Radiotherapy skin care: A survey of practice in the UK

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A B S T R A C T

Aim: The primary objective of the survey was to evaluate clinical skin care practice in radiotherapy departments across the United Kingdom.

Methods and Sample: A questionnaire containing sixty-one questions grouped into eight themed sections was developed and a link to an on-line survey, using the Survey Monkey® tool, was e-mailed to all radiotherapy department managers in the United Kingdom (N = 67). Each recipient was invited to provide one response per department.

Key results: Fifty-four departments responded within the allocated timeframe giving a final response rate of 81%. Products and their use for skin conditions varied and some outdated and unfounded practices were still being used which did not always reflect the current evidence base. The amount of data routinely collected on skin toxicity was limited making it difficult to quantify the extent of skin morbidity following radiotherapy.

Conclusion: The survey demonstrated variability in skin care practice in radiotherapy departments across the UK, with limited practice based on evidence or on skin toxicity measurement and monitoring.

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Introduction

The Society and College of Radiographers (SCoR) last reviewed UK radiotherapy centre skin care practice in 2000 and produced guidelines for radiotherapy departments.1 A decade later it was timely to re-assess what was actually happening in clinical practice with the aim of assessing current practices and subsequently updating the information.

Skin reactions from external beam radiotherapy are one of the most common side-effects from treatment and a factor which can limit radiation dose. Megavoltage linear accelerators with skin sparing capabilities have significantly reduced the severity of reactions from radiotherapy,2 however accelerated dose schedules with combined radiation chemotherapy regimens3 have increased the condition. The most severe reactions tend to be in seen in those patients receiving high doses to large fields. Recently the use of intensity modulated radiotherapy (IMRT) has been shown to offer the opportunity to reduce skin toxicity in some cases, especially the rates of dry and moist desquamation when treating cancers in the head and neck region.4–10

Despite changes in practice and published guidelines1,11,12 radiotherapy skin care appears to have changed little over the years, with departments caring for their patients’ skin in different ways. Consequently, a plethora of agents is being used on the skin in a non-standardised fashion.13,14

Faithfull et al15 note ‘a growing awareness of the need for evidence based practice in radiotherapy’ but that there are ‘well documented disparities between clinical practice and research findings which could underpin care’, reflecting that supportive care is often based on no, little, or poor evidence. Comparing data across radiotherapy skin care studies is difficult as often the methods used are unclear, patient allocations differ, different skin assessment scales are used, and follow-up data is inconsistent.16

Although it is unlikely that radiation reactions can be completely prevented, the current driver in clinical practice is to minimise and delay the onset of symptoms.
The extent of skin reaction is often dependent upon the clinical site being treated. For example, patients undergoing radiotherapy for head and neck cancer require immobilisation and often receive combination chemotherapy. This can make these patients very vulnerable to intensified skin reactions and it is known that interruptions in radiotherapy for this category can have a detrimental effect on treatment outcome.17

The use of an effective evidence-based skin care protocol and monitoring system18,19 would assist in a researched approach to radiation skin care management, aiding product evaluation and justification of practice.

Background

In Barkham’s 1993 assessment of radiotherapy skin reactions and associated treatments,13 52% of UK radiotherapy departments reported dry desquamation as a common event and 85% of departments reported moist desquamation as an occasional event. However, as Gleen et al.20 noted, the incidence of skin reactions has not been accurately quantified in departments and practices have changed since Barkham’s survey.

