Barrier products in the treatment of incontinence-associated dermatitis

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Conflict of interest
None declared.

Abstract
This article reviews contemporary primary research studies to establish the evidence supporting the use of barrier products and evaluate practice regarding their use in the acute hospital setting. Six primary research studies investigating the use of barrier products for preventing and managing incontinence-associated dermatitis were reviewed. The aim was to identify the most effective treatments for incontinence-associated dermatitis to enhance the quality of life of patients. The studies identified that there is no significant difference in efficacy between petrolatum, zinc oxide oil and a polymer-based barrier film, and that a polymer-based barrier film is more cost-effective than petrolatum or zinc oxide. However, further robust research studies are required to inform practice. The efficacy and cost-effectiveness of barrier products can be enhanced by providing education in clinical practice on consistent skin care regimens and effective use of barrier products.

Keywords
barrier products, excoriation, incontinence-associated dermatitis, moisture damage, moisture lesion, skin care, skin maceration, wound care

Aims and intended learning outcomes
This article reviews contemporary primary research studies to establish the evidence supporting the use of barrier products to prevent and manage incontinence-associated dermatitis in the acute hospital setting and improve patients’ quality of life. After reading this article and completing the time out activities you should be able to:

» Define incontinence-associated dermatitis and describe the sources of moisture that may cause it.
» Describe different barrier products and the evidence supporting their use.
» Discuss the efficacy and cost-effectiveness of petrolatum, zinc oxide oil and a polymer-based barrier film.
» Explain the benefits of a consistent skin care regimen and effective use of barrier products.
» Identify incontinence-associated dermatitis resources available in your workplace.

Introduction
Incontinence-associated dermatitis is inflammation of the skin that occurs when there is prolonged exposure of perineal or perigenital skin to urine or stools (Gray et al 2007, Beeckman et al 2015). It is important to recognise incontinence-associated dermatitis not only as a specific problem in continence care, but also as a common problem encountered in many patient groups (Dowsett and Allen 2013). Incontinence-associated dermatitis is also referred to as moisture lesions, perineal dermatitis or diaper dermatitis (Dowsett and Allen 2013). Other sources of moisture that are associated with moisture lesions include perspiration, wound exudate, mucus and saliva (Defloor et al 2005, Gray et al 2011).

Incontinence-associated dermatitis presents as red skin, with or without ‘weeping’ (exudate), sometimes appearing as blisters (Junkin and Selekof 2007, Beeckman et al 2011) or with loss of...
superficial skin layers (Figure 1) (Zimmaro Bliss et al 2006). It is often confused with superficial pressure ulceration (Beeckman et al 2007) and may coexist with pressure ulcers (Zimmaro Bliss et al 2006). Exposure to moisture sources alone does not result in damage to the skin, instead skin damage is the result of multiple factors, including the chemical content of the moisture source, mechanical factors such as friction and pathogenic microorganisms (Gray et al 2011).

TIME OUT 1
Consider the definition of incontinence-associated dermatitis in relation to your practice setting and the patients you work with. What moisture sources most commonly affect patients in your care?

Urinary and faecal incontinence are common in patients in the acute care setting and may lead to skin breakdown, especially in patients with faecal incontinence (Junkin and Selekof 2007). Faeces contain proteolytic and lipolytic digestive enzymes as well as bacteria, which contribute to skin irritation. Urinary incontinence creates an alkaline environment which will also irritate the skin (Gray et al 2002, Holloway and Jones 2005, Gray 2007). The prevalence of incontinence-associated dermatitis is estimated to be 20-27% in the acute care setting (Heywood and Holloway 2014). Incontinence-associated dermatitis presents a significant health challenge, especially in older people (Thompson et al 2005). In 2014, more than 11.4 million people in the UK were aged 65 years and over (Office for National Statistics 2015). With an increasing ageing population, incontinence-associated dermatitis is likely to have a significant effect on tissue viability services.

