



## CANDIDIASIS IN BREASTFEEDING MOTHERS: BREAKING THE CHAIN OF INFECTION

Candidiasis of the nipple and breast can cause breastfeeding mothers considerable discomfort and even pain. Prompt diagnosis and effective treatment can ensure that women do not stop breastfeeding early due to candidiasis. This CPD module examines *Candida albicans*, which is a resilient species, and how to break the chain of infection. The Mum & Baby Academy estimates that completing this module is equivalent to one hour of CPD.



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In association with:

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### LEARNING OBJECTIVES

**After studying this Clinical Review you should:**

- Appreciate the prevalence and clinical significance of *Candida* colonisation and infections.
- Be able to describe the factors that predispose breastfeeding mothers to candidiasis.
- Understand the ways in which *Candida* can form 'chains of infection' and how to prevent reinfection.
- Be able to advise and counsel women presenting with breast discomfort or pain about the possible role of *Candida*.

### QUESTIONS

**Visit our website to test your knowledge about *Candida*.**

**Our questions cover:**

- Prevalence of *Candida*.
- Symptoms of nipple candidiasis.
- Differential diagnosis of nipple candidiasis.
- Breaking the chain of infection.



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#### ABOUT THE MUM & BABY ACADEMY

The Mum & Baby Academy does not endorse any particular products.

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### Abstract

The human body is home to some 100 trillion bacteria<sup>1</sup> as well as numerous fungi, protozoa, viruses and other microbes – collectively called the microbiota or microbiome. Species of *Candida*, for example, are part of the normal, healthy microbiota in the mouth, gastrointestinal tract and female genitourinary tract.<sup>2</sup> Indeed, up to 80% of healthy women have *Candida albicans* in their vagina.<sup>3</sup> Species of *Candida* colonise between 17% and 48% of healthy infants.<sup>4</sup>

When the normal balance of the microbiota is disrupted, *Candida* can cause a range of conditions, including vulvovaginal thrush, oral thrush in infants as well as breast and nipple candidiasis. Indeed, nipple candidiasis accounts for about a third of women experiencing pain during breastfeeding<sup>5</sup> and may lead to women stopping breastfeeding prematurely.

Signs and symptoms of breast and nipple candidiasis vary considerably between women.<sup>4</sup> Typically, however, women with breast candidiasis report that both nipples

are persistently sore, which probably arises from inflammation of the lactiferous ducts.<sup>3-5</sup> Healthcare professionals, who come in contact with breastfeeding mothers who have uncomfortable breasts, should consider nipple pain that does not resolve or decline after the first week postpartum as potentially abnormal<sup>5</sup> and include candidiasis in their differential diagnosis. Nevertheless, breast and nipple candidiasis can develop several weeks or months after women begin breastfeeding.<sup>6</sup>

*Candida* is remarkably resilient and can spread easily:

- Between parts of a woman's body
- Between mother, baby and other family members
- Between healthcare professionals and mother and baby
- On fomites (inanimate objects capable of transmitting infectious organisms).

Good hygiene, thorough cleaning of devices and products, as well as effective treatment and continuing vigilance for candidiasis in the mother and baby can help break the chain of infection.

### Introduction

The human body is home to some 100 trillion bacteria<sup>1</sup> as well as a range of fungi, protozoa, viruses and other microbes – collectively called the microbiota or microbiome. The most common organism depends on the part of the body:

- Species of *Actinobacteria* are the most common bacteria in the hair, nostrils and skin.<sup>1</sup>
- Species of *Firmicutes* are the most common bacteria in the vagina.<sup>1</sup>
- *Malassezia* is the most common fungus on the head, torso, arms, ears and nose.<sup>2</sup>

*Candida* species are part of the normal, healthy microbiota in the mouth, gastrointestinal tract and female genitourinary tract.<sup>2</sup> Indeed, up to 80% of healthy women have *Candida albicans* in their vagina.<sup>3</sup> *Candida* species also colonise between 17% and 48% of healthy infants.<sup>4</sup>