Turesson et al.21 demonstrated that the number of basal cells in the epidermis declines during fractionated radiotherapy due to increased cell cycle arrest and reduced mitosis. The reduction in the basal cells causes a thinning of the epidermis and an inflammatory reaction. The variation in the reaction appears to be a genetic predisposition due to individual DNA repair capacity.22–27 Genetic radiosensitivity,28–30 and/or intravascular thrombin generation.31 Specific genetic tests could therefore be used to predict those patients most likely to develop a severe radiotherapy reaction.32,33

Certain clinical factors can also help to predict the possibility of a radiation reaction.34,35 Extrinsic factors are treatment related, i.e. dose; volume; fractionation; adjuvant treatment; treatment in a skin fold area (e.g. inframammary fold or rectal cleft); use of bolus material; type of immobilisation; treatment technique.36 These factors need to be under constant review with changing work practices; for example, with the introduction of IMRT. Intrinsic factors are individual patient related, e.g. larger breast size2,36; higher body mass index (BMI)18,37,38; pre-existing conditions (e.g. psoriasis).21,39 Such intrinsic factors may enhance a skin reaction and therefore should be recorded as a baseline and closely monitored.12,40–42

Gosselin43 notes that some skin care products did show promising results but comparing data across studies is difficult because of the wide variety of differing assessment tools. By utilising skin assessment tools on at least a weekly review basis, it would be possible to monitor and record a patient’s skin reaction throughout the treatment stage.

Naylor and Mallet44 undertook a literature review to investigate the products being used for radiotherapy skin reactions and the evidence base behind their use. They identified certain products where evidence contraindicated use:

- Petroleum jelly45–47 as it may create a build up effect and is difficult to remove;
- Topical antibiotics unless there is a proven infection18,46,47;
- Topical steroids on broken skin due to the adverse effect on the wound healing process45,48–50;
- Gentian Violet due to potential carcinogenic side-effects.18,49,51

Another important aspect of skin care during radiotherapy is that of patient well being. It may not be possible to stop or even reduce the rates of skin reaction from occurring, but there may be comfort and psychosocial benefits that skin care products provide, such as empowerment and control.43 Recording of patient acceptability/satisfaction and compliance (as incorporated into some existing scales52) are helpful indicators of how appropriate a product will be for future use.

The survey

A panel of experts was consulted for the issues they felt required investigation in a survey of skin care practice. The panel consisted of a team from the Society and College of Radiographers, two leading nursing professionals, the Chair of the SCoR Research Group, and the authors of the recent systematic reviews. Initially the survey was large and unfocussed as panel members had different aspects of care they felt required exploration. Two previous surveys53,54 into radiotherapy skin care practice aided this survey construction and focus, as did an examination of the relevant literature.

D’hase et al.45 evaluated skin care during radiotherapy practice by nurses in Flanders. They designed a 58 item questionnaire structured into 4 main sections: preventative advice, advice for erythema, dry desquamation and moist desquamation. Dividing the questionnaire into these key sections seemed a logical easy to follow format which the project team adapted.

Swamy et al.46 developed a questionnaire to explore variations in radiation oncologist practice across the USA in managing breast cancer, specifically related to skin reactions. Their main questions focussed on prophylactic skin care, risk factors, topical products used, and percentages of patients with skin reactions. These themes were also built into the survey tool.

This final survey comprised of 61 questions, grouped into 8 sections (Table 1).

An advanced draft of the survey tool was reviewed by the SCoR Public and Patient Liaison Group and was also piloted at one radiotherapy department. Comments returned were minor and around clarity. These were incorporated and the survey tool finalised.

The final survey is a comprehensive tool which is relevant to UK radiotherapy practice.

Sample

A link to an on-line survey, using the Survey Monkey™ tool, was e-mailed to all radiotherapy department managers in the United Kingdom (N = 67) and they were invited to provide one response per department. A ‘back-up’ pdf file was also provided which could be printed off and a hard copy returned if required (2 departments used this option). Anonymity was maintained for all respondents.

Fifty-four departments responded within the allocated timeframe with a final response rate of 81%.

Main results

Not all departments responded to all questions, therefore n values stated for each result are associated with the number of responses to each particular question, as opposed to the number of returned responses.