TIME OUT 2
List the factors that contribute to incontinence-associated dermatitis in your practice setting, and write down the reasons for this.

Beeckman et al (2010) identified incontinence-associated dermatitis as an important problem in nursing. The condition can lead to pain, distress and anxiety for patients (Warshaw et al 2002, Colpman 2014, Rodgers et al 2014). However, it is frequently misdiagnosed and treatment is often suboptimal (Corcoran and Woodward 2013). It is increasingly apparent that a standardised protocol for skin care is required, however there are no national guidelines for incontinence-associated dermatitis (Corcoran and Woodward 2013).

Barrier products for the treatment of incontinence-associated dermatitis
Factors that might influence the management of incontinence-associated dermatitis include cleansing products, perianal pouches, incontinence pads, barrier products and skin care (Gray et al 2002, Wolfman 2010). Several studies advise that barrier products should be used to protect the skin and prevent broken skin from further damage (Bliss et al 2007, Cooper et al 2012, Dowsett and Allen 2013). If untreated, incontinence-associated dermatitis can progress to ulceration and secondary bacterial or fungal infections (Thompson et al 2005, Bliss et al 2007).
No single barrier product has been found to be more effective than any other in the acute hospital setting, possibly because of insufficient clinical evidence (Corcoran and Woodward 2013).

TIME OUT 3
Note the barrier products that are available in your practice setting. What is the main ingredient in each product? What type of product is it? For example, is it a spray, cream or lotion?

The cost-effectiveness of a patient’s care is important given the financial pressures in the NHS (Voegeli 2011). There is no exact figure for expenditure on incontinence-associated dermatitis management in the UK (Baadjies et al 2014). Spending on zinc oxide, dimeticone and other barrier products was more than £2.8 million in England in 2003-2013 based on prescriptions dispensed in the community (Health & Social Care Information Centre 2014); this does not include prescriptions dispensed in hospitals. Caring for patients with incontinence-associated dermatitis can also expend significant nursing hours (Voegeli 2008). Therefore, the financial effects of incontinence-associated dermatitis management on the NHS are considerable (Baatenburg de Jong and Admiraal 2004, Thompson et al 2005, Ichikawa-Shigeta et al 2014).

TIME OUT 4
Consider the barrier products in your practice setting. How much does each product cost? How many products are used each week and each month?

The Code: Professional Standards of Practice and Behaviour for Nurses and Midwives (Nursing and Midwifery Council 2015) emphasises the importance of basing practice on the best evidence available. Therefore, this article reviews contemporary primary research studies to establish the evidence supporting the use of barrier products in the acute hospital setting, to ensure optimal patient care and effective use of resources.

Literature review
The following databases were searched to identify appropriate literature: MEDLINE, Embase, British Nursing Index and Cumulative Index to Nursing and allied Health Literature Plus, as well as the following websites: the Cochrane Database of Systematic Reviews, Department of Health and the National Institute for Health and Care Excellence. The chosen key words were: incont*, dermatitis*, moist*, lesion*, damage*, pressure ulcer*, excoriat*, macerat* barrier*, product* and IAD. Truncation was used to expand the scope of the literature search and key words were combined with their synonyms using Boolean operators (AND, OR, or NOT) to refine searches. For example, (incont* AND dermatitis*) OR (moist* AND lesion*) NOT (pressure ulcer*).

The inclusion criteria was studies involving humans and exclusion criteria were pressure ulcers and other types of dermatitis. The search was limited to studies published in English between 2005 and 2015. Snowballing techniques, using the reference lists of studies identified from the initial search to locate additional studies, were also used to expand the search, so that the terms petrolatum ointment*, zinc oxide oil*, polymer-based barrier film*, dimeticone* and cyanoacrylate* were added after an initial review of the literature.