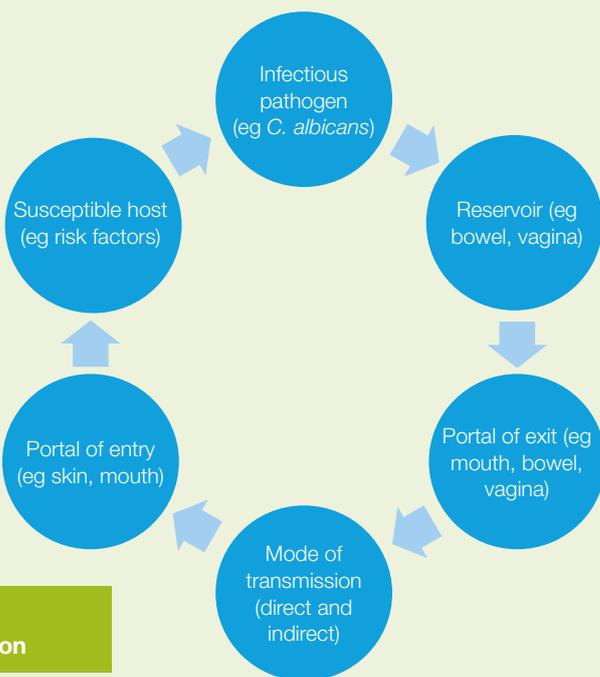
*Malassezia* and *Candida* are usually harmless. Indeed, they may help control the growth of harmful microorganisms.<sup>2</sup> However, when the normal balance of the microbiota is disrupted, these usually benign organisms can cause clinical disease. *Malassezia*,

for example, causes dandruff, seborrheic dermatitis and pityriasis. Several species of *Candida* can cause vulvovaginal thrush, oral thrush in infants and nipple candidiasis.

Occasionally, candidiasis can be serious. Vulvovaginal candidiasis during pregnancy seems to be associated with an increased risk of, for example, premature rupture of membranes, preterm labour, chorioamnionitis and congenital cutaneous candidiasis.<sup>7</sup> Breast and nipple candidiasis accounts for about a third of women experiencing pain during breastfeeding.<sup>5</sup> Indeed, breast and nipple candidiasis may lead to women stopping breastfeeding prematurely.

*C. albicans* can spread easily between parts of a woman's body, between mother and baby, and between healthcare professionals and mother and baby. *Candida* can spread on fomites (inanimate objects capable of transmitting infectious organisms), including:

- Traditional methods to relieve breast pain and soreness (cabbage leaves) or hot and cold packs
- Aids for expressing and feeding colostrum or breastmilk, including syringes, cups, finger, spoons and nasogastric tubes



**Figure 1:**  
Chain of infection

- Breast pump flanges
- Methods for everting flat or inverted nipples
- Disposable or reusable breast pads.

Good hygiene and thorough cleaning of any devices or products are essential to break the chain of infection (figure 1).

### **C. albicans: A common pathogen**

At least 17 species of *Candida* can cause disease in humans,<sup>8</sup> which range from mild superficial infections to potentially fatal systemic candidiasis.<sup>2</sup> However, five species cause more than 90% of cases of invasive candidiasis: *C. albicans*, *C. glabrata*, *C. parapsilosis*, *C. tropicalis* and *C. krusei*.<sup>9</sup> *C. albicans* accounts for 85-95% of cases of vulvovaginal thrush, as well as most cases of oral and systemic candidiasis.<sup>7,10</sup>

*C. albicans* is one of only two species of *Candida* (the closely related species *C. dubliniensis*, also found in the vagina, is the other) that can grow as a single-celled yeast as well as multicellular filaments called hyphae.<sup>10,11</sup> Yeasts reproduce by forming buds on their surface. When the yeast form of *C. albicans* sticks to the surface of a host cell, the fungus transforms into a hyphal form that can penetrate the surrounding tissue.<sup>2</sup>

Hyphae penetrate healthy tissues in two ways. Firstly, *C. albicans* secretes molecules called invasins, which stimulate the host's cells to take up the fungi. Secondly, *C.*

*albicans* produces enzymes that weaken protein and allows the hyphae into the tissues.<sup>2</sup>

