NURSES SPECIALIZED IN
WOUND, OSTOMY AND CONTINENCE
CANADA

INFIRMIÈRES SPÉCIALISÉES EN
PLAIES, STOMIES ET CONTINENCE
CANADA

Paediatric Incontinence-Associated Dermatitis: Canadian Best Practice Recommendations

JULY 2023

NOTES

DISCLAIMER

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Technical writer and project manager John Gregory, IIWCC, ISWA, Opencity Inc., edited and produced these best practice recommendations in collaboration with a paediatric community of practice of volunteers.

Nurses Specialized in Wound, Ostomy and Continence Canada (NSWOCC) operates on the traditional and unceded territory of the Algonquin Anishinaabe Nation.

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CONFLICTS OF INTEREST

Ashley Hudson is an employee of Smith + Nephew. Shelley Masyoluk is an employee of Medline. No other conflicts of interest were noted.

INTRODUCTION

Diaper dermatitis is a term delineating incontinence-associated dermatitis in those wearing diapers. It is often used in the context of children, albeit not exclusively. Diaper dermatitis (DD) is an acute, inflammatory skin reaction that occurs in the diaper area. DD manifests as erythematous, eczematous patches that spare the folds, without infection, but affect the buttocks, perianal area, genitals, inner thighs, and waistline.[1] It is the most common dermatological condition impacting infants typically between 9-12 months of age and diapered children.[2,3]

Incontinence-associated dermatitis (IAD) has become established as the preferred term; however much of the published literature and assessment tools are oriented to the adult population. Paediatric and neonatal skin are not as mature as adult skin.[4] It appears essential to differentiate IAD in paediatrics. The authors have adopted the term paediatric incontinence-associated dermatitis (PIAD) to reflect that this applies to a broader paediatric population beyond which the infants become continent and the widespread use of diapers ends. It also helps convey that the diaper is not the cause of the condition.

Familiarity with consistent definitions is imperative to enable communication among members of the interprofessional team and to make the correct choice of strategies for prevention and management.

Dunk and colleagues published an opinion editorial in Journal of Tissue Viability in January 2023 asking whether it is time to retire use of the term diaper dermatitis.[5] We agree with challenging this phrase, which now appears misleading.[5,6] Consequently, we refer to PIAD throughout the rest of this manuscript noting that the work referred to in the literature describes diaper dermatitis and other related names.

This document provides recommendations for nurses with added information to assist caregivers of infants/children and families in preventing and managing PIAD. In Canada and elsewhere there appears to be no nursing guidelines for the assessment, prevention, and management of PIAD. These best practice recommendations are intended for use by Nurses Specialized in Wound, Ostomy, and Continence (NSWOCs), registered nurses, physicians, and other allied health care professionals working in the care of children. All NSWOCs and other health care professionals must work within their scope of practice as well as health care organizational policies and procedures. The best practice recommendations are supported by a quick reference guide for infants and children older than 32 weeks of gestational age.

METHODOLOGY

The NSWOCC Paediatric Community of Practice undertook formulation of best practice recommendations on incontinence-associated dermatitis. Search terms with inclusion and exclusion criteria were agreed with the task force. A review of the literature was conducted in June 2021 through Queen's University with both spelling variants of pediatric/paediatric searched. The search strategy employed focused on keywords related to *nappy rash, diaper rash, nappy associated dermatitis, diaper associated dermatitis, skin infection in paediatrics, dermatitis in paediatrics, infant skin condition, infant skin adhesives, paediatric skin prevention, paediatric skin excoriation, paediatric skin development, chronic paediatric skin dermatitis, paediatric skin changes in oncology cases, creams used in diaper rash, neonate and neonatal incontinent associated dermatitis, bum/butt rash in neonates/paediatric, neonates/paediatric perianal skin breakdown, neonates/paediatric perineal skin breakdown, neonates/paediatric peri-rectal skin breakdown, neonates/paediatric Crohn's of the skin rectal area, neonates/paediatric yeast, neonates/paediatric Candida, neonates/paediatric Staph infection, neonates/paediatric high pH of stool/skin excoriation, neonates/paediatric diaper rash pain, neonates/paediatric quality of life with incontinent associated dermatitis, neonates/paediatric IAD psychological impact, bed wetting in paediatric, hemangiomas in the diaper area, medication induced dermatitis in neonates/paediatric, and adult best practice guidelines for incontinent associated dermatitis.*

All papers in English were considered within the last 10 years. Additional articles were identified in support of the Province of Québec. Databases searched encompassed organization websites and libraries: CINAHL; EMBASE; Google Scholar; Medline; Nurses Specialized in Wound, Ostomy and Continence Canada; Nursing and Allied Health Source on ProQuest; Ordre des infirmiers et infirmières du Québec; PsycInfo; and PubMed; Registered Nurses' Association of Ontario; Wound, Ostomy, Continence Nurses Society library.