A total of 21 studies were identified, duplicated studies were removed, and 18 unique studies were selected. Eight primary studies that discussed incontinence-associated dermatitis were identified. Six of these studies provided evidence to support the use of barrier products and/or compared the use of barrier products in the prevention and treatment of incontinence-associated dermatitis (Table 1). Four of the six studies focused on prevention and two studies focused on treatment. Four of the six studies were sponsored by the companies that make barrier products. The implications of this are discussed later in this article.

Findings
Two themes emerged from reviewing the six studies: the efficacy of barrier products and their cost. The components of barrier

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**KEY POINT**

“No single barrier product has been found to be more effective than any other in the acute hospital setting, possibly because of insufficient clinical evidence (Corcoran and Woodward 2013)”
products help to prevent irritants or moisture from coming into contact with the skin. Barrier products act either by forming a physical barrier using ointments, lotions and creams, or by forming a film on the skin after a solvent has evaporated (Hoggarth et al 2005). The components discussed in the six studies analysed were: petrolatum ointments (such as Vaseline), zinc oxide oil, polymer-based barrier film, dimeticone and cyanoacrylate.

**Efficacy of barrier products**

Zehrer et al (2004) conducted a six-month descriptive study comparing petrolatum ointments with a polymer-based barrier film in nursing homes in the US. There were five groups in the study, based on the product used at the nursing home:

- **Group 1** used Aloe Vesta (ConvaTec) petrolatum ointment.
- **Group 2** used SECURA (Smith & Nephew) petrolatum ointment.
- **Group 3** used Baza Protect (Coloplast) petrolatum ointment.
- **Group 4** used Cavilon (3M) barrier film – once daily application.
- **Group 5** used Cavilon (3M) barrier film – three times weekly application.

Group 3 was excluded from the study, since no nursing homes using Baza Protect were identified at the recruitment stage.

A total of 250 residents who were doubly incontinent of urine and faeces, with intact perineal skin (75.6% female; 51% aged 81-90 years), were enrolled in the study from four nursing homes. Only three of the five groups (groups 2, 4 and 5, n=183) completed the study. Group 1 (n=67) withdrew because of changes in the nursing home management that were not related to the study. The product used in group 2 was applied after each episode of incontinence, whereas the products used in group 4 and group 5 were applied once daily and three times weekly respectively.

During the 90-day follow up, 6/183 (3.3%) residents developed new incontinence-associated dermatitis, of which three were in group 4, two were in group 5 and one was in group 2. The study concluded that there was no significant difference between protocols of care (P=0.4448), indicating that the barrier products compared had similar efficacy for preventing incontinence-associated dermatitis.

Bliss et al (2007) also observed no significant difference between four barrier

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**TABLE 1. Research studies identified in the literature review**

<table>
<thead>
<tr>
<th>Authors (year of publication)</th>
<th>Title</th>
<th>Journal citation</th>
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<tbody>
<tr>
<td>Hoggarth et al (2005)</td>
<td>A controlled, three-part trial to investigate the barrier function and skin hydration properties of six skin protectants.</td>
<td>Ostomy/Wound Management. 51, 12, 30-42.</td>
</tr>
</tbody>
</table>
products ($P=0.55$). This was a multi-site open-label quasi-experimental study conducted in nursing homes in the US, in which 981 participants who were incontinent (80.1% female, 96% ≥65 years old) with intact perineal skin from 16 nursing homes were randomly selected. There were 771/981 (78.6%) of the participants who were doubly incontinent of urine and faeces. The barrier products compared in the study were a polymer-based barrier film (Cavilon), an ointment with 43% petrolatum (Aloe Vesta), an ointment with 98% petrolatum (SECURA) and a cream with 12% zinc oxide and 1% dimeticone with petrolatum (Baza Protect). The polymer-based barrier film was applied three times weekly, whereas all other barrier products were applied after each episode of incontinence. Of the residents enrolled in the study, 33/981 (3.4%) developed new incontinence-associated dermatitis during the 6 weeks of the study. Of the participants who developed incontinence-associated dermatitis, 48% were doubly incontinent.

