 45-53
Takala J, Varmavuo S, Soppi E	Prevention of pressure sores in acute respiratory failure: a randomised controlled trial	Clinical Intensive Care 1996 7: 228-235
Vyhlidal SK, Moxness D, Bosak KS, Van Meter FG, Bergstrom N	Mattress replacement or foam overlay: a prospective study on the incidence of pressure ulcers	Allied Nursing Research 1997 10 (3): 111-20
Whitney JD, Fellows BJ, Larson E	Do mattresses make a difference?	Journal of Gerontological Nursing 1984 10:20-25

Appendix 4

Studies included in update of AHCPR review

See Technical Report for table of excluded studies

Study	Design including sampling strategy	Results	Comments	Conclusions
Finucane (1995) To review data about the relationship between pressure sores and 1) nutritional status 2) nutrient intake and 3) tube feeding	Literature review	(findings in relation to pressure ulcer development) Low serum albumin associated with the development or presence of sores in seven studies, in five others it was not Most measures of nutritional status were not associated with pressure sore outcomes Poor nutritional intake associated with poor pressure sore outcome in four out of seven studies	Not all available data captured	Data on relationship between malnutrition and pressure ulcers is incomplete and contradictory There is no real evidence that there is any association between malnutrition and development of pressure ulcers No evidence to suggest that correcting malnutrition reduces the likelihood of developing pressure ulcers
Garber *et al* (1996)	Survey via interviews assessing demographic, Spinal Chord Injury (SCI) and ulcer characteristics, detection method, immediacy and appropriateness of action, time from detection to clinic visits, number of prior ulcers and knowledge and practice of ulcer prevention techniques Sampling: convenience Setting: patients presenting at a community based outpatient plastic surgery clinic N= 23 (20 men, 3 women), with ulcers that were of 12 weeks' duration or less	Individuals who waited longer to go to the clinic presented with more severe ulcers	Small sample size	Education programmes should emphasise immediate visits to the physician on detection of an ulcer Individuals with SCI should be encouraged to have another person inspect their skin regularly – even if they are capable of doing it themselves

Study	Design including sampling strategy	Results	Comments	Conclusions
Brandeis *et al* (1994) To determine risk factors associated with the formation of stage II-IV pressure ulcers in nursing homes	Longitudinal cohort study 4,232 nursing home residents in 78 homes, over 60 years of age, 73% women, admitted without pressure ulcers Homes divided up based on incident rates of pressure ulcer formation – high and low incidence homes Assessed at 3, 6 and 21 months for presence of pressure ulcers Data collected on variables such as age, gender, antipsychotic medications, Body Mass Index cognitive status, incontinence, mobility, and an Activity of Daily Living score Pooled logistic regression	In high incidence homes – faecal incontinence, difficulty with mobility, diabetes and difficulty feeding oneself were significant independent factors In low incidence homes – difficulty with mobility, difficulty feeding oneself and male sex were significant independent factors	The nursing homes themselves may play a greater role in pressure ulcer development than the characteristics of the residents because practice was not controlled for Not all potential risk factors were investigated Nursing home staff carried out measures with only intermittent checks on reliability	By identifying and controlling for specific risk factors within certain populations pressure, ulcer incidence may be reduced
Papantonio *et al* (1994) To examine the incidence and risk factors related to the development of sacral pressure ulcers following elective surgery	Cohort study Convenience sample of 136 adult patients (66% male) undergoing elective surgery Measurement of pre-, intra-, and post-operative variables, such as demographics, BMI, pre-existing medical conditions, position on table, use of thermal under blankets, and skin condition 6 day follow up period	Variables such as diabetes, increasing age, transfer from another hospital, respiratory disease and haematocrit levels were found to be associated with pressure ulcer development	Assessments carried out by a number of different assessors No strict inclusion criteria of patients Size of ulcer not recorded and collapsed stage I and II damage may have overestimated damage Limited to cardiac surgery	People judged prior to surgery as being 'healthy' are at risk of developing pressure ulcers during cardiac surgery

