Best Practice Statement ~ March 2010

Skincare of patients receiving radiotherapy
NHS Quality Improvement Scotland is committed to equality and diversity. We have assessed this Best Practice Statement for likely impact on the six equality groups defined by age, disability, gender, race, religion/belief and sexual orientation. For a summary of the equality and diversity impact assessment, please see our website (www.nhshealthquality.org). The full report in electronic or paper form is available on request from the NHS QIS Equality and Diversity Officer.

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Introduction

NHS Quality Improvement Scotland (NHS QIS) leads the use of knowledge to promote improvement in the quality of health for the people of Scotland and performs three key functions:

- providing advice and guidance on effective clinical practice, including setting standards
- driving and supporting implementation of improvements in quality, and
- assessing the performance of the NHS, reporting and publishing the findings.

In addition, NHS QIS also has central responsibility for patient safety and clinical governance across NHSScotland.

Updated statement

Following a scoping exercise conducted by the Cancer Care Research Centre at the University of Stirling to review the best practice statement on the skincare of patients receiving radiotherapy, NHS QIS commissioned the update of this document (the first version was published in April 2004). It has been developed in collaboration with a network of nurses and allied health professionals involved in the management of skincare of patients receiving radiotherapy. A multidisciplinary reference group has advised the network.

The importance of patient involvement in the development of clinical guidelines has been highlighted. Two patient advisory groups consisting of people who have experienced or are currently experiencing skincare associated to their radiotherapy treatment contributed to the development of this updated best practice statement and this is evidenced throughout the document.

Key principles of best practice statements

A series of best practice statements has been produced within the Directorate of Implementation and Improvement Support of NHS QIS, designed to offer guidance on best and achievable practice in a specific area of care. These statements reflect the current emphasis on delivering care that is patient-centred, cost-effective and fair. They reflect the commitment of NHS QIS to sharing local excellence at a national level.

Best practice statements are produced by a systematic process, outlined overleaf, and underpinned by a number of key principles.

- They are intended to guide practice and promote a consistent, cohesive and achievable approach to care. Their aims are realistic but challenging.

- They are primarily intended for use by registered nurses, midwives, allied health professionals, and the staff who support them, but will also be of relevance to medical professionals.

- They are developed where variation in practice exists and seek to establish an agreed approach for practitioners.

- Responsibility for implementation of these statements rests at local level.

Best practice statements are periodically reviewed, and, if necessary, updated in order to ensure the statements continue to reflect current thinking with regard to best practice.

This best practice statement is accessible electronically via the NHS QIS website (www.nhshealthquality.org).
Supporting implementation
Comments on best practice statements are very much welcomed. We are always keen to hear from anyone who has been involved with using the statements in their own area of practice. In particular, we would like to hear about specific successes or challenges relating to implementation and impact on quality of care provision.

Any information provided will be used to inform the next review of the statement.

Please forward any comments to: qis.bestpracticestatements@nhs.net

Privacy note: We will only use your email details to reply to your comment. Your address will not be passed on to any third parties.
Key stages in the development of best practice statements

1. Establish working group.
2. Topic selection and scoping process.
4. Review literature on topic. Source grey literature. Ascertain current policy and legislation. Seek information from manufacturers, voluntary groups and other relevant sources.
5. Establish reference group to advise on consultation drafts.
6. Determine focus and content of statement. Review evidence for relevance to practice. Determine how patients’ views will be incorporated.
8. Review and revise statement in light of consultation comments.
10. Feedback on impact of statement is sought/impact evaluation.
Best practice statement: Skincare of patients receiving radiotherapy

Cancer incidence
It is anticipated that 33,500 people will be newly diagnosed with cancer per annum by 2010-2014. This is an increase of approximately 28% over the last four years. The expected increase in cancer incidence is due, in part, to the increased proportion of older people in the population.

Scotland, along with the rest of the UK, has an ageing population. Cancer is more common in later life. Around one-third of all cancers are diagnosed in people over 75. Currently these individuals form only around 7% of the population, but between 2000-2031, the number of people aged over 65 is expected to rise from 787,000 to 1,200,000; and those aged over 85 from 84,000 to 150,000. Age is an important factor as comorbidities increase with age and skin regeneration is affected by age.

Radiotherapy
In the context of current treatment methods and practice, approximately half of those diagnosed with cancer will receive radiotherapy at some stage of their illness. Radiotherapy can be for the curative or palliative treatment of cancer and is often delivered in combination with chemotherapy treatment.

Radiotherapy, along with surgery and chemotherapy, is a major modality in the management of cancer. Most commonly, radiotherapy is delivered by a linear accelerator with the beam directed to the tumour. This is termed external beam therapy and accounts for more than 95% of all radiotherapy delivered to cancer patients.

Radiotherapy and skincare
All patients receiving external beam radiotherapy are at risk of skin damage. It is essential that this damage is minimised as far as possible and where skin damage does occur, staff should take steps to minimise further damage and promote effective healing. This best practice statement is one way of supporting easy access, for patients and staff, to evidence-based guidance.

There are a few randomised controlled trials to evaluate prophylactic skincare procedures and a few relating to the treatment of radiation damaged skin. The guidance provided within this best practice statement has been drawn from robust and reliable research evidence which has been published. However, where such evidence does not exist, it has relied on expert consensus from specialists within each of Scotland’s cancer centres and other stakeholders.

This statement identifies best and achievable practice that is patient-centred. Implementation of the statement will promote comparable standards of care for patients wherever and from whomever they access the service, ie in the community, in hospitals and specialist cancer centres. For the purpose of this document, the term ‘cancer’ encompasses leukaemias and lymphomas as well as solid tumours.

Anatomy and physiology of the skin
The skin is the largest vital organ in the body. It has five main functions: protection; temperature regulation; sensory perception; excretion; and vitamin production. Regeneration of the skin is a normal physiological process which takes approximately 28 days, but with advancing age can take longer.

The skin has two main layers: the outer epidermis and the underlying dermis. The epidermis is comprised of 5 layers. The epidermis constantly produces new cells (stem cells), which have a major role in forming new epithelial tissue. This happens through a process of proliferation, maturation, cell division and destruction. The process commences at the innermost basal cell layer (stratum germinativum) and progresses to the outer layer (stratum corneum). In their migration the cells from the basal cell layer lose their nuclei and gradually push to the skin surface as keratinocytes.
Keratinocytes are surrounded by a lipid layer, which protects the surface of the skin against water loss and helps maintain the skin in a soft, supple and odour-free state. Together with water, salt and oil from the underlying sweat and sebaceous glands, the skin is maintained at pH 5.5. The surface keratinocytes flatten, dehydrate and eventually shed as dead cells, thus starting the entire process all over again. Keratinocytes also secrete a variety of cytokines in response to tissue injury or in certain skin diseases. They therefore have a role to play in immune function, cutaneous function and tissue repair. The basal cell layer also contains melanocytes, which protect against ultraviolet irradiation.

