

Management of common vaginal discharges

Mixed infections are common, and high vaginal and endocervical swabs for gonococcus and chlamydia should be taken from all patients presenting with a vaginal discharge.

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Abnormal vaginal discharges and associated vulval symptoms such as itch and pain are common problems. While some discharges may be due to sexually transmitted infections, many are unrelated to sexual activity. These discharges may hinder a woman's enjoyment of sex, because of embarrassment or discomfort. Complications are being recognised increasingly.

This article examines the nature of normal and common abnormal vaginal discharges. Correct interpretation of symptoms, examination findings and test results will ensure that all women are given appropriate management and accurate advice.

The normal vaginal discharge

After puberty, the vagina of the premenopausal woman is lined by nonkeratinised stratified squamous epithelium, which is relatively resistant to trauma. A normal healthy vaginal discharge consists of continually shed vaginal epithelial cells, vaginal transudate and secretions from

the cervix. Lactobacilli are the predominant bacterial flora (Figure 1), with other bacteria such as staphylococci, diphtheroids and streptococci usually accounting for less than 5% of normal flora.¹

Lactobacilli produce lactic acid from glucose, which in the vagina is metabolised from glycogen by epithelial cells. The production of lactic acid keeps the vaginal pH acidic (less than 4.7). Some species of lactobacilli also produce hydrogen peroxide (H₂O₂), which may act as a protective agent within the vagina by inhibiting other bacteria.²

Occasionally, young women may present with a normal discharge that they perceive as unhealthy or unusual. A normal vaginal discharge will appear white or clear, and at mid cycle the amount of cervical discharge in an ovulating woman will increase in amount and change in nature. Education and reassurance may be all that is required.

Bacterial vaginosis

IN SUMMARY

- Use of narrow range pH tape (pH 4.0 to 6.0) and 10% potassium hydroxide solution when evaluating a vaginal discharge is invaluable for the general practitioner.
- Bacterial vaginosis is the name of the syndrome formerly known as 'gardnerella'. Despite treatment, bacterial vaginosis often recurs.
- Testing for bacterial vaginosis should occur before operative invasive gynaecological procedures. It should be treated before surgery, including termination of pregnancy.
- Symptomatic vaginal yeast infections may produce a range of clinical features, from vulval swelling and pain after intercourse, with no discharge, to the classical 'cottage cheese' discharge with vulval itching.
- Many skin conditions other than yeast infection cause vulval itching, and examination is always advisable. Fungal resistance to over-the-counter preparations may be increasing.
- Vaginal relapse and not reinfection is thought to be the cause of recurrent vaginal yeast infections, and this may be related to the immune system. Long term suppressive or maintenance therapy is recommended.
- *Trichomonas vaginalis* infection may be more common than previously realised, as more sensitive nucleic acid tests become available.

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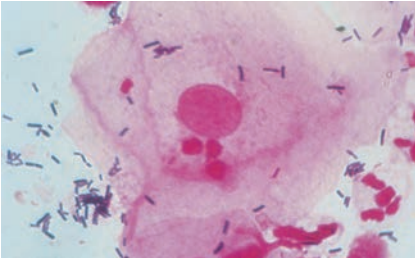


Figure 1. The predominant bacterial flora in a normal vaginal discharge are lactobacilli.

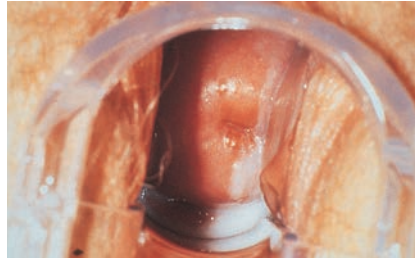


Figure 2. Vaginal discharge typical of bacterial vaginosis.



Figures 3a and b. The amine 'whiff' test. a (left). A 10% solution of potassium hydroxide is added to the vaginal discharge. b (above). A positive result, indicative of bacterial vaginosis, is the detection of a characteristic fishy odour on mixing.

