The Prevention and Management of Pressure Ulcers
An educational reference book
# Contents

**The Prevention and Management of Pressure Ulcers**  
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**Glossary**  

**Bibliography**
Welcome to this programme on the prevention and management of pressure ulcers. The aim of the programme is to help you understand pressure ulcers – how they form, how they are treated and, crucially, how they can be prevented.

Pressure ulcers can be devastating for the people they affect. They cause pain and distress. They reduce patients'/clients’ ability to get on with their day-to-day lives. They require what are often long and arduous courses of treatment. And they make people vulnerable to potentially life-threatening infections.

But most pressure ulcers are preventable. There is evidence to suggest that appropriate clinical care can help to prevent the occurrence of pressure ulcers. Gaining an understanding of how pressure ulcers develop arms us with the know-how to stop them forming in the first place. The wealth of knowledge that has been gathered by scientists and specialists over the years means that we now have at our disposal an enormous array of evidence, technologies and treatments for pressure ulcers that have been proven to work.

‘Patient/client’ refers to people who are receiving care in hospital or in their homes and residents living in care homes.
Who is the programme for?
Pressure ulcers can affect people of all ages, shapes and sizes. If you are in a caring role – whether as a registered professional or support worker in the NHS, social care or the independent sector – the chances are that you will be caring for someone who is at risk of pressure ulcers.

Our task is to protect these vulnerable people from the dangers of pressure ulcer development or, if they already have one, to give them the best-quality, evidence-based treatment we can. This programme will help you understand how we can achieve both of these goals.

You may already have a basic knowledge of tissue viability issues, in which case this programme will be a useful reminder of key precautions and management principles. Those who are experienced in tissue viability will also find it a useful tool in supporting knowledge development among more junior staff.

The programme
Along with this programme you should read the ‘Prevention and Management of Pressure Ulcers’ Standards, available from www.healthcareimprovementscotland.org. The programme is based on the NHS QIS evidence-based standards for the Prevention and Management of Pressure Ulcers. There are eight modules in the programme. Module 1 addresses some underpinning principles of caring for patients/clients who are at risk of, or who have already developed, a pressure ulcer. The remaining seven modules focus on specific key aspects of pressure ulcer formation, prevention and management.

The entire programme is set out in this reference book but you will need to download and print out your workbook in order to complete the learning activities and multiple choice questions. The only other place you will need to go for information is the online tissue viability toolkit, which contains a wide range of resources such as best practice statements and other tools relevant to tissue viability. The toolkit is housed on the NHS Healthcare Improvement Scotland Tissue Viability webpage www.healthcareimprovementscotland.org/our_work/patient_safety/tissue_viability.aspx.

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We use the term ‘health care worker’ throughout this text to denote all those employed to deliver care in all settings.
Your own local policies, protocols and procedures related to pressure ulcer management will also be important – we’ll guide you to these through the learning activities.

The following programme features will support you as you progress through the modules.

- **Learning outcomes.** These describe what you will be able to learn from each individual module. When you finish a module, you can check the learning outcomes again to make sure you’ve captured everything you need to understand.

- **Learning activities.** These will help you to see how the theory in the module can be applied to your own practice. Some of the learning activities ask you to carry out short tasks in your workplace, so it would be helpful if you could find a senior colleague who could be your mentor – that is, someone you work with who has the knowledge and experience to be able to support you as you progress through the programme and carry out the learning activities and multiple choice questions.

- **Multiple choice questions.** At the end of each module you should complete the multiple choice questions in your workbook. There are four for each module. The pass mark is 75% or more or three or more correct answers. You can compare your answers to those given at the back of the workbook.

- **Glossary.** If you’re unsure about the meaning of a word, the glossary should be your first port of call.

- **Bibliography.** The bibliography lists resources used to inform the development of the content of this programme.

- **Symbols.** The following symbols will alert you to key areas of interest.

  - Workbook activity
  - Key point
  - Stop & think
  - Link to toolkit

You can move through the programme at your own pace. If you have a colleague or friend who is also interested in the topic, you might want to consider doing the programme together, sharing your learning and experiences as you go.

By completing this programme, you are showing your determination to increase your knowledge and abilities in relation to the management of pressure ulcers. In so doing, you will be playing a huge part not only in protecting the health of vulnerable people and preserving NHS resources, but also in developing your strengths as a health care worker.
Many of the patients/clients you will look after will be at risk of developing pressure ulcers. Some may have a pressure ulcer already.

The modules that follow will take you through the processes of pressure ulcer risk assessment, prevention, treatment and other important aspects of care you need to know about to help care for this group of patients/clients.

**Learning outcomes**

Before we move on, please take time to read the learning outcomes for this module. These will give you clear direction on what the module covers and the learning we hope will result from it.

**By the end of this module, you will be able to:**

- discuss the importance of full patient/client assessment
- follow the care plan document and carry out care accordingly
- discuss the importance of regular reassessment and evaluation of care.
**Principles of care**

The Scottish Patient Safety Programme (SPSP) was established to improve the safety of healthcare and reduce the level of harm experienced by people using healthcare services. As part of the programme, there is an aim to reduce pressure ulcers in hospitals and care homes by 50% by December 2017. The work with care homes is delivered in partnership with Scottish Care and the Care Inspectorate.

The principles of care for this group are related closely to patient/client safety and infection control. From a patient/client-safety perspective, it is important that we do our best to prevent pressure ulcers from occurring. But in so doing, we must remember to address the other problems the person may have.

When a patient/client develops a pressure ulcer, the hospital or care setting where he or she developed the skin damage may be subject to a review of practice in an attempt to protect other patients/clients from developing pressure ulcers in the future. It is also possible that a patient’s/client’s family may take legal action against a care setting if their relative becomes ill due to the development of a pressure ulcer.

Infection control issues relate to preventing a pressure ulcer becoming infected and to preventing the transmission of infection to other patients/clients with wounds. This will be explained in more detail in Module 8.

But the key thing is that most pressure ulcers can be prevented. We are all responsible for caring for and checking patients’/clients’ skin when we are looking after them.

**Key point**

Pressure ulcers are everyone’s responsibility and it is important that the whole team should be involved in their prevention and management.

**Person-centred care planning**

If you are caring for a patient/client who is at risk of pressure ulcer development, you should ensure that the nursing care plan or multidisciplinary pathway identifies the care he or she requires.

The nursing process is a method of ensuring that patients/clients receive care that is not only appropriate to their needs, but which also improves their experience of the service.

The nursing process involves four key parts.

**Assessment**

Preliminary Pressure Ulcer Risk Assessment (PPURA) tool can be used at the point of admission to a care area and can also be incorporated into the daily regime of patient/clients who are not identified to be at risk. If the patient/client is a full pressure ulcer risk assessment should be undertaken.
Assessment will involve overall assessment of general health, mobility, skin, nutrition status, continence, psychosocial and psychological status and, importantly, risk assessment for the development of pressure ulcers using tools such as the Waterlow Risk Assessment Tool and the Braden Risk Assessment Tool, in conjunction with clinical judgement.

A good way to assess and plan care is to use the patient's/client's activities of daily living as a guide. Not all the activities will need to be addressed, but it is useful to ensure that you are treating the whole person and not just focusing on one area of his or her care. A care plan should only reflect problems the patient/client has and how these can be managed.

Activities of daily living include:

- breathing
- eating and drinking
- sleeping
- mobilising
- communicating/socialising
- excretion/continence
- personal cleansing and dressing
- expressing sexuality
- spiritual care
- dying.

Planning
Planning care involves taking steps to decide what measures the patient/client needs to help prevent pressure ulcers from forming and address his or her other care needs. This will mean using the information you gained from the assessment to guide the care you will provide. It should be decided by all staff caring for the patient/client, who should also be involved if he or she is able to do so.

Explanation should be given to the patient/client with the pressure ulcer and/or carer about the associated problems of pressure ulcers and possible consequences; this may help to encourage compliance with treatment.

Implementation
This is the part of the process in which you provide the care for the patient/client based on your plan.

For patients/clients with poor mobility, you will use a pressure-redistributing bed or mattress and seating cushions; frequent changing of position will also be necessary. Some patients/clients may need moving and handling aids to assist in repositioning. Access to equipment may be limited in community settings – community-based health care workers should be aware of where equipment can be sourced to enable them to supply necessary items and keep patients/clients and carers informed.

Patients/clients who are not eating well will require assessment by a dietitian and may need dietary supplements to help reduce the risk of pressure ulcers. It is essential to ensure the patient/client is eating and drinking well.

Patients/clients with no relatives at home will require more social support.
Evaluation
This is the stage in which you review the patient/client to make sure that the care you have provided has worked and that his or her pressure areas have remained healthy and intact as a result. Evaluation may also let you know if the care you have provided is not working and a new plan is required. Evaluation may be carried out daily or more or less frequently, according to the patient’s/client’s needs.

An example of a care plan based of this method is shown below. Please note that this is for reference only, and must not be adopted wholly or in part for any patient/client in your care. You might, however, find the kinds of information contained within the example care plan useful in helping you formulate care plans for your patients/clients as part of a multidisciplinary plan of care.

### Example care plan

Example care plan: this is a sample care plan which should be adapted according to care setting and tailored to meet the individual needs of the patient/client.

<table>
<thead>
<tr>
<th>Activity of living</th>
<th>Problem</th>
<th>Treatment plan</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eating and drinking</td>
<td>The patient/client is dehydrated. The patient/client is not keen to eat.</td>
<td>Use the MUST tool to assess nutritional status if the patient is able (note, however, that the MUST tool is not used in community settings). Refer to the dietitian. Encourage hourly fluids. Provide nutritional supplements when appropriate. (Good practice for care homes would be to offer fortified foods before supplements.) Refer to speech therapist if difficulty swallowing. Record fluid intake and output. Record daily food intake. Record weight weekly. Find out why patient/client is not keen to eat.</td>
<td>Daily</td>
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<tr>
<td>Mobilising</td>
<td>The patient/client cannot move independently due to a stroke.</td>
<td>Refer to the physiotherapist. The patient/client will require a risk assessment for pressure ulcers and for falls. Change the patient’s/client’s position as required according to need and skin inspection and record this information. Use a pressure-redistributing mattress/bed system which can help to prevent pressure ulcers. Avoid long periods of time in chairs (greater than two hours). Provide a suitable seating cushion and move into bed after two hours. Use moving and handling aids when changing position. Maximise independent mobility when possible.</td>
<td>Weekly</td>
</tr>
<tr>
<td>Activity of living</td>
<td>Problem</td>
<td>Treatment plan</td>
<td>Evaluation</td>
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<tr>
<td><strong>Breathing</strong></td>
<td>The patient/client may have a chest infection if immobile.</td>
<td>Monitor the patient’s vital signs. Report temperatures of 38ºC or higher to medical staff. Listen for changes in breath sounds. Record respiration rate and report changes. Report any productive cough.</td>
<td>Daily</td>
</tr>
<tr>
<td><strong>Sleeping</strong></td>
<td>The patient/client cannot move when in bed and is at risk of skin damage.</td>
<td>Use a pressure-redistributing mattress to help prevent pressure ulcers. Changes of position should be carried out according to individual needs and assessment and be recorded. Pain relief may be necessary to help the patient/client to sleep. Night sedation may also be required.</td>
<td>Weekly</td>
</tr>
<tr>
<td><strong>Communication</strong></td>
<td>The patient/client may not be aware of the risk of developing pressure damage. The patient/client may be anxious about the outcomes of care.</td>
<td>The patient/client and carers should be taught about the risk of pressure ulcers when people are less mobile. It is important to always inform patients/clients about procedures and equipment being used in their care to reduce anxiety.</td>
<td>Daily</td>
</tr>
<tr>
<td><strong>Excretion</strong></td>
<td>The patient/client is incontinent of urine and faeces.</td>
<td>Routine skin inspection is carried out to detect excoriation when in contact with urine or faeces or after episodes of incontinence. Use the excoriation tool as part of the assessment to help identify the severity of skin damage. Special attention should be paid to wounds that are at risk of faecal or urinary contamination. Sending specimens of urine or faeces for testing may help to eliminate infection as the cause of incontinence. After episodes of incontinence, the skin is cleansed with a foam cleanser. Barrier creams should be used sparingly. Good quality, well-fitted and absorbent pads/pants should be worn. Toileting should be attempted regularly or according to the patient assessment. If incontinence continues, seek specialist advice.</td>
<td>At each episode</td>
</tr>
<tr>
<td>Activity of living</td>
<td>Problem</td>
<td>Treatment plan</td>
<td>Evaluation</td>
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<tr>
<td>Personal cleansing</td>
<td>The patient/client has a Grade 2 pressure ulcer on the sacrum.</td>
<td>Skin should be inspected daily, at dressing changes or after episodes of incontinence. Wound assessment should also be carried out at these times, using the wound assessment chart. The wound dressing should be changed when the wound fluid is visible at the edge of the dressing as this is likely to cause leakage – this is known as 'strikethrough'. The wound dressing used should manage wound fluid and promote healing. If the wound is deteriorating, report to the nurse in charge. The Scottish adapted EPUAP grading tool should be used to assess the level of tissue damage. Aseptic technique should be used when changing dressings. Showers can be taken if the wound can be exposed to water or if the dressing is waterproof; care should be taken if using a power shower. Dispose of all waste materials according to local policy. Take steps to reduce the risk of infection being transmitted by adhering to local policy. Ensure that appropriate pressure-redistributing equipment is being used. Change the patient’s/client’s position according to assessed needs.</td>
<td>Daily or at each dressing change</td>
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<td>and dressing</td>
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<td>Expressing sexuality</td>
<td>The patient/client with a pressure ulcer may have an altered body image and lack confidence.</td>
<td>If the patient/client is concerned about the impact of a wound, this should be discussed with staff and measures taken to address odours, bulky dressings and exudate.</td>
<td>At each dressing change</td>
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<td>Spirituality</td>
<td>Many patients/clients have religious beliefs which may affect their treatment.</td>
<td>Ensure that staff are aware of the spiritual or religious beliefs of the patient/client they are caring for. Caution when using hydrocolloid sheet dressings on Muslim or Jewish people [some hydrocolloid products are made from porcine sources].</td>
<td>Monthly</td>
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<tr>
<td>Dying</td>
<td>Pressure ulcers often occur in the end-of-life stage of care. Patients/clients with pressure ulcers will have added suffering due to pain, wound fluid and odour.</td>
<td>Pressure ulcer prevention should be practised at all times, but only if this is tolerated by the patient/client. Turning regimes should be adapted to suit the patient/client and relatives. Pressure-redistributing beds and mattresses should be used when possible. Dressings which reduce pain, manage exudate and eliminate odour should be used. Dressings that can be left in situ can also reduce the need for frequent changes and trauma for the patient/client. The patient/client and family should be treated with dignity, empathy and respect at all times.</td>
<td>Daily or if the patient’s/client’s condition changes</td>
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The care plan should form the basis for the care you give to the patient/client, but you should always be looking out for signs that his or her condition is changing. Changes in condition may require changes in treatment. Evaluation is the key to making sure that the care you provide is having a positive effect.