Table 1

<table>
<thead>
<tr>
<th>Distribution of survey questions.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section</td>
</tr>
<tr>
<td>Pre-treatment — assessment</td>
</tr>
<tr>
<td>Pre-treatment — prophylactic skin care</td>
</tr>
<tr>
<td>During treatment — assessment</td>
</tr>
<tr>
<td>During treatment skin care — erythema</td>
</tr>
<tr>
<td>During treatment skin care — dry desquamation</td>
</tr>
<tr>
<td>During treatment skin care — moist desquamation</td>
</tr>
<tr>
<td>Post-treatment — assessment and skin care</td>
</tr>
<tr>
<td>Review of guidelines</td>
</tr>
</tbody>
</table>

Pre-treatment: assessment

All departments (n = 54) stated they provide verbal and written information to patients on how they should care for their skin during their course of radiotherapy. Forty six (n = 52 = 88%) departments stated they had skin care guidelines and protocols. Twenty seven (n = 52 = 52%) departments use their own locally developed guidelines or adaptations of existing national guidelines (Graph 1).

Skin assessment

Thirty eight (70%) departments stated that skin assessment prior to radiotherapy would be conducted by a radiographer.

Only thirteen (24%) use a skin assessment tool on all patients prior to radiotherapy; with 30 departments (55%) using no assessment tool at all (Graph 2).

The Radiotherapy Oncology Group (RTOG) skin assessment tool\(^5\) is the most commonly used by 20 departments (n = 30 = 46%); 24 departments chose not to answer this question.

Thirty six respondents (67%) reported no formal documentation and 22 (41%) do not review skin care products that a patient currently uses.

Forty two departments (77%) stated they knew their hospital had a tissue viability nurse (TVN), or equivalent, but liaison with this person was not commonplace.

Pre-treatment: prophylactic skin care

Twenty six (n = 38 = 68%) departments use aqueous cream as a prophylactic treatment (Table 2).

Five (n = 38 = 13%) departments recommend aloe vera for prophylactic skin care.

Nine (n = 38 = 23%) use a range of other products, for example: calendula; diprobase\(^6\); sucralfate\(^6\); skin sealant.

Sixteen (29%) departments chose not to answer this question.

During treatment: assessment

The range of responses to the questions on assessment of patients’ skin during treatment was varied, demonstrating no single clear practice was followed by the majority of departments. The one area where it was possible to identify practice that was comparable in several departments was the advice on using soap and deodorant, as shown below.

Forty-two (77%) departments specify the type of soap to use: ‘simple’, ‘dove’ or ‘none’ being the most common answers.

Nine (16%) specify the type of deodorant to use: ‘Pitrok’\(^5\) or a non-metallic being the most common answers.

Thirteen (24%) state no deodorant to be used.

During treatment: erythema

Aqueous cream is used by 49 (n = 50 = 98%) departments as a product to alleviate erythema (Table 3).

Aloe vera is used by 8 (n = 50 = 16%) departments.

A variety of other products are also used to a lesser extent.

Evaluation and cost effectiveness

Only 1 (n = 49) department is conducting a randomised controlled trial into the clinical effectiveness of a topical agent for erythema.

There were no assessments into the cost effectiveness of using creams and topical agents for erythema.

During treatment: dry desquamation

Twenty four (n = 44 = 54%) departments are using hydrocortisone 1% for dry desquamation (Table 4).

A variety of other products are used to a lesser extent.

Ten (18%) departments chose not to answer this question.

Table 2

| Prophylactic skin care products. Question 16 If yes, which prophylactic skin care product(s) does your department recommend? (please tick all that apply) |
|---|---|---|
| Answer options | Response percent | Response count |
| None | 0.0% | 0 |
| Aqueous cream | 68.4% | 26 |
| Chamomile and Almond oil | 0.0% | 0 |
| Aloe vera | 13.2% | 5 |
| Calendula | 2.6% | 1 |
| Biafine | 0.0% | 0 |
| Hyaluronic acid | 0.0% | 0 |
| Sucralfate cream | 0.0% | 0 |
| Diprobase cream | 7.9% | 3 |
| Skin sealant or barrier product i.e. Cavilon | 5.3% | 2 |
| Other | 7.9% | 3 |
| N/A | 31.6% | 12 |
| If other, please specify | 9 |
| answered question | 38 |
| skipped question | 16 |
During treatment: moist desquamation

A variety of products and dressings are used for moist desquamation but hydrogels were the most popular with 33 (n = 45 = 73%) departments using them (Table 5).