The community of practice members reviewed the 258 articles identified and retained 174 as relevant for the project. Three groups developed the section content. Best practice recommendations were drafted. After the proposed statements were reviewed, a Delphi methodology was implemented to achieve consensus. First, members were encouraged to propose additional statements. Then, individual statements were introduced by the moderator for discussion and voting. After discussion, members voted to accept the statement as written. The agreement was set at 80%. All statements exceeded 80% consensus in two initial rounds. The community of practice members engaged in substantial debate and further revision was made to the wording of some statements. A final Delphi round was conducted in December 2022 with consensus reached at 93% or greater on nine statements related to the assessment, prevention, and management of PIAD. Due to the length of the project the literature was reviewed during the preparation of the document to validate whether new articles had been published. The community of practice members reviewed drafts of the manuscript.

An interprofessional mix of peer reviewers provided input into the best practice recommendations and quick reference guide development. A total of ten peer reviewers provided valuable input into the document. This was collected via Survey Monkey during March 2023. Overall, 100% of the reviewers stated that they would recommend these best practice recommendations to colleagues and administrators to support PIAD practices in Canada. Refinements were made to the document, and the overall results and insights were discussed with the community of practice members. Finally, the completed best practice recommendation document was approved by the NSWOCC Board before publication.

PIAD BEST PRACTICE RECOMMENDATIONS

RECOMMENDATION 1
Complete a holistic assessment. Perform a head-to-toe assessment while considering the underlying etiology, pain, effectiveness of previous management and treatment strategies, and assessment of cultural practices. LOE IIa-V

RECOMMENDATION 2
Advocate a consistent approach for the prevention and treatment that addresses five components–cleansing, air, skin barrier, diapers, and education. LOE Ia-V

RECOMMENDATIONS 3
Streamline skin care products within your health care organization, including skin cleanser, skin barrier cream and cleansing cloth. Review rationale for skin barriers, ingredients to avoid, and their accessibility and availability. LOE IIb-V

RECOMMENDATIONS 4
Define the duration of recommended skin care regimen (usually 3-5 days) before reassessing, unless the condition is worsening (examples include: adverse reaction, new or persistent signs/symptoms of increasing infection/inflammation, or pain). LOE Ia-V

RECOMMENDATION 5
Seek advice from an NSWOC or a qualified wound care specialist if management strategies are not effective. LOE V

RECOMMENDATIONS 6
Add an antifungal if *Candida* is diagnosed. A prescription for these products may be required. LOE IIb-V

RECOMMENDATIONS 7
Standardize documentation and communication with all health care professionals, the child (if age appropriate) and their family. LOE IIb

RECOMMENDATION 8
Educate and collaborate with all those involved in the care of the infant/child about the plan of care for prevention and management. Provide ongoing education. LOE Ia-V

RECOMMENDATION 9
Refer to the paediatric incontinence-associated dermatitis (PIAD) quick reference guide for classification and management principles. LOE V

Note. The level of interpretation of evidence is described in Appendix 1.[7]

RECOMMENDATION 1

RECOMMENDATION	RATIONALE
Complete a holistic assessment. Perform a head-to-toe assessment while considering the underlying etiology, pain, effectiveness of previous management and treatment strategies, and assessment of cultural practices.	A comprehensive assessment involving a thorough head-to-toe assessment is imperative. NSWOCs should seek to differentiate PIAD from other etiologies that may be systemic, dermatological, or infectious in nature.[8,9] The clinical presentation, infant/child and family history, as well as diagnostic tests can help differentiate between causes. Erythema and skin loss are noted consistently across tools for the assessment of IAD. Persistent redness, skin loss and clinical signs of infection will impact the choice of intervention.[10] Changes in skin colour may act as a guide to inflammation or infection.[11] Be sure to assess the skin with adequate lighting, particularly with dark skin tones. The care of infants/children may vary substantially based on cultural and societal practices such as breastfeeding, use of disposable versus cloth diapers, exposure of skin to air, diet, toilet training, medications, and the application of products. Fundamental to an assessment of the infant/child is an understanding of what has been tried previously and associated outcomes. Assessing pain in infants/children can be problematic. A webpage managed by Hospital for Sick Children [SickKids] discusses pain scales in paediatrics, including infants/children under the age of 3 years, accessed here AboutKidsHealth.[12] Risk factors for PIAD are noted in the top portion of Table 1.