The studies by Zehrer et al (2004) and Bliss et al (2007) had a similar gender mix. Both studies involved older adults, although the age of the participants in the study conducted by Zehrer et al (2004) was greater. However, the doubly incontinent status of patients differed. In the Zehrer et al (2004) study, 100% of patients were doubly incontinent of urine and faeces, whereas 78.6% of patients were doubly incontinent in the Bliss et al (2007) study. There were 981 patients enrolled in the Bliss et al (2007) study; this was more than three times the number enrolled in the Zehrer et al (2004) study. This larger sample size means that the findings could be generalised to a larger population, or to a similar population with incontinence issues.

There was suboptimal concordance with the study protocols in the Zehrer et al (2004) study. For example, two of three petrolatum ointments were withdrawn early or excluded from the study. Moreover, the once daily Cavilon protocol was switched to three times weekly after six weeks of the study, without explanation. There was a higher rate of staff adherence and concordance with skin damage prevention regimens in the Bliss et al (2007) study compared to the Zehrer et al (2004) study. Bliss et al (2007) may have delivered a more comprehensive educational package to staff than Zehrer et al (2004), thus enhancing the overall rate of concordance.

Hoggarth et al (2005) indicated that in terms of barrier effectiveness against irritants, the most effective barrier products were those that contained zinc oxide ($P<0.005$), followed by water-in-oil and non-aqueous based formulations.

### TABLE 2. Products used in the Hoggarth et al (2005) study

<table>
<thead>
<tr>
<th>Product name</th>
<th>Description</th>
<th>Barrier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aloe Vesta protective ointment</td>
<td>Water-in-oil based ointment</td>
<td>Petrolatum</td>
</tr>
<tr>
<td>Proshield Plus skin protectant</td>
<td>Non-aqueous based ointment</td>
<td>Dimeticone</td>
</tr>
<tr>
<td>Triple Care protective cream</td>
<td>Oil-in-water based paste</td>
<td>Zinc oxide</td>
</tr>
<tr>
<td>Baza Cleanse &amp; Protect lotion</td>
<td>Oil-in-water lotion</td>
<td>Dimeticone</td>
</tr>
<tr>
<td>Calmoseptine ointment</td>
<td>Ointment</td>
<td>Zinc oxide</td>
</tr>
<tr>
<td>Cavilon one-step skin care lotion</td>
<td>Oil-in-water lotion</td>
<td>Dimeticone</td>
</tr>
</tbody>
</table>

Hoggarth et al (2005) indicated that in terms of barrier effectiveness against irritants, the most effective barrier products were those that contained zinc oxide ($P<0.005$), followed by water-in-oil and non-aqueous based formulations (Table 2). The oil-in-water based formulations were the least effective barrier product.

The barrier effect was investigated by applying an irritant (sodium lauryl sulphate) via an occlusive patch on top of each product applied to skin. The results were evaluated every 24 hours over the five-day period. Healthy volunteers were recruited for this study using skin on the volar forearms and upper arms,
rather than individuals vulnerable to the condition who were incontinent with intact perineal skin. There is little similarity between this group and the patients with incontinence-associated dermatitis in the other studies. Therefore, the research findings are not comparable and there is limited contribution to the evidence base.

In Canada, Woo (2014) studied a cyanoacrylate barrier film coloured with a purple tint for managing superficial skin lesions, including partial-thickness pressure ulcers, skin tears and incontinence-associated dermatitis. The coloured cyanoacrylate barrier—Marathon Liquid Skin Protectant (Medline Industries)—enables healthcare professionals to identify the area where the barrier product is applied to avoid unnecessary reapplication.

This study compared the cyanoacrylate barrier film with petrolatum ointment containing dimeticone—Critic-Aid Clear (Coloplast). Half of the 12 patients in the study with moisture-associated skin damage in a chronic care facility were assessed for seven days after petrolatum treatment and another seven days using cyanoacrylate. After seven days of using cyanoacrylate, there was significant improvement noticed in erythema ($P=0.003$), erosion ($P=0.006$) and exudate ($P=0.017$). However, these results should be interpreted with caution, since only six participants with moisture-associated skin damage were recruited to the study. Moreover, improvement with cyanoacrylate was observed after seven days treatment using petrolatum followed by a further seven days treatment using cyanoacrylate.