The underlying dermis is comprised of a matrix of collagen and elastin (connective tissue), hair shafts, blood vessels and sebaceous glands. The upper layer of the dermis is ridged, valleyed and meshed, and the underlying surface of the epidermis is pitted; this provides a large surface area where the two join together (Rete ridges). As ageing progresses, the ridges flatten giving rise to increased risk of skin tears.

Some patients may have underlying skin conditions such as psoriasis or eczema. It is therefore important to identify what is the normal condition for each individual and devise the care plan accordingly. Patients with underlying skin conditions may need an urgent referral to a dermatologist for advice with regard to medication prior to commencing radiotherapy treatment.

How radiotherapy affects the skin

The biological effect of radiation commences with the absorption of energy from ionising radiation. Radiobiological damage affects regeneration of the skin and the process of repair, redistribution, repopulation and reoxygenation. The inflammatory response activated is a normal physiological response to radiation therapy. Despite improved delivery techniques, healthy tissue within the radiation treatment area may still be damaged. Subsequently, the most vulnerable layer of the epidermis to sustain damage is the basal cell layer (stratum germinativum).

Any skin damage resulting from radiotherapy treatment may manifest itself during treatment and approximately 10-14 days post-treatment. This coincides with the time when damaged basal cells migrate to the skin surface. The skin compensates by increasing mitotic activity in an attempt to replace damaged cells. Cells produced tend to be immature and are vulnerable to normal wear and tear on the skin surface. If the new cells reproduce faster than the old cells can shed, the skin becomes scaly and thickened (dry desquamation). Alternatively, if the dead cells shed before new cells have replaced them, the skin will appear thin, eroded, broken or atrophic (moist desquamation).

The rate of mitosis initially decreases when skin is exposed to low doses of radiation, which may result in minimal disruption to the basal cell layer. Intermediate doses may result in some basal cells being destroyed and, as a result, dry desquamation occurs. When radiation associated damage is severe enough, stem cells undergo apoptosis and die, the epidermis sloughs off, producing moist desquamation. With advanced techniques in treatment delivery, patients should no longer experience the final stage of skin necrosis, referred to in some classifications of radiation skin toxicity.

Initially, radiotherapy stimulates melanocyte production, which may give the skin a darker appearance. Skin appendages such as hair, sebaceous glands and sweat glands in the treatment area are also affected; their functions may lessen or cease altogether.

Thereafter, skin that has been irradiated may be changed permanently. A previously irradiated site often takes on a typical appearance, with loss of pigmentation (due to destruction of melanocytes), indentation (due to fibrosis of collagen and supporting structures in the dermis) and occasionally telangiectasia, which appears as spidery red lines across the skin surface (due to fibrosis of the blood vessels). These fibrotic changes will result in the area being permanently prone to poor healing.
Format of statement
The statement is divided into six sections covering:

Section 1: The effects of radiotherapy on the skin
Section 2: Combined modality treatment
Section 3: Skin assessment
Section 4: Skincare management
Section 5: Radiation recall reaction
Section 6: Communication of best practice for radiotherapy skincare and multidisciplinary teamwork

Each section contains a table corresponding to the what, why and how of best practice, ie summarising the statement, the reason for the statement and how to achieve the statement or to demonstrate that it is being achieved and highlights the underpinning philosophy of the statement and/or explicit skill requirements to achieve best practice. Key challenges of the statement reflect existing examples of best practice and highlight areas that may require specific action or development. As best practice statements are periodically reviewed and updated, the current statement does not recommend particular products or dressings that should be used in the skincare of patients receiving radiotherapy. This will ensure its validity and relevancy until the next review and update.

How can the statement be used?
This best practice statement can be used in a variety of ways, although primarily it is intended to serve as a guide to best practice and promote a consistent and cohesive approach to care. The statement is intended to be challenging but realistic and can be used:

- as a basis for developing and improving care directly and indirectly
- to stimulate learning among multidisciplinary teams
- to promote effective multiprofessional team working and enhance partnerships with patients, carer(s) and relevant others
- to stimulate ideas and priorities for research.
Section 1: The effects of radiotherapy on the skin

Key points:
1. Patients undergoing radiotherapy may experience skin changes\(^1\)\(^8\).
2. All patients receiving external beam radiotherapy are at risk of skin damage.
3. Individual patients’ skin may react differently to radiotherapy and each patient should be made aware of possible changes.
4. Patients should have their skin formally assessed prior to, during radiotherapy and post-treatment (see sections 3 and 4).
5. Patients and carer(s) should be provided with written and verbal information regarding their skincare prior to commencing radiotherapy treatment.

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<tr>
<td>All healthcare professionals involved in the management of patients receiving radiotherapy should have access to resources which provide education on the anatomy and physiology of the skin.</td>
<td>It is essential to understand normal skin physiology in order to identify skin changes which may occur during radiotherapy.</td>
<td>All healthcare professionals involved in the management of patients receiving radiotherapy can identify where to access resources, which provide education on the anatomy and physiology of the skin.</td>
</tr>
<tr>
<td>Before radiotherapy begins, a baseline assessment of the patient’s current skin condition should be made and documented.</td>
<td>It is essential to have baseline information to allow changes during the course of radiotherapy to be identified.</td>
<td>List of resources will be available.</td>
</tr>
<tr>
<td>All healthcare professionals involved in the delivery of radiotherapy to patients can identify the potential effects of radiotherapy on a patient’s skin and the impact on skin regeneration.</td>
<td>There are risk factors (Figure 1) which predispose the loss of skin integrity whilst undergoing radiotherapy which enable healthcare professionals to identify patients at risk of skin damage and to plan skincare accordingly.</td>
<td>Teaching plans/presentations will include reference to local resources.</td>
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<tr>
<td></td>
<td>Skin reactions can interfere with treatment and can negatively impact on the quality of life of patients(^1)(^9).</td>
<td>There is documented evidence that the risk factors for each individual patient have been assessed and managed accordingly.</td>
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## Section 1: The effects of radiotherapy on the skin (continued)