Study	Design including sampling strategy	Results	Comments	Conclusions
Bergstrom and Braden (1992) To determine if dietary intake, nutritional status, and other physical markers are risk factors for the development of pressure ulcers in the elderly	Cohort study 200 newly admitted patients, 70% female, over 65 years of age, to a 250 bedded nursing home Skin assessment, Braden Scale score, blood pressure, temperature, anthropometric measurements and dietary intake were studied weekly Serum zinc, albumin, iron, copper and vitamin C were studied weekly for 4 weeks and biweekly for 8 weeks Main outcome measure – the presence or absence of pressure ulcers	Stage I pressure ulcers developed in 35% and stage II or worse in 38.5% of residents Age, blood pressure, temperature, dietary protein, iron and Braden score emerged as significant predictors of pressure ulcer development in logistic regression analysis	Background of patients unclear in relation to UK populations Selection bias present Results should be interpreted in the light of the pressure ulcer prevention practices of the nursing home in which the study took place	These are factors that practitioners need to be aware that may increase a person's risk of developing pressure ulcers A formal, structured risk assessment should be undertaken on people admitted to nursing homes

WOUND MANAGEMENT

GUIDELINES

JANUARY 2001

Contents

Introduction

The original Portsmouth HealthCare NHS Trust (PHCT) guidelines were produced in 1994 following work undertaken within the organisation. Whilst these guidelines are based on the original work, every attempt has been made to ensure the currency and strength of evidence utilised. This was achieved through literature search utilising Medline and Cinhal, and contact made with the Centre for Reviews and Dissemination. As a consequence of this, contact was also made with EPUAP.

In support of these guidelines the trust contracts with the local university for education and development associated with tissue viability (Grimshaw & Russell 1993, DOH 1993a). In addition a system of resource nurses facilitates peer support among clinicians. These resource nurses have undertaken an accredited course in tissue viability and are supported by a part-time tissue viability advisor.

The NHSE (1996:11) indicated "that all reliable information on effectiveness should clearly state the nature of its evidence base". In producing these guidelines the best available evidence has been utilised and can be found in the text in *italics.*
Categories have been graded 1, 11, 111, 1V, V in line with the Cochrane Collaboration recommendations.

STRENGTH OF EVIDENCE

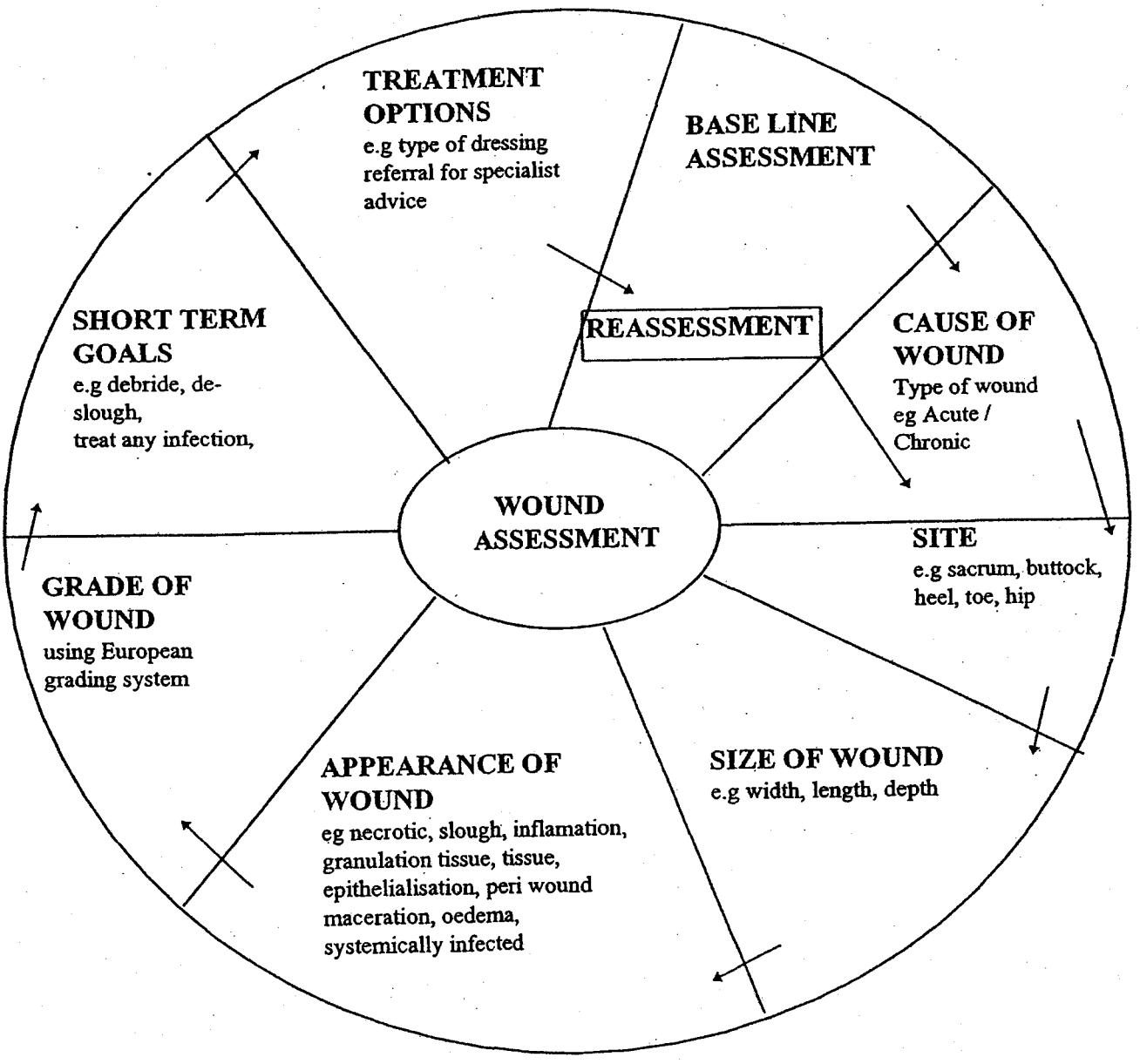
- I- Strong evidence from at least one systematic review of multiple well designed randomised controlled trials.
- II- Strong evidence from at least one properly designed randomised controlled trial of appropriate size.
- III- Evidence from well designed trials without randomisation, single group, pre-post, cohort, time series or matched case-control studies.
- IV- Evidence from well designed non- experimental studies for more than one centre or research group.
- V- Opinions of respected authorities based on clinical evidence, descriptive studies or reports of expert committees.