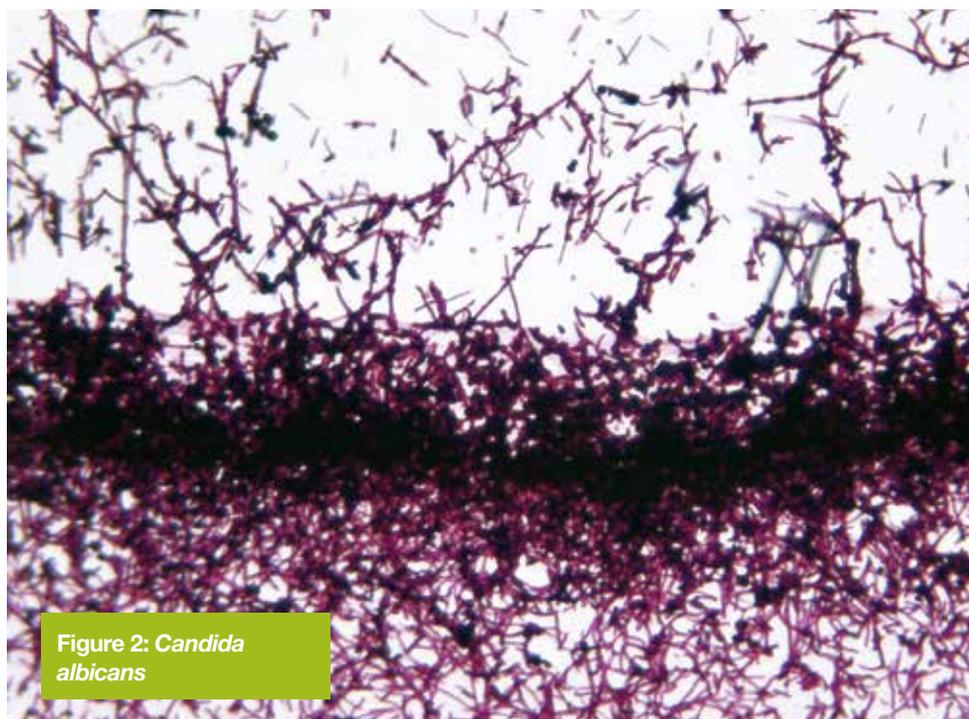
*C. albicans* can produce structured, functional, co-ordinated communities formed from layers of yeasts and hyphae embedded in an extracellular matrix. These 'biofilms' can form in tissues and make candidiasis more difficult to treat. As such, *Candida*'s ability to form biofilms makes an important contribution to clinical candidiasis. In addition, biofilms can form on the surfaces of catheters and other medical devices,<sup>2,9</sup> which underscores the importance of

thoroughly cleaning any potential fomite. *Candida* tends to favour warm, moist environments,<sup>5</sup> which is reflected in the pattern of presentation: vulvovaginal, oral and nappy rash. So, *Candida* is not usually present on healthy glabrous skin (areas without hair), such as the nipple.<sup>3</sup> Breast milk is, however, rich in glucose, which helps sustain *Candida* on the skin.<sup>4</sup> Indeed, about a third of women show *Candida* on their breast and nipples in the first 8 weeks of breastfeeding.<sup>12</sup> As mentioned below, occlusion and maceration can also predispose to candidiasis.<sup>3</sup>

### **Don't underestimate breast and nipple candidiasis**

Conventional microbiological cultures may underestimate the prevalence of *Candida* on the breast.<sup>12</sup> For example, human milk contains lactoferrin, also known as lactotransferrin, which is part of the body's immune defences. Lactoferrin inhibits the growth of *C. albicans* making the yeast difficult to detect in human milk.<sup>13</sup> The CASTLE study followed 360 nulliparous women until 8 weeks postpartum. Real-time polymerase chain reaction (PCR) - 'genetic fingerprinting' - of swabs taken from the nipple detected *Candida* species in 33% of women. Conventional culture suggested that only 3% of women were colonised with *Candida*.<sup>12</sup>

The CASTLE study found a statistically significant association between burning nipple pain and non-mastitis breast pain