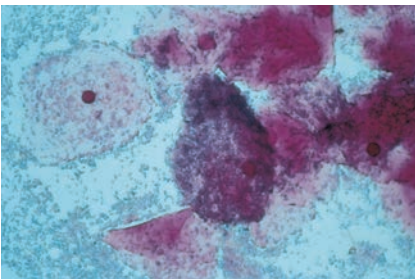


Figure 4. Clue cells are present in the vaginal discharge of bacterial vaginitis.

The ecosystem of the vagina may change over time in response to influences that are poorly understood. In 1955, Gardner and Dukes isolated *Haemophilus vaginalis* (later named *Gardnerella vaginalis*) from women with a syndrome known as bacterial vaginosis. The syndrome has also been known as gardnerella, nonspecific vaginitis and anaerobic vaginosis.

The early naming of the syndrome after

only one organism was a misnomer, because the discharge contains a variety of bacteria, most of which are anaerobic. *G. vaginalis*, *Bacteroides* spp., *Prevotella* spp., *Peptostreptococcus* spp, *Mobiluncus* and *Mycoplasma* spp., among others, are all found in increased numbers in patients with bacterial vaginosis. Culture of *G. vaginalis* alone does not define bacterial vaginosis. Lack of lactobacilli is pathognomonic of the syndrome. No lactobacilli means that no lactic acid is produced, and the vaginal pH is 'alkaline' (>4.7).

Bacterial vaginosis is common, and prevalence rates vary between 5 and 51%.^{2,3} Some studies have shown a relationship between bacterial vaginosis and new sexual partners, as well as numbers of partners, douching and non-white races; however, the cause of the condition remains unclear.

The syndrome does not appear to be

sexually transmitted as several placebo-controlled trials have shown that treatment of male partners made no difference to the relapse or recurrence rates in women.²

Diagnosis

Bacterial vaginosis is defined as at least three out of four of the following (see also the table on page 81 and the flowchart on page 82).

- Vaginal discharge (Figure 2). The discharge is grey or white, is homogeneous and may pool in the speculum with an occasional bubble. The vaginal walls and vulva are not inflamed, and bacterial vaginosis does not produce symptoms of itching or pain. Bacterial vaginosis is a 'vaginosis', not a 'vaginitis'.
- Alkaline pH (>4.7). A narrow range (pH 4.0 to 6.0) pH tape should be used. False pH readings can occur from incorrectly sampling cervical mucus, semen or lubricating gel, or from infection with *Trichomonas vaginalis*. (Narrow range indicator paper – pH 4.0 to 6.0 – can be obtained from Merck in Kilsyth, Victoria, tel: 1800 337 460.)
- A positive amine 'whiff' test with 10% potassium hydroxide (Figure 3). This test is based on the characteristic that when anaerobic bacteria are mixed with an alkaline solution they produce volatile amines such as putrescine and cadaverine. When a bacterial vaginosis specimen is mixed with 10% potassium hydroxide (obtainable from a local pharmacist) a 'fishy' odour emits. As menstrual blood and semen are alkaline, the characteristic smell of bacterial vaginosis is often more noticeable around menstruation and after intercourse.
- 'Clue' cells (Figure 4). These are vaginal epithelial cells that have attracted and become coated with bacteria, obscuring the clear nature of the walls. Testing vaginal pH and performing a

Table. Comparison of normal and common abnormal vaginal discharges

Feature	Normal vaginal discharge	Candidiasis	Trichomoniasis	Bacterial vaginosis	Cervicitis
Lactobacilli present	Yes	Yes	Usually decreased	No	Yes
pH	< 4.7	< 4.7	> 4.7	> 4.7	< 4.7
Amine 'whiff' test	Negative	Negative	Malodorous/offensive	Fishy	Negative
Clue cells	No	No	No	Yes	No
Trichomonas	No	No	Yes	No	No
Spores +/- hyphae	No	Yes (sensitivity 50%; culture if suspected)	No	No	No
Polymorphs	No	Yes	Yes	No	Yes
Appearance on examination	Normal	Vulvovaginitis with redness	Inflammatory response	No inflammation	Purulent discharge from cervix not vaginal walls
Discharge	White flocculent; clear mucus from cervix	White 'curds'/plaques attached to vaginal walls	Yellow-green frothy discharge	Grey, white homogeneous discharge; occasional bubbles	Purulent discharge, green or yellow seen as coming from cervix
Symptoms	Nil	Vulval itching, swelling after intercourse, vulval pain	Asymptomatic or itchy or painful vulval area	Fishy smell after sex, menstruation or constantly	Possibly lower abdominal pain, deep dyspareunia; other signs of PID