(Muir Gray 1997). (p61).
(Also see trust policy on prevention and management of pressure ulcers.)

Assessment

To identify and provide the optimum conditions for wound healing, thereby reducing incidence of delayed healing and should be ongoing and holistic. Special consideration should be given to the patients nutritional status and any current systemic and / or chronic diseases.

1. Wound assessment:



1.0 General Wound Assessment

1.1 The guidelines are based on the general principles of wound management, regardless of the aetiology. General wound assessment is the cornerstone for all further assessment and management.

- Wound assessment is the responsibility of both the qualified nurse and the doctor caring for the patient.
- To complement the assessment of the wound all information gathered at the assessment relating to the general condition / health of the patient should be recorded in the nursing / medical notes.
  The patients medical condition should also be considered identifying any factor which may delay healing. Conditions which are likely to influence wound healing are: systemic disease, drug therapy, smoking, nutritional status, high risk of pressure ulcers difficulty in sleeping, urinary and or faecal incontinence.
- It is essential to establish priorities. Are there any life threatening problems such as infection or necrosis which could potentially lead to septicaemia? What is the most significant to the patient, e.g. pain, exudate, odour?

Wound Assessment

1.2
- During the wound assessment process all information gathered must be documented and the care plan should include a diagram and description of the wound, this should be then signed / countersigned by a qualified nurse.
- A framework should be followed which takes into consideration the type, site, size depth, grade and appearance of the wound detecting the presence of any exudate and foreign materials
- The initial wound assessment provides the base line for ongoing assessment and management and provides a reference point for monitoring progress. Short and long term goals should be established following consideration of the assessment data, and involving the patient wherever possible. Goals should be realistic and achievable to the patient.
- On reviewing the plan, progress is compared with defined objectives, so that judgement can be made on the success or failure of the treatment. The treatment plan can be changed in the critical analysis if the outcome indicates this.
- Appropriate referral and discharge planning systems should be in place. Documentation and nursing care plans should support continuity of care and give clear information regarding the current assessment and management of the wound and the resources used.