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<td>During radiotherapy, a comprehensive assessment of the patient’s skin should be made by healthcare professionals within the radiotherapy treatment area, using a valid and reliable assessment tool, eg RTOG (see Appendix 2)(^{20}).</td>
<td>To identify the grade of damage and initiate prompt skincare management.</td>
<td>Skin assessment will be documented and there will be evidence of an individualised radiotherapy skincare plan included in the patient’s notes.</td>
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| Treatment centres will have primary responsibility for educating and providing patients and carer(s), prior to, during and after radiotherapy, with both verbal and written information\(^{20}\). | Inappropriate skincare management may exacerbate radiation skin damage. Preparing patients and their carer(s) prior to commencing radiotherapy is critical to alleviate fears and anxieties, and to promote self-care with therapeutic skincare measures. | To enable best supportive care, the information and education needs of patients and carer(s) must be identified and met\(^{19,21,22}\). Provision of written and verbal information for each patient is documented and given to the patient before treatment begins. |

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**Key challenges:**

- Provision of educational resources for staff relating to potential effects of radiotherapy on skin.
- Provision and use of a valid and reliable skin assessment tool, eg RTOG.
- Development of appropriate information packs to prepare patients and their carer(s) for potential skin reactions and for necessary skincare during and after radiotherapy.
Section 1: Risk factors for radiotherapy skin reactions

There are direct and indirect factors that influence the risk of skin reactions.

Key points:

1. Skin reactions can be influenced by factors which are extrinsic (treatment related) and intrinsic (patient-related)\textsuperscript{18}.
2. Patients and their carer(s) should be aware of preventative skincare measures and contact points for further information.
3. There are direct and indirect factors that influence the risk of skin reactions.
4. There is strong evidence that people who smoke are at risk of a more acute and prolonged radiotherapy skin reaction\textsuperscript{10,23,24}.

The best treatment plan for each individual patient will be to deliver a high dose to the tumour while minimising the dose to the surrounding normal tissue\textsuperscript{25}. In order to achieve this, it is necessary to irradiate through the skin, thus increasing the risk of acute skin reactions. Other factors will also influence the risk of skin reactions and these are detailed in Figure 1.

Key challenges:

- Provision of educational resources for staff to identify potential risk factors.
- Provision of appropriate information and support to patients and their carer(s) related to individual risk factors.
- Provision of appropriate information and support to patients and their carer(s) where risk factors could be reduced and/or eradicated, eg ensuring that smoking cessation services are available and promoted.
Figure 1: Risk factors for radiotherapy skin reactions

Age
The epidermal turnover decreases with age resulting in extended healing times, and ageing results in atrophy of the dermis. Different age ranges are often linked with co-existing diseases. However, there is a lack of evidence to define the older patient, but the National Library of Medicine categorises adult ages as follows: adult 19-44 years, middle aged 45–64 years, aged 65-79 years and aged, 80 and over.

Chemical irritants
Application of chemical irritants such as deodorant, perfume and aftershave to the treatment area should be avoided as they can increase skin reactions.

Chemotherapy
Some chemotherapeutic agents may cause increased skin reactions (see Section 2).

Co-existing disease
Illness or medication can have a direct effect on the skin healing process, eg diabetes and steroids. Most co-existing diseases are linked with an increase in age as well as with changes in BMI and/or nutritional status.

Ethnic origin/skin diversity
There is insufficient evidence to support the theory that the risk of skin reaction increases in different ethnic groups. Ethnic origin can often be linked with previous exposure to ultraviolet light and to genetic predisposition. It is known that chronic ultraviolet light exposure, which would include therapy for skin conditions, may impair healing within the skin.

Infection
Any bacterial and/or fungal infection can damage basal layer cells and impede healing.
Inherited radiosensitivity
Some genetic disorders such as ataxia-telangiectasia can increase sensitivity to radiation therapy. There are also theories that mutations in genetic material can predispose individuals to an increased risk of skin reactions, although there is no firm evidence to date.

Mechanical irritants
Friction, eg clothing and shaving, can increase skin reaction and cause delayed healing.

Nutritional status
The intake of adequate nutrients is required for optimum repair of tissue damage. Intake of such nutrients may be influenced or directly linked with co-existing diseases and/or stage of cancer and/or cancer site. Absorption of such nutrients may be inhibited by disease, chemotherapy or other drug therapy. Fatigue and socio-economic factors can also influence the nutrient balance or intake of an individual.

Obesity
Having excess adipose tissue can compromise healing due to poor vascularity and is linked with extra skin folds, friction, moisture and warmth which will increase skin reactions. This increase in moist warm folds can also lead to a greater risk of fungal infections.

Previously irradiated areas
These areas may be more at risk of acute skin reactions, as palliative treatment to a previously radiated area may also increase the risk of skin reactions.

Smoking
Inhaling nicotine through smoking can impair the body’s response to infection and healing. It also limits the oxygen-carrying capacity by replacing oxygen with carbon monoxide.

Patients should be fully aware and encouraged to stop smoking prior to treatment. Referrals to appropriate smoking cessation services are recommended.
**Thermal irritants**
Direct application of extremes of temperature, ie icepacks or heat (heat pads, hot water bottles or sun lamps), onto the treatment area can cause skin irritation and thus delay healing.

**Radiotherapy**
Higher doses and increased volume of radiation will lead to greater risks of skin reactions.

**Energy of beam**
Megavoltage (MV) photon energies (energies above 1MV) deliver maximum dose underneath the skin surface. This is known as the skin sparing effect. Kilovoltage beams (energies below 1MV) will deliver maximum dose to the skin surface, thus causing an increased skin reaction.[31]

**Entry and exit sites**
It is worth noting that apparently ‘unrelated’ skin reactions may be due to the exit site dose of the beam, eg a skin reaction on the back of the shoulder which is the result of an anterior supraclavicular fossa field on a breast patient.

**Use of build-up material (also known as ‘bolus’)**
Where tissue equivalent build-up material is placed over the treatment area, the dose to the skin is intentionally increased as part of the treatment plan, and therefore the skin reaction is likely to be worse.

**Site of treatment**
Some sites of the body will tend to show an increased skin reaction following radiotherapy. In general, areas of the body most at risk include underneath the breast, axilla, head and neck, perineum and groin.[12]

**Treatment regimes**
Different treatment regimes may be associated with increased skin toxicities due to different treatment doses.
Section 2: Combined modality treatment

Key points:

1. Combined modality treatment may include concurrent or sequential/consecutive therapy with radiotherapy, chemotherapy and/or surgery.
2. There is increasing use of chemo-radiotherapy, where the two treatments work together to improve overall response to treatment, and this can affect the severity of the skin reactions.