The Scottish Patient Safety Programme (SPSP) was established to improve the safety of healthcare and reduce the level of harm experienced by people using healthcare services. As part of the programme, there is an aim to reduce pressure ulcers in hospitals and care homes by 50% by December 2017. The work with care homes is delivered in partnership with Scottish Care and the Care Inspectorate.

**Tissue Viability Toolkit**

The Tissue Viability toolkit provides tools and worksheets that make preventing pressure ulcers possible in your workplace.

These include:
- Pressure ulcer standards
- Risk identification
- Risk assessment
- SSKIN care bundle
- Grading and tools

You will find these tools at [www.healthcareimprovementscotland.org/our_work/patient_safety/tissue_viability.aspx](http://www.healthcareimprovementscotland.org/our_work/patient_safety/tissue_viability.aspx)

**Summary**

This module has covered the key principles of care for patients/clients who may develop pressure ulcers while in a care setting. The key messages from the module are that we are all responsible for ensuring that patients/clients receive the highest quality care at all times, and that pressure ulcers can be prevented in many cases.

The next module describes the structure and functions of the skin, which will give you the basis from which to assess skin damage.

You have now completed Module 1. Please go to your workbook and complete the multiple choice questions for Module 1.
Module 2
The structure and functions of the skin

The skin is often referred to as the largest body organ and serves as the main protective barrier against damage to internal tissues from trauma, ultraviolet light, temperature, toxins and bacteria. The skin is responsible for sensory perception, temperature regulation and excretion of waste products. In addition to preventing harmful substances from entering the body, it also controls the loss of vital substances from the body.

It is vital that the skin remains intact to allow the body to perform these essential functions. It is also vital that when the skin is damaged, attempts are made to close the defect as quickly as possible to prevent infection and allow normal functioning to return.

As the skin shows the first signs of pressure damage, it is important that we recognise the skin changes that will alert us to damage occurring.

Learning outcomes

Before we move on, please take time to read the learning outcomes for this module. These will give you clear direction on what the module covers and the learning we hope will result from it.

By the end of this module, you will be able to:
• demonstrate an understanding of the basic structure of the skin
• identify the key components of the skin
• explain the main functions of the skin.
Layers of the skin and functions of the skin

The skin contains a number of accessory organs which assist in its protective role. As we can see in Fig. 1, it consists of two main layers: the epidermis, or outer layer, and the dermis, which lies beneath the epidermis.

The thickness of the skin varies depending on the site, with thicker skin being present on areas of the body that experience friction or wear and tear, such as the soles of the feet and palms of the hand. It also varies at extremes of age, when it is thinner.

The skin is supported by a layer of fatty tissue, sometimes known as the hypodermis. This fatty area helps to act as a cushion to protect the body and is also important for insulation.

Fig.1 The skin

**The epidermis**

The epidermis (or outer layer) contains no blood vessels and is divided into five layers. Cells move from the base of the epidermis up to the surface, changing shape and structure as they go. The outer layer of the epidermis is made up of stratified squamous epithelium or hardened cells which play a role in the skin’s protective function. This may be referred to as the stratum corneum.

Epidermal cells line the hair follicles, sebaceous glands and sweat glands.

A number of projections which reach down from the epidermis to the dermis can be found at the point at which they join. These are called rete pegs, which help to maintain skin integrity when the skin is under stress.

Melanocytes are cells found in the deepest layer of the epidermis. They produce melanin, which helps protect the body from the sun’s harmful rays.

**The dermis**

The main function of the dermis is to provide physical support and nutrients to the epidermis. The two layers identified within the dermis are the papillary layer and the reticular layer. Key substances found in the dermis include collagen and elastin.
Collagen is an important substance which helps give support and protection within the skin. The amount of collagen we have decreases as we age.

The dermis also contains nerve endings, sweat glands, sebaceous glands, hair follicles and blood vessels. The papillary dermis contains smaller blood vessels which supply oxygen, elastic fibres and nutrients to the lower epidermis. These vessels also assist in the removal of waste products from the skin into the general circulation.

The nerve endings sense pain, touch, temperature and pressure and are a vital part of the body’s protective mechanisms. There are more nerve endings in certain parts of the body, such as the fingertips and toes.

Sweat glands produce sweat, which contains some body waste products, water and salt. Evaporating sweat causes cooling of the body. Sweat from the axilla and groin areas (apocrine glands) is more oily in nature and produces a characteristic odour when digested by the skin bacteria.

Sebaceous glands secrete (sebum) into hair follicles. Sebum is an oily substance that keeps the skin moist and produces antimicrobial lipids which act as a barrier against foreign substances.

Hair follicles produce the various hair types that can be found around the body, so can affect a person’s appearance. Hair is also involved in protecting the body from injury and can improve sensation.

The blood vessels within the dermis are involved in temperature regulation.

The thicker reticular dermis contains denser connective tissue, larger blood vessels, elastic fibres and bundles of collagen arranged in layers.

**Also within the reticular layer are the following key cell types:**
- fibroblasts – a key cell involved in repairing tissue damage
- mast cells – which are involved in fighting infection
- lymphatic vessels – the lymphatic system is a key part of the body’s defence against infection
- epidermal appendages or rete pegs – as was explained above, the epidermis and dermis are linked in this way to prevent skin damage
- ground substance – a gel-like substance that helps to support the cells within the dermis and provides structure to the area.

**The hypodermis or subcutaneous layer**
The hypodermis or subcutaneous layer provides support for the dermis and is made up largely of fatty and connective tissue. It is essential for protection of internal structures and also provides insulation.
Differences in pre-term infants and neonatals (an infant in the first 28 days after birth)

The skin matures in utero during the third trimester. The skin has not thickened, matured or fully developed in pre-term infants and neonatals, with the epidermis only a few cells thick. The subcutaneous fat layer is poorly developed and the fibrils connecting the epidermis and dermis are fewer in number and more widely spaced.

This underdeveloped skin is thinner and less effective at performing the normal functions of the skin, leaving the pre-term infant at increased risk of heat loss, fluid loss and chemical absorption through the skin. The skin is also more easily damaged, further disrupting the barrier function and leaving pre-term infants at increased risk of infection.

Regardless of gestational age, the skin of pre-term infants matures to that of a term infant 2–4 weeks after birth.

Module 2: Learning Activity 1

The above image shows a cross section of the skin. Go to Module 2: Learning Activity 2 in the workbook where you will be asked to list the skin appendages in the diagram there. Once you have completed the activity in your workbook, you can compare your answers with 'Fig. 1, The skin' on page 15 of this reference book.

We will now examine the functions of the skin.
The functions of the skin

The skin has six main functions:
• protection
• sensation
• temperature regulation
• excretion
• metabolism
• non-verbal communication.

Protection
The skin acts as a barrier to prevent the entry of substances that may be harmful and the loss of vital substances from the body. It also provides protection against physical trauma such as pressure, shearing and friction.

As we get older, there is a decrease in the collagen present in the skin, which causes it to appear thinner and less elastic. This affects the ability of the skin to protect the underlying structures of the body. The skin also produces less sebum as we get older.

The skin has a slightly acidic pH which helps to protect it from certain bacteria, but if this is altered in, for instance, patients/clients who have episodes of incontinence, it can be prone to damage. The skin is also at risk of damage if it becomes excessively moist through, for example, wound fluid or incontinence.

Sensation
The nerve endings in the skin allow the body to detect pain and changes in temperature, touch and pressure. This is a protective mechanism designed to remove us from dangerous situations. Nerve endings decrease in number as we age, which may have an impact on the protective function of the skin.

Temperature regulation
The skin allows the body to respond to changes in temperature by constricting or dilating the blood vessels within it. The sweat glands produce sweat, which stays on the skin and allows the body to cool down as it evaporates. When the body is cold, the hair erector pili muscles contract, raising the hair and trapping warm air next to the skin.

Excretion
The skin excretes waste products in sweat, which contains water, urea and albumin. Sebum is an oily substance excreted by the sebaceous glands which helps to lubricate and protect the skin.

As we age, sebum secretion decreases and this can lead to the skin becoming drier, flaky and more fragile.

Metabolism
The skin enables the synthesis of vitamin D when ultraviolet light is present. Vitamin D is essential in allowing the body to manufacture certain hormones.
Non-verbal communication
The skin can convey changes in mood through colour changes, such as blushing. It also
gives clues about the physical wellbeing of individuals.

Module 2: Learning Activity 2

Now turn to Module 2: Learning Activity 2 in your workbook. You will be asked to
answer the following questions and complete the activity:

• Can you list the key functions of the skin?
• Can you think of three examples of how the skin may become damaged?
• Consider how an older person’s skin will differ from that of a younger person
and note your examples.

Once you have completed this learning activity, you may wish to compare your
thoughts with the information provided earlier in this module.

Summary

This module has aimed to give you baseline knowledge of the key structure and functions
of the skin. In the next module, you will learn about some of the factors that can lead to
skin breakdown, including individual patient/client-related issues and some environmental
issues that you may be able to influence.

You have now completed Module 2. Please go to your workbook and complete the multiple
choice questions for Module 2.
Module 3
Risk factors and risk assessment

In Module 2, you learned about the structure and functions of the skin. Module 3 explores the risk factors that can affect skin integrity and risk assessment to avoid tissue breakdown.

Learning outcomes

Before we move on, please take time to read the learning outcomes for this module. These will give you clear direction on what the module covers and the learning we hope will result from it.

By the end of this module, you will be able to:
• describe intrinsic factors that contribute to pressure ulcer development (general health, continence, poor nutrition and hydration)
• demonstrate awareness of the extrinsic factors that may lead to skin damage
• discuss the importance of risk assessment in relation to skin damage
• be aware of the risk assessment tools used in Scotland
• discuss the key differences between pressure damage and excoriation.

Factors that may contribute to tissue breakdown

Some people may be more vulnerable to developing pressure ulcers than others. When you are caring for a patient/client, it is important to be aware of the characteristics or factors that might cause him or her to become vulnerable to pressure damage. These are shown in Table 1. The
The table includes factors that are influenced by the external environment (extrinsic factors) and internal, innate factors (intrinsic factors).