RATIONALE REFERENCES	LOE
1,4,8,9,13-19	IIa–V

Table 1 *Risk factors and treatments for PIAD*

Risk factors	Impaired skin barrier	Newborn skin susceptibility	
		Moisture, friction	
		Chemical irritation	Harsh soap detergent
		Altered microbiota with activated faecal enzymes	Urine and faeces increasing pH
Treatments	Skin barrier restoration	Diaper	Superabsorbent Disposable Breathable Loose-fitting
		Cleansing	Immediately remove soiled diaper Water +/- mild soap Air dry
		Topical	Barrier creams Low potency steroids Antimicrobials for secondary infection Restore pH

RECOMMENDATION 2

RECOMMENDATION	RATIONALE
Advocate a consistent approach for the prevention and treatment that addresses five components–cleansing, air, skin barrier, diapers, and education.	Prevention is a mainstay of mitigating the likelihood of discomfort to the infant/child and distress to the families caused by PIAD. While the presenting symptoms need to be addressed to avoid further skin damage, a central principle of management is reducing the anxiety of families and educating them to prevent recurrence. The approaches to prevention and treatment differ depending on the age of the infant/child with different approaches for neonates, full term babies, or for children beyond normal diaper age who experience incontinence issues. Neonates and children beyond usual diaper age are considered separately later in this document. While the causes of PIAD are complex and multifactorial, in many cases, management can be simple. Prevention and treatment centres on identifying and eliminating the cause(s). To facilitate healing of the damaged skin and prevent recurrence, five components should be addressed: • cleansing; • exposure to air; • use of skin barriers; • using super absorbent diapers; and • parent education. These five components are considered in turn here. The prevention and treatment of PIAD are intertwined. Table 2 addresses the treatment by the elimination of causative factors or primary factors. Positioning applicable treatment strategies is dependent on a clear comprehension of the underlying etiology noted in Recommendation 1. **Cleansing** Cleanse the area under the diaper with every faecal episode. Avoid over cleansing with every urination as this may cause excess friction and skin hyperhydration. Cleansing should aim to reduce friction to the skin.[20-22] Water alone is not an effective cleanser in removing dried stool from the skin: surfactants contained within some cleansers can help with softening and removal of debris.

RECOMMENDATION	RATIONALE
	There appears to be a lack of clear evidence and divided opinion on cleansing versus bathing. There is a role for both yet NSWOCs should advise families to avoid prolonged sitz baths.[21,23] Merrill (2015) advocates for the use of pH balanced cleanser wipes with emollients, which have been found to be safe and effective in improving the barrier function and maintaining skin integrity.[24,25] Emollients are substances that soften and moisturize the skin and decrease itching and flaking.[26] Where pH balanced cleansers are not available, the use of warm water is recommended. It is important to thoroughly dry the skin again without inducing trauma to the skin. Patting skin creates less friction than rubbing or scrubbing.[24,27] Modern cleansers are pH balanced, formulated to avoid any irritants or fragrances and may contain agents to aid stool removal.[22,24,28,29] Families should be advised never to use cleansing products that are specifically manufactured for adults, as many of these are not pH neutral and will not be mild enough for a sensitive baby's skin.[30] Several authors are now advocating the use of wipes rather than cotton, water, or a washcloth as a superior choice for cleansing at each diaper change. Families should also check for the concentration of ingredients in the wipes. An integrative review by Burdall (2019) showed additive-free disposable cleanser wipes should contain pH buffers to maintain slight acidity of the skin and free of potential irritants.[31] Only a mild cleanser with slightly acidic to neutral pH that will not disturb the barrier function should be used in the perineal area.[32] Infants/children who were cleaned with the brand with fewest ingredients had significantly fewer days of rash.[33] Skin cleansers often contain appropriate well tolerated preservatives to prevent microbial growth.[21]

RECOMMENDATION	RATIONALE
	Exposure to air Air-drying the buttocks area for certain periods allows ventilation and facilitates observation. In a systematic review Lim and Carville (2019) found several guidelines recommending diaper-free periods to prevent and promote healing in patients with incontinence-related dermatitis.[22] However, no benefit related to such a practice has been demonstrated. Also, according to the same systematic review, the optimal duration of the periods without diapers remains unknown and it varies considerably according to the preferences of the caregiver.[22,34] The evidence is inconclusive. Leave the buttocks and groin diaper free, exposing it to the air to allow the skin to dry, where possible. These are described by Bikowski (2011) as 'air baths'.[20] Ideally, an infant/child with PIAD should be allowed periods of rest without a diaper, exposing the damaged skin to air, reducing the contact time between skin with urine, faeces, moisture, and other irritants. Following removal of barrier ointment from perineal skin or bathing, air-drying perineal skin can help reverse over-hydration of the skin resulting from exposure to urine and temporarily remove friction caused by the diaper.[35] **Skin barrier** Protecting the skin is a mainstay of PIAD prevention and management. A skin barrier should be applied at each diaper change for infants/children at risk of developing PIAD. Skin barriers diminish exposure to moisture and irritants, while allowing healing of the underlying skin.[22,25,27-29] Skin barriers, including dimethicone, low to moderate percentage zinc oxide (less than 20%), or petrolatum applied at diaper change, aim to prevent and treat PIAD.[1,28,36] Those with a history of PIAD should use these regularly for prevention.[20]