'whiff' test may be enough to diagnose bacterial vaginosis. Culture of *G. vaginalis* in combination with an alkaline vaginal pH would be strongly suggestive of bacterial vaginosis. To interpret vaginal culture correctly, the 'whiff' test result and pH are best recorded in the notes at the time of consultation.

Treatment

Bacterial vaginosis may be self-limiting, recurrent or chronic. Most doctors recommend treatment for symptomatic women and for those who may develop complications.

Oral treatment with metronidazole (Flagyl, Metrogyl, Metronide), either in

a single dose (2 g) or a week-long course (400 mg three times daily), may be given. Although longer courses of oral treatment appear slightly more effective, side effects are common. In Australia, the only topical preparation available is clindamycin 2% cream (Dalacin V Cream 2%).

The relapse rate after treatment is approximately 20 to 30% within four weeks of treatment, and up to 70% of women relapse within three months. Relapse appears to be due to the failure of lactobacilli to recolonise the vagina. Commercial preparations of yoghurt, acidifying the vagina with Aci-Jel and intravaginal lactobacilli pessaries have

proved ineffective.²

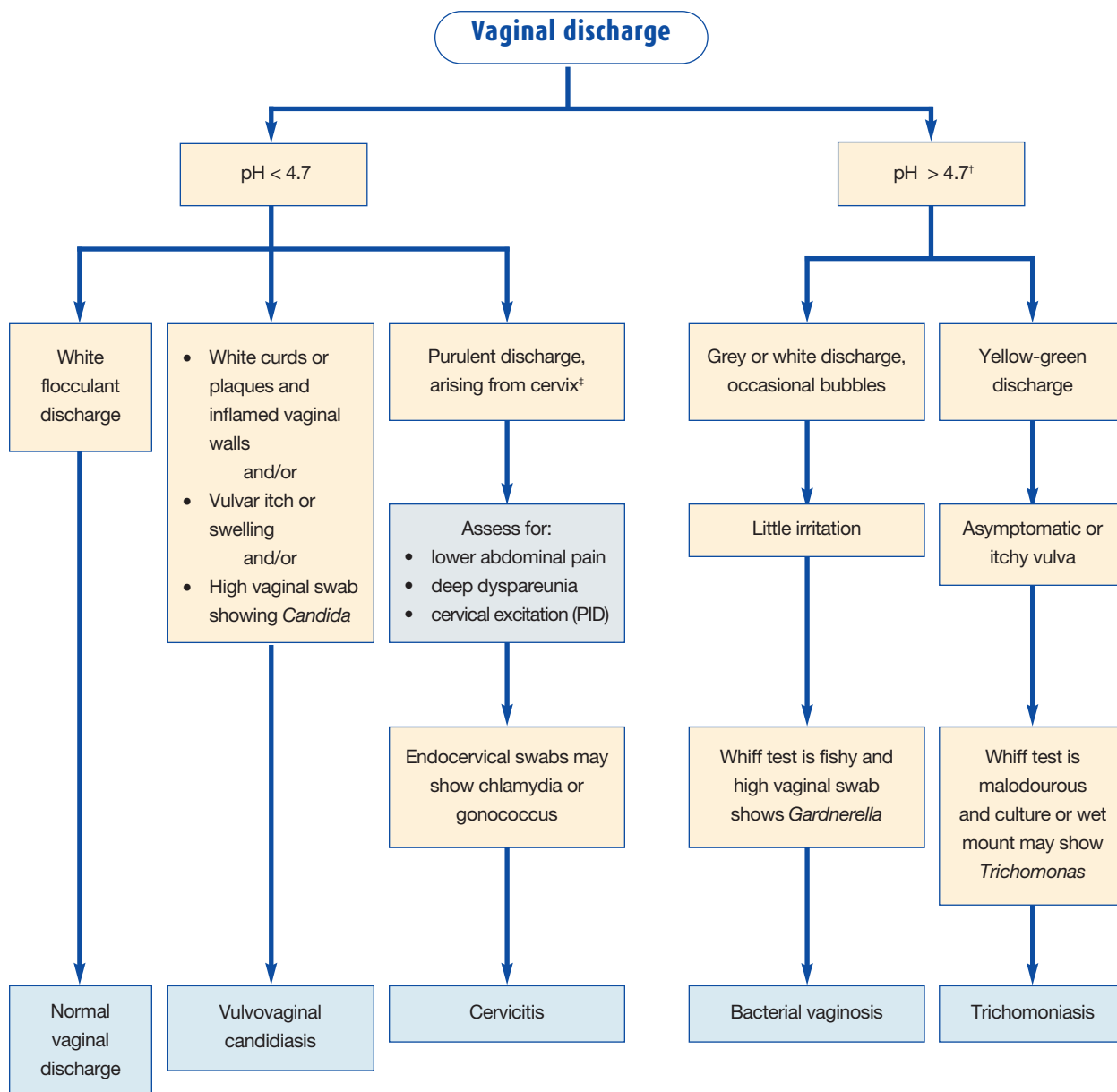
Complications

Untreated bacterial vaginosis present before operative termination of pregnancy may increase the rate of infection more than twofold.⁴ All women should have their vaginal discharge evaluated before undergoing operative gynaecological surgery. Bacterial vaginosis has also been associated in many studies with chorioamnionitis and premature rupture of membranes. The effectiveness of treatment during pregnancy is controversial, although currently recommended in high-risk situations. Bacterial vaginosis has also been implicated in