### Table 1 Common factors found in people with pressure ulceration

<table>
<thead>
<tr>
<th>Factors</th>
<th>Intrinsic</th>
<th>Extrinsic</th>
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<td>Health status</td>
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<td>Mobility</td>
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<td>Posture</td>
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<td>Moisture</td>
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<td>Sensory impairment</td>
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<td>Level of consciousness</td>
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<td>Systemic signs of infection</td>
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<td>Nutritional status/body weight</td>
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<td>Previous pressure damage</td>
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<td>Pain status</td>
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<td>Psychological and social factors</td>
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<td>Cognitive status</td>
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<td>Blood flow</td>
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<td>Extremes of age</td>
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<td>Multifactorial</td>
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Now let’s look at each of these factors in more detail.

#### Intrinsic factors

**Health status**

Patients/clients who suddenly become very unwell (acute illness) may be vulnerable to skin breakdown. Those who have had an illness for a longer period of time (chronic illness) may also be vulnerable. This is especially the case for patients/clients with vascular/arterial disease, which causes a poor blood supply to the lower legs, and those with diabetes, who may have a loss of sensation in their feet in addition to a poor blood supply.
Children who may be vulnerable to skin breakdown include those with epidermolysis bullosa, congenital cardiac anomalies, spina bifida and cerebral palsy, which may cause decreased peripheral circulation and sensory impairment.

**Mobility**
Immobility may be the greatest risk to skin integrity. Our normal response to pressure is to move or reposition ourselves. When patients/clients are unable to reposition themselves in this way, tissue breakdown may occur.

A patient’s/client’s ability to move may be affected by a number of factors (see Learning Activity 1, below). Repositioning charts may be used to record when and how patients/clients have had their position changed.

**Module 3: Learning Activity 1**

Go to Module 3: Learning Activity 1 in your workbook. You will be asked to think of a patient/client in your care with reduced mobility. In the space provided, list the risk factors for that individual.

**Posture**
Proper posture when sitting is a key part of maintaining skin integrity. Anatomical changes in some patients/clients may mean the pelvis is tilted either forwards, backwards or sideways, which can cause unusual pressure distribution.

**Sensory impairment**
Reduced awareness of pressure can lead to reduced spontaneous movement. Patients/clients who have had a stroke or a spinal cord injury are among those who may have sensory impairment.

**Level of consciousness**
Think of patients/clients who are having surgery and are unconscious. They will not have the ability to reposition themselves. Others, such as people who have had a head injury, may have a reduced level of consciousness or be unconscious. Reduced natural (spontaneous) movement is similar to reduced mobility and can affect the skin’s integrity.

**Systemic signs of infection**
An elevation in body temperature, such as when a patient has an infection, may affect tissue integrity through, for instance, an increase in moisture due to sweating (older patients/clients who have infections may not develop a high temperature, so other signs and symptoms such as generally feeling unwell or the onset of confusion will need to be monitored).
**Nutritional status**

Patients/clients with extremes of weight (either emaciation or obesity) are likely to be at higher risk of pressure ulceration.

There is a clear link between patients having poor nutritional status and the development of pressure ulcers. It is essential that we do not overlook the importance of a well-balanced diet. Additionally, vulnerable individuals may be at risk of pressure damage if they lose weight rapidly.

Adequate nutrition for all individuals being treated within healthcare settings is seen as a priority by NHSScotland, which has produced a guidance document called *Improving Nutritional Care*. This recommends that the Malnutrition Universal Screening Tool (MUST) be part of the admission procedure for adults admitted to hospital or to a care home and that a personal nutritional care plan related to the MUST score be developed. In addition, the Care Commission publication *Promoting Nutrition in Care Homes for Older People* provides a good reference source for care home staff. Nutritional screening should be carried out at admission and with each significant change in clinical condition and or when progress towards pressure ulcer closure is not observed. If the screening identifies nutritional risk and the patient/client has a pressure ulcer they should be referred to a dietitian or an interprofessional nutrition team for a comprehensive nutrition assessment.

If you wish to access the guidance document *Care Homes for Older People: Best Practice on Food and Nutrition* HIS website:

[www.healthcareimprovementscotland.org](http://www.healthcareimprovementscotland.org)

and the MUST tool at:

[www.bapen.org.uk/pdfs/must/must_full.pdf](http://www.bapen.org.uk/pdfs/must/must_full.pdf)

The Care Inspectorate publication *Promoting Nutrition in Care Homes for Older People* can be accessed at:

[www.scswis.com](http://www.scswis.com)

It is emphasised, however, that the MUST tool is not suitable for application to children. For nutritional screening in children, the Paediatric Yorkhill Malnutrition Score (PYMS) should be used.

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**Module 3: Learning Activity 2**

Can you identify the person responsible for nutrition in your area? Discuss with him or her how a patient’s/client’s nutritional status is assessed. Go to Module 3: Learning Activity 2 in your workbook to make notes from your discussion.

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**Previous pressure damage**

Scar tissue from, for example, an old pressure ulcer is never as strong as undamaged tissue. It may have little or no blood supply, which makes it more vulnerable to breakdown.
Pain status
We may reduce the number of times we move or reposition ourselves when in severe pain. It is important to assess a patient’s/client’s pain and, if necessary, make sure he or she has adequate analgesics to allow repositioning with comfort. If the patient/client is able to respond reliably, ask him or her to identify any areas of discomfort or pain which could be attributing to pressure damage.

Psychological and social factors
Very depressed people (acute depression) can have feelings of apathy and may become less active.

Medication
Some medications, such as antihistamines or strong analgesics, can make a patient/client feel drowsy, and inotropes, steroids and chemotherapy agents can affect tissue perfusion. In addition, long-term use of steroids can cause thinning of the skin and therefore put the patient/client at risk of skin damage. The skin can become vulnerable if such medications are being used and the patient/client is not able to move as freely as normal.

Cognitive status
The cognitive state relates to thought processes. If the thought processes are altered due to confusion or a condition such as Alzheimer’s disease, the patient/client may be unable to recognise the risk of sitting or lying still for long periods of time without repositioning.

Blood flow
As you will have noted from Module 2, it is essential for the skin to have a good blood supply to provide necessary oxygen and nutrients and remove waste products. Damage to skin integrity is more likely if the blood flow is reduced.

Extremes of age
Newborn babies and very elderly people have more fragile skin. The skin gets thinner and can become dry as we get older; think back to Module 2, when you identified the differences in pre-term neonatal skin and the changes that occur as skin ages.

Extrinsic factors
The external forces or extrinsic factors that may lead to skin damage are pressure, shear and moisture. We will look at each factor separately.

Pressure
Again, if you think back to Module 2, you will remember that the blood vessels in the skin supply oxygen and nutrients and are responsible for removing waste products. If high levels of pressure are applied, particularly to skin over bony prominences, the blood vessels can become compressed. If interruption to blood flow is sustained over a period of time, the skin and underlying tissue can become damaged, leading to skin breakdown.

Infants and children can suffer pressure ulcers due to pressure over bony prominences, but they more commonly occur under equipment, such as splints, masks and tubing.
Shear
In addition to unrelieved pressure, shearing forces can intensify the destructive effect on the skin. Shear is caused when the body slips down; the underlying structures move, but the skin stays in the same position. This may result in deeper layers tearing away from the top layer of the skin.

An example of shear is when a person slides down the bed or chair; the skin stays stationary while the skeleton and surrounding tissues move.

Moisture (can be both extrinsic and intrinsic)
If an area of the skin is wet due to incontinence or even excessive sweating, it can become macerated (waterlogged). This may lead to an alteration in the resilience of the epidermis (top layer of the skin) to external force. This is known as excoriation. Further skin breakdown can occur if this condition is left untreated.

The skin excoriation tool should be used when assessing excoriated skin.

Pressure and shear, in combination with moisture, can make an individual very susceptible to skin damage.

Damage caused by friction
Skin damage can be caused by friction due to, for instance, rubbing against sheets. Think of a graze injury and how the skin is damaged. Footwear can also cause rubbing and blistering. Although this type of skin damage is not caused by pressure but friction it should be treated in the same way as a pressure ulcer.

Multifactorial
A patient/client will often have several of these factors, which work together to impact on skin integrity.
Special populations
Some groups of patients/clients might need additional support to prevent or treat pressure ulcers.

These ‘special populations’ include:
- bariatric patients/clients
- critically ill individuals
- older adults
- individuals in the operating room
- individuals in palliative care.

A senior member of staff should aid with risk assessment.

Further guidance can be found at the European Pressure Ulcer Advisory Group (EPUAP) website:

www.epuap.org

What can we do to prevent skin damage?

Some important steps can be taken to reduce the risk to patients/clients who are vulnerable to skin damage.

These include:
- inspecting the skin regularly – this is discussed in Module 4
- making sure all surfaces, such as the bed and chair, are appropriate to the patient/client – this is discussed in Module 5
- assisting the patient/client to reposition him or herself on a regular basis if he or she is unable or has difficulty doing so – this is discussed in Module 5
- using manual handling aids to minimise shear and friction.

Module 3: Learning Activity 3

When you are taking a break, make a mental note of the number of times you move in the seat (reposition yourself) over a half-hour period. You are likely to move several times. Now think about a patient/client with reduced mobility. How often do you help someone you are caring for to reposition? Now share your thoughts with a colleague and discuss the importance of repositioning. There is space provided to record your thoughts at Module 3: Learning Activity 3 in your workbook.
Risk assessment

We have explored factors that may contribute to tissue breakdown. It is important to consider these factors in all patients/clients in your care to minimise damage. Often several factors impact on the skin integrity of the patient. It is important to take steps to reduce the risk of skin damage.

Many of the patients/clients we care for will be at risk of developing a pressure ulcer. Pressure ulcers can have a significant impact on a person’s quality of life, but with good care and preventative strategies, we can reduce the likelihood of pressure ulcers developing.

We need to consider informal (observation and clinical judgement) and structured formal (using risk assessment tools and clinical judgement) assessment to help us identify whether someone is at risk of developing a pressure ulcer. The factors discussed in this module are important when assessing a patient’s/client’s risk of pressure damage.

Risk assessment tools

Preliminary Pressure Ulcer Risk Assessment (PPURA) can be used at the point of admission to a care area and can also be incorporated into the daily regime of patient/clients who are not identified to be at risk. If the patient/client is a full pressure ulcer risk assessment should be undertaken. For children the paediatric risk assessment tool should be used.

These tools can be found at:

www.healthcareimprovementscotland.org/our_work/patient_safety/tissue_viability.aspx

These tools were developed to enable early detection of patients/clients at risk of developing pressure ulcers. Strategies can then be put in place to reduce risk, such as repositioning more frequently and, in some cases, the use of pressure-redistributing devices (we will discuss this more fully in Module 5).

Below are some examples of factors that may appear on a risk assessment tool:

- mobility
- activity
- continence
- malnutrition
- impaired mental status
- impaired sensation.

The tools most commonly used for infants and children are the Glamorgan Tool for Infants and Children Birth to 18 Years, and the Neonatal Skin Risk Assessment Scale (NSRAS).
Key point

It is important to be aware of how the scoring works in individual tools. For example, with the Waterlow, NSRAS and Glamorgan tools, the higher the score, the greater the risk; but with the Braden tool, it is the lower the score, the greater the risk.

Although the score is a useful guide to risk status, clinical experience and judgement should also be used to assess the patient/client, and the individual factors that make up the score should be addressed.

Module 3: Learning Activity 4

You should now complete Module 3: Learning Activity 4. There is space for you to do this at Module 3: Learning Activity 4 in your workbook.

Risk assessment – when should it be carried out?
The NHS HIS standards for Scotland states:

Trained health and social care staff should document the risk of pressure ulcer development or further damage to existing pressure ulcers:

A) within 8 hours of admission to hospital or care home

B) within 24 hours of admission to any care setting, or

C) on the first visit from the community services or teams, for example, community nurse, hospital at home, social care or care at home

www.healthcareimprovementscotland.org/our_work/patient_safety/tissue_viability.aspx

Reassessment

Reassessment should be carried out regularly, but the frequency depends on individual needs. As your knowledge and skills on pressure ulcer prevention grow, you will find that you informally reassess each patient’s/client’s risk every time you care for them. This will help determine the frequency of structured formal reassessment. Reassessment should be carried out if there is any significant change in the patient’s/client’s condition. An indication that an individual requires more frequent reassessment is described in the care study overleaf.
Module 3: Learning Activity 5. Care study

Module 3: Learning Activity 5 is a care study of a 68-year-old man called Robert who is cared for at home. Turn to Module 3: Learning Activity 5 in your workbook and take time to complete this activity before moving on.

We have discussed in this module the importance of both formal and informal risk assessment in relation to pressure ulcer damage. The decision on frequency of reassessment will depend on the patient’s/client’s health status. You should carry out the risk assessment with a colleague to see if you agree or differ on the level of risk, and document your findings. Where necessary, the advice of someone with specialist knowledge should be sought.