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<tr>
<td>Healthcare professionals within treatment centres should be aware that combined modality treatment may lead to an increased risk of skin reactions. This information must be shared with the primary care team if relevant for an individual patient.</td>
<td>Early recognition leads to prompt management.</td>
<td>Treatment of skin reactions is documented. Information has been communicated to all relevant healthcare professionals.</td>
</tr>
<tr>
<td>Healthcare professionals within treatment centres should be aware of potential radiosensitisers used in their area. This information must be shared with the primary care team if relevant for an individual patient.</td>
<td>Early recognition leads to prompt management.</td>
<td>Risk of reaction due to combined modality treatment is documented.</td>
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Key challenges:

- Provision of guidance within treatment centres relating to increased risk of skin reactions due to other treatments.
- Ensure all healthcare professionals are kept up-to-date with new treatments/trials which may make patients more susceptible to an increased skin reaction.
- Patients should be fully aware that their combined therapies may result in an enhanced skin reaction during or after completion of radiotherapy treatment.
- Healthcare professionals clearly document any combined treatments on radiotherapy prescription and follow-up communications.
Section 3: Skin assessment

Key points:
1. This best practice statement recommends the RTOG skin assessment tool will be used (Appendix 2). This is a nationally accepted, validated tool.
2. Mild skin reactions are common, with 80-90% of patients experiencing erythema\textsuperscript{15}.
3. Around 10-15% of patients will experience serious problems, such as moist desquamation\textsuperscript{15}.

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<td>A validated assessment tool should be used to assess the degree of radiation toxicity, eg RTOG (see Appendix 2). Healthcare professionals will require training prior to using the RTOG.</td>
<td>It is essential to have baseline information to allow changes during the course of radiotherapy to be identified and appropriate action taken. For comparability, reliability and audit.</td>
<td>The stage of toxicity is documented in the case notes using a validated assessment tool.</td>
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<tr>
<td>The suggested frequency of skin assessment is as follows: RTOG 0 - weekly RTOG 1 - weekly RTOG 2a - daily RTOG 2b - daily RTOG 3 - daily</td>
<td>To promote standardisation of patient care. Frequency of assessment needs to increase as the skin toxicity increases. Inter and intra operator reliability can be an issue so there is a need to ensure staff have been trained in the use of the assessment tool. This training should include all disciplines – nursing, radiographers and medical staff. Lack of training may invalidate use of the tool.</td>
<td>Grade and action recommended is recorded in patient case notes. Record of staff training is available.</td>
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Key challenges:
- Validated tool is disseminated outside specialist units so that all healthcare professionals have access to the same assessment scale allowing consistency.
- Universal awareness and use of skin grading tool.
Section 4: Skincare management

Section 4 is divided into sections to illustrate the varying levels of skincare management to be delivered to patients receiving radiotherapy whilst on treatment and for up to 3 weeks post-treatment.

The section begins with a discussion of general skincare management during this period. (Figure 2 illustrates the basic skincare guideline), before moving on to discuss the appropriate management of each score on the RTOG skin assessment tool (Appendix 2). For illustration purposes, RTOG scores 1, 2a, 2b and 3 include a photographic example of a typical skin reaction.

Section 4 closes with discussion of delayed skin reactions which may occur more than 3 weeks after radiotherapy treatment has been completed.

Key points:

1. During treatment and for up to 3 weeks post-treatment, it is acknowledged that there will be a certain amount of radiotherapy-induced skin damage (see Section 1).
2. The skin reaction is not avoidable and interventions and advice are aimed at minimising the severity of the reaction. It is important that this message is understood by the patient and carer(s).
3. The skin reaction is delayed and may peak within 10 days following completion of treatment\(^{20,32}\). It is therefore important to anticipate this to enable forward planning of any aftercare.
4. There are a number of skincare practices which \textbf{must} be avoided. These are detailed in Figure 3.

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<tr>
<td>Patients understand how to care for the treated area in accordance with the basic skincare guideline (see Figure 2).</td>
<td>To maintain soft, supple, clean, odour-free and intact skin. Washing does not have significant negative effects on skin reactions and makes patients feel more comfortable(^ {31} ).</td>
<td>Prior to treatment, patients will be given written and verbal guidelines regarding skincare (see Figure 2). Skin is soft, supple, clean, odour-free and intact on examination during treatment.</td>
</tr>
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Key challenges:

- Provision of appropriate written and verbal guidance relating to skincare for all patients and their carer(s) prior to starting treatment.
- Development of local communication pathways to ensure all healthcare professionals involved in an individual’s care are aware of necessary skincare guidance and interventions.
- There is limited evidence base available to inform best practice.
Figure 2: Basic skincare guideline

All patients receiving radiotherapy should be advised of the following skincare guidelines. All patients should receive a copy of the information below, as appropriate, in both verbal and written formats\textsuperscript{33}.

THIS GUIDELINE ONLY APPLIES TO THE AREA BEING TREATED, INCLUDING BOTH THE ENTRY AND EXIT SITES

When washing/bathing/showering on a daily basis:
- Use warm/tepid water, with unperfumed soap if desired.
- Do NOT use perfumed products.
- Avoid rubbing the area and use a soft towel to pat the area dry (avoiding friction).

Other skincare products:
- Do NOT apply perfume, aftershave or deodorant to the treatment area.
- Only use products advocated by the radiotherapy treatment centre.
- All gels, creams or lotions for skin application should be used at room temperature. If normally stored in a refrigerator, these should be removed from the refrigerator half an hour before use\textsuperscript{34}.

Hair removal:
- Use an electric shaver instead of a wet razor when shaving the face.
- If the axilla is within the treatment area, shaving should be avoided.
- Do NOT use wax or other hair removing creams within the treatment area.