2.0 Choice of Dressings

Local wound management:

2.1 A wound care plan should contain information re:
the type of wound dressing, cleansing agents (if indicated) and frequency of the dressing changes.
It should be based on individual assessment

2.2 When planning and setting goals the views of the patient must be taken into consideration.

2.2 Specialist advice for complex wounds is available from link nurses or the Specialist Tissue Viability Nurse Advisor

3.0 Principles of Dressing Choice:

3.1 It is essential that all professionals involved in the management of wounds and the selection of dressings should have a sound knowledge at a local level, of the wound healing process and of the optimum conditions for wound healing.

3.2 Dressing selection

For appropriate dressing selection the following factors must be taken into consideration:

- The product must be licensed and used as per the manufacturers intention
- It meets the set objectives and goals
- It meets the criteria for wound dressings i.e. maintain a moist environment, occludes, debrides, desloughs or absorbs.
- It accommodates the site and condition of the wound
- It is acceptable to the patient

There have been many suggestions of a criteria for the 'ideal dressing' Turner in (1985) set out the following framework which also shows the nursing implications. (Dealey, 1991).

Dressing	Nursing implications
Maintains a high humidity.	Do not apply dry dressings onto open wounds. Do not dry open wounds only the skin surrounding the wound
Removes excess exudate.	Dressings used should be absorbent. A secondary pad / dressing may also be needed.
Allows gaseous Exchange.	No proven nursing implications

Dressing	Nursing implications
Thermal insulator	Wounds should not be cleaned with cold lotions. Dressings should not be removed from wounds for long periods of time. (this also allows wound to dry out and can effect the action of macrophages).
Impermeable to bacteria	Strapping should be applied to the dressing (like a picture frame). If strike through occurs either an absorbent pad / dressing should be placed on top of the dressing or the dressing should be changed.
Free of particles and toxic wound contaminants	Cotton wool or gauze which shreds should not be used on any wound.
Removal without trauma	As before do not use dry dressings on open wounds Wounds should be irrigated in preference to swabbing

3.3 Other factors that may be considered alongside are:
cost effectiveness, capability of standardisation and evaluation, provision of mechanical protection, sterility and availability (drug tariff, nurse prescribing formulary, hospital formluary).

4.0 Secondary Dressings:

Some dressings may require a secondary dressing to secure them, absorb exudate or facilitate the correct environment for healing. Selection should therefore, bear in mind the nature of the primary dressing, the amount of exudate and site of the wound.

4.1 The instructions for using secondary dressings will be indicated on the primary dressing product information.

4.2 The selection of these dressings should take into consideration their bulk and ability to avoid shedding fibres into the wound therefore promoting comfort.

4.3 Frequency of dressing change:

This depends on the type of wound, condition of the wound and the type of dressing used.

- Some dressings work more efficiently if they are intact for several days. However, once strike through occurs the dressing should be changed.
- With heavily exuding wounds it is necessary to avoid contamination therefore these dressing may require frequent changes.
- Some highly absorbent dressings such as alginates can be used with a semi-occlusive secondary dressing, thereby reducing the need for frequent change.

5. Criteria for changing to alternative dressings:

The following reasons set out why it may be necessary to considered changing the current dressing to an alternative one.

- The wound dimensions have increased but not as a result of loss of slough or necrosis.
- Exudate has increased or decreased or changed in nature.
- Erythema or cellulitis has increased.
- Slough or necrosis has increased or decreased.
- There are indications of sensitivity / allergic reaction to products (erythema, rash, itching or blistering). If this occurs a full comprehensive detail of sensitivity / allergic reaction must be recorded and documented in nursing and medical notes.

5.1 It is important to bear in mind that some dressings are more appropriate for the different stages of healing. Therefore, to continue with the same dressing throughout the management may not be appropriate or economical.
The following have been adapted from Dr. S. Thomas, A prescriber's guide to" Dressings and Wound Management", materials. Commissioned by, Welsh Office Health Department (1997)