Summary

We have explored risk factors and risk assessment in this module. It is important to be aware of the different types of risk assessment we can use to alert us to the possibility of skin damage and pressure ulcer development.

In Module 4, you will learn about the principles of inspection and care of the skin.

You have now completed Module 3. Please go to your workbook and complete the multiple choice questions for Module 3.
Module 4
Inspection and care of the skin

You learned about the principles of risk assessment in Module 4. We will now focus more closely on the importance of inspecting and caring for the skin.

Learning outcomes

Before we move on, please take time to read the learning outcomes for this module. These will give you clear direction on what the module covers and the learning we hope will result from it.

By the end of this module, you will be able to:
• demonstrate the fundamental principles of skin assessment
• discuss the importance of observing, recording and reporting skin damage
• demonstrate awareness of issues relating to patient/client dignity and safety.

Key point

All patients/clients who are at risk of developing a pressure ulcer should have their skin inspected regularly if it is possible to do so; if it is not possible to do so because of the patient’s/client’s condition, this should be documented clearly in his or her records.
Why is skin inspection important?

Skin inspection helps us to identify any early changes in the skin which may lead to a pressure ulcer.

We are looking for an area (or areas) of redness (erythema) when we inspect the skin. When you see such an area, compare it to the skin nearby. If nearby skin appears normal in colour, the area of redness may be an early warning sign of pressure damage. You should also conduct a blanching test, which involves applying light pressure with your finger to the area. If the area of skin turns white on pressure then quickly becomes red again after the pressure is removed, this indicates that the microcirculation is intact. If the skin remains red on finger pressure, it indicates damage to the microcirculation (see Module 6 and the definition of a Grade 1 pressure ulcer for more information).

It is extremely important to identify, report and record early changes in the skin; if we intervene quickly and appropriately to stop further damage, we can prevent tissue loss. You will learn more about grading of pressure ulcers and the importance of redness in early pressure damage in Module 6.

People with darker skin

This simple inspection may be more difficult in people with darker skin, as redness is more difficult to see. Studies have shown early pressure changes in darker skin can be missed. You may still see redness, but the skin may also look blue or have a purple hue or a bruised appearance.

Other changes you may note in darker skin include a change in temperature compared to nearby skin (this can be either coolness or warmth), or a change in skin consistency (either a firm or ‘spongey’ feel).

The key to assessing individuals with dark skin is to combine visual assessment, touch, risk assessment and the history of the patient/client to determine the likelihood of pressure ulceration.

Guidance can be found at the toolkit website at:

www.healthcareimprovementscotland.org/our_work/patient_safety/tissue_viability.aspx

Key point

Early identification of skin changes may prevent further damage. Assessing early pressure area damage in darkly pigmented skin can be difficult, but is achievable using the different methods described.
Which areas of the skin are vulnerable to damage?

Most pressure damage in adults occurs on the sacrum or heel, but any area where the skin lies close to bone can be vulnerable. **Fig. 1 & 2** shows some of the bony areas that have potential for pressure damage.

As you can see from **Fig. 1 & 2**, damage can occur at virtually any bony area of the body. It is important to inspect all areas, paying particular attention to bony prominences.

In infants and small children, the occiput (the back of the head) is the most common bony prominence over which tissue damage occurs. This is due to the relatively increased size of the head in proportion to the rest of the body.

**Special factors to consider**

We explored the factors that contribute to tissue breakdown in Module 3. While all are important, special attention should be paid when we carry out a skin inspection with patients who are incontinent of urine, faeces or both. In addition a continence management plan should be implemented.
Module 4: Learning Activity 1 concerns incontinence and skin breakdown. Turn to Module 4: Learning Activity 1 in your workbook to complete the activity.

When should the skin be inspected?

This will depend on the patient/client you are caring for and his or her level of risk.

As a minimum the skin should be inspected:
- within 8 hours of admission to hospital or care home
- within 24 hours of admission to any care setting, or
- on the first visit from the community services or teams, for example, community nurse, hospital at home, social care or care at home

If the patient/client is able to respond ask him or her to identify any areas of discomfort or pain which could attribute to pressure damage.

Inspect the skin around medical devices at least twice daily for signs of pressure related injury to the surrounding skin.

The environment

We must always maintain the dignity of the patient/client. It is important to explain what you are doing and why, and to gain consent for what you propose.

Before carrying out a skin inspection, make sure the room is warm and that the light is bright enough for you to carry out your inspection. Only expose the area of skin you are inspecting and cover it again before moving on to the next area.

The examination should always move from head to toe, inspecting all bony areas (as outlined in Fig. 1). If the person is bedbound, ask him or her to roll from side to side (if able to do so) to allow you to examine the back and sacrum. The patient/client may need assistance with this action from two or more people.

Module 4: Learning Activity 2. Care study

Module 4: Learning Activity 2 is a care study of a 74-year-old woman who has been admitted to a medical ward. Turn to Module 4: Learning Activity 2 in your workbook and take time to complete this activity before moving on.
Cleaning the skin

Cleaning the skin with a gentle soap and warm water is adequate for normal daily hygiene, but soap and water should not be used if the patient/client has moisture damage (excoriation) of the skin in the groin and/or buttock area. pH-balanced skin cleansers are considered to be better for vulnerable skin.

Patients/clients who have continence problems are particularly vulnerable to developing moisture damage or excoriation of the skin. A pH-balanced skin cleanser should always be used to clean the skin after an episode of incontinence, with strict adherence to the principle of individualised canisters of pH-balanced skin cleanser for each patient/client.

In relation to neonates, skin cleansing may be contraindicated, depending on the age and health status of the infant. Plain water and dilute emollients may be used for cleaning the nappy area, but the skin should be irrigated and not wiped if moderately or severely excoriated and either patted dry or allowed to air-dry, depending on the extent of the excoriation. Barrier films and creams should be used according to local guidelines.

A good-quality absorbent nappy should be used and changed frequently. Baby wipes should never be used in neonates (the use of soft cotton swabs and water is preferred), and care should be taken to use only non-perfumed, pH-balanced skin cleanser. Routine use of moisturisers in neonates is not recommended as they have been proven to increase the risk of nosocomial infection.

Protecting excoriated skin
We discussed excoriation of the skin in Module 3. This condition is often very painful. If the patient is incontinent, further damage can occur due to chemical irritants in urine and faeces. Barrier creams or barrier films should be used to prevent further damage to areas of excoriation. They should be applied sparingly to all areas of excoriation. As a general rule, barrier creams should be used on unbroken skin and films on broken skin.

Excoriation assessment tool
It is important to be aware of the extent of excoriation the individual has to treat it appropriately and monitor any improvement or deterioration. The excoriation assessment tool can be found in the online toolkit at:

www.tissueviabilityonline.com

There is no paediatric excoriation tool available at the present time.
Module 4: Learning Activity 3

Module 4: Learning Activity 3 involves looking at the excoriation tool in your area with someone who is familiar with it. Turn to Module 4: Learning Activity 3 in your workbook to complete the activity.

Moisturising the skin
As we get older, our skin produces less of our natural moisturiser, sebum. The skin can become dry and flaky as a result. If you see dryness while examining a person’s skin, report this to a more senior member of the health care team. Treatment with a non-perfumed moisturiser at least twice a day will help reduce dryness.

Protecting the skin

The following key principles are of great importance in protecting the skin of the patients/clients we care for:

- closely inspect the skin for areas of redness, dryness or excoriation and record changes
- report changes to a senior member of the health care team to enable measures to be put in place to help prevent further damage, such as the use of pressure-reducing equipment.

You will learn about some of the different methods available to us to help prevent skin breakdown in Module 5.

Summary

We have explored inspection of the skin in this module. It is important to remember the frequency of skin inspection should be determined by the patient’s/client’s level of risk. Any changes should be reported in a timely fashion.

In Module 5, you will learn about the different types of pressure ulcer prevention and management techniques.

You have now completed Module 4. Please go to your workbook and complete the multiple choice questions for Module 4.
Module 5
Prevention and management techniques

You learned about the principles of inspecting and caring for the skin in Module 4. Here, we move into the realms of preventing and managing pressure ulcers.

Learning outcomes

Before we move on, please take time to read the learning outcomes for this module. These will give you clear direction on what the module covers and the learning we hope will result from it.

By the end of this module, you will be able to:

• demonstrate an awareness of key pressure-redistributing equipment
• state the importance of correct moving and assistance techniques and be able to use them
• use appropriate equipment when needed
• make sure that equipment is properly maintained, cleaned and decontaminated.

Key point

The main reason a pressure ulcer develops is lack of movement (or reduced mobility) leading to prolonged pressure.
Mobility

Mobility can be reduced for some patients/clients either in the short term, such as a person who is generally well and active but who has a period of acute illness, or over a longer term with someone who is permanently disabled. Lack of movement increases the risk of an individual developing a pressure ulcer. It is important to encourage movement to the degree that the patient/client is able, including moving about in bed. This may also involve helping the patient/client out of bed to sit in a chair, or helping him or her to take short walks about the room.

Pressure redistribution

Carrying out informal and structured formal pressure ulcer risk assessment and assessing the patient’s/client’s skin will help to determine the type of interventions needed. The equipment and techniques available for pressure redistribution are listed below:

- repositioning
- specialist mattresses
- specialist beds
- specialist cushions
- prophylactic dressings for bony prominences, or to prevent medical device-related pressure damage
- other aids, such as heel protectors.

A senior member of staff should assist in decision making when considering prophylactic dressings.

We need to consider the factors in Table 1 in choosing the pressure redistributing equipment most suitable for individuals.

<table>
<thead>
<tr>
<th>Table 1 - Factors to consider when selecting pressure-redistributing equipment</th>
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<tbody>
<tr>
<td>Appropriateness of equipment for age, weight and size of the patient/client*</td>
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<tr>
<td>Level of risk of pressure ulceration</td>
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<tr>
<td>Pressure ulcer assessment</td>
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<tr>
<td>Location and cause of pressure ulcer</td>
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<td>General skin assessment</td>
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<td>General health status</td>
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<tr>
<td>Acceptability and comfort to the patient/client</td>
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<td>Lifestyle of the patient/client</td>
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<tr>
<td>Ability of the patient/client to reposition him or herself</td>
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<tr>
<td>Availability of health care workers to reposition the patient/client</td>
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<tr>
<td>Availability of equipment</td>
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<tr>
<td>Ease of equipment used by health care worker, patient/client and carer</td>
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<td>Ease of maintenance</td>
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<tr>
<td>Cost</td>
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<tr>
<td>Suitability if to be used in patient’s/client’s home environment</td>
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<tr>
<td>Specialist training for patient/client and his or her family or carers in use of the equipment</td>
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</tbody>
</table>

*Equipment designed for use with adults may not be suitable for use with infants and children – always check the manufacturer’s instructions.
Repositioning
Repositioning is one of the essential elements of caring for someone at risk of developing a pressure ulcer and is equally important if the patient/client already has a pressure ulcer.

The time period between repositioning is dependent on the patient’s/client’s risk status. Decisions on this can be made with the help of a more senior member of the health care team.

It is important to remember to encourage patients/clients to reposition themselves if they are physically and cognitively able. If their risk assessments show they are at high risk, it is advisable to start a repositioning chart. This will provide you with a useful record of the number of times the patient/client has been repositioned and can also help with decision-making on whether the frequency of repositioning is appropriate or should be amended.

Repositioning is important for patients/clients not only while they are in bed, but also while in a chair. The European Pressure Ulcer Advisory Panel (EPUAP, 2009) suggests if sitting in a chair is necessary for individuals with pressure ulcers on the sacrum/coccyx or Ischia, limit sitting to three times a day in periods of 60 minutes or less. This generally means returning the patient/client to bed for a period of time.

Anyone who has to reposition patients/clients needs to have access to training on the movement and handling of patients/clients; this includes people caring for someone at home.

Other considerations
Avoid positioning patients'/clients' directly on medical devices such as tubes or drainage systems. To prevent shear injury, limit the head of bed elevation to 30 degrees for those on bed rest unless contra-indicated by medical condition or feeding considerations.

30° tilt
In addition to pressure, shear and friction forces may also put a patient/client at increased risk. The 30° tilt is a method of positioning the patient/client to decrease the risk of damage. The person is not fully on his or her side, but is placed on pillows positioned to angle the pelvis at approximately 30° to the surface of the bed.
Module 5: Learning Activity 1

Module 5: Learning Activity 1 concerns repositioning charts in your area. Turn to Module 5: Learning Activity 1 in your workbook to complete the activity.

Specialist beds and equipment
The patient/client may have an electric profiling bed. Electric profiling beds, when used correctly, will assist pressure redistribution. They can also be used to help reposition, along with aids such as hoists, slings or sliding sheets.