The various other products used included: 18 departments use hydrocolloid dressings (n = 45 = 40%); 21 silicone dressings (n = 45 = 46%); 7 lyofoam (n = 45 = 15%).

Three departments (n = 45 = 6%) use lanolin and 2 (n = 45 = 4%) gentian violet.

Nine (16%) departments chose not to answer this question.

Twenty nine (n = 47 = 61%) departments stated that those undertaking care of moist desquamation have received additional training in wound care management (Graph 3).

Only 3 (n = 46 = 6%) departments are conducting randomised controlled trials into the clinical effectiveness of a topical agent for moist desquamation.

There is one on-going assessment into the cost effectiveness of a product.

Post-treatment: assessment and skin care

37 (n = 47 = 78%) departments stated they supplied post radiotherapy moist desquamation skin care products for up to two weeks (2–3 days being the most common answer) after which they would expect the community nurse to continue supply and care.

Table 3
Skin care products for erythema.

<table>
<thead>
<tr>
<th>Question 29 If yes, which skin care product(s) does your department recommend for erythema? (please tick all that apply)</th>
<th>Answer options</th>
<th>Response percent</th>
<th>Response count</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>0.0%</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Aqueous cream</td>
<td>98.0%</td>
<td>49</td>
<td></td>
</tr>
<tr>
<td>Chamomile and Almond oil</td>
<td>0.0%</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Aloe vera</td>
<td>16.0%</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Calendula</td>
<td>0.0%</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Biafine</td>
<td>0.0%</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Hyaluronic acid</td>
<td>0.0%</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Sulfaffate cream</td>
<td>0.0%</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Diprobase cream</td>
<td>14.0%</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Skin sealant or barrier product i.e. Cavilon</td>
<td>8.0%</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>16.0%</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>N/A</td>
<td>0.0%</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>If other, please specify</td>
<td>12</td>
<td>59</td>
<td></td>
</tr>
<tr>
<td>answered question</td>
<td></td>
<td>59</td>
<td></td>
</tr>
<tr>
<td>skipped question</td>
<td></td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

Post-treatment: assessment and skin care

37 (n = 47 = 78%) departments stated they supplied post radiotherapy moist desquamation skin care products for up to two weeks (2–3 days being the most common answer) after which they would expect the community nurse to continue supply and care.

Table 5
Skin care products for moist desquamation.

<table>
<thead>
<tr>
<th>Question 45 If yes, which skin care product(s) does your department recommend for moist desquamation? (please tick all that apply)</th>
<th>Answer options</th>
<th>Response percent</th>
<th>Response count</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>0.0%</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Parafin or Lanolin Gauze</td>
<td>6.7%</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Hydrocolloid dressing</td>
<td>40.0%</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Silicone dressing e.g. Mepitel</td>
<td>46.7%</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>Gentian violet</td>
<td>4.4%</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Dermofilm</td>
<td>0.0%</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Second skin</td>
<td>2.2%</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Hydrogel</td>
<td>73.3%</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>Lyofoam</td>
<td>15.6%</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>28.9%</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>N/A</td>
<td>0.0%</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>If other, please specify</td>
<td>20</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>answered question</td>
<td></td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>skipped question</td>
<td></td>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>

Limitations of the survey

There are certain limitations to the survey that need to be recognised and which may have affected results.

As the survey was sent to each radiotherapy departmental manager and they selected who completed the survey and anonymously returned data, it is unknown who and what department answered. Therefore, it is also unknown if the responses expressed are individual views or departmental policy.