RECOMMENDATION	RATIONALE
	The data of a study from Baldwin et al. (2001) showed that the addition of zinc oxide to a petrolatum formulation provided a notable improvement in transepidermal water loss and skin erythema-protecting characteristics beyond a petrolatum without zinc oxide formulation alone.[37] The added benefits of zinc oxide can potentially be enhanced by increasing the total level of formulation delivered to skin or by increasing the level of zinc oxide in the formulation.[37] NSWOCs and families should review listed ingredients to avoid skin barriers containing alcohol, phenols, perfumes, or potential allergens such as lanolin. Products containing potential irritants may worsen the situation. The categories of most common allergens is shown in Table 3.[38] However, allergies can also have other etiologies. In some situations, where many babies have the same allergic reaction on a unit, it is critical to search for the cause. A full list of potential allergens in disposable diaper wipes and topical diaper preparations is provided in Appendix 3.[38] Skin barriers should be applied according to the manufacturer's instructions for use, noting that the advice will differ on whether they should be applied sparingly vs. generously. Care should be taken to minimize friction in the removal of any residual products.
	Use super absorbent diapers Super absorbent diapers help keep moisture away from the skin and are shown to be preferable to cloth diapers.[20] Families may wish to consider switching from cloth to disposable / super absorbent diapers if they are affordable and culturally acceptable. Evidence supports the use of new advanced diapers with superabsorbent polymers and breathable outer lining as they may assist in avoidance of PIAD.[1,22,24] Several authors note less severe PIAD through the use of super absorbent diapers.[21] They are preferred to cloth diapers due to their ability to wick away irritants from the skin.[36]

RECOMMENDATION	RATIONALE
	Multiple authors report correlations of reduced PIAD with increased frequency of diaper changes.[1,21,31,39] Change the diaper frequently every 1-3 hours, and as soon as soiled with faeces to decrease exposure time to a combination of urine and stool, and once overnight.[24] **Education** Education of families is critical to success. PIAD can be distressing for families where it lasts a long time and NSWOCs can provide support emphasizing that PIAD is not a reflection of the quality of parenting. Providing prevention and management education helps reduce recurrence of PIAD.[22] Families should receive education about common ways to reduce the likelihood of PIAD through the approaches discussed in these recommendations.[24] Families need to be involved in the plan of care. Education extends to cleansing, bathing, exposure to air, the frequency of diaper change, the use of skin barriers, and breastfeeding.[21] Good education can help families avoid waste through ineffective product purchases. Educating families leads to better outcomes and a lower cost to treat. The stool of breastfed infants has a lower pH and enzyme content compared to formula-fed infants, which is considered less irritating to the skin.[1,27] Other authors have described the use of a mnemonic ABCDE [Air, Barrier, Cleansing, Diaper, and Education]. While it may be a way to remember the concepts, they are not followed in a stepwise approach. Cleansing comes first. As a bilingual nation, the task force decided the mnemonic wasn't sufficiently helpful.

RATIONALE REFERENCES	LOE
1,4,20-40	Ia–V

Table 2 *Prevention of PIAD by elimination of causative factors*

CAUSATIVE FACTOR	EFFECT	INTERVENTION
Prolonged and excessive humidity	• Moisture-associated skin damage making skin vulnerable to friction injuries	• Frequent diaper change • Super absorbent diaper
Altered skin pH	• Disruption of pH balance • Potential skin breakdown • Microbial overgrowth	Use a pH balanced cleanser • Cleansing with wipes or soft cloth • Topical emollient
Faeces	• Contact of faecal lipases, endogenous and exogenous proteases digest/destroy/ damage/ the fragile skin barrier • Skin maceration • Increased permeability secondary to a weakened skin barrier	• Super absorbent diaper • Cleansing with soft cloth or wipes • Skin barrier • Topical emollient • Education

Note. Elimination of causative factors substituting diaper dermatitis for PIAD.[21]

Table 3 *Most Common Allergens*

ALLERGEN	RELEVANT POSITIVE PATCH TEST (%)
Balsam of Peru, 25% pet	5.5
Lanolin alcohol, 50% pet	5.1
Fragrance mix, 8% pet	4.9
Formaldehyde, 1% aq	2.9
Quarternium-15, 2% pet	2.9

Note. aq indicates aqueous vehicle and pet, petrolatum vehicle. Adapted from Yu et al., 2016[38] and Zug et al., 2014. Reproduced with permission of rightsholder © Mary Ann Liebert Inc.

RECOMMENDATION 3

RECOMMENDATION	RATIONALE
Streamline skin care products within your health care organization, including skin cleanser, skin barrier cream and cleansing cloth. Review rationale for skin barriers, ingredients to avoid, and their accessibility and availability.	A structured regime of products to help in prevention and treatment of PIAD is easier for bedside nurses, nursing aids, and families to follow. Streamline the products within your health care organization to avoid too broad a selection. This will reduce confusion and waste. The quick reference guide provided as part of these best practice recommendations is intended to be generic. Skin barriers for example may be a variety of types, e.g., cream, paste, ointment etc. An emollient is an ingredient found in barriers and creams that soothe and hydrate the skin. The accessibility to specific products varies considerably from province to province and from urban centres to rural communities. NSWOCs can choose the product available in their health care organization and even for families at a community pharmacy.