You can seek help from a more senior member of the health care team on whether an aid is necessary. It is important to remove these aids after the repositioning has taken place.

Module 5: Learning Activity 2

Module 5: Learning Activity 2 involves listing the reasons why aids should be removed. Go to Module 5: Learning Activity 2 in your workbook to list the reasons.

Specialist mattresses and devices
The NHS QIS best practice statement says that as a minimum, an individual at risk of developing pressure ulcers or with an existing pressure ulcer should be cared for on a pressure-redistributing foam or overlay mattress. Rather than providing a flat surface to lie on, these mattresses mould around the patient's/client's body and redistribute pressure.

Other types of pressure-redistributing surfaces are needed in some cases, such as for a patient/client whose skin or general condition deteriorates. These surfaces include pressure-redistributing overlays (specialist surfaces that go on top of the mattress) and mattress replacements. Care should be taken when using an overlay, as it will raise the height of the bed. If bed rails/sides are being used, you may need to use extra-height versions.

A senior member of the team should assist you in carrying out the risk assessment and may ask advice from the member of the team who is responsible for the allocation of equipment. This is often the tissue viability nurse, but could be a senior member of the nursing team such as the district charge nurse. They have in-depth knowledge of the equipment and will help with decision-making on what is best for the individual. It should be noted that availability of specialist mattresses and devices may be limited in community settings and care homes.

Module 5: Learning Activity 3

Module 5: Learning Activity 3 involves finding out which pressure-redistributing products are available in your area. Turn to Module 5: Learning Activity 3 in your workbook to complete this activity.
Seating
It is important to remember that when a patient/client who either has, or is at risk of developing, a pressure ulcer is sitting in a chair, he or she will need pressure-redistributing measures to be taken. Several types of pressure-redistributing cushions are available.

While the cushion is important, it is equally important that the seat is suitable. The individual should be able to have his or her feet flat on the floor and the length of the seat and the back should be appropriate for the patient/client. Correct seating helps with balance and lumbar support. It also helps distribute pressure evenly and may aid independent movement.

Pressure redistribution in wheelchairs
A specialist assessment is required for individuals who need a wheelchair for long-term use to make sure the cushion is appropriate.

Emerging therapies for prevention of pressure ulcers
New therapies for prevention of pressure ulcers may be required for some individuals. A specialist assessment is required before using any new therapies.

- microclimate manipulators, which can help to control moisture and temperature
- electrical stimulation of muscles for individuals with spinal cord injury
- prophylactic dressings
- silk-like fabrics to reduce shear and friction

Key point
A record of the risk assessment should be kept in the patient’s/client’s health record. If you have any concerns, it is essential to report them to a more senior member of the health care team.

Reassessment
We discussed frequency of reassessment in Module 3, when we saw that this is dependent on each individual's health status.

You may find on reassessment that the pressure ulcer risk has decreased and the individual no longer needs the type of pressure-redistributing surfaces he or she currently has. If the risk has increased, this is also an indication to review the current repositioning regime and pressure-redistributing equipment and consider whether changes should be made.

Record the risk assessment in the health record and report your findings to a more senior member of the health care team. They will assist you in decision-making.
Maintenance and decontamination

Maintenance to ensure the equipment is in good working order and decontamination to prevent the spread of infection are of the utmost importance.

Standards for healthcare associated infection are published by NHS QIS. You may wish to access them at:

www.healthcareimprovementscotland.org

Pressure-redistributing equipment comes with instruction manuals on how to care for them, including troubleshooting for problems and advice on how to clean and decontaminate. It is important to take time to read the instructions to ensure proper use of the product and to cut the risk of spreading infections. Some companies will offer decontamination services for their equipment or a nurse advisory service. Evidence of annual maintenance and cleaning schedules should be recorded.

Module 5: Learning Activity 4

Module 5: Learning Activity 4 involves identifying the person responsible for cleanliness in your area and discussing the procedure for maintenance and decontamination of equipment. Turn to Module 5: Learning Activity 4 in your workbook to complete this activity.

Summary

We have explored pressure ulcer prevention and management techniques in this module. It is important to be aware of the pressure-redistributing equipment available in your area and the importance of repositioning your patient/client depending on their level of risk.

Module 6 is about how we assess and grade pressure ulcers and skin damage associated with excoriation.

You have now completed Module 5. Please go to your workbook and complete the multiple choice questions for Module 5.
Module 6
Grading of skin damage

All patients/clients should have pressure ulcers assessed by a qualified person, but it is important that you are aware of how to examine the skin and identify which type of skin damage you are observing.

Good skin assessment can help to determine which treatment the patient/client might need with respect to pressure-relieving equipment and wound dressings. Risk assessment was addressed in Module 3, and inspection of the skin in Module 4.

Learning outcomes

Before we move on, please take time to read the learning outcomes for this module. These will give you clear direction on what the module covers and the learning we hope will result from it.

By the end of this module, you will be able to:

• identify areas of skin damage
• be involved in the assessment and reporting of skin damage, according to grade, using the standardised pressure ulcer grading tool and the excoriation tool
• describe the difference between pressure damage and excoriation (moisture damage)
• differentiate between superficial and deeper tissue damage.
What is a pressure ulcer?

A pressure ulcer is an area of skin and tissue damage caused by pressure, shear or a mixture of these factors.

Pressure is the direct force on the skin and tissues which affects the patient/client if he or she remains in one position for too long. This is common when patients/clients are being cared for in bed or sitting up in a chair for long periods of time without moving or being moved. Two hours is the maximum allowable time in one position for many patients/clients.

The blood supply to the tissues is reduced or cut off when tissue is compressed against bone for long periods of time; the tissue may die as a result. This may cause blue/black skin damage, which can appear like bruising on the skin.

It is important to recognise that superficial and deep tissue damage can occur to patients/clients who are unable to change their own position. This may mean that the damage you can see on the skin may also involve the deeper tissues.

Pressure and shearing is discussed in Module 3; you should review this material now.

This individual’s ulcer has deep damage caused by pressure and shearing.
Moisture-related skin damage

Moisture-related skin damage is often assessed as being due to pressure damage, but these are different things. There are two assessment tools that can help you to differentiate between them.

If patients/clients are incontinent and urine or faeces come into prolonged contact with the skin, the chemicals within the urine or faeces can cause the skin’s protective function to break down. This leads to areas of damage to the skin that are painful for the patient/client and which can be extensive. This is discussed in more detail in Module 3 – please review this material now.

The skin of the patient/client below has been in prolonged contact with urine and faeces. As you can see, the incontinence has caused damage to the skin: the upper layer has been destroyed to reveal the dermis.

This type of skin damage should be treated with foam cleansers. Soft wipes should be used, barrier creams applied and good-quality incontinence pants or pads worn. Caution should be used when applying to broken areas or in cases of sensitivity.

If a patient/client is consistently incontinent of urine for a prolonged period of time, specialist advice should be sought.

Severe moisture damage

The excoriation tool provides a guide to assessing skin that has been damaged by urinary and faecal incontinence. You can access it at:

www.tissueviabilityonline.com

Faecal collectors

Faecal collectors are occasionally used to avoid loose stools causing skin damage. A tube is inserted into the patient’s/client’s rectum to allow the diarrhoea to be collected in a bag. They should be prescribed only by a specialist and be used by people who are competent in their application. Faecal collectors are only effective in relation to collecting loose, not formed, stools, and can only be used for patients/clients who are bedbound.

In neonates and young children, a good-quality absorbent nappy or pad should be used and changed as soon as possible to reduce skin contact time.

Module 6: Learning Activity 1

Module 6: Learning Activity 1 involves revisiting material from Module 2, The Structure and Functions of the skin. Turn to Module 6: Learning Activity 1 in your workbook to complete this activity.
Skin inspection

As we have emphasised throughout this programme, all patients/clients should have their skin inspected when admitted to a care setting and at regular intervals during their treatment. You should review Module 4, Inspection and Care of the Skin, to make sure you are familiar with skin inspection techniques and processes.

Grading of pressure damage

The next step is deciding the following.

- What type of skin damage exists?
- Is the damage due to moisture, pressure, shearing, friction, or a combination?

The grading tool can help you answer these questions. The individual's history and the site of the skin damage will also help you to decide which type of skin damage has occurred. You can access this in full from the online toolkit at:

www.tissueviabilityonline.com

Grading of pressure ulcers is essential to:

- identify the level of skin and tissue damage present
- identify early damage to trigger treatment
- enable preventative equipment to be used appropriately
- assess the wound and apply appropriate dressings
- identify wound infection.

Grading of pressure damage

**Grade 1:** non-blanchable erythema of intact skin. Discolouration of the skin, warmth, oedema, induration or hardness may also be used as indicators, particularly on individuals with darker skin.

Grade 1 ulcers are sometimes hard to detect. To test the skin on an area of redness, apply finger pressure for 10 seconds and then stop. If the area turns white then red, the small local blood vessels are intact and functioning. If the skin remains red and does not change colour, the vessels are damaged: this is a Grade 1 ulcer.
Grade 2: partial-thickness skin loss involving epidermis, dermis, or both. The ulcer is superficial and presents clinically as an abrasion or blister.

Grade 2 ulceration is generally referred to as superficial damage. They can be caused by a number of factors such as pressure, shearing, friction and, in some cases, moisture.

Grade 2 ulceration can deteriorate if appropriate treatment is not initiated, so treatment which involves repositioning, pressure-redistributing supports, nutritional care and mobilising (if possible) should be implemented, in addition to an appropriate wound management regime.

Grade 3: full thickness skin loss involving damage to, or necrosis of, subcutaneous tissue that may extend down to, but not through, underlying fascia.

Grade 3 ulceration may be the result of prolonged unrelieved pressure, shearing and friction forces on the tissue. Tissue death can occur under the surface of the skin due to the impact of pressure and shearing on the blood vessels, which become damaged, resulting in local tissue being starved of oxygen and nutrients. Once this occurs, the tissue will change colour and begin to break down, which explains why we often see areas of yellow or black necrotic or dead tissue in deep pressure ulcers.

There is a risk of infection in patients/clients who have deep pressure ulceration due to the dead tissue and the fact that bacteria may be able to enter the wound and multiply.

The cornerstone of treatment for these patients/clients is the use of pressure-redistributing supports such as mattresses and seating cushions. Repositioning should take place at least every two hours. Appropriate dressings that can cope with wound fluid/exudate and which can be effective in a cavity wound should be used. Wounds should also be assessed for debridement by an expert to remove necrotic tissue and promote healing.

Attention should be paid to the fluid and dietary intake of the patient/client, and dietary supplements may be required.
**Grade 4:** extensive destruction, tissue necrosis, or damage to muscle, bone or supporting structures, with full-thickness skin loss.

As with Grade 3 pressure ulcers, there is a risk of infection due to the presence of dead tissue in the wound. Necrotic or sloughy tissue should be removed by an expert, if appropriate.

Repositioning should be carried out at least two hourly where possible, and pressure-redistributing supports such as a mattress or seating cushions should be used to assist in redistributing pressure. Where possible, it is helpful to remove all pressure from the affected area. On heels, it may be necessary to use specific pressure-reducing devices which allow the heel to be completely free of pressure.

As with all patients/clients with pressure ulceration, they must have appropriate medical care and adequate nutrition and hydration with the use of supplements guided by senior practitioners or the dietetic department.

**Unstagable:** A full thickness pressure ulcer where the wound bed is covered in slough or necrotic tissue. Until the sloughy/necrotic tissue is removed, the grade cannot be determined.

**Suspected deep tissue injury:** Purple or maroon localised discoloured area of intact skin or blood filled blister due to damage of underlying soft tissue. In individuals with darker skin deep tissue injury may be difficult to detect.

Debridement of wounds should only be undertaken by a skilled practitioner. When debriding heel areas, vascular assessment should be carried out to avoid the risk of infection and permanent limb damage. Debridement may not be a suitable option in patients who are dying.

As a general rule, the deeper the level of damage, the higher the grade of sore. It must be remembered, however, that a 2 cm ulcer on the heel may be reaching bone, and is therefore a Grade 4 ulcer, but that 2 cm of skin loss on a patient’s/client’s buttock may only represent a Grade 2 or 3.
Module 6: Learning Activity 2

In this learning activity you will be asked about the wounds in the following three images. You will have a number of questions to answer for each image. Turn to Module 6: Learning Activity 2 in your workbook and complete the activity. You will need to refer to the colour images in this reference book for your answers.