**Figure 2:** *Candida albicans*

between the second and eighth week after birth and *Candida* species in the nipple, breast milk, baby or vagina. In this study, 54% of women with burning nipple pain and non-mastitis breast pain showed *Candida* compared to 36% of other women. *Candida* significantly increased the risk of burning nipple pain and non-mastitis breast pain by 87% compared to women without *Candida*. Mothers' reports of nipple damage more than doubled (2.3 fold increase) the likelihood of suffering these symptoms.<sup>12</sup>

Against this background, healthcare professionals should perform a full breastfeeding assessment, including positioning and attachment, in any woman presenting with discomfort or pain. This helps the mother understand and address any underlying issues can lead to nipple pain, such as incorrect positioning of the infant, disorganised sucking pattern and friction from the nipple and tongue.<sup>5</sup> A full assessment should support mothers to continue to breastfeed or supply her baby with expressed breastmilk allowing the skin time to heal.

### Signs and symptoms of breast and nipple candidiasis

The signs and symptoms of breast and nipple candidiasis can vary considerably between women.<sup>4</sup> However, women with breast candidiasis typically report persistently sore nipples, which probably arises from inflammation of the lactiferous ducts. Usually both nipples are sore.<sup>3-5</sup> Some mothers report an "excruciating dagger-like, burning pain deep in the breast".<sup>4</sup>



**Figure 3: *C. albicans* can spread easily between parts of a woman's body**

The soreness can develop rapidly, may radiate into the woman's back and tends to be worse during or immediately after breastfeeding.<sup>5,12</sup> Pain associated with breast and nipple candidiasis tends to be persistent. Nipple shields, hand expression of milk, using a breast pump or applying heat do not generally alleviate pain associated with candidiasis. Pain related directly to infant feeding may be more likely to be mechanical than caused by candidiasis.<sup>12</sup>

A breast affected by candidiasis may appear diffusely pink, show satellite lesions or striae radiating from the nipple.<sup>4,12</sup> The nipple and areola may become bright pink, red or purple or, in darker skinned women, darker.<sup>4,6</sup> The skin may seem shiny and, after a few days, may become flaky.<sup>6</sup> Some mothers report breast itching, although there is no rash.<sup>4</sup>

Clinically, the symptoms of nipple and breast candidiasis often develop during the first week postpartum. However, most breast pain in the first week postpartum, especially in first-time mothers, arises as the body adjusts to breastfeeding and usually resolves with correct positioning and attachment on the breast.<sup>12,13</sup> Healthcare professionals can consider nipple pain that does not resolve or decline after the first week postpartum as potentially abnormal<sup>5</sup> and candidiasis can be included in the differential diagnosis. However, breast and nipple candidiasis can also develop months after women begin breastfeeding.<sup>6</sup> Pain that began in

association with a predisposing factor - such as vaginal thrush, oral or nappy candidiasis in the child or corticosteroid or antibiotic use - may help confirm the diagnosis.<sup>4</sup>

### Differential diagnoses

Healthcare professionals should consider several differential diagnoses:

- Eczema of the areola and nipple usually presents as acute vesicular eruptions and crusting, although some women develop a dry scaling dermatitis. Typically, eczema of the areola is distinct from, and does not affect, the nipple. Many women with areola eczema have a history of the condition elsewhere on their body.<sup>13</sup>
- In Raynaud's syndrome of the nipple, vasospasm causes severe, throbbing, burning pain, and blanched nipples. Cold temperatures can cause cyanosis, erythema or both.<sup>13</sup> Cold exacerbates Raynaud's syndrome, while heat or nifedipine relieves the vasospasm,<sup>12</sup> which is not generally the case with breast candidiasis.
- Bacterial infection of the nipple usually presents as red, inflamed, cracked nipples. Some women also show exudate or fever.<sup>13</sup>
- Inflammatory mastitis is usually unilateral and manifests as redness, tenderness and hot swollen areas.<sup>13</sup>
- Recurrent vulvovaginal candidiasis can offer a reservoir of infection for other sites and usually reflects contamination from the bowel. Healthcare professionals should, therefore, stress the importance of good hygiene, such as wiping faeces from front to back and avoiding tight underwear, especially those made from synthetic materials.<sup>14</sup>