RATIONALE REFERENCES	LOE
19,25,28,29,41-46	IIb–V

RECOMMENDATION 4

RECOMMENDATION	RATIONALE
Define the duration of recommended skin care regimen (usually 3-5 days) before reassessing, unless the condition is worsening (examples include: adverse reaction, new or persistent signs/ symptoms of increasing infection/inflammation, or pain).	In the care plan, set a clear time frame for treatment and reassessment. Expert opinion typically defines the duration as 3-5 days to allow interventions time to take effect. Switching from one skin care regimen to another too rapidly makes it almost impossible to ascertain which approaches are effective. Stick to the care plan unless the condition of the infant/child is deteriorating. Examples warranting more immediate intervention include adverse reaction to skin barriers or medications, new or persistent signs and symptoms of increasing infection/inflammation, or pain.

RATIONALE REFERENCES	LOE
28,47,48	Ia–V

RECOMMENDATION 5

RECOMMENDATION	RATIONALE
Seek advice from an NSWOC or a qualified wound care specialist if management strategies are not effective.	Where there is no improvement following PIAD management investigate other underlying causes or etiology.[9] When infection has been diagnosed, antifungal or antimicrobial medications applied and where after 3-5 days no improvement is seen, or the condition is worsening then seek advice from an NSWOC or a qualified wound care specialist. An interprofessional team approach is recommended and referral may be necessary. Interprofessional collaboration is advised to those with the knowledge, skills, and judgment in the use of pharmaceutical interventions. It is recognized that not all families will have access to these resources.

RATIONALE REFERENCES	LOE
9,48	V

RECOMMENDATION 6

RECOMMENDATION	RATIONALE
Add an antifungal if *Candida* is diagnosed. A prescription for these products may be required.	Fungal infections become more common in those with previous episodes of PIAD as well as those using wet wipes and those with more frequent and loose stools. Esroy-Evans et al. (2016) reported a moderate correlation between the frequency of infection and frequency of PIAD.[1] In those with secondary *Candida* sp. infection, satellite lesions and involvement of the skin folds can be observed.[1] Additional treatment approaches are necessary where there are signs of infection. When *Candida* sp. is diagnosed, antifungal medication will be prescribed or recommended by the physician. Apply the antifungal, according to the medical order (typically 2-3 times per day). Antifungal treatment should be pursued for 5 days after the dissipation of clinical signs of fungal infection to prevent recurrence. As *Candida albicans* infection is common, a variety of antifungals are available depending on jurisdiction, including ciclopirox, clotrimazole, ketoconazole, miconazole, nystatin, and sertaconazole, which can be applied to the diaper area skin with every diaper change.[21,24,49] In some instances, a one-step management approach may be ordered from a pharmacy department to apply a custom antifungal, consisting of a mixture of talc-free antifungal powder or antifungal cream. In some jurisdictions an over-the-counter antifungal agent may be available; families should seek advice from the pharmacist in these cases. Clotrimazole powder has been found to work faster than nystatin powder and should be applied 3-4 times per day with diaper changes.[20,50] At the time of writing, nystatin powder is not commercially available in all jurisdictions and therefore compounded by a pharmacy department depending on health care organizational policy and procedure. In addition, mild topical corticosteroids may be used if skin is infected with *Candida* sp. and major/severe inflammation is observed.[27] Corticosteroid is intended for short term application. Ointment is preferred over cream as it can penetrate the stratum corneum.[28]

RECOMMENDATION	RATIONALE
	It is important to maintain PIAD prevention and management measures while using an antifungal. NSWOCs should be aware that the use of an antifungal may deter from the primary objective of eliminating the cause of candidiasis and may not always be effective. Cleanse and dry the skin and apply the antifungal agent directly to the affected area first as prescribed, letting it absorb into the skin. The antifungal agent is applied as ordered while a dimethicone or zinc oxide skin barrier should be applied over as often as needed. Only remove soiled skin barrier, leaving intact dimethicone or zinc oxide skin barrier in place to reduce friction from cleansing, except when it is the time to apply the antifungal product. Secondary bacterial infections may need topical and systemic antibiotics. Merrill (2015) advises mupirocin 2% was found to be effective against mixed fungal and bacterial infections.[21,24] *Staphylococcal* sp. infections sometimes are misdiagnosed as fungal, thus an antimicrobial would be more appropriate as it usually covers bacterial and fungal, if such a product is necessary. Oral antibiotics are indicated for more severe infections, including perianal streptococcal dermatitis. Infants with bacterial PIAD may require additional evaluation for serious bacterial illness, especially if they are febrile and/or ill-appearing.[27]