Module 6: Learning Activity 2 - Image 1

Module 6: Learning Activity 2 - Image 2
Module 6: Learning Activity 2 - Image 3

Summary

You have learned in this module how to grade pressure ulcers and about excoriation. Pressure ulcers and any open wounds are at risk of infection, primarily due to the fact that the skin has been damaged. Add to this the presence of dead or sloughy tissue and moisture and we can recognise that these wounds offer an ideal site in which bacteria can grow.

In Module 7, you will learn about the phases of wound healing and the fundamentals of wound management.

You have now completed Module 6. Please go to your workbook and complete the multiple choice questions for Module 6.
Module 7
Phases of wound healing and fundamental wound management

It might be useful to read over Module 2, The Structure and Functions of the Skin, to help you with this module.

Pressure ulcers are a type of chronic wound in the skin and tissues. A knowledge of wound healing can help you to treat the ulcers appropriately.

Learning outcomes

Before we move on, please take time to read the learning outcomes for this module. These will give you clear direction on what the module covers and the learning we hope will result from it.

By the end of this module, you will be able to:
• describe the main phases of wound healing
• discuss some of the factors that may delay healing
• demonstrate the ability to carry out a basic wound assessment
• be aware of the role of risk assessment tools
• demonstrate fundamental knowledge of wound healing products.
The wound healing process

The main aim of the wound healing process is to restore the area of damage to normal strength and function (or as normal as possible). The newly healed wound will not be as strong as before and will still be prone to damage.

Wound healing will not always be the ultimate aim for some patients/clients, particularly those nearing the end of life; instead, the aim will be to make life easier for the patient/client and improve his or her quality of life. Realistic goals should be set, involving the patient/client and carers.

The wound healing process can be affected by a number of external and internal influences, so it is essential that we assess the whole person when treating a patient/client with a wound.

Wounds are often divided into acute or chronic, and healing by primary intention or secondary intention (see below).

Acute wounds
Acute wounds are those that arise as a result of surgery or trauma. They most commonly have a relatively short, uneventful healing time. Some examples of acute wounds are shown below.

Burns are acute wounds but will heal slowly (like a chronic wound) because of the area and depth of tissue damage involved.

Chronic or long-term wounds
These are wounds such as pressure ulcers, leg ulcers, diabetic foot ulcers and malignant wounds. Chronic wounds tend to have prolonged healing times, are prone to episodes of infection, and may have increased levels of exudate due to prolonged inflammation. Again, examples are shown below.

Types of healing
Primary intention or primary closure refers to the healing of a wound in which the wound edges have been brought together by sutures, clips, staples or glue. Often there is minimal tissue loss and the healing process is relatively short.

Secondary intention healing refers to wounds that are open. These wounds may be deep and will heal from the bottom of the wound. Eventually, the wound edges will come together.
Module 7: Learning Activity 1

Consider patients/clients with wounds in your care setting in this activity. Turn to Module 7: Learning Activity 1 in your workbook to complete this activity.

Wound healing

The wound healing process can be divided into four main phases, which do not occur in isolation. This means that it is difficult to place a definite timescale on the sequence of events (Table 1). You should also note that the healing process may be much quicker among children.

Table 1 Stages and healing times

<table>
<thead>
<tr>
<th>Stage or phase of healing</th>
<th>Timescale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haemostasis (blood clotting)</td>
<td>Within approximately 10 minutes</td>
</tr>
<tr>
<td>Inflammation</td>
<td>Approximately 3–5 days</td>
</tr>
<tr>
<td>Proliferation</td>
<td>Approximately 28 days</td>
</tr>
<tr>
<td>Maturation</td>
<td>Up to 18 months</td>
</tr>
</tbody>
</table>

It is important to remember that the wound healing process will be slower in chronic wounds and in individuals who are ill.

Haemostasis (blood clotting)

Wounds caused by surgery or trauma are likely to bleed. When the skin is damaged, the body begins healing by creating a blood clot which will prevent too much blood being lost.

During this time, the body will send cells and chemical messengers to the area; these will help to start healing the wound.

Inflammation

The inflammatory phase of wound healing lasts approximately 3–5 days in acute wounds, but could take much longer in chronic wounds. The inflammatory phase begins as soon as the injury is sustained.

During inflammation, the body sends cells to the wound which help to digest bacteria (bugs), dead cells and ‘dirt’. The wound might appear red, swollen, hot and painful when this phase is taking place. These signs will be difficult to recognise in chronic (long-term) wounds.

Key cells will move to the wound to clear up the debris. White blood cells are among the important blood cells involved in this part of healing. They digest bacteria and dead cells to prepare the wound to heal.

Cells from the immune system are also involved in protecting the body from infection during the inflammatory phase.
You may witness a tissue called ‘slough’ appearing in some acute and chronic or long-term wounds during the inflammatory phase. This tissue is a combination of dead tissue and cells, white cells and bacteria.

Once wound debris and bacteria are removed by the white cells, the body can begin to grow new tissue. This next phase is called proliferation.

Individual with sloughy pressure ulcer on buttock.

**Proliferation**

The wound is filled with granulation tissue and is covered over with epithelial tissue (epithelium) during this phase.

New blood vessels grow at this time, allowing the body to produce tissue called granulation tissue. Again, chemical messengers are involved in starting this process.

A special cell called a fibroblast produces a substance called collagen. Collagen is one of the main building blocks of new tissue in the body. The newly formed blood vessels are able to deliver oxygen and nutrients to the healing tissues.

Once granulation tissue has filled the wound, new skin cells (epithelium) will grow across the surface. In the image above, you can see granulation tissue in the centre of the wound. The edges of the wound are closing as the new skin cells move across the wound surface.

When the cells have completely covered the wound, the tissue is able to prevent bacteria from entering.

The next stage of healing is called maturation, during which the body makes the wound stronger.

An individual with a healing wound. The wound base shows 100% granulation tissue. Some new epithelium is growing from the wound edge.
This wound shows epithelial cells moving across the surface to close the wound. There is red granulation tissue in the centre of the wound and the epithelial tissue is pink in colour.

**Maturation**

The maturation phase of wound healing may take up to 18 months to complete. It is sometimes known as the ‘remodelling’ phase of healing, during which the wound is strengthened and the scar will change colour.

Collagen bundles that were once laid down within the wound in an irregular fashion are now remodelled to form stronger, more organised layers. The blood vessels will decrease, which may leave the scar looking less red; in many cases, the scar appears ‘silver’ or white in colour.

An individual with a pressure ulcer on the heel. You can see the scar where the wound edges have come together. The scar tissue appears whiter than the surrounding skin.

**Module 7: Learning Activity 2**

In this learning activity you will be asked about the stages or phases of wound healing. Go to Module 7: Learning Activity 2 in your workbook to complete this activity.

**Factors that can affect healing**

Wound healing can be affected by a number of factors which may slow down or stop the process. This is a short reminder of some of the material covered in Module 3.

Some of these factors are internal (from within the patient/client), and some are external (outwith the patient/client).
Internal factors you should consider when treating a patient/client with a wound include:

- **age** – older individuals have slower healing due to changes within the skin which reduce blood and nerve supply
- **general poor health** – patients/clients with poor health are likely to have slower healing; conditions such as poor circulation, bronchitis, diabetes, anaemia and kidney disease can affect healing, as do many others, particularly those that limit mobility and cognitive function
- **nutritional status** – patients/clients with poor nutrition are likely to have slow healing, as the body requires extra energy and nutrients when a wound is healing
- **psychological influences** – patients/clients with wounds may experience anxiety (which has been shown to reduce healing rates) or depression, possibly due to the wound or its associated pain; they may be distressed by the smell and fluid from the wound and if dressings do not stay in place
- **drug therapy** – some medication, such as steroids, can slow down or prevent healing; it is important to know which medicines patients/clients are taking.

External factors that can affect healing include:

- **mechanical stress** – such as pressure, shearing or friction on the wound
- **equipment** – equipment should be appropriate for the patient/client to help maximise healing
- **social support** – some patients/clients may have little or no social support; this can affect their ability to care for themselves and their wound
- **wound care products** – it is important to use the correct products for the individual and for the wound to improve healing.

### Assessing a wound

The first step in treating a wound appropriately is to carry out an assessment of the patient/client and the wound.

Wound assessment should be carried out by a qualified nurse; however, all staff caring for patient/clients with wounds should be able to assess changes in wound status.

**Assessment of the wound should include the following:**

- the patient’s/client’s history
- the wound history (cause of the wound)
- the position or site of the wound
- the size of the wound (measure the area and depth, if possible)
- the type of tissue in the wound (this may be necrotic, sloughy, granulation and epithelialising).
How much fluid or exudate is coming from the wound?

You should ask the following.
• Is the wound leaking?
• Is the wound dry?
• Are the dressings wet when you remove them?

Assess the condition of the surrounding skin – the surrounding skin can be affected by moisture from the wound and can also be damaged by dressings which adhere strongly to the skin.

Assess the wound for signs of infection

The signs of infection include:
• raised temperature – the patient/client may have an increased temperature due to bacteria in the wound
• localised redness – the wound or the skin around the wound (2 cm margin) are red and hot to touch
• spreading redness – a large area around the wound is red and hot to touch (more than 2 cm from the wound edge)
• pain – the individual may feel an increase in pain in the wound when it is infected
• increased wound fluid – bacteria in a wound can cause the body to respond by producing more fluid
• pus – yellow/grey or green liquid which leaks from the wound and is the result of bacteria destroying the tissue in the wound
• wound breakdown – infected wounds may become wider or deeper and the healing process may be interrupted
• odour – some wounds will have a strong smell, often due to dead tissue and bacteria being present; this may be due to infection.
• Lack of signs of healing for two weeks may indicate local infection. A senior member of the team should be involved in assessing the wound if this is suspected

Module 7: Learning Activity 3

In this learning activity you will be asked about illnesses and other factors that are likely to affect healing. Go to Module 7: Learning Activity 3 in your workbook to complete this activity.

Wound dressings

Wound dressings are one part of the overall treatment but should not be considered the only treatment. Attention must be paid to the other needs of the individual, such as nutrition, hydration, medical care and pressure ulcer prevention.

A large number of wound dressings are available, and no one dressing can be used on all wound types. It is important to be able to decide what the patient/client and the wound needs, and to use dressings that meet these needs.

It is important to use dressings that reduce the risk of damage to the skin surrounding the wound. Harsh adhesives can cause damage when removed without due care.

Choosing a dressing will also depend on the dressings that are available through local formularies and local guidelines on use.
The properties of an ‘ideal’ dressing are shown in Table 2.

<table>
<thead>
<tr>
<th>Table 2 Properties of the ideal dressing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceptable to the person.</td>
</tr>
<tr>
<td>Creates a warm, non-toxic, moist environment that is conducive to healing.</td>
</tr>
<tr>
<td>Prevents cross infection.</td>
</tr>
<tr>
<td>Reduces pain by excluding air from exposed nerve endings.</td>
</tr>
<tr>
<td>Controls and contains wound fluid and leakage.</td>
</tr>
<tr>
<td>Minimises odour.</td>
</tr>
<tr>
<td>Protects the surrounding skin and does not cause pain on removal.</td>
</tr>
<tr>
<td>Protects exposed tissue from mechanical trauma.</td>
</tr>
<tr>
<td>Improves quality of life.</td>
</tr>
<tr>
<td>Is conformable.</td>
</tr>
<tr>
<td>Is non-allergenic.</td>
</tr>
<tr>
<td>Is cost-effective.</td>
</tr>
</tbody>
</table>

Commonly used wound dressings

**Alginate dressings**

Alginate dressings are based on seaweed compounds which gel when they come into contact with wound fluid.

The dressings are soft and conformable and can be placed onto flat wounds such as leg ulcers. They are also available as ribbon dressings or rope that can be layered into cavity wounds.

Alginate dressings are normally applied to wounds that have medium to high levels of wound fluid. Once they gel, they can help to remove sloughy tissue from the wound bed.

**Alginate flat dressing.**

**Alginate ribbon dressing.**

Although the dressings will vary in how they perform in the wound, the general principles of alginate dressings are the same.
Hydrofiber dressings

Hydrofiber dressings are based on hydrocolloid material, which also gels when in contact with wound exudate.

Hydrocolloids are made of natural substances (synthetically produced) that create an ideal environment for healing.

Hydrofiber dressings are available as flat dressings and rope or ribbon. As with alginates, hydrofiber dressings can be used on medium to heavily leaking wounds and can also help to hydrate sloughy tissue.

Hydrogel dressings

Hydrogel dressings contain a high amount of water. They can be applied to wounds that have low moisture levels or which have dry necrotic tissue present.

Hydrogels are available as gels or as sheet dressings. The type of hydrogel used will depend on the wound type, position and level of fluid leakage.

Hydrogel dressings can help to add water to dry tissue and help removal of this tissue from the wound bed.