### Risk factors for nipple and breast candidiasis

Trauma and local occlusion or maceration can predispose to breast candidiasis.<sup>3</sup> For example, 88% of 51 lactating women with candidiasis showed nipple damage in early breastfeeding. In contrast, 57% of 47 controls who either breast feed normally or who were referred for other lactation problems showed nipple damage.<sup>3</sup> In candidiasis, the nipple's sensitivity is out of proportion to the clinical damage.<sup>12</sup>

Healthcare professionals should remind women to change their breast pads regularly<sup>6</sup> and ideally use disposable pads. In addition, occlusion or maceration can



**Figure 4: Women with breast candidiasis typically report persistently sore nipples, which probably arises from inflammation of the lactiferous ducts**

predispose to breast candidiasis.<sup>3</sup> The skin allows water to pass to the environment. But an occlusive layer prevents the passage of water, which remains in and macerates the skin. Healthcare professionals could ensure that the pads and nipple creams are not fully occlusive. For example, mothers with candidiasis should use a nipple cream containing ultra-purified, anhydrous lanolin. As this does not contain water, such formulations do not support the growth of *Candida*.

Excessive washing and bubble baths and perfumed soaps may unbalance the vagina's naturally protective microflora.<sup>14</sup> Mothers could consider using water and unscented soap, which will not irritate the skin and or alter the natural skin oils on the areola and nipple. Antibiotics may also disrupt the microbiota, which can predispose to candidiasis.<sup>3</sup> For example, 69% of lactating women with candidiasis had used antibiotics after birth compared to 47% of controls. In addition, 29% of lactating women with candidiasis and 13% of controls reported using antibiotics for more than one month for acne and recurrent urinary tract infections. Some women had used antibiotics many years before giving birth. This suggests that the antibiotic might have chronically altered the microbiota.<sup>3</sup> Indeed, long-term or repeated antibiotic use may mean that the microbiome never regains its original composition.<sup>1</sup> Some case reports suggest that children taking antibiotics can transfer *Candida* to the mother's breast.<sup>3</sup>

The association with antibiotics means that breast candidiasis is common after caesarean section, instrumental birth or mastitis. In one study, for example, 12% of women with candidiasis reported two episodes of mastitis compared to 4% of

controls. Furthermore, 25% of women with candidiasis reported three or more episodes of mastitis compared to 17% of controls.<sup>3</sup> *Candida* can also pass from the vagina to the baby's mouth during the birth and in turn to the breast.<sup>3</sup> For example, 82% of lactating women with candidiasis reported a history of vaginal thrush compared to 60% of controls. Furthermore, 31% and 13% respectively reported vaginal candidiasis during pregnancy.<sup>3</sup> Healthcare professionals could be vigilant for these signs in lactating women who experience discomfort during breastfeeding and their babies such as angular oral cheilitis – red, sore, ulcerated areas around the corner of the mouth – and paronychia (swelling, tenderness and redness around the nail).<sup>3</sup>

Babies born to women with breast candidiasis are often asymptomatic.<sup>6</sup> However, some babies develop oral candidiasis, characterised by white patches on their tongue, the inside of their cheeks and the roof of their mouth that cannot be wiped away.<sup>6</sup> In one study, 61% of infants of women with breast candidiasis had oral thrush compared to 36% of controls.<sup>3</sup> On the other hand, some mothers of a child with oral candidiasis are asymptomatic.<sup>4</sup> However, they could still spread the fungus.