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Simplistic bedside assessment of normal and abnormal vaginal discharges*

High vaginal and endocervical swabs for gonococcus and chlamydia should always be taken.
Mixed infections are common and may confuse the signs and symptoms.



* In the absence of 'on site' microscopy facilities.
† Exclude pH sampling error, such as cervical mucus, semen or lubricating gel.
‡ Trace and treat contacts.
PID = pelvic inflammatory disease.

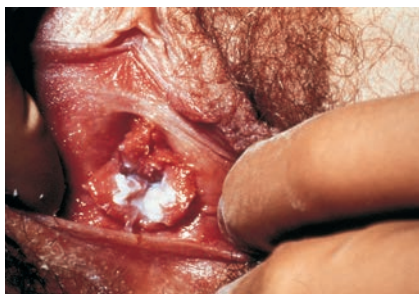


Figure 5. The typical 'cottage cheese' discharge of candida infection.



Figure 6. Typical candida infection showing white plaques on an inflamed vaginal wall.

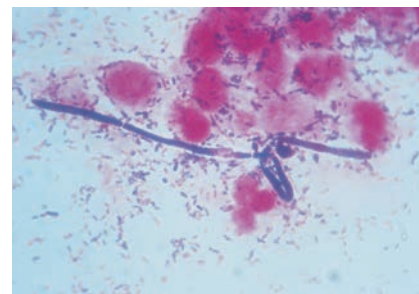


Figure 7. Hyphae and spores of *Candida*.

pelvic inflammatory disease in its own right and requires oral treatment when associated with pelvic pain.²

Vulvovaginal candidiasis

Candida infections are asymptomatic in 10 to 20% of women. Up to 75% of women will experience a symptomatic vaginal yeast infection during their lifetime and *Candida albicans* is the species isolated in 85% of cases. *Candida glabrata* and noncandida species are becoming more common as over-the-counter antifungals become increasingly available,⁵ indicating these species may be more resistant to topical preparations.

Variable clinical presentations

Candida infection of the vagina presents in a variety of ways, ranging from a classical 'cottage cheese' vaginal discharge with vulval irritation and itch (Figure 5) to a yeast hypersensitivity producing swelling and pain after intercourse only, with minimal discharge. Other symptoms of yeast infections may be vaginal pain, superficial dyspareunia and external dysuria.