Use of swimming pools:
- Caution should be taken as chlorinated water can have a drying effect on the skin.
- Care should be taken regarding the use of showers particularly where there is no temperature control or where jets are very powerful.
General advice:

- Avoid direct application of heat or cold to the area.
- Friction will be reduced with the avoidance of scratching, rubbing and massaging the skin.
- Loose natural fibre clothing will help avoid friction.
- Following mastectomy, if a permanent prosthesis causes increased moisture and/or friction, a soft prosthesis should be worn.
- Use of a mild detergent (fragrance-free if possible), for washing clothing to be worn next to the skin, may reduce irritation.
- Adhesive tape should always be avoided within the treatment area during treatment and until any reaction has settled.
- Avoid sun exposure or cover the area during treatment and until any skin reaction has settled. There is a permanent risk of developing a skin cancer at the irradiated site, so appropriate protective measures should continue indefinitely, particularly when the irradiated area is a habitually sun-exposed site.
- Use sunscreen, eg sunblock of at least SPF 15 (health promotion advice advocates that nothing less than SPF 15 should be used by anyone at anytime, regardless of skin type or past medical history.) Sunscreen should be used as an addition to sun avoidance or other protective measures for sun exposure (eg a hat) but should not lead to increased time in the sun. Irradiated skin will always be at risk of sun damage.
- If you have any concerns regarding your skin during your treatment, contact your radiographer/radiotherapy nurse. Local contact details should be given for in and out-of-hours.
- If you have any concerns regarding your skin after your treatment, contact your district or practice nurse. Local contact details should be given for in and out-of-hours.
Figure 3: Skincare practices to avoid

Skin reactions are expected during radiotherapy treatment. There is nothing that can be used to prevent these but there are a number of practices which **must be avoided** during the care and management of these reactions.

- Do not use thick creams that cause a lot of friction to apply or put on.
- Do not use creams that are paraffin based.
- Do not use adhesive dressings.

Steroid or cortisone creams should only be used following medical advice from the radiotherapy department. These creams should not be used on broken skin.
Section 4: Skincare whilst on treatment and for up to 3 weeks post treatment (RTOG 0)

Key point:
1 Essential to emphasise the importance of skincare at this early stage – in particular, stress the delayed nature of the skin reaction.
2 Skin reactions are expected to occur and the following recommendations are for patient comfort and to prevent unnecessary deterioration.

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<td>RTOG 0 (no visible change): (a) Patients will be advised to follow the skincare guideline in Figure 2.</td>
<td>To maintain soft, supple, clean, odour-free and intact skin. To avoid unnecessary further trauma to the skin. To promote comfort in those who wish to use cream.</td>
<td>Skin is soft, supple, clean, odour-free and intact on examination during treatment. Supplying patient with cream will be documented in the notes. RTOG grade is documented weekly.</td>
</tr>
<tr>
<td>(b) Patients may use an unperfumed preparation for comfort if they wish.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Key challenges:
- Provision of appropriate written and verbal guidance relating to skincare for all patients and their carer(s) prior to starting treatment.
Section 4: Skincare whilst on treatment and for up to 3 weeks post treatment (RTOG 1)

Key points:
1. Skin reaction is monitored and deterioration recognised.
2. Patients are informed and aware of the care of their skin.
3. Patients are aware of the potential for further escalation of reaction.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Reason for statement</th>
<th>How to demonstrate statement is being achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTOG 1 (faint or dull erythema): (a) Patients will continue to follow the skincare guideline in Figure 2.</td>
<td>To maintain soft, supple, clean, odour-free and intact skin. To reduce risk of introducing unnecessary irritants to the treatment area. To reduce irritation and promote comfort.</td>
<td>Skin is soft, supple, clean and odour-free on examination during treatment. RTOG is documented weekly. Record any symptoms reported by the patient, eg ‘itchy’, ‘warm’.</td>
</tr>
<tr>
<td>(b) Patients may use an unperfumed preparation for comfort if they wish.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Key challenges:
- Provision of appropriate written and verbal guidance relating to skincare for all patients and their carer(s) prior to starting treatment.
- Patient experience is considered and documented regarding the comfort of their skin.
Section 4: Skincare whilst on treatment and for up to 3 weeks post treatment (RTOG 2a)

Key points:
1. Daily assessment of skin is now recommended as there is now a risk of moist desquamation occurring.
2. This requires a change in skincare management.
3. If steroid creams are commenced strict daily review of skin reaction is essential to detect potential deterioration or additional complications and this action is documented to aid communication.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Reason for statement</th>
<th>How to demonstrate statement is being achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTOG 2a (tender or bright erythema with/without dry desquamation): (a) Patients will continue to follow the skincare guideline in Figure 2. (b) Patients may use an unperfumed preparation for comfort if they wish, unless there is evidence that it is no longer keeping the patient comfortable. (c) A change of topical agent may be necessary if comfort is not achieved. There is some evidence to support the use of topical agents (eg topical mild steroid cream such as hydrocortisone) to reduce itching. This should not be a routine therapy and should only be prescribed following medical advice.</td>
<td>To maintain soft, supple, clean and odour-free skin. Patients need reassurance that this is a normal response to radiotherapy treatment. There is also evidence that topical steroids can make skin thinner and more fragile so caution is advised.</td>
<td>Check that advice is understood and patient is adhering to guidelines. RTOG is documented daily. It has been documented that a change in topical treatment has been explored. Itching ceases and the topical agent is no longer required. Hydrocortisone cream should not be used for more than 7 days. Reduction in anxiety and improved understanding of the skin reaction. Rationale for the use of topical agents is documented.</td>
</tr>
<tr>
<td>Avoid topical mild steroid cream if skin is broken or there are any signs of infection.</td>
<td>Delays healing and may mask symptoms of infection.</td>
<td></td>
</tr>
</tbody>
</table>

Key challenges:
- Daily assessment of skin is now recommended as there is now a risk of moist desquamation occurring. This requires a change in skincare management.
- Provision of appropriate dressings if moist desquamation occurs. However, evidence is inconclusive in terms of which interventions are recommended for use at this time.
Section 4: Skincare whilst on treatment and for up to 3 weeks post treatment (RTOG 2b)

Key points:
1. Daily skincare by a healthcare professional may now be required.
2. Reassurance to patient that reaction will heal within a few weeks of treatment completion.
3. Skin reaction is treated promptly in a manner which is according to local policy.
4. Patients are fully aware of the necessity of skincare and additional methods to aid skin healing.
5. Patients are fully informed regarding the actions, potential implications and future expectations regarding their skin reaction.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Reason for statement</th>
<th>How to demonstrate statement is being achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTOG 2b (patchy moist desquamation; moderate oedema) – the integrity of the skin is now compromised:</td>
<td>Optimum healing is at body temperature in a moist environment. Pain is reduced when nerve endings are moist. This may be achieved by the use of dressings. Different centres may use or recommend different dressings according to local practice. Healing will be delayed/reduced until the end of radiotherapy.</td>
<td>Check that advice is understood and patient is adhering to guideline. RTOG grade is documented daily. Use and type of dressings is documented. Patient is infection free and comfortable.</td>
</tr>
<tr>
<td>(a) Patients may continue to follow the skincare guideline in Figure 2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) Previous creams may still be used in non-moist areas.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) The principles of moist wound healing should apply to reduce further unnecessary deterioration, promote a healing environment, prevent infection and control pain.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Each unit should identify which wound products should be used and when.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 4: Skincare whilst on treatment and for up to 3 weeks post treatment (RTOG 2b)