It is not possible to know if each question was fully understood in the manner intended as there was no ‘face to face’ follow up. The disparity in results could be owing to misinterpretation of a question, although the authors believe this reflects the unknown statistics as many departments do not routinely record this data.

It is unknown if all questions were answered honestly or if the survey was given the answer the respondent felt was correct. For example, do more departments use gentian violet in reality but felt this was an incorrect response to declare?

Discussion

The survey highlights the need for departments to undertake a baseline assessment of the patient’s current skin condition. Despite papers emphasising the potential risk factors35,36 which

Question 47 Has the person who primarily undertakes skin care for moist desquamation received additional training in wound care management?

<table>
<thead>
<tr>
<th>Question 47</th>
<th>Response percent</th>
<th>Response count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>10.6%</td>
<td>35</td>
</tr>
<tr>
<td>No</td>
<td>51.7%</td>
<td>81</td>
</tr>
<tr>
<td>Don’t Know</td>
<td>37.7%</td>
<td>51</td>
</tr>
</tbody>
</table>

Response count = 47

Graph 3. Training in wound care management.
may exacerbate a skin reaction these are not routinely recorded. Over two thirds of the respondents to this survey did not routinely assess and formally record the patient’s skin prior to radiotherapy. Without the collection of such data it is difficult to attain a complete picture of the extent of radiotherapy induced reactions, which will be essential for improved research and skin care studies. Furthermore, over a third of respondents failed to assess and record skin care products currently being used by patients, hence it is possible that unsuitable skin care practices may be being used unmonitored by the health care team; potentially exacerbating radiotherapy skin reactions.

The importance of linking with other sectors of care, especially a Tissue Viability Nurse (TVN), or equivalent, would strengthen improved communication, understanding and consistency of radiotherapy skin care across the care pathway thereby avoiding patient and staff confusion. It is disheartening that many departments did not know if their hospital had a TVN and did not collaborate on skin care with this person.

A main area of variation across departments relates to washing instructions and the use of soap and deodorant (also confirmed by other studies13,53,58). The traditional patient advice of not to wash the affected area with soap and water, or even use water alone is still given, despite little evidence that this is unnecessary60,61,62 and there should be no restriction to using a specific type of soap60,61,63–67. Over two thirds of respondents in this survey reported washing restrictions (i.e. either no soap, or limited to specific brands such as ‘simple’68 and ‘dove’69); this has the potential to unnecessarily control choices and preferences an individual may have.

Still referencing traditional practice may be a factor affecting patient social well being. For example, breast cancer patients who are advised not to use a deodorant often cite this as one less area of control they have in their life.68 Additionally, we need to consider whether or not patients actually comply with these instructions.43

The survey illustrates that there are numerous products for radiotherapy skin care available and there is no consensus as to the best practice, causing an inconsistency of care.57

As noted by Russell34 if the underlying cause of a radiation reaction is physiological and the extent is genetically predisposed topical agents are unlikely to realistically have any significant effect. Currently the quality and quantity of studies evaluating topical agents appears to be insufficient to support or refute any specific product62,69 and the survey indicated there were minimal on-going assessments into skin care products; therefore it would appear progress into understanding what actually may work will be slow.

Aqueous cream is commonly recommended by most departments and is a relatively cheap readily available moisturising agent, and recommended by the recently withdrawn College of Radiographer’s 2000 guidelines.1 However, the evidence base indicates that type of regime applied preventatively and to erythema appears to have no influence in a skin reaction occurring70–72. Therefore, there needs to be further debate about this aspect of care and the evidence base supporting actions. Furthermore, 16% of responding departments reportedly advise patients to use topical aloe vera which may incur a substantial cost either to the institution or to the individual, yet there is limited evidence73 as to any benefit obtained using this agent over another and therefore no justification without further detailed studies for this recommendation to patients.74,78

Hydrocortisone 1% is frequently used (over 50% of respondents reported using this cream) for dry desquamation reactions, in line with the College of Radiographer’s 2000 guidelines.1 This is despite current ‘contradictory’ evidence13,53,54,62,75–77. This is in line with ‘contradictory’ evidence13,53,54,62,75–77, further illustrating how clinical practice has not kept pace with emerging research evidence.