The advantages of the study design are that it uses the same patients with the same skin conditions and same wound dimensions, reducing variation between study samples. However, it is difficult to determine whether the carryover effect of seven days treatment with petrolatum had an effect on the results of the cyanoacrylate treatment. Moreover, the small sample size ($n=6$), means that findings may not be generalisable.

Cost-effectiveness

Zehrer et al (2004) and Bliss et al (2007) analysed cost-effectiveness and recognised that there were cost savings to be made when using a polymer-based barrier film. The mean number of episodes of incontinence per day were similar in both studies: 4.61 ($\pm2.307$) and 6.0 respectively. Zehrer et al (2004) examined cost differences using decision-analysis software and a cost equation. They concluded the nursing homes could save 47-78% per year in product costs and 56-81% in labour costs by using a polymer-based barrier film, after calculating the daily cost of all products with and without labour. However, a statistical analysis was not included.

Bliss et al (2007) indicated that the use of a barrier film three times weekly had significantly lowered the total costs ($P<0.001$), despite the higher cost of the
cleanser in the use of a polymer-based barrier film compared with the other regimens. Costs included total product costs, together with labour costs associated with barrier application, skin cleansers and supplies. Bliss et al (2007) did not appear to have included the cost of cleansing patients more than three times weekly in their calculation of the total labour cost. This may be because a polymer-based barrier film was to be applied three times weekly. However, additional labour costs associated with applying other products more often than three times weekly should be considered when comparing the total costs with those of other barrier products.

Woo (2014) considered time, products and supplies in his cost analysis, which compared cyanoacrylate with petrolatum for treating incontinence-associated dermatitis. He concluded that for the six patients with moisture-associated dermatitis, the average cost of petrolatum treatment per patient was $46.20 per week, and the cost of cyanoacrylate treatment per patient was $12.26 per week, with similar results. A potential cost saving of 73.5% could be made using cyanoacrylate, when compared with petrolatum. However, no statistical analysis was reported, and the study is limited by the small sample size (n=6) and the short monitoring period of seven days. Moreover, a convenience sample was used in the study.

Convenience (accidental) sampling is a non-probability sampling method; using the most conveniently available sample as participants (Nieswiadomy 2008, Loiselle et al 2010). One difficulty is that the sample is sometimes atypical of the target population, which could lead to the risk of bias and erroneous findings (Polit and Beck 2004). Nonetheless, convenience sampling is the most frequently used method in healthcare research (Nieswiadomy 2011) and is often used in a preliminary trial or pilot study to test a methodology (Polit and Beck 2012).

The study conducted by Woo (2014) is a starting point for research. However, a larger research study using long-term surveillance is required to validate the research findings.

Baatenburg de Jong and Admiraal (2004) also evaluated the cost of treating incontinence-associated dermatitis. This was a single-centre open-labelled study that compared treatment with zinc oxide oil with a polymer-based barrier film (Cavilon) for patients with moderate to severe incontinence-associated dermatitis, over 14 days of treatment in the Netherlands. There were 40 patients (66.7% female, mean age 85.1±7.2 years in the polymer-based barrier film group and 83.3±7.8 years in the zinc oxide group) with incontinence-associated dermatitis initially involved. Ten patients ended their participation in the study prematurely as a result of healing (n=5), death (n=4), and high fever and hypotension (n=1).

Zinc oxide oil was applied each morning and evening and after each episode of incontinence, whereas the barrier film was applied every 48-72 hours for moderate skin damage and 24-48 hours for severe damage. The study concluded that after the 14-day trial, the mean total costs were lower for patients treated with the barrier film (€76.13) than for patients treated with zinc oxide oil (€102.96), with similar improvements to their skin condition (P=0.05). However, no statistical analysis was reported for costs.