Foam dressings

Foam dressings are designed to help absorb fluid from wounds and maintain a warm, moist wound healing environment under the dressing. In many cases, foam dressings are used in conjunction with other products such as hydrogels or alginates.

They are available as flat pads without adhesive borders, so require tape or bandages to stay in position. They are also available with adhesive borders which help to maintain their position on the wound.

A new range of dressings with soft silicone technology is also available. These products have much less-harsh adhesives, which are less damaging to the surrounding skin.
Film dressings

Transparent film dressings are non-absorbent dressings that can be used over intravenous sites, on superficial wounds or as a fixative for other dressings.

Low-adherent contact layers

The use of silicone contact layers to line wounds and prevent dressings sticking to them is now more common. Reduction of pain is one of the key reasons for using such products.

Hydrocolloids

Hydrocolloid dressings are based on cellulose and pectin, which are natural products. They combine to form a dressing used mainly for low- to medium-exuding wounds. Hydrocolloids can also help to hydrate and remove sloughy tissue. The dressings are highly conformable and are able to mould to awkward areas. Muslim or Jewish patients/clients may not be able to use hydrocolloid dressings that are based on porcine products.

Charcoal dressings

Dressings that contain charcoal are used primarily to reduce odour by filtering malodorous compounds from the wound fluid. Some of the dressings also contain silver, which can help to kill bacteria in the dressing.
Super-absorbent dressings

Highly absorbent non-adhesive dressings designed to adsorb and retain fluid. Should be used on wounds which have moderate to high levels of exudate.

Topical negative-pressure wound therapy

Some areas will use topical negative-pressure dressings to speed up the healing process, in particular when wounds are large in size and leakage is high.

Topical negative-pressure suction therapy removes fluid from the wound and stores it in a sealed canister. It also encourages healing and reduces odour.

Topical negative-pressure wound therapy should be prescribed by a specialist nurse or doctor.

Antimicrobial dressings

Antimicrobial dressings are used when wounds are infected or contain sufficient bacteria to stop the healing process.

If the signs of infection are present, antimicrobial dressings can be used to reduce the levels of bacteria and help to restart healing.

Antimicrobial dressings include:

- silver dressings
- honey dressings
- Polyhexamethylene Biguanide (PHMB)
- iodine dressings.

There are other types of dressings you may see used in practice, such as protease-modulating dressings; these have very specific functions. It may be useful to speak to your tissue viability nurse or a more senior member of the health care team about these products. You may also see:

- larvae or maggots, for removing dead tissue
- laser therapy, which can speed healing in some wounds.
Protecting the surrounding skin

It is also important to observe and report changes in the surrounding skin when dressing the wound, as this may become damaged due to fluid leaking from the wound or from removal of adhesive dressing products. Using some warm water or adhesive remover can help to dissolve the adhesive and make removal easier.

Barrier preparations can be applied to protect the skin before adhesive dressings are used.

Pain in pressure ulcers

Patients/clients with a pressure ulcer may experience pain due to the ulcer and also when the dressing is changed. They should have appropriate medication at all times to minimise pain, especially prior to dressing changes. If you utilise a pain assessment tool in your care setting, this can help you to gauge the level of pain a patient/client is experiencing. Pain should be assessed before, during and after wound care is carried out, and at other times of the day and night.

Key points

- The wound healing process in some wounds is straightforward and relatively fast (average of two weeks).
- Healing is sometimes slower in chronic or long-term wounds due to other health problems and poor nutritional state.
- Wound assessment techniques and wound assessment tools should be used to underpin treatments used.
- Dressing selection should be based on the wound assessment, tissue type, exudate level, and the presence or absence of infection. The patient/client should be involved in the decision.
Module 7: Learning Activity 4

This learning activity concerns George who has been admitted to your care setting with a pressure ulcer on his sacrum. The pressure ulcer looks like this (see below). Turn to Module 7: Learning Activity 4 in your workbook to complete this activity.

Module 7: Learning Activity 5

In this learning activity you will be asked to choose an individual in your care and answer questions about their wound. Turn to Module 7: Learning Activity 5 in your workbook to complete this activity.

Summary

This module has been about the assessment and management of wounds you may see in practice. Central to caring for patients/clients with pressure ulcers is the need to accurately identify and grade the ulcer and begin appropriate treatment.

In Module 8, we will address some of the issues associated with wound infection and look at how we can help prevent cross infection.

You have now completed Module 7. Please go to your workbook and complete the multiple choice questions for Module 7.
Infection control issues are crucial in relation to pressure ulcers, and this final module will provide you with the basic information you need to be able to protect individuals from the risk of infection.

The presence of bacteria in a pressure ulcer does not necessarily mean that an infection is present, as bacteria are often harmless. Some bacteria will, however, have the potential to cause infection; these potentially pathogenic bacteria may seriously threaten individuals’ health and wellbeing, diminish their quality of life, delay the wound healing process, and present significant challenges to health care staff.

The module provides an introduction to the issues involved in the prevention and control of infection in relation to pressure ulcers. If you want more information, please visit the websites you’ll find cited in the text.

**Learning outcomes**

Before we move on, please take time to read the learning outcomes for this module. These will give you clear direction on what the module covers and the learning we hope will result from it.
By the end of this module, you will be able to

• identify the association between pressure ulcers and infection and/or colonisation
• describe measures that assist in the prevention and control of infection
• understand the need to adopt standard infection control precautions at all times

Chain of infection

It is essential that you understand how to prevent and control infection. First, however, you need to understand what infection is, how it occurs and how it can be spread.

Several things have to take place for an infection to occur. This sequence of events is commonly known as ‘the chain of infection’.

![Chain of Infection Diagram]

Each link in the chain is connected to the others. If the chain isn’t broken at any point, there is an increased chance of an infection occurring. The above diagram clearly shows the six links.

You have a key role to play in making sure that you break the links (and thereby break the chain of infection) to protect others and yourself during care activities. We will discuss how infection can spread and what measures should routinely be taken to protect others later in the module.

Definition

You may hear the following terms being used when staff talk about pressure ulcers or other wounds, and it is important that you can understand what each means.

Colonisation

Colonisation is generally used to describe the presence of bacteria in tissues and surfaces of the body where they multiply but do not cause unwanted effects. No signs of infection are present in colonised pressure ulcers and healing may continue to take place.
Some patients/clients could be colonised in other areas of the body, such as the nose, throat, axilla, groin and perineum, by the same bacteria as the pressure ulcer. Should a swab be taken from a colonised site, the laboratory results may indicate that specific bacteria are present. In the absence of clinical signs of infection or delayed healing, however, the prescription of an antibiotic is unlikely to be advised at this stage.

Colonisation of a pressure ulcer nevertheless poses a potential threat to the patient/client when bacteria multiply to such a level that they begin to affect healing or invade other body sites. It will then be important to observe the patient/client for local and/or general signs of infection.

**Infection**

Infection is generally used to describe the presence of bacteria in tissues and surfaces of the body where they multiply and cause unwanted effects, such as delaying the healing process.

In relation to pressure ulcers, the effects of infection may include redness of the surrounding skin, swelling, pain, high temperature, increased moisture, pus, discoloured tissue and/or a strong smell. The individual may feel unwell and require additional prescribed treatment, such as antibiotics.

If you notice signs of an infection or are concerned in any way, it is important that you discuss this with the appropriate person, such as the person in charge. A decision may be taken to take a bacterial swab for analysis and appropriate antibiotics may be prescribed. If antibiotics are prescribed, it is very important that these are given at the correct time of day and the course is completed. It is also important that accurate records of the patient’s/client’s condition and management are kept.

We will look at the signs of infection in more detail later in the module.

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**Bacteria and infection**

Bacteria are all around us all of the time, on our body, in our food and in the environment, but our body’s immune system and unbroken skin protects us from harm. If the immune system does not work properly and/or the skin is broken, harmful bacteria can enter a body site where they do not normally live; once there, they can multiply and produce infection.

**What conditions do bacteria need to survive?**

Bacteria are the first link in the chain of infection – the ‘infectious agent’. But like all living things, bacteria need the right conditions to grow and multiply.

- **They need:**
  - nutrients or food – such as the dead tissue in an ulcer or wound
  - oxygen – available from the air, although some bacteria do not need oxygen to survive
  - warmth – a body temperature of 37ºC is ideal for bacteria to grow in
  - moisture – bacteria thrive in moist environments
  - time – bacteria can multiply if left.

Unfortunately, pressure ulcers and other wounds offer all of these vital life-support sources for bacteria.
Where are bacteria commonly found?
The areas where bacteria are commonly found are referred to as ‘reservoirs’, the second link in the chain of infection. Bacteria can be found in sinks, on toilet door handles, on keyboards, in wash bowls and even in flower vases, and are also in the environment in skin scales that have been shed by people. A clean, dry environment is therefore required to help prevent the spread of infection.

Patients/clients, staff and/or visitors can be ‘reservoirs’, and bacteria can be present on their skin, particularly their hands, and, for example, in their stomach and respiratory tract.

How do bacteria exit the body?
The third link of the chain of infection is the ‘portal of exit’. This is the means by which bacteria leave the body on, for example, skin scales and in body fluids such as diarrhoea, pus, vomit and blood. Anyone who comes into contact with these can pass the bacteria onto others.

Individuals who have an infection must have their ulcers covered with an occlusive dressing (one that seals the wound from air or further contamination) and possibly an antimicrobial dressing to prevent bacteria from spreading. We must remember that the pressure ulcer is a reservoir for bacteria and is therefore a risk not just for the individual, but also to other people if good infection control measures are not followed.

How do bacteria spread?
The bacteria need some way of getting from where they exit the body into another entry point. This is the fourth link in the chain of infection – the ‘mode of transmission’. Bacteria can spread (or be ‘transmitted’) through a variety of means, such as in food, through the air, on health care equipment, through broken skin, via pests and on hands.

How can we prevent the spread of bacteria?
Nine core infection control measures/actions that should be used by all health care workers in the care of all individuals all of the time have been published by Health Protection Scotland. These are known as Standard Infection Control Precautions (SICPs), and they are designed to reduce the chances of spreading infection from one person to another.

In addition, in some circumstances, additional infection control precautions may be required. These are referred to as transmission-based precautions (contact precautions) and are enacted in the event of, for instance, MRSA being identified in a pressure ulcer. The implementation of these extra precautions will depend on the needs of the patient/client, the care setting, the infectious agent and the procedures and activities being undertaken. Further information can be obtained from your local infection control policies and infection control advisor.

SICPs consist of:
- Patient Placement/Assessment for Infection Risk
- Hand Hygiene
- Respiratory and Cough Hygiene
- Personal Protective Equipment (PPE)
- Safe Management of Care Equipment
- Safe Management of the Care Environment
- Safe Management of Line
- Safe Management of Blood and Body Fluids Spillages
- Safe Disposal of Waste (including sharps)
- Occupational Safety: Prevention and Exposure Management (including sharps).
NHS Education for Scotland have developed an education resource - *Preventing Infection in Care at Home* in the format of an app and pocket booklet. Familiarise yourself with SICPs by accessing this educational resource on the NES website at

www.nes.scot.nhs.uk/hai

Further information regarding SICPs can be found in the National Infection Prevention and Control Manual at http://www.nipcm.scot.nhs.uk/

**Your 5 moments for hand hygiene**
One of the single most important ways of preventing the spread of infection is by carrying out regular and thorough hand hygiene and should be applied in all healthcare settings:

1. **Before touching a patient**
   *When?* Clean your hands before touching a patient when approaching him/her.
   *Why?* To protect the patient against harmful germs carried on your hands.

2. **Before clean/aseptic procedure**
   *When?* Clean your hands immediately before performing a clean/aseptic procedure.
   *Why?* To protect protect the patient against harmful germs, including the patient’s own, from entering his/her body.

3. **After body fluid exposure risk**
   *When?* Clean your hands immediately after an exposure risk to body fluids (and after glove removal).
   *Why?* To protect yourself and the healthcare environment from harmful patient germs.

4. **After touching a patient**
   *When?* Clean your hands after touching a patient and her/his immediate surroundings, when leaving the patient’s side.
   *Why?* To protect yourself and the healthcare environment from harmful patient germs.
5 After touching patient surroundings

When? Clean your hands after touching any object or furniture in the patient’s immediate surroundings, when leaving – even if the patient has not been touched.

Why? To protect yourself and the healthcare environment from harmful patient germs.

How do bacteria enter the body?
The fifth link in the chain of infection is a means (portal) of bacteria entering the body – the ‘portal of entry’. Bacteria can enter the body through:

- ingesting contaminated food or fluids
- medical or surgical procedures that involve contaminated medical devices or infected blood or blood products
- breathing in bacteria through the nose and air passages
- breaks in the integrity of the skin and soft tissues, as is the case with cuts or pressure ulcers.