TYPE	AIM	MANAGEMENT
Discolouration of intact skin. (Grade / Stage 1)	Prevent further breakdown	Hydrocolloid e.g. Granuflex / Duoderm / Comfeel, Film dressings e.g. Tegaderm Opsite, Bioclusive. Skin protection e.g. Cavilon.
Partial thickness skin loss (Grade / Stage 2)	As above	As above or Silicon dressing e.g. Mepitel
Black necrotic wounds a) small superficial b) extensive and deep (Grade / Stage 3 and 4)	Remove necrotic tissue and promote healing	a) Hydrocolloid e.g Granuflex / Comfeel Hydrogel e.g Intrasite Gel Enzymatic e.g. Varidase b) Hydrogel e.g. Intrasite Gel Enzymatic e.g. Varidase
Wounds covered or filled with yellow/brown slough a) small and dry b) small and moist c) large deep cavities (Grade / Stage 3 and 4)	Remove slough and absorb exudate	a) Hydrocolloid e.g. Granuflex/ Comfeel b) Hydrofibre e.g. Acquacel Hydrocolloid, e.g. Granuflex Hydrogel e.g. Intrasite Gel CombiDERM c) Hydrogel e.g. IntrasiteGel Hydrofibre e.g. Acquacel Hydrocolloid granules, paste e.g. Comfeel, Allevyn cavity

TYPE	AIM	MANAGEMENT
Granulating wounds a) Clean surgical wound b) Chronic wounds with low or moderate exudate c) Chronic open wounds with moderate to high exudate	Maintain moist environment insulation and promotion of granulation tissue	a) Hydrofibre e.g. Acquacel Cavity foam dressings egg Cavi - care. Vacuum assisted closure b) Hydrocolloid e.g. Granuflex Comfeel, CombiDERM c) Alginates e.g. Kaltostat Sorbsan Polyurethane foam e.g. Lyofoam extra, Allevyn Hydrofibre e.g. Acquacel Vacuum assisted closure
Epithelialising wounds a) Clean low exuding wounds b) Clean wounds with medium to high exudate	Maintain moist environment and promote epithelialisation	a.) Semi-permeable film e.g. Tegaderm, Opsite, Bioclusive Skin protection e.g. Cavilon Hydrocolloid e.g. Granuflex, Comfeel. b) Hydrofibre e.g. Acquacel Alginate e.g. Kaltostat, Sorbsan, Polyurethane foam e.g. Allevyn, Lyofoam extra, CombiDERM.
Clinically infected wounds a) Extensive or heavily exuding wounds b) Shallow open wounds. (Any Grade / Stage)	Clear infection and promote healing.	a) Systemic antibiotics Alginate e.g. Sorbsan Kaltostat, Cadexomer iodine e.g. Iodoflex / Iodosorb Hydrofibre e.g. Acquacel Hydrogel e.g. Intrasite b)Systemic antibiotics Hydrofibre e.g. Acquacel Alginate e.g. Sorbsan Cadexomer iodine e.g. Iodosorb / Iodoflex
Malodorous Wounds (e.g. infected pressure sores)	Eradicate wound odour	a) Activated charcoal e.g. Actisorb, Lyofoam C, Keltocarb, Carboflex Metronidazole Gel.

5.2 Types of wound dressings

Alginate Dressings: e.g. Kaltostat, Sorbsan, Tegagel
Alginates are found naturally in various species of brown seaweed a polymer alginic acid obtained from the seaweed is composed of mannuronic and guluronic acid residues. Alginates are produced from calcium and sodium salts of alginic acid. The products consist of calcium alginate alone which is non soluble or a mixture of calcium and sodium alginate, the sodium alginate being insoluble. By varying the proportions of the two salts, gels can be produced when they come in contact with the wound exudate. Patient acceptability with alginates is high, they are comfortable and painless to remove. (*Alginates should not be allowed to dry out*)

Foam Dressings: e.g. Cavi-Care, Lyofoam Extra, Lyofoam, Allevyn, Allevyn Cavity
These products are easily shaped to a wound and help to keep the wound surface moist. They are permeable to water vapour and oxygen. These products can absorb significant quantities of wound exudate. Range from flat non adhesive and adhesive to cavity dressings consisting of hydrophilic foam.

Hydrocolloid Dressings: (e.g. Comfeel, Granuflex, Tegasorb
These dressings consist of gel forming agents to which have been added adhesives, elastomers and in some cases proteins. They are presented as a flexible sheet which is coated with the layer of hydrocolloid base and covered with pieces of release paper. These dressings have occlusive properties. They are also valuable in treating pressure ulcers. They are best suited to wounds which do not produce excessive quantities of wound exudate. The occlusive properties of the hydrocolloid dressings have been found to be very useful in reducing pain and in the treatment of pressure ulcers and leg ulcers.