Product use varies considerably, hydrogels are the most commonly used (over 70% of respondents) but there is conflicting evidence as to their effect on wound healing.78,79

Gentian violet and lanolin are still used (10% of respondents reported using these products) despite contraindications for use18,80. In a small randomised controlled trial (n = 30) comparing gentian violet and hydrogel dressings for moist desquamation80 the gentian violet was significantly less effective (p = 0.0003) and also less well tolerated by patients. This again demonstrates our propensity to continue with familiar traditional practice rather than an openness to test the effectiveness of products.

There were no assessments into the cost effectiveness of using creams and topical agents for erythema or dry desquamation and only one assessment of a product for moist desquamation.

With the introduction of more expensive skin care treatments to a vulnerable clientele market, health care professionals need to consider if such products are more effective than their cheaper comparators and why centres choose one product over another.60,54,81,82. This is an important facet of modern health care with the necessity for justification for actions and seems to have been almost totally overlooked.

There may be problems with product supply and continuity of care after treatment. Not all departments routinely supplied skin care products for moist desquamation post-treatment. For those that did, the majority provided products for up to 2–3 days post radiotherapy, with an expectation that community care providers would then take over skin care following this period. This means that about 20% of responding departments did not provide skin care products post radiotherapy. Therefore, in the period when most skin reactions build up to their maximum there may be variability and inconsistency in product availability.

An evaluation into the treatment after care requires review to ensure local continuity of care across the pathway; a general need highlighted by a recent Department of Health cancer patient experience survey.83 It is essential that the whole health care pathway of a patient is considered and reviewed to ensure best practice.

Conclusion

The survey appears to indicate that skin care advice to patients undergoing radiotherapy in the UK is varied. Currently, some of the skin care provided may not alleviate the problem and indeed may even compound the effect. This area of patient care is time consuming and expensive, therefore it is important to understand what is being done and why.2

As Kedge16 noted, and as the results of this survey show, the College of Radiographers (CoR) guidelines1 need updating, paying particular attention to advice about deodorant use, aqueous cream for erythema, use of hydrocortisone 1% for dry desquamation, and the use of hydrogels and hydrocolloids for moist desquamation. Given that the survey shows that the CoR 2000 guidelines1 were followed by the majority of departments, it is reasonable to assume that revised guidelines would be followed and so provide an appropriate base for future evaluation of skin care practices.

The results indicate that not all radiotherapy departments are monitoring and documenting skin morbidity in a systematic way. Departments need to routinely monitor, assess and document skin reactions using standard grading systems, and noting intrinsic and extrinsic related factors. Although the majority of skin reactions tend to subside after a few weeks, some can be prolonged, uncomfortable and distressing, thereby affecting a patient’s quality of life.84 As Gosselin et al noted, ‘patients prefer to take action rather than do nothing’72 so the focus for skin care should be on alleviating symptoms and providing comfort.
Recommendations

- All radiotherapy departments should implement pre-treatment assessment and baseline, and weekly reviews of skin condition using a validated tool and process. Skin care practice should also be agreed across the cancer network, in line with the requirement for agreed radiotherapy protocols as recommended within the Cancer Peer Review Measures for Radiotherapy (England).

- New high quality trials to investigate interventions for dry or moist desquamation are urgently required; enabling a more consistent approach for patients receiving radiotherapy and to inform guidelines.

- The College of Radiographers skin care guidelines1 must be revised as the evidence on which they were based is no longer valid.

- Evaluation of treatment after care requires review to ensure local continuity and consistency of care across the patient pathway.

- Research into patient preferences and compliance with skin care information and products should be undertaken in order to inform future national guidelines.

Conflict of interest

None.

Acknowledgements

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