RATIONALE REFERENCES	LOE
20,21,24,27,49	IIb–V

RECOMMENDATION 7

RECOMMENDATION	RATIONALE
Standardize documentation and communication with all health care professionals, the child (if age appropriate) and their family.	Consistent and accurate documentation can guide prevention strategies and treatment.[29] PIAD occurrence in infants/children must be documented. Consistency is key in both the descriptors used in documentation and the means with which it is shared with the care team. The quick reference guide accompanying these recommendations notes general principles and suggested language to use to describe the management of PIAD. Document the skin condition, previous treatments, and their results. Note cultural and social differences. Include photographs, if feasible, to monitor progress according to the organization's health care policies and procedures. Provide applicable notes to the family to share with other caregivers or other health care professionals such as a pharmacist. This recommendation also has implications for health care organizations in ensuring appropriate policies and procedures on documentation are in place, particularly in relation to clinical photography of infant/child.

RATIONALE REFERENCES	LOE
29	IIb

RECOMMENDATION 8

RECOMMENDATION	RATIONALE
Educate and collaborate with all those involved in the care of the infant/child about the plan of care for prevention and management. Provide ongoing education.	The importance of education for families is included in Recommendation 2. Families need to be involved in the plan of care. Families should receive education about common ways to reduce the likelihood of PIAD through the approaches discussed in these recommendations.[24] Education extends to cleansing, bathing, exposure to air, the frequency of diaper change, and the use of skin barriers.[21] Providing prevention and management education helps reduce recurrence of PIAD.[22] The education of families to immediately clean the buttocks of infants/children in wet diapers is critical to impacting diaper change frequency.[51] Good education can help families avoid waste through ineffective product purchases. Educating families leads to better outcomes and a lower cost to treat. PIAD can be distressing for families when it lasts a long time and NSWOCs and nurses can provide support emphasizing that PIAD is not a reflection of the quality of parenting. Provide specific education to families where antifungal agents have been prescribed. The antifungal treatment should be continued for 5 days after signs of fungal infection have disappeared to prevent recurrence.

RATIONALE REFERENCES	LOE
4,10,14,17,21,22,24,48,51	Ia–V *Note.* Beeckman et al (2018) relates to IAD in adults.

RECOMMENDATION 9

RECOMMENDATION	RATIONALE
Refer to the Paediatric Incontinence-Associated Dermatitis (PIAD) quick reference guide for classification and management principles.	To complement these best practice recommendations a quick reference guide for practice has been developed. This quick reference guide is intended for nurses managing PIAD in infants/children and neonates over 32 weeks of gestational age. The quick reference guide provides management recommendations and notes for consideration according to the five categories included: • intact skin / prevention; • erythema / red skin; • broken skin; • erythema / red skin with infection; and • broken skin with infection. The NSWOCC Paediatric Community of Practice noted that information is often shared with families and so this quick reference guide has been produced knowing that it might be shared; albeit it is intended for nurses. As noted in Recommendation 5 further advice should be sought from an NSWOC or other specialist if approaches are not effective after 3-5 days or there is a deterioration in the infant's/child's condition. The quick reference guide notes that for special populations of patients such as premature neonates under 32 weeks of gestational age, and paediatric oncology patients a referral to a specialist is warranted. All NSWOCs and other health care professionals must work within their scope of practice as well as health care organizational policies and procedures.

RATIONALE REFERENCES	LOE
Based on expert opinion of the authors	V

SPECIAL CONSIDERATIONS

Neonates
The skin of premature neonates is underdeveloped in comparison to adult skin. Anić Jurica and colleagues (2016) provide a detailed discussion of the skin in premature newborns <32 weeks of gestational age which has an immature structure and insufficiently developed function.[13] The gestational age of neonatal skin and age of paediatric skin in weeks or months is among the most significant factors. The odds of developing PIAD increased by ~2% for each additional day in the neonatal intensive care unit (NICU).[28] According to Burdall et al. (2019), diaper-free time in NICU in children with highly immature skin may be the best mode of management for PIAD.[31]

Children Beyond Expected Diaper Age
By age four, the average child would be expected to have discontinued the use of diapers and be fully toilet trained during waking hours. However, some children experience urinary or faecal incontinence or both arising from medical conditions. Examples include, but are not limited to, global developmental delay, chemotherapy, antibiotic treatment, severe constipation, and bowel diseases.

Meticulous prevention is needed to maintain skin integrity, especially if these children have previously experienced periods of continence where the perineal skin has not been exposed to stool or urine. Changes in the child's health status that contribute to altered skin barrier integrity necessitate education and counselling for families and caregivers.