Other babies show nappy candidiasis: typically, a beefy red rash with satellite lesions.<sup>4</sup> Infants of women with breast candidiasis were twice as likely to develop nappy thrush (28% and 13%) compared to controls, although this difference was not statistically significant.<sup>3</sup> So, *Candida* may “ping-pong” between mother and infant.<sup>3</sup>

### Treating breast candidiasis

Healthcare professionals should emphasise self-help measures and encourage women

to continue breastfeeding even if symptoms do not resolve immediately.<sup>5</sup> Women should be reminded to see their GP if they or the baby are no better 2-3 days after starting the antifungal or if they show signs and symptoms of a bacterial or viral infection, such as fever, chills or aches.<sup>6</sup>

Because *Candida* can spread back and forth, the mother and baby need to be treated at the same time.<sup>6</sup> Topical antifungals are the first-line treatment for breast and nipple candidiasis. However, some women require oral antifungals for deep breast pain that does not improve with topical antifungals. Healthcare professionals need to be cognisant of drug interactions with some antifungals.<sup>6</sup>

### Breaking the chain of infection

Several approaches may reduce the risk that breast candidiasis will emerge or recur:

- *Candida* can spread rapidly to other family members.<sup>5</sup> So, health professionals should stress the importance of good hygiene to women and their families - and maintain a high standard of hygiene themselves.
- *Candida* spores are resilient.<sup>6</sup> Correct hand washing technique in hot soapy water is important to prevent transmission.
- As mentioned, *Candida* can form biofilms.<sup>2,9</sup> So, any item that comes into contact with the mother's breasts or the baby's mouth - such as soft toys, dummies, breast pump parts, towels, clothes (especially underwear), bottles and teats - need regular and thorough cleaning at as high a temperature as possible.<sup>6</sup> Parents should replace nipple shields, dummies and teats regularly.
- Trauma, local occlusion and maceration can predispose to candidiasis.<sup>3</sup> Women should be reminded to change their breast pads often and wear 100% cotton underwear.<sup>5,6</sup> Disposable breast pads may be preferable to washable ones.<sup>5</sup>
- Taking a probiotic that includes *Acidophilus* daily<sup>5</sup> may help restore the healthy microbiome.

Candidiasis of the nipple and breast is common. However, prompt diagnosis and effective treatment can help ensure that women do not stop breastfeeding early due to candidiasis. In addition, health professionals can suggest that parents take some simple steps to break the chain of infection that can perpetuate nipple and breast candidiasis.

## LEARNING POINTS

- *Candida* is part of the normal, healthy microbiota in the mouth, gastrointestinal tract and female genitourinary tract.<sup>2</sup> When the normal balance of the microbiota is disrupted, *Candida* can cause a range of conditions, including vulvovaginal and oral thrush as well as breast and nipple candidiasis.
- Healthcare professionals should remain vigilant for candidiasis in women presenting with persistently sore nipples, burning nipple pain or non-mastitis breast pain.<sup>3, 12</sup>
- Healthcare professionals should stress the importance of good hygiene to prevent the fungus spreading, including hand washing and thorough cleaning of any item that comes into contact with the mother's breasts and/or the baby's mouth, such as healthcare professionals' hands, breastfeeding aids, methods for everting flat or inverted nipples, breast pads and traditional and conventional approaches for alleviating painful breasts.
- Healthcare professionals should discuss treatment with parents, emphasise self-help measures and encourage women to continue breastfeeding even if symptoms do not resolve immediately.<sup>5</sup>
- Trauma, local occlusion and maceration can predispose to candidiasis.<sup>9</sup> Healthcare professionals should remind women to change their breast pads often.<sup>5, 6</sup>

## Next steps

This clinical review is part of a free series of resources for antenatal, postnatal and paediatric professionals. When you have read this review, you can take an on-line CPD assessment and either download a certificate from our website or complete the tear-off learning log in this review to support your revalidation.

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Breastmilk is the best form of nutrition for infants, and exclusive breastfeeding is recommended for the first 6 months (26 weeks) of an infant's life. Thereafter breastfeeding should continue for as long as the mother and baby wish, while gradually including a more varied diet<sup>1</sup>.

# Supporting women to overcome sore nipples and avoid candidiasis

Using your expertise in correcting positioning and attachment concerns, addressing the risk factors for breast and nipple candidiasis, and with the aid of Lansinoh HPA<sup>®</sup> Lanolin we can ensure breastfeeding women and their babies have a pleasurable and sustained breastfeeding experience.

Lansinoh has supported breastfeeding mothers and health professionals for more than 30 years.