<table>
<thead>
<tr>
<th>Statement</th>
<th>Reason for statement</th>
<th>How to demonstrate statement is being achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unless treatment has been planned with the dressing in place, the dressing must be removed.</td>
<td>Dressings will alter the radiation dose to the treatment area unless treatment has been planned with a dressing in place. This is also likely to enhance the radiation reaction.</td>
<td>Any dressing covering the treatment area during treatment delivery is documented.</td>
</tr>
<tr>
<td>Avoid adhesive and adherent dressings and the use of tape to secure dressings.</td>
<td>Dressings with adhesive borders may cause epidermal stripping and cause pain to the patient on removal.</td>
<td>There are no signs or symptoms of trauma on dressing removal.</td>
</tr>
<tr>
<td>Consider the use of tubular bandages or body stockings.</td>
<td></td>
<td>Surrounding skin remains intact.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Record patient comfort with skincare and dressing.</td>
</tr>
</tbody>
</table>

Key challenges:
- Provision of an individual appropriate skincare regime for all patients regarding their progressing skin reactions.
- Patient view on comfort and appropriateness of skincare regime is documented.
- Patient receives the correct skincare without delay as soon as skin breaks.
## Section 4: Skincare whilst on treatment and for up to 3 weeks post treatment (RTOG 3)

### Key points:
1. Daily skincare by a healthcare professional may now be required.
2. Skin reaction is treated promptly in a manner which is according to local policy.
3. Patients are fully aware of the necessity of skincare and additional methods to aid skin healing.
4. Patients are fully informed regarding the actions, potential implications and future expectations regarding their skin reaction.
5. It should be noted that these reactions are not common. However, it is essential that healthcare professionals are aware of how to care for these reactions.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Reason for statement</th>
<th>How to demonstrate statement is being achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTOG 3 (confluent moist desquamation; pitting oedema):</td>
<td>Topical anti-microbials will reduce the bacterial burden and reduce the risk of systemic infection developing.</td>
<td>Condition of area will be assessed daily, non-adherent dressings renewed and any changes documented.</td>
</tr>
<tr>
<td>(a) Patients may continue to follow the skincare guideline in Figure 2.</td>
<td></td>
<td>Patient comfort is documented.</td>
</tr>
<tr>
<td>(b) Painful moist areas are present which will be treated daily according to local cancer centre policy.</td>
<td></td>
<td>Use and removal prior to treatment of activated silver or iodine-based dressings is documented.</td>
</tr>
<tr>
<td>(c) The area will be observed for infection (particularly in the skin folds).</td>
<td></td>
<td>Changes in the patient’s general condition are documented.</td>
</tr>
<tr>
<td>(d) If there are signs of localised clinical infection, ie exudate which may be yellow/green and sticky, increased exudate and malodour developing with oedema and redness, topical anti-microbial dressings may be used, eg activated silver or iodine based. Manufacturer’s information must be checked before use to ensure the silver stays within the dressing. If these dressings are used, they MUST be removed before treatment. DRESSINGS, CONTAINING SILVER KNOWN TO BE TAKEN UP INTO TISSUE, MUST BE AVOIDED.</td>
<td></td>
<td>Health professionals should be aware of concomitant treatment.</td>
</tr>
<tr>
<td>(e) Patients may be immuno-compromised and may not exhibit classic signs of infection (eg raised temperature, white blood cell count or ESR).</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Section 4: Skincare whilst on treatment and for up to 3 weeks post treatment (RTOG 3) (continued)

<table>
<thead>
<tr>
<th>Statement</th>
<th>Reason for statement</th>
<th>How to demonstrate statement is being achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signs of spreading cellulitis (redness beyond the treatment area) may indicate the onset of systemic infection and either oral or intravenous antibiotics should be commenced (as clinically indicated). These may be used in conjunction with topical anti-microbials.</td>
<td>In all instances of spreading cellulitis, antibiotics are required to prevent septicaemia.</td>
<td>Resolution of signs of clinical infection.</td>
</tr>
<tr>
<td>Use of bacteriology wound swabs should not be routinely used.</td>
<td>Bacteriology wound swabs are only necessary if antibiotics are being commenced.</td>
<td>Rationale for the use of swabs is documented.</td>
</tr>
<tr>
<td>If pyrexia (temperature &gt; 38°C) or clinical signs of systemic infection are apparent, bacterial swab and blood cultures may be indicated.</td>
<td>If systemic infection is suspected, antibiotics based on advice of oncologist and microbiologist should be commenced immediately to avoid septicaemia. Swabbing or blood cultures may be required to confirm the strain of bacteria.</td>
<td>Resolution of signs of clinical infection.</td>
</tr>
</tbody>
</table>
Section 4: Skincare whilst on treatment and for up to 3 weeks post treatment (RTOG 3)(continued)

<table>
<thead>
<tr>
<th>Statement</th>
<th>Reason for statement</th>
<th>How to demonstrate statement is being achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>On completion of radiotherapy treatment, the patient will be referred, as required, and agreed with the patient, on to their local practice/district nurse or arrangements will be made for the patient to attend the nursing staff at their treatment centre.</td>
<td>To provide continuity and to establish a partnership of care for the patient.</td>
<td>Any intervention to the wound is documented in the case notes and discharge letter.</td>
</tr>
<tr>
<td>Local practices must be able to provide care appropriate to patients needs after radiotherapy treatment.</td>
<td>Reduce patient anxiety following post-treatment referral from main treatment centre. Referral is documented in the case notes.</td>
<td></td>
</tr>
</tbody>
</table>

Key challenges:
- Provision of appropriate written and verbal guidance relating to skincare for all patients and their carer(s) prior to starting treatment.
- Development of local communication pathways to ensure all healthcare professionals involved in an individual’s care are aware of necessary skincare guidance and interventions.
- Individual cancer centres have the responsibility to disseminate their written skincare policy throughout the communication network to ensure consistency of care.
- There is limited evidence base available to inform best practice.
- Provision of appropriate dressings if moist desquamation occurs. However, evidence is inconclusive in terms of which interventions are recommended for use at this time.
Section 4: Delayed skin reactions to radiotherapy more than 3 weeks after radiotherapy has been completed