Hydrofibre Dressings: e.g. Acquacel
This is a new generation of dressing, combining the healing benefits of hydrocolloids, fluid handling properties of alginates, which look and feel like gauze. The dressing is woven in a process which allows the dressing to promote vertical wicking of fluid and minimises lateral wicking reducing the risk of maceration. The dressing forms a clear gel when hydrated through contact with wound exudate. It absorbs and retains up to 25 times its weight in fluid.

Hydrosorbtion Dressings: e.g. CombiDERM
The dressing incorporates the hydrocolloid thin adhesive surround with a non adherent wound contact layer consisting of absorbent granules of Polyacrylate Hydrocolloid. This significantly increases the quantity of fluid that can be absorbed into the dressing pad.

Hydrogel Dressings: e.g. Intrasite, Intrasite conformable, Nu-gel
Hydrogels consist of insoluble polymers which have a hydrophilic nature. When mixed with aqueous solutions, they will absorb large volumes of water. They are amorphous without a fixed macro structure, as they absorb fluid they reduce in viscosity and start to flow so that they can take up a wound shape. The gel is painless

to apply and remove, transparent, prevents dehydration and further loss of valuable tissue. Will also re-hydrate devitalised tissue.

Polysaccharide Dressings: e.g. Iodosorb, Debrisan
These are presented as beads, paste and granules, and their osmotic pressure will draw water out of the surrounding tissues. The beads will also draw exudate and bacteria away from the wound surface. Some products present the beads impregnated with an anti-microbial agent which is released when they become moist. Major indication for use is in early stages of the healing cycle, particularly for cleaning, debriding sloughy or infected wounds.

Semi-permeable Dressings: e.g. Bioclusive, Opsite, Tegaderm.
These cover the wound and are permeable to water vapour and oxygen but impermeable to water and micro- organisms. The film acts as a barrier to bacteria attempting to enter the wound. Film dressings are convenient to use, comfortable and enable the wound to be observed at all times.

Odour absorbing Dressings: e.g. Actisorb, Lyofoam C, Keltocarb and Carboflex.
These dressings act as filters and absorb the odoriferous chemicals liberated from the wound before they enter the air. Activated charcoal is considered to be the most effective material available.
The charcoal is incorporated to porous spun-bonded nylon dressings, multi-component dressings, calcium alginate fibre bonded, and polyurethane dressings. Despite the wide use of activated charcoal dressings, little has been published in the medical press of their clinical use.

5.3 Debridment

- *debridement (removal of necrotic material and slough) reduces the risk of infection, enables grading and promotes wound healing (V) (Agren & Stromberg 1985).*
- *surgical debridement is indicated in advanced cellulitis and sepsis (V) 9 Bale & Harding 1990, Longe 1986).*

Surgical - Usually indicated for large necrotic ulcers that are in danger of producing life threatening side effects.

Mechanical - Should only be performed by a competent practitioner. Debriding blind may result in further traumatising the wound bed.

Enzymatic - Involves the application of a prescribed enzyme preparation in a gel, over necrotic tissue and held in place by a moisture retentive secondary dressing e.g. film.

Autolytic - involves re-hydrating the necrotic area of tissue by the use of a gel producing and fluid retentive dressings, (hydrogels and hydrocolloids).

Larvae Therapy - involves the introduction of specially bred maggots to engulf and digest necrotic tissue.

The decision to debride a wound should take into account the patients' preference and quality of life. The method chosen will depend on the objective of debridement which is likely to be promotion of wound healing and/or patient comfort.

De-sloughing agents: (Chlorine releasing agents, hydrogen peroxide)
Current research suggests that these preparations are toxic to new granulation tissue and there is evidence that hydrogen peroxide used to irrigate cavity wounds may result in air embolism (Sleigh & Linter, 1985: Bassen, 1982). If the wound bed is covered with more than 85% necrotic tissue, it may be necessary to surgically or mechanically, remove the slough. This decision will be in consultation with the medical team and or the Tissue Viability Nurse Advisor.

Topical Antibiotics:
Should be avoided, they can be a source of resistance and sensitivity reactions.
If clinical symptoms of infection are present a swab should be taken for microbiological culture and sensitivity and the appropriate systemic antibiotic prescribed. (D`ARCY, 1982).