These findings would be more robust if the drop-out rate for the study was lower, the treatment period was longer and the scale used to rate skin condition was easier to follow. There were some similarities between the scales used by Baatenburg de Jong and Admiraal (2004) and the four-point scale used by Zehrer et al (2004), but neither used a standardised scale. The studies emphasise that a standardised tool for rating incontinence-associated dermatitis condition and severity is required.

Discussion

Four of the six studies selected for the literature review (Baatenburg de Jong and Admiraal 2004, Zimmaro Bliss et al 2006, Bliss et al 2007, Woo 2014) were supported by educational grants from product suppliers. Woo (2014) received an unrestricted research grant, which could be...
inferred as imposing less potential bias than a grant associated with a particular research question. The other three studies were funded by the education grants for their specific purposes. Two authors (Zimmaro Bliss and Zehrer) in the Zimmaro Bliss et al (2006) study were disclosed as 3M Health Care employees. The four studies sponsored by product suppliers resulted in high-quality research in respect to research methodology and data analysis.

Petrolatum, often thickened with zinc oxide, has a greasy consistency which can impair the adhesion of an external appliance to the skin. It also tends to adhere to skin, making it difficult to remove, and it may affect the performance of absorbent incontinence pads (Baatenburg de Jong and Admiraal 2004, Woo 2014). These properties mean that petrolatum and zinc oxide take longer to remove from the skin compared with a barrier film. Barrier films resist removal by cleansing; this extends the protection they provide from bodily fluids. Barrier films do not transfer to an incontinence pad in the same way as petrolatum, which could contribute to their effectiveness (Bliss et al 2007).

It is suggested that a barrier film should be reapplied three times weekly as indicated by previous studies (Baatenburg de Jong and Admiraal 2004, Zehrer et al 2004, Bliss et al 2007). However, it is difficult to identify when a barrier film needs to be reapplied, since it is transparent. Bliss et al (2007) based their recommendations for reapplying a barrier film on shift allocations and daily staffing levels in nursing home settings. These recommendations may be increasingly challenging in an acute hospital setting, because of the absence of designated documents for incontinence-associated dermatitis management and frequent staff turnover.

Research suggests that there is no significant difference in the efficacy of petrolatum, zinc oxide oil and a polymer-based barrier film (Zehrer et al 2004, Bliss et al 2007). However, polymer-based barrier films appear to be more cost-effective than petrolatum or zinc oxide oil (Baatenburg de Jong and Admiraal 2004, Zehrer et al 2004, Bliss et al 2007).

Cyanoacrylate barrier film was shown to be more cost-effective than petrolatum treatment (Woo 2014); however, no studies have compared a polymer-based barrier film with cyanoacrylate.

Education on consistent skin care regimens and appropriate use of barrier products is likely to have an important role in their efficacy and cost-effectiveness. Cavilon barrier film has been included in the wound dressing formulary at the author’s healthcare organisation. The author recommends an ongoing education programme for healthcare staff on the appropriate use of a barrier film and to achieve cost-effectiveness for this product (Bale et al 2004, Junkin and Selekof 2007).

An education programme could also be included in an induction course or in ward-based teaching such as poster displays. An effective method of documenting each application of barrier film should be implemented. The author suggests that barrier film application could be recorded in relation to skin care as part of the hygiene assessment record on the electronic patient information system.

Ongoing education is required to achieve organisation-wide recognition and concordance with skin care protocols for incontinence. The author recommends that incontinence-associated dermatitis management guidelines should be incorporated in the healthcare organisation’s wound assessment and management policy, which may be accessed via electronic patient management systems.

**TIME OUT 5**

Locate the information related to incontinence-associated dermatitis available in your workplace. Read the documents or guidance and consider how you would apply the information to your practice. If no guidance is available, consider what information should be included. Discuss your findings with your colleagues and manager.