Key points:
1. Skin reactions may develop after treatment has been completed.
2. Permanent skin changes may occur following treatment.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Reason for statement</th>
<th>How to demonstrate statement is being achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients will be reminded about potential skin reactions that may follow treatment. Patients believe it is beneficial to receive this information both before and after treatment.</td>
<td>Reduction of patient anxiety. Prompt reporting of significant reactions.</td>
<td>Documentation that information has been delivered.</td>
</tr>
<tr>
<td>Patients will be aware of any permanent radiotherapy related side-effects to the skin, e.g. dryness of skin, reduction of skin elasticity, increased skin sensitivity.</td>
<td>Reduction of patient anxiety.</td>
<td>Documentation that information has been delivered.</td>
</tr>
</tbody>
</table>

General Information:
Prior to the use of skin sparing mega-voltage treatment, patients may have been exposed to potential late skin reactions following radiotherapy, such as ulceration (uncommon), dermal necrosis, dermal atrophy and telangiectasia. However, these are rare due to improvements in radiotherapy treatment and equipment, and as such, such reactions are no longer expected.

Key challenges:
- Provision of educational resources for healthcare staff relating to skin reactions and changes occurring after treatment has been completed.
- Local communication pathways are established for access to expert advice.
### Section 5: Radiation recall reaction

**Key point:**

1. Use of certain drugs may cause a radiation recall reaction, but this is not common.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Reason for statement</th>
<th>How to demonstrate statement is being achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare professionals within treatment centres and patients who are receiving relevant drugs should be aware of the phenomenon of radiation recall.</td>
<td>Reduction of patient anxiety. Early recognition leads to prompt management, if appropriate.</td>
<td>Protocols are available to identify drugs with the potential of causing these reactions.</td>
</tr>
<tr>
<td>Healthcare professionals within treatment centres should assess each individual patient in relation to past radiotherapy reactions and planned drug treatments.</td>
<td>Early recognition leads to prompt management, if appropriate.</td>
<td>Assessment of risk is documented for each individual patient.</td>
</tr>
</tbody>
</table>

**Key challenges:**

- Provision of protocols that identify drugs with a potential to induce radiation recall reactions.
## Section 6: Communication of best practice for radiotherapy skincare and multidisciplinary teamwork

### Key points:
1. Health professionals should work in partnership with the patient and carer(s) in the management of skincare of patients receiving radiotherapy.
2. Effective multidisciplinary teamwork is essential for the effective management of skincare of patients receiving radiotherapy.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Reason for statement</th>
<th>How to demonstrate statement is being achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health professionals should work in partnership with patients and carer(s) in the management of skincare of patients receiving radiotherapy. Patients need to know what may happen to their skin after their treatment has ended.</td>
<td>To ensure patient co-operation with their skincare policy throughout treatment.</td>
<td>Evidence of partnership working between the patient, carer(s) and health professionals in the management of skincare of patients receiving radiotherapy.</td>
</tr>
<tr>
<td>Each radiotherapy department should implement a strategy to ensure communication of best practice to the appropriate healthcare professionals: those involved before, during and after radiotherapy.</td>
<td>To minimise skin reactions and to ensure appropriate use of interventions.</td>
<td>There is documented evidence of multidisciplinary approach to the management of skincare of patients receiving radiotherapy.</td>
</tr>
<tr>
<td>A communication pathway is implemented for healthcare professionals between all care settings.</td>
<td>To ensure appropriate use of this best practice statement.</td>
<td>There is evidence of education on effective multidisciplinary working.</td>
</tr>
<tr>
<td></td>
<td>To ensure continuity of care for the patient throughout the patient pathway.</td>
<td>Evidence of availability of appropriate information for healthcare professionals (see Appendix 1).</td>
</tr>
<tr>
<td></td>
<td>To ensure all patients with skincare reactions are dealt with in the appropriate way.</td>
<td>Evidence of documentation of communication between healthcare professionals.</td>
</tr>
</tbody>
</table>

### Key challenges:
- Healthcare professionals should ensure robust co-ordination of care when working as part of the multidisciplinary team.
- Encourage patient compliance with skincare advice.
- Provision of appropriate information for all healthcare professionals caring for an individual receiving radiotherapy.
- All healthcare professionals caring for an individual receiving radiotherapy will have access to expert advice.
- Identifying best methods for patient involvement and provision of patient information.
Appendix 1: Communication pathways

Local communication policies should be put in place to ensure equity of care for all patients.

1. To deliver the best quality care for patients receiving radiotherapy, teamwork among healthcare professionals is essential.
2. The following table represents the healthcare professionals who should be included in local policy and communication policy implemented for the dissemination of the best practice statement.
3. The table also suggests a list of healthcare professionals who may be involved along the patient’s treatment pathway.

<table>
<thead>
<tr>
<th>Healthcare professionals</th>
<th>Pre-radiotherapy</th>
<th>During radiotherapy</th>
<th>Post-radiotherapy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hospital staff</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical staff</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Therapy radiographers</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Site specific clinical nurse specialist/therapy radiographer</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Review team</td>
<td></td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Inpatient/outpatient nurses</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Clinical pharmacists</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td><strong>Community staff</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GP</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>District nurse</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Practice nurses</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Community pharmacists</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td><strong>Other specialists</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tissue viability team</td>
<td></td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Dermatology team</td>
<td></td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td><strong>Allied health professionals</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dietician, speech &amp; language therapist, physiotherapist</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>
Appendix 2: RTOG skin assessment tool

Summary of intervention for acute radiotherapy induced skin reactions in cancer patients.

This is a clinical guideline recommended for use by the College of Radiographers and is available free to healthcare professionals (see below). This leaflet contains descriptions and photographs of radiotherapy skin reactions. Other assessment tools, such as the Common Toxicity Criteria (CTC) are available. However, CTC does not provide a visual guide to skin reactions.