As we’ve seen earlier in this module, the skin acts as a protective barrier to the body to prevent the entry of bacteria. Pressure ulcers are open wounds which provide suitable conditions in which bacteria can thrive. Pressure ulcers are therefore vulnerable to bacteria entering, surviving and multiplying within them, initially colonising the ulcer but possibly progressing to local or generalised infection. You will recall that this may delay or prevent wound healing or cause the patient/client to become generally unwell.

Who is at risk of developing an infection?
The very young, older people, particularly those who are hospitalised, and those with open wounds or medical conditions that affect their immune system are at increased risk of developing an infection. We call such individuals ‘susceptible hosts’, the sixth link in the chain of infection. If bacteria enter the bodies of these susceptible hosts and multiply, an infection is likely to develop.

To summarise...

All pressure ulcers will have some bacteria in them, but as we’ve seen, that doesn’t automatically mean they will cause an infection or prevent the ulcer healing. You will remember that we discussed colonisation, where bacteria multiplies in the wound but does not cause any local or general signs of infection and the wound continues to heal, earlier in the module.

Local infection is when the ulcer shows signs of infection, such as redness, swelling and pus, and the individual may complain of pain. The skin surrounding the ulcer may also appear red.

Spreading/systemic infection is when the infection has moved beyond the ulcer edges and is affecting the surrounding skin. The individual may feel unwell, may have a high temperature and will require immediate antibiotics. Any signs of spreading infection should be recorded and reported immediately to the person in charge and to medical staff, where appropriate, for reassessment.
There are a number of features to look out for when assessing an ulcer for signs of infection:

- **redness** – this can sometimes be seen on the skin around the ulcer
- **heat** – you can feel heat coming from the ulcer and surrounding skin
- **pain** – the individual may find the ulcer extremely painful
- **swelling** – you may see swelling around the ulcer
- **loss of function** – the individual may find it difficult to move the affected area
- **high temperature/pyrexia** – the individual may have a high temperature
- **more ulcer fluid (excess exudate)** – there may be an increase in ulcer fluid as the body tries to fight the infection; the fluid may also become thicker and yellow in colour (pus)
- **odour or smell** – the ulcer may start to smell when infected
- **tracking** – you may see red lines coming from the ulcer; this shows that the infection is spreading through the tissues
- **cellulitis** – a large area around the ulcer becomes swollen and red as a result of infection
- **lack of healing** – the healing may stop or slow down because of the infection; some bacteria can cause an ulcer to break down by destroying the new tissue that has grown.

This Grade 4 pressure ulcer has sloughy and necrotic (dead) tissue in the base. Around the outside of the ulcer is a red cellulitis, which would point to infection being present. The individual was in a great deal of pain and required regular pain killers. This ulcer produced a large amount of foul-smelling fluid.

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**Module 8: Learning Activity 1**

This learning activity concerns the chain of infection. Turn to Module 8: Learning Activity 1 to complete this activity.

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**Module 8: Learning Activity 2**

This learning activity concerns the Standard Infection Control Precautions. Turn to Module 8: Learning Activity 2 to complete this activity.

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**Module 8: Learning Activity 3**

This learning activity involves locating the infection control policies in your own workplace. Turn to Module 8: Learning Activity 3 to complete this activity.
Reducing the risk of infection

There are a number of ways you can help to reduce the risk of ulcer infection:

- performing effective hand hygiene is the most important thing you can do to help stop the spread of infection; make sure you perform hand hygiene before and after caring for an individual
- putting on PPE, such as disposable gloves and aprons, before caring for a person with a pressure ulcer; hand hygiene should always be performed before putting items of PPE on and after taking them off
- reducing the amount time that ulcers are exposed by, for example, not removing dressings unless you need to and always having the new dressing to hand when changing the dressing
- reducing the risk of introducing bacteria to the pressure ulcer by using an aseptic technique when cleaning the ulcer and changing the dressing, and by stressing to the individual how important it is that he or she does not touch the ulcer
- reducing the risk of spreading infection by cleaning or decontaminating equipment before and after use (according to local protocol) and by disposing of all old dressings and other materials in the appropriate clinical waste bin before performing hand hygiene.

NES have developed an educational Aseptic Technique programme for healthcare staff. The module on wound care can be accessed online at:


Treatment of a pressure ulcer infection

In some cases, a wound swab will be sent to the laboratory to find out which type of bacteria is causing the infection. This can allow the correct antibiotics to be given, if required.

The treatment of the ulcer will depend on the stage of infection present:

- if the ulcer stops healing and it is suspected that an infection is developing, a dressing that can reduce the bacteria in the ulcer may be applied; dressings with silver, iodine and honey are commonly used for this purpose
- treatment for local infections may include antibiotics and a dressing that can reduce the numbers of bacteria in the ulcer
- where there is spreading/systemic infection, the individual is at risk and may require admission to hospital, intravenous antibiotics and review by medical staff; he or she will also need dressings that can reduce the amount of bacteria in the ulcer.
Case study example
A 62-year-old lady with multiple sclerosis and reduced mobility and who is wheelchair bound has over some weeks refused to allow her elderly, frail husband to transfer her to bed at night time.

She came to the attention of the GP when her husband called to say that she was complaining of feeling unwell and having pain over her buttocks.

On examination it was noted that she had a pressure ulcer on her sacrum. The tissue was necrotic and sloughy with a small amount of granulation (see image below).

Some of the necrotic (dead) tissue was removed by the tissue viability nurse. An antimicrobial dressing, which can reduce the level of bacteria in the ulcer was applied.

After one week, the ulcer had improved (see image below). There was less necrotic (dead) tissue present and the redness on the surrounding skin was much reduced.

Following a further week of treatment with the antimicrobial, the ulcer bed had filled with granulation tissue and there were no signs of infection.
Module 8: Learning Activity 4

This learning activity concerns the prevention of pressure ulcers becoming infected. Turn to Module 8: Learning Activity 4 to complete this activity.

Module 8: Learning Activity 5

This learning activity concerns the changes you may see in an infected ulcer. Turn to Module 8: Learning Activity 5 to complete this activity.

You can access information on other NHS Education for Scotland educational packages relating to the reduction of healthcare associated infection at:

www.nes-hai.info

And finally...

You have now completed The Prevention and Management of Pressure Ulcers. Well done!

You may now find it useful to revisit the learning outcomes for the programme and reflect on what you have achieved by working through the workbook.

You will find the workbook useful for future reference. You may also wish to keep it in your professional development portfolio as it will help you demonstrate your learning and your commitment to providing quality care.

Please return this reference book to a safe place so that others may use it to work through the programme and complete their own workbooks.
Glossary

30 degree tilt
When the patient is placed in the sideways tilted position supported by a pillow, with the pelvis (hips) at a 30 degree angle with the support surface.

Antibiotic
A chemical substance produced by a microorganism which has the capacity, in dilute solutions, to inhibit selectively the growth (static) of microorganisms or to kill (cidal) them.

Aseptic technique
Technique used to prevent cross infection of wounds by minimising wound contact, using sterile solutions and sterile wound dressings.

Bacteria
Microorganisms which can live normally on the human body but which can cause infection if allowed to multiply in, for example, a wound.

Barrier cream
A preparation to protect the outermost layer of the skin from contaminants.

Best practice statements
Statements of best practice focus on specific aspects of care. They are usually developed after wide consultation, taking into account a broad range of views from health professionals.

Blanching
The skin whitening that occurs when pressure is applied, indicating that microcirculation is intact.

Braden Risk Assessment Tool
A tool devised by Braden and Bergstrom which calculates a person’s risk of developing a pressure ulcer.

Care bundles
A care bundle is a structured way of improving the process of care and patient outcomes.

Cellulitis
Inflammation and infection of the cells, associated with redness, heat, swelling and pain.

Collagen
A substance found in human tissue which provides structure and support within the tissue. Collagen is required for wound healing.

Colonisation
Multiplication of organisms in a wound with no host reaction. ‘Critical colonisation’ is the situation in which host defences cannot maintain the balance of organisms in a wound.
**Debridement**
The removal of dead or contaminated tissue by surgical (scalpel, scissors), chemical or enzymatic means, larval therapy, or through autolysis (a process in which the body’s own enzymes break down, or ‘lyse’, dead [or de-vitalised] tissue).

**Decontamination**
The act of deep cleaning of equipment to kill bacteria to prevent cross infection.

**Erythema**
Non-specific redness of the skin that can be localised or general in nature, as seen in inflammation surrounding wounds, or in areas where prolonged pressure has closed off the local blood supply resulting in inflammatory changes. It may be associated with cellulitis or reactive hyperaemia.

**Extrinsic**
Factors that are external or outside, for example the surface a person lies on.

**Excoriation**
Damage to the skin caused by urine, faeces or wound exudates, resulting in painful, red, superficial skin damage.

**Exudate**
Clear fluid that has passed through the walls of a damaged or overextended vein and which varies from a thin watery to a thick sticky fluid, depending upon the condition of the wound. Often contains growth factors when a wound is acute, and may contain bacteria and dead white cells when the wound is chronic. Bacteria indirectly cause permeability of the vein wall and this results in increased exudate production.

**Fibroblasts**
A key cell involved in wound healing which lays down collagen within a healing wound.

**Glamorgan Paediatric Pressure Ulcer Risk Assessment Scale**
A pressure ulcer risk assessment scale for children based on statistical methods and patient data.

**Infection**
The presence of multiplying bacteria in body tissues, resulting in the spread of cellular injury. This would be apparent from any one or more of the classical signs of inflammation: erythema, heat, swelling, and pain.

**Intrinsic**
Factors that are internal, or present within the individual, such as other conditions or illnesses the person may have.

**Inflammation**
The phase of the wound healing process where the body clears debris and bacteria from the wound by sending white cells and other key cells to the wound site.

**Maturation**
The phase of wound healing where the wound is strengthened with collagen synthesis.
**Multidisciplinary pathway**
Utilising all health care professionals appropriate to the patient’s/client’s needs.

**Neonate**
Infant in the first four weeks after birth.

**Non-blanching erythema**
There is no skin colour change when light finger pressure is applied.

**Non-perfumed moisturiser**
An emollient that is fragrance-free.

**NSRAS**
Neonatal Skin Risk Assessment Scale.

**Overlay**
A thin mattress used over the top of the patient’s/client’s existing mattress. Overlays can either be static or dynamic. Static mattresses can be constructed from materials such as foam or fibre. Static overlays are mainly indicated for the provision of comfort and prevention of pressure ulcers in low- to medium-risk patients. Alternating overlays are indicated for patients who are at medium- to high-risk.

**Preliminary Pressure Ulcer Risk Assessment (PPURA)**
PPURA can be used at the point of admission to a care area and can also be incorporated into the daily regime of patients/clients who are not identified to be at risk.

**Pressure-redistributing product**
Any product, mattress, bed or cushion which can reduce pressure on at-risk areas by redistributing or altering the surface area on which the person rests.

**Proliferation**
The phase of the wound healing process where the body fills the wound with new granulation tissue and the wound is covered with epithelial tissue.

**Psychosocial**
Involving both psychological and social aspects.

**Reactive hyperaemia**
The characteristic bright flush of the skin associated with the release of pressure – a direct response of incoming arterial blood.

**Repositioning**
Changing the position of a person to effect pressure reduction by moving them off an area at risk of damage.

**Rete pegs**
Projections of epidermis reaching into the dermis which help prevent damage due to friction.
**Risk assessment tool**
A tool which looks at the risk factors of a person and calculates his or her risk of developing a pressure ulcer. This will include assessing nutritional state, general health and mobility.

**Sebum**
A substance secreted by glands in the skin which helps to moisten and protect the skin.

**Slough**
A mixture of dead white cells, dead bacteria, rehydrated necrotic tissue and fibrous tissue. Can be ‘soft’ slough and easily cleaned away or fibrous slough, which can resist even sharp debridement.

**Specialist mattress**
A mattress which is designed to reduce pressure on at-risk areas. Normally these are low air loss or alternating pressure systems. This may be an overlay which rests on tops of the normal mattress or a full mattress replacement which is used instead of the mattress.

**Specialist bed**
This is a bed which may have a pressure-redistributing mattress in situ and has hydraulic movement available to assist in repositioning the patient.

**Systemic**
Referring to the whole of the body rather than one component.

**Waterlow Risk Assessment Tool**
The risk assessment tool developed by Judy Waterlow which calculates the risk of a person developing a pressure ulcer.
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This resource may be made available, in full or summary form, in alternative formats and community languages. Please contact us on 0131 656 3200 or email altformats@nes.scot.nhs.uk to discuss how we can best meet your requirements.