**TIME OUT 6**

Access the resources available at: www.ucvvgent.be/IAD/index.html from the European Pressure Ulcer Advisory Panel (2014) on incontinence-associated dermatitis. Consider how these resources could be used to enhance practice in your area.
Conclusion
There is no significant difference in the efficacy of petrolatum, zinc oxide oil and a polymer-based barrier film. However, a polymer-based barrier film appears more cost-effective than petrolatum or zinc oxide oil. Cyanoacrylate barrier film also appears to be more cost-effective than petrolatum treatment; however, no studies have compared a polymer-based barrier film with cyanoacrylate. This review of the primary research literature has identified the need for robust studies with larger sample sizes and longer surveillance periods to validate the existing findings and compare the marketed barrier products available. Further research may improve the care of patients with incontinence-associated dermatitis and enhance their quality of life.

TIME OUT 7
Now that you have completed the article you might like to write a reflective account as part of your revalidation.

References


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Incontinence-associated dermatitis

TEST YOUR KNOWLEDGE BY COMPLETING SELF-ASSESSMENT QUESTIONNAIRE 853

1. Incontinence-associated dermatitis:
   a) Presents as red skin with or without exudate
   b) May involve blisters or loss of superficial skin layers
   c) Occurs when urine or stools have prolonged contact with skin
   d) All of the above

2. How does urinary incontinence contribute to skin irritation?
   a) It creates an alkaline environment
   b) It creates an acid environment
   c) It contains proteolytic enzymes
   d) It contains lipolytic enzymes

3. Which is not a potential consequence of untreated incontinence-associated dermatitis?
   a) Ulceration
   b) Bacterial infection
   c) Fungal infection
   d) Enhanced skin healing

4. Barrier product ointments, lotions and creams:
   a) Keep irritants and moisture in close contact with the skin
   b) Protect the skin and prevent broken skin from further damage
   c) Are more effective than barrier film products
   d) Are less effective than barrier film products

5. Polymer-based barrier film products:
   a) Act by forming a physical barrier
   b) Act by forming a film on the skin after a solvent has evaporated
   c) Are less cost effective in terms of product costs than barrier product ointments or creams
   d) Are less cost effective in terms of labour costs than barrier product ointments or creams

6. Polymer-based barrier film products:
   a) Appear more cost effective than petrolatum or zinc oxide oil
   b) Require more frequent application than petrolatum or zinc oxide oil
   c) Show improved treatment outcomes when compared with petrolatum
   d) Adversely affect the performance of absorbent incontinence pads

7. Coloured cyanoacrylate barrier film:
   a) Appears less cost effective than petrolatum
   b) Requires more frequent application than petrolatum or zinc oxide oil
   c) Shows improved treatment outcomes when compared with petrolatum
   d) Enables the nurse to determine when it should be reapplied

8. Low incidence of incontinence-associated dermatitis after application of barrier products is associated with:
   a) A defined skin-care regimen
   b) Regular in-service education
   c) Reinforcement of incontinence-associated dermatitis prevention protocols
   d) All of the above

9. What is the estimated prevalence of incontinence-associated dermatitis in acute hospitals patients?
   a) 7-10%  
   b) 10-20%  
   c) 20-27%  
   d) 27-35%

10. A disadvantage of using petrolatum-based products is:
    a) They are easy to remove
    b) They are difficult to remove
    c) They improve the performance of absorbent incontinence pads
    d) They should be applied three times weekly

How to complete this assessment

This self-assessment questionnaire will help you to test your knowledge. It comprises ten multiple choice questions that are broadly linked to the CPD article in this issue. There is one correct answer to each question.

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This self-assessment questionnaire was compiled by Beth Knight

The answers to this questionnaire will be published on 3 August

Answers to SAQ 851 on gastrointestinal care for older people, which appeared in the 6 July issue, are:

1. b 2. c 3. d 4. c 5. a 6. c 7. d 8. d 9. a 10. b