In a typical infection presenting with vaginal discharge, examination of the vulva may show erythema in the vestibule. Occasionally 'satellite' lesions may be present. On vaginal examination, white plaques may be attached to the vaginal wall and the vaginal walls appear inflamed (Figure 6).

Lactobacilli usually coexist with yeasts

and the vaginal pH remains acidic. A culture of the discharge should be taken to confirm the diagnosis. Doctors able to perform 'on site' microscopy will be able to see hyphae and spores in the discharge (Figure 7), either on Gram stain at 100x or when mixed with 10% potassium hydroxide and viewed under 40x lens. The sensitivities of these methods are less than that of culture.

For uncomplicated cases of yeast infection, topical vaginal azoles, such as clotrimazole (Canesten Vaginal, Clozole 1% Vaginal Cream, Gyne-Lotrimin Vaginal Cream), econazole (Pevaryl Vaginal) and miconazole (Fungo Vaginal Cream, Monistat Vaginal), all achieve cure rates in excess of 80%. Most preparations have similar reported efficacy rates.

Mixed candida and bacterial vaginosis infections may also present with unusual symptoms.

Other causes of vulval itching

Vulval itching is a common symptom associated with yeast infection, but not all itching is due to infection. The vulva must be examined and other conditions excluded, such as irritant dermatitis, lichen simplex chronicus, lichen sclerosus and genital herpes. Dermatitis may present with splits and fissures laterally between the labia majora and perineum. All small abrasions in the vulval skin should be cultured for genital herpes. Vulval irritation may also occur in response to

an unusually high or low vaginal pH.

The affected skin should be treated appropriately for the condition diagnosed, for instance, hydrocortisone 1% (Cortef, Sigmacort) for dermatitis. Irritants such as soaps, antiseptic creams and hygiene sprays should be avoided.

Cyclical vulvitis

Vulval hypersensitivity to small amounts of yeasts may present with vulval pain, dyspareunia and vulval swelling, which is often more noticeable after intercourse. The symptoms are often cyclical in nature and may worsen at ovulation or around menstruation. Vaginal culture for yeasts may be negative and the diagnosis rests with history, examination and response to treatment. This condition has been named cyclical vulvitis and management is usually cyclical administration of oral azoles such as fluconazole (Diflucan) 150 mg once a week/once a month or ketoconazole (Nizoral) 200 mg a day for the five days immediately preceding the time during the menstrual cycle when the symptoms are more noticeable.

Recurrent candidiasis

Recurrent candidiasis is defined as four or more culture or microscopy proven episodes of yeast infection a year. Recurrent infections are thought to be due to vaginal relapse and not re-infection from the bowel. Although all factors are not fully understood, predisposing factors to

recurrent symptomatic infection include states of relative immunosuppression including HIV infection, diabetes and pregnancy. Resistant strains of candida, local vaginal immune mechanisms and high dose oral contraceptive pills may also be contributing factors. Recent studies suggest a possible genetic and biological predisposition.³ Broad spectrum antibiotics may also precipitate symptomatic yeast infections in some women, due to a variety of local factors, including competition for nutrients between lactobacilli and yeasts.⁵

Depending on the cause, patients with recurrent infection may require long term suppressive maintenance therapy for up to six months with either oral or topical antifungal agents. Weekly clotrimazole 500 mg, in the form of applications of vaginal pessaries (Canesten Vaginal), has been used with some success.⁵

Trichomoniasis

Trichomonas vaginalis is a sexually transmitted flagellate protozoan that, worldwide, is said to affect 180 million women. In urban areas of Australia the infection appears to be uncommon, although increasingly sensitive tests show that it may be more common than previously thought. Infection rates as high as 25% were found in a recent study in the Northern Territory.⁶

Trichomoniasis may present with an inflammatory vaginal discharge and symptoms of vulval irritation; however, approximately half the infections are asymptomatic. The discharge, if present, has a characteristically unpleasant odour and may be described as frothy 'yellow'.