Pain Management
Literature regarding pain control and comfort in PIAD is scarce. A webpage managed by SickKids discusses pain scales in paediatrics, including infants/children under the age of 3 years, accessed here AboutKidsHealth.[12]

The Registered Nurses' Association of Ontario Assessment and Management of Pain Best Practice Guidelines, Third Edition, 2013 include two separate appendices with validated pain assessment tools for neonates and one for children.[52] Two papers were found that reported pain in preterm infants.[53,54] Comaru and Milura reported lower distress and pain during diaper change using 'nested' postural support.[53]

Role of the Interprofessional Team
For uncomplicated PIAD the nursing team supported by an NSWOC or advanced practice nurse should be able to put in place adequate prevention and treatment plans of care. In difficult cases the addition of a paediatrician, dermatologist, gastroenterologist, dietitian, or social worker may be added to the team.

Health Care Organization Implications

Health care organizations should take an inventory of the products available for the prevention and management of PIAD in efforts to standardize. Lack of uniformity in the prevention and management may increase the cost, both for products and nurse time. Health care organizations should employ algorithms for the prevention and treatment (management) based on available products.

Cost

Smith et al. (2013) examined diaper need and its impact on child health. The study highlights insufficient supply of diapers as a risk factor for poor paediatric health as well as the impact on maternal mental health.[55] While there noted study limitations, studies examining socioeconomic factors where parents limit the frequency of diaper changes is warranted. The cost includes the diapers, wipes/cleansing products, protectants, and treatments.

NURSES SPECIALIZED IN WOUND, OSTOMY AND CONTINENCE CANADA
INFIRMIÈRES SPÉCIALISÉES EN PLAIES, STOMIES ET CONTINENCE CANADA

PAEDIATRIC INCONTINENCE-ASSOCIATED DERMATITIS (PIAD) | QUICK REFERENCE GUIDE

This quick reference guide is intended for nurses managing PIAD in children and neonates over 32 weeks of gestational age.

GENERAL PRINCIPLES

Refer to the Canadian PIAD Best Practice Recommendations for Nurses

- Assess the skin with adequate lighting particularly with dark skin tones.
- Assess the cause and contributing factors to PIAD and resolve where possible.
- Cleanse the area under the diaper with every faecal episode.
- Avoid over cleansing with every urination as this may cause excess friction and hyperhydration.
- Leave the buttocks diaper free exposing it to the air to allow the skin to dry, where possible.
- Avoid friction or rubbing and only remove soiled skin barrier, leaving clean barrier in place and adding more if needed.
- Document skin condition, previous treatments/results and be aware of cultural and social differences.
- Include photographs, if feasible, according to organizational health care policy and procedures, to monitor progress.
- Review listed ingredients to avoid skin barriers containing alcohol, phenols, perfumes, or allergens such as lanolin.
- Apply a skin barrier following manufacturer's instructions for use (i.e., some are to be applied sparingly vs. generously).
- Treatments should remain consistent and unchanged for 3-5 days unless PIAD is worsening.
- When reassessing the skin, fully remove the old barrier.

PIAD RISK FACTORS

- anorectal surgeries;
- cystic fibrosis;
- diarrhea;
- digestive stoma closure;
- gastroenteritis;
- ileo or colo-anal reservoir;
- immature skin barrier;
- immunosuppression;
- inadequate hygiene;
- medication affecting transit and intestinal flora; and
- pathologies with malabsorption problems.

CLASSIFICATION	MANAGEMENT	CONSIDERATIONS
Intact skin/prevention 	• use appropriate skin barriers that include: - dimethicone; - low to moderate (less than 20%) percent zinc oxide; or - petrolatum.	• apply a skin barrier at each diaper change in the presence of risk of PIAD; and • use super absorbent diapers.
Erythema/red skin 	• increase frequency of diaper changes; • use dimethicone or low to moderate (<20%) zinc oxide skin barrier; • to remove skin barrier/stool, soak with pH balanced cleanser to soften and then gently remove soiled layer (use warm water if cleansers unavailable) and • reapply dimethicone or zinc oxide skin barrier as needed.	• in dark skin tones damage can appear darker or lighter than surrounding skin, look for changes in tone or texture.
Broken skin 	• increase frequency of diaper changes; • apply a moderate or high (>20%) zinc oxide skin barrier, or dimethicone; and • if dimethicone or zinc oxide skin barriers are unsuccessful, consider using a hydrophilic product or a cyanoacrylate film skin barrier, where no fungal infection has been diagnosed.	• partial thickness skin loss can be extremely painful, consider pain management; • if skin barrier is not adhering to weepy skin, sprinkle or dust with stoma powder first; • only remove soiled skin barrier, leave intact dimethicone or zinc oxide skin barrier in place to reduce friction from cleansing; and • if using a hydrophilic product or a cyanoacrylate skin barrier film, follow the manufacturer's instructions for use.
Erythema/red skin with infection  & **Broken skin with infection** 	• increase frequency of diaper changes; and • when a fungal infection is diagnosed, apply an antifungal, according to the medical order (typically 2-3 times per day); or • one-step management: apply a custom antifungal (mixture of talc-free antifungal powder or antifungal cream) prepared by the pharmacy department.	• cleanse and dry the skin and apply the antifungal directly to the affected area first as prescribed, let it absorb into the skin. Apply the skin barrier over. Important: the antifungal is applied as ordered while a dimethicone or zinc oxide skin barrier should be applied as often as needed; • only remove soiled skin barrier, leave intact dimethicone or zinc oxide skin barrier in place to reduce friction from cleansing; and • antifungal treatment may require prescription.