6.0 Cost Effectiveness:
When the wound has been properly assessed, with full consideration given to the size and the stage of healing the wound is at , an appropriate dressing can be selected. This will minimise the cost of inappropriate use of dressings (Hermans, 1992)

7.0 Recommendations:

Training Program:

7.1 This should be ongoing and cross the boundaries of other disciplines; e.g. Dieticians, Occupational Therapist, Physiotherapist and Medical team

7.2 All nursing staff working within the Portsmouth HealthCare NHS Trust should have a yearly update on tissue viability and wound management. By attending basic training sessions and or advanced training sessions which are available within the Portsmouth HealthCare NHS Trust. And /or by Completion of the wound management and pressure ulcer prevention courses available from both Portsmouth and Southampton Universities.

7.3 Following the trust initiative to cascade information via recognised link / resource personnel for pressure ulcer prevention / wound management and nutrition, all staff should be encouraged to make use of the appropriate link / resource nurse for their local area and have easy access to the Tissue Viability Nurse Advisor.

** The content of this education should be based on the best available evidence and tailored to the needs of patient / client group (V) (EPUAP 19998).*

8.0 Transferring of patients:

8.1 A full description of the wounds condition, type, size, grade, location and also the current treatment, should be fully documented and sent with the patient when he/she is transferred. If possible telephone communication should be established and any other relevant information given. This will enable the patient to have, and allow those caring for him/her to give, continuity of care.

9.0 Nutritional Status:

Patients who are nutritionally compromised need to be managed and accurately recorded. (V) (Goode & Allman 1989, AHCPR 1992).
The need to screen nutritional status is paramount in identifying patients at risk and managing pressure ulcers. This nutritional screening along with monitoring for 48 hours food and fluid intake, will provide a basis for choosing appropriate supplements or replacement nutrients. (Goodison-McLaren, 1993)

9.1 All patients will have their nutritional status screened on admission.

9.2 Appropriate documentation and referral to dietitians for those at risk should be carried out as soon as possible after screening.

9.3 Refer to local policy in place for the Prevention and Management of Malnutrition in Hospital and Residential services.

10.0 Wound cleansing:

10.1 Normal practice is to leave the wound bed undisturbed to minimise trauma to new tissue growth. Wound cleansing using the irrigation method is therefore only recommended to remove dressing remnants and other debris.

10.2 The European Tissue Advisory Panel (EPUAP) recommend in their pressure ulcer treatment guidelines, that where cleansing is necessary, saline, tap water or water suitable for drinking can be used.

11.0 Dressing technique:

11.1 Principles of asepsis should be adhered to thus reducing the risk of contamination by, inanimate objects and dirty hands. (Tomlinson, 1987).

11.2 A clean non-touch technique may be applicable for chronic wounds (e.g. pressure ulcer, leg ulcers) which are already colonised by the patients own bacteria.
It is important however if this method is being used that meticulous attention must be paid to hand washing thereby reducing the risk of cross-infection.

11.3 The dressing procedure in the patients home may need to be adapted as appropriate, but clinicians need be mindful of the risk of infection.

Points to remember

12.1 Wound Dressings

- *The dressing of choice should be one which creates and maintains a moist environment at the wound bed (II) (Winter 1961, Gorse & Messener 1987).*
- *Assessment of wound and identification of patient preference should inform the choice of dressing to meet the treatment objectives (V) (AHCPR 1992).*
- *Frequent dressing changes should be avoided, unless clinically indicated to prevent trauma and taking account of the manufacturers recommendations (III)*
- *Dressing should be changed when leakage / strike through is evident and consideration given to the appropriateness of the dressing choice (V)*

12.2 Managing Infection / Colonisation of Pressure Ulcers

- *Debridement, wound cleansing and hand hygiene can reduce the risk of infection (II)*
- *Frequency of cleansing and debridement are increased where purulent exudate and offensive odour are present (V)*
- *Routine swabbing of ulcers is not recommended except where the patient evidences systemic infection (V)*
- *X-ray to identify osteo-myelitis and intra-articular infection should be undertaken where suspected infection does not respond to treatment (V)*
- *Systemic antibiotics may be prescribed by the physician where there is evidence of severe infection (II)*
- *Pressure ulcers should be protected from contamination by faeces etc. (V)*
- *Disposal of all wound debris and dressings, as for clinical waste material (V)*

(Also see guidelines for Diabetic foot)

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