On examination, the vulval and vaginal walls are inflamed. The classical 'strawberry' appearance of the cervix is rare, the discharge has an alkaline pH and a 'foul' odour is noticeable when it is mixed with 10% potassium hydroxide.

Recent studies have shown that the standard diagnostic tests of *T. vaginalis* infection – microscopy, culture and detec-

tion on cervical smears – are insensitive when compared with the newer DNA tests.⁷ When these tests become commercially available the diagnosis of this infection should improve dramatically.

Management and complications

A single 2 g dose of metronidazole or tinidazole (Fasigyn, Simplotan) is usually effective; however, cases have been reported of resistance requiring larger and longer doses, leading to intravenous administration. Sexual partners must always be treated, because isolating the organism from men is more difficult and reinfection can occur. *T. vaginalis* infection has been associated with premature delivery and the infection may be more important than previously thought.³

Cervicitis

A discharge visible at the introitus and perceived as vaginal may be coming from the cervix and not the vagina. Speculum examination should enable a distinction to be made. A purulent discharge appearing from the endocervix

may be a sign of a bacterial sexually transmitted infection.

Mucopus may be visible, and specific tests for *Chlamydia trachomatis* and *Neisseria gonorrhoea* should be taken from the cervix. Large quantities of inflammatory cells may be seen on microscopy of the cervical discharge, and a cervical smear may often be reported as showing 'inflammatory' changes.

Bimanual pelvic examination should be performed and signs of cervical excitation elicited. Other symptoms of pelvic inflammatory disease may include lower abdominal pain, postcoital bleeding, breakthrough bleeding, heavier menstrual bleeding, dysuria and possibly deep dyspareunia. Recent male sexual partners may have symptoms of urethral dysuria and discharge. A careful sexual history should be taken because recent partners and contacts need to be traced and treated.

Treatment of uncomplicated cervicitis is with doxycycline 100 mg twice daily for 10 days. Single dose azithromycin (Zithromax) 1 mg can be used for uncomplicated *C. trachomatis* cervical infection, but if there are signs of ascending infection the addition of metronidazole 400 mg three times daily for seven days and a longer course of antibiotics (up to two to three weeks) may be required. An antigonorrhoeal agent, such as ceftriaxone (Rocephin) 250 mg intramuscular injection, could be added in areas of high prevalence. The use of azithromycin has not been evaluated in cases of pelvic inflammatory disease. Partners must always be treated.

Other causes of cervicitis may be herpes infection of the cervix (an ectocervicitis) and other organisms not routinely tested for, including *Mycoplasma* spp.

Other vaginal discharges

Atrophic vaginitis

Atrophic vaginitis may present at menopause with a watery, scalding vaginal discharge. The vaginal epithelium is thin

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and pale and takes on a smooth shiny appearance. The symptoms are readily reversed after one to two weeks of oestrogen therapy.

Cytolytic vaginosis

An abundance of lactobacilli in the vagina with a highly acidic pH, presenting with vaginal discharge and vulval irritation, has been named cytolytic vaginosis.⁸ On microscopy, lactobacilli are numerous, and cytolysis or disruption of the vaginal epithelial cells is seen. The irritation often appears worse in the second half of the menstrual cycle. The current treatment recommended is sodium bicarbonate vaginal douches.

Desquamative inflammatory vaginitis

Desquamative vaginitis is rare, and characterised by a purulent alkaline discharge with diffuse vaginitis with an occasional vaginal rash. There is a rapid response to clindamycin 2% topical vaginal cream. The aetiology is thought to be related to streptococcus group B infection.²

Conclusion

Irritating vaginal symptoms and discharges need to be evaluated. A sexual and reproductive history and a genital examination can be complemented by simple tests such as pH and the 'whiff' test. Vulval symptoms such as itching

often accompany a vaginal discharge, but should be differentiated from other causes. Appropriate tests should be ordered to identify discharges caused by sexually transmitted infections. These infections may have more serious consequences and require treatment of partners and contact tracing. MT

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