Seek advice from a Nurse Specialized in Wound, Ostomy and Continence (NSWOC) or wound care specialist if approaches are not effective.

For special populations of patients such as premature neonates under 32 weeks of gestational age, and paediatric oncology patients, refer to an NSWOC or wound care specialist. They will know when a referral to a specialist is needed.
NSWOCs and other health care professionals must work within their scope of practice as well as organizational policies and procedures.

Refer to the *Canadian Paediatric Incontinence-Associated Best Practice Recommendations for Nurses developed by Nurses Specialized in Wound, Ostomy and Continence Canada* for full recommendations, rationale, levels of evidence and references.

APPENDIX 1
INTERPRETATION OF EVIDENCE OF RECOMMENDATIONS

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Ia	Evidence obtained from meta-analysis or systematic review of randomized controlled trials and/or synthesis of multiple studies primarily of quantitative research.
Ib	Evidence obtained from at least one randomized controlled trial.
IIa	Evidence obtained from at least one well-designed controlled study without randomization.
IIb	Evidence obtained from at least one other type of well-designed quasi-experimental study without randomization
III	Synthesis of multiple studies primarily by qualitative research.
IV	Evidence obtained from well-designed non-experimental observational studies, such as analytical studies, or descriptive studies and/or qualitative studies.
V	Evidence obtained from expert opinion or committee reports, and/or clinical experiences of respected authorities.

APPENDIX 2
CLINICAL PEARLS

The quick reference guide lists the following general principles.

Assessment	• assess the skin with adequate lighting particularly with dark skin tones; • assess the cause and contributing factors to PIAD and resolve where possible; • document skin condition, previous treatments/results and be aware of cultural and social differences; • include photographs, if feasible, according to organizational health care policy and procedures, to monitor progress; and • when reassessing the skin, fully remove the old barrier.
Prevention	• cleanse the area under the diaper with every faecal episode; • avoid over cleansing with every urination as this may cause excess friction and hyperhydration; • leave the buttocks diaper free, exposing it to the air to allow the skin to dry, where possible; • avoid friction or rubbing and only remove soiled skin barrier, leaving clean barrier in place and adding more if needed; and • review listed ingredients to avoid skin barriers containing alcohol, phenols, perfumes, or allergens such as lanolin.
Treatment	• apply a skin barrier following manufacturer's instructions for use (i.e., some are to be applied sparingly vs. generously); and • treatments should remain consistent and unchanged for 3-5 days unless PIAD is worsening.

APPENDIX 3

POTENTIAL ALLERGENS IN DISPOSABLE DIAPER WIPES AND TOPICAL DIAPER PREPARATIONS

POTENTIAL ALLERGENS	OBSERVED FREQUENCY IN DISPOSABLE DIAPER WIPES (*n* = 63)	OBSERVED FREQUENCY IN TOPICAL DIAPER PREPARATIONS (*n* = 41)
α-bisabolol	2 (3.2)	2 (4.9)
Benzyl alcohol	12 (19.0)	2 (4.9)
Benzoic acid	3 (4.8)	2 (4.9)
Botanical extracts	60 (95.2)	30 (73.1)
Bronopol	3 (4.8)	Not observed
Cocamidopropyl betaine	2 (3.2)	Not observed
Decyl glucoside	5 (7.9)	Not observed
Diazolidinyl urea	Not observed	1 (2.4)
DMDM hydantoin	5 (7.9)	Not observed
Ethylhexylglycerin	5 (7.9)	3 (7.3)
Fragrances	21 (33.3)	18 (43.9)
Idopropynyl butylcarbamate	13 (20.6)	Not observed
Lanolin	5 (7.9)	17 (41.5)
Methylchloroisothiazolinone	1 (1.6)	Not observed
Methylisothiazolinone	4 (6.3)	Not observed
Myroxylon pereirae	Not observed	5 (12.2)
Parabens	6 (9.5)	10 (24.4)
Propylene glycol	13 (20.6)	6 (14.6)
Quarternium-15	1 (1.6)	Not observed
Sorbitan sesquioleate and derivatives	Not found	6 (14.6)
α-Tocopherol acetate	40 (63.5)	15 (36.6)

Note. Values are number (percentage). American Contact Dermatitis Society.[38]

ABBREVIATIONS

DD–diaper dermatitis
IAD–incontinence-associated dermatitis
LOE–level of evidence
NICU–neonatal intensive care unit
NSWOC–nurse specialized in wound, ostomy, and continence
NSWOCC–Nurses Specialized in Wound, Ostomy and Continence Canada
PIAD–paediatric incontinence-associated dermatitis

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