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
<th>Visual example</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTOG 0</td>
<td>No visible change</td>
<td>N/A</td>
</tr>
<tr>
<td>RTOG 1</td>
<td>Faint or dull erythema</td>
<td></td>
</tr>
<tr>
<td>RTOG 2a</td>
<td>Tender or bright erythema with/without dry desquamation</td>
<td></td>
</tr>
</tbody>
</table>
### Appendix 2: RTOG skin assessment tool continued

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
<th>Visual example</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTOG 2b</td>
<td>Patchy moist desquamation; moderate oedema</td>
<td></td>
</tr>
<tr>
<td>RTOG 3</td>
<td>Confluent moist desquamation; pitting oedema</td>
<td></td>
</tr>
</tbody>
</table>

Further information may be sought from:

The College of Radiographers  
207 Providence Square, Mill Street, London SE1 2EW  
Tel: 020 7740 7200  
website: [www.sor.org](http://www.sor.org)

Full access to the website is available only to members of the Society of Radiographers. However, a summary of the clinical guideline for acute radiotherapy skin reactions referred to in this document can be viewed online at:  

Additionally, for information, the CTC can be viewed online at:  
### Appendix 3: Audit tool

This audit tool has been developed from the Best Practice Statement: Skincare of patients receiving radiotherapy (March 2010) to support health professionals and organisations who would like to audit current practice. This should be used in conjunction with the best practice statement and not in isolation.

#### Section 1: The effects of radiotherapy on the skin

<table>
<thead>
<tr>
<th></th>
<th>Y</th>
<th>N</th>
<th>Don’t know</th>
<th>Action and comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>a Patients have had their skin formally assessed prior to, during radiotherapy and post-treatment.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b Patients and carer(s) have been provided with written and verbal information regarding their skincare prior to commencing radiotherapy treatment.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Section 2: Combined modality treatment

No audit tool has been developed for Section 2.

#### Section 3: Skin assessment

<table>
<thead>
<tr>
<th></th>
<th>Y</th>
<th>N</th>
<th>Don’t know</th>
<th>Action and comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>a Health professionals are knowledgeable about the range of direct and indirect risk factors that can influence the risk of radiotherapy skin reactions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b A validated assessment tool has been used to assess the degree of radiation toxicity.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c Health professionals involved in the use of validated assessment tools have received training on their use.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Section 4: Skincare management

<table>
<thead>
<tr>
<th></th>
<th>Y</th>
<th>N</th>
<th>Don’t know</th>
<th>Action and comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Patients understand how to care for the treated area in accordance to the basic skincare guideline and have been provided with written guidance on this.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Health professionals are aware of the RTOG skin assessment tool and provide care to patients according to the appropriate RTOG status of the patient.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Section 5: Radiation recall reaction

<table>
<thead>
<tr>
<th></th>
<th>Y</th>
<th>N</th>
<th>Don’t know</th>
<th>Action and comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Patients have been assessed for past radiotherapy reactions and planned drug treatments.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Section 6: Communication of best practice for radiotherapy skincare and multidisciplinary teamwork

<table>
<thead>
<tr>
<th></th>
<th>Y</th>
<th>N</th>
<th>Don’t know</th>
<th>Action and comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Radiotherapy departments have a strategy in place to ensure the communication of best practice to the appropriate healthcare professionals before, during and after radiotherapy.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Health professionals work in partnership with patients and carer(s) in the management of skincare for patients receiving radiotherapy.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please see the NHS Quality Improvement Scotland website ([www.nhshealthquality.org](http://www.nhshealthquality.org)) to download a Word version of this audit tool to save and use electronically, or print to use by hand.
### Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>apoptosis</td>
<td>Intracellular process leading to programmed death of the cell.</td>
</tr>
<tr>
<td>body mass index</td>
<td>A key index for relating a person’s body weight to their height. The body mass index (BMI) is a person’s weight in kilograms (kg) divided by their height in meters (m) squared.</td>
</tr>
<tr>
<td>bolus</td>
<td>Tissue equivalent material, eg wax, used to therapeutically increase the dose to the skin.</td>
</tr>
<tr>
<td>combined modality</td>
<td>Radiotherapy, chemotherapy and/or surgery treatment used together to treat an individual patient.</td>
</tr>
<tr>
<td>cytokine</td>
<td>A substance secreted by certain cells of the immune system.</td>
</tr>
<tr>
<td>dermal atrophy</td>
<td>Contraction of previously irradiated area causing thinning of the dermis.</td>
</tr>
<tr>
<td>dermal necrosis</td>
<td>Vascular insufficiency causing necrosis of the dermis.</td>
</tr>
<tr>
<td>dry desquamation</td>
<td>Flaking or peeling of the skin.</td>
</tr>
<tr>
<td>entry and exit sites</td>
<td>‘Entry site’ is the area through which the radiation beam enters the body. ‘Exit site’ is the area through which the radiation beam leaves the body. Radiation beams travel in straight lines so the exit site should be predictable.</td>
</tr>
<tr>
<td>erythema</td>
<td>Reddening of the skin.</td>
</tr>
<tr>
<td>erythrocyte sedimentation rate</td>
<td>The rate at which red blood cells precipitate in an hour; a screening test used to test for various conditions.</td>
</tr>
<tr>
<td>fraction</td>
<td>Total dose of radiation is divided over a treatment period; each of these divisions is termed a ‘fraction’.</td>
</tr>
<tr>
<td>immuno-compromised</td>
<td>Patients whose disease and/or treatment has rendered them susceptible to infection.</td>
</tr>
<tr>
<td>linear accelerator</td>
<td>Radiotherapy machine which delivers external beam therapy.</td>
</tr>
<tr>
<td>moist desquamation</td>
<td>Flaking or peeling of the skin revealing moist areas.</td>
</tr>
<tr>
<td>oedema</td>
<td>Abnormal infiltration of tissues with fluid.</td>
</tr>
<tr>
<td>pitting oedema</td>
<td>Moderate/severe oedema which can be demonstrated by pressure from a finger.</td>
</tr>
<tr>
<td>radiation recall</td>
<td>Development of an inflammatory reaction throughout a previously irradiated area, precipitated by the administration of certain drugs.</td>
</tr>
<tr>
<td>radiosensitisers</td>
<td>Drugs which enhance the effect of radiation.</td>
</tr>
</tbody>
</table>
repair, redistribution, repopulation and reoxygenation

Repair of intracellular sublethal damage by normal cells between fractions is one benefit of fractionation. Redistribution of cells as they move into different phases of the cell cycle within a course of radiotherapy is advantageous as more tumour cells become radiosensitive. Repopulation of normal tissues takes place through cell division at some time during a multi-fraction treatment course. Oxygenated cells are radiosensitive: fractionating the dose allows time between treatments for the tumour to reoxygenate leaving it more liable to cell damage and death.

RTOG

Radiation Therapy Oncology Group (see Appendix 2 for the Skin Assessment Tool).

skin sparing

100% of radiotherapy dose is delivered under the skin.

telangiectasia

Visible atypical dilation of the capillaries on skin.

treatment area

Area of skin through which the radiation beam passes to treat the tumour site.
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