Our multi-award winning Lansinoh HPA<sup>®</sup> Lanolin product has been clinically proven to overcome breastfeeding challenges.<sup>2</sup> As a highly purified anhydrous nipple cream, Lansinoh HPA<sup>®</sup> Lanolin, will not promote candidiasis of the nipple and breast.<sup>3</sup>

What are the benefits of Lansinoh and health professionals working together?

With your breastfeeding knowledge and expertise, you are often the first person a breastfeeding mother will contact when she has a problem, such as candidiasis. Even with correct positioning and attachment a sore nipple needs time to recover and while it may feel more comfortable, there can still be an element of hesitation when baby latches. Together, you and the mother will get back to a great breastfeeding experience. In line with NMC guidance, your professional advice can help breastfeeding mothers to use our pure lanolin nipple cream appropriately in the prevention and treatment of sore nipples.<sup>8-11</sup>

Why is Lansinoh HPA<sup>®</sup> Lanolin loved by mothers and health professionals?

For more than 30 years Lansinoh has been improving the manufacturing process to remove as many impurities from the natural product as possible. The unique formulation of Lansinoh HPA<sup>®</sup> Lanolin has been developed and refined to offer a clinically proven, 100%

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natural product and is the only product of its type to be given the Seal of Approval by the British Allergy Foundation.<sup>2</sup>

What breastfeeding mothers say.

Mothers tell us that "breastfeeding is challenging" but that Lansinoh HPA<sup>®</sup> Lanolin "provides instant relief". Indeed, many tell us that "sore nipples can be a reason for giving up breastfeeding". For example, in a survey we found that:<sup>6</sup>

- 54% of breastfeeding mothers said that midwives were key to supporting them with their breastfeeding problem using our nipple cream.
- 74% say that Lansinoh HPA<sup>®</sup> Lanolin works works within one hour.<sup>7</sup>

At Lansinoh, we believe that women want to breastfeed for as long as possible. Together, we can help them overcome common problems, especially early on where positioning and attachment can be a key reason for women to stop breastfeeding.<sup>1,2,4,5</sup> Your support of breastfeeding mothers is of great importance to us.

How to ensure breastfeeding women get the clinically proven nipple cream.

Using your professional knowledge of the mother and the baby, you are well placed to provide breastfeeding expertise as well as understanding lanolin nipple cream as an intervention that helps heal sore nipples without supporting the growth of *Candida*.<sup>3, 8-11</sup>



As a highly purified anhydrous nipple cream, Lansinoh HPA<sup>®</sup> Lanolin will not support the growth of *Candida*.



Lansinoh HPA<sup>®</sup> Lanolin can promote the healing of sore nipples.



Care Products for Breastfeeding challenges



YEARS SUPPORTING  
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Storage products for the safe  
conservation of breastmilk



Pumps for when your breastfeeding mothers want to express



## Lansinoh® the know

The Lansinoh® *In The Know* Programme has been designed to provide resources to health professionals who support breastfeeding mothers.

As part of the programme Lansinoh® offers a range of options:

- To receive HPA® Lanolin sample sachets (For UK Health Professionals only)
- To receive a monthly newsletter go to: [lansinoh.co.uk/professional/sampling-programme](http://lansinoh.co.uk/professional/sampling-programme)
- For other resources such as research, events and product information go to: [lansinoh.co.uk/professional](http://lansinoh.co.uk/professional).

For any further information please contact Lansinoh's In-House Health Professionals :

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# Learning Log



## CANDIDIASIS IN BREASTFEEDING MOTHERS: BREAKING THE CHAIN OF INFECTION

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Name	
Date completed	
Method (please tick)	<input type="checkbox"/> Independent learning <input type="checkbox"/> Participatory learning
Please tick the relevant parts of the Revalidation Code	<input type="checkbox"/> Prioritise people <input type="checkbox"/> Practise effectively <input type="checkbox"/> Preserve safety <input type="checkbox"/> Promote professionalism and trust
Number of hours spent on this CPD module (Please indicate the number of hours for any participatory learning)	
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In association with:



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How often do you encounter the topic of this CPD? How often do you proactively offer advice about the subject of this CPD?

What questions did the CPD raise that you'd like to investigate further?

How will this CPD change your practice? What barriers may you need to overcome?



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