

# Vaginal swab

**Vaginal discharge** is a mixture of liquid, cells, and bacteria that lubricate and protect the vagina. This mixture is constantly produced by the cells of the vagina and cervix, and it exits the body through the vaginal opening.

Normal vaginal discharge is composed of cervical mucus, vaginal fluid, shedding vaginal and cervical cells, and bacteria.

The majority of the liquid in vaginal discharge is mucus produced by glands of the cervix. The rest is made up of transudate from the vaginal walls and secretions from glands (Skene's and Bartholin's). The solid components are exfoliated epithelial cells from the vaginal wall and cervix as well as some of the bacteria that inhabit the vagina. These bacteria that live in the vagina do not typically cause disease, they can protect the individual from other infectious and invasive bacteria by producing substances such as lactic acid and hydrogen peroxide that inhibit growth of other bacteria. The normal composition of bacteria in the vagina (vaginal flora) can vary, but is most commonly dominated by lactobacilli. On average, there are approximately  $10^8$  to  $10^9$  bacteria per milliliter of vaginal discharge

The composition, amount, and quality of discharge varies between individuals and can vary throughout the menstrual cycle and throughout the stages of sexual and reproductive development

## Neonatal

In neonates, vaginal discharge sometimes occurs in the first few days after birth. This is due to exposure to estrogen while in utero. Neonatal vaginal discharge may be white or clear with a mucous texture, or it may be bloody from normal transient shedding of the endometrium.

## Pediatric

The vagina of girls before puberty is thinner and has a different bacterial flora. Vaginal discharge in pre-pubertal girls is minimal with a neutral to alkaline pH ranging from 6 to 8. The composition of the bacterial population in pre-pubertal girls is dominated by staphylococcus species, in addition to a range of anaerobes, enterococci, *E. coli*, and lactobacillus.

## Puberty

During puberty, the hormone estrogen begins to be produced by the ovaries. Even before the beginning of menses (up to 12 months before menarche, typically at the same time as the development of breast buds, vaginal discharge increases in amount and changes in

composition. Estrogen matures vaginal tissues and causes increased production of glycogen by epithelial cells of the vagina. These higher levels of glycogen in the vaginal canal support the growth of lactobacilli over other bacterial species. When lactobacilli use glycogen as a food source, they convert it to lactic acid. Therefore, the predominance of lactobacilli in the vaginal canal creates a more acidic environment. In fact, the pH of the vagina and vaginal discharge after puberty ranges between 3.5 and 4.7.

### **Menstrual cycle**

The amount and consistency of vaginal discharge changes with the menstrual cycle. In the days right after menstruation, vaginal discharge is minimal, and its consistency is thick and sticky.<sup>[10]</sup> When approaching ovulation, the rising estrogen levels cause a concomitant increase in vaginal discharge. The amount of discharge produced at ovulation is 30 times greater than the amount produced directly following menstruation. The discharge also changes in color and consistency during this time, becoming clear with an elastic consistency. After ovulation the body's progesterone levels increase, which causes a decrease in the amount of vaginal discharge. The consistency of the discharge once again becomes thick and sticky and opaque in color. The discharge continues to decrease from the end of ovulation until the end of menstruation, and then after menstruation it begins its rise again.

### **Pregnancy**

During pregnancy, vaginal discharge volume increases as a result of the body's increased levels of estrogen and progesterone. The discharge is usually white or slightly gray, and may have a musty smell. The normal discharge of pregnancy does not contain blood or cause itching. The pH of the vaginal discharge in pregnancy tends to be more acidic than normal due to increased production of lactic acid. This acidic environment helps to provide protection from many infections, though conversely it also makes women more susceptible to vaginal yeast infections.

### **Menopause**

With the drop in estrogen levels that comes with menopause, the vagina returns to a state similar to pre-puberty. Specifically, the vaginal tissues thin, become less elastic; blood flow to the vagina decreases; the surface epithelial cells contain less glycogen. With decreased levels of glycogen, the vaginal flora shifts to contain fewer lactobacilli, and the pH subsequently decreases to a range of 6.0-7.5. The overall amount of vaginal discharge decreases in menopause. While this is normal, it can lead to symptoms of dryness and pain during penetrative sexual intercourse. These

symptoms can often be treated with vaginal moisturizers/lubricants or vaginal hormone creams.

### *Normal discharge*

Normal vaginal discharge is clear, white, or off-white.<sup>[1]</sup> The consistency can range from milky to clumpy, and odor typically mild to non-existent.<sup>[1]</sup> The majority of the discharge pools in the deepest portion of the vagina (the posterior fornix)<sup>[2]</sup> and exits the body over the course of a day with the force of gravity.<sup>[1][3]</sup> A typical reproductive-age woman produces 1.5 grams (half to one teaspoon) of vaginal discharge every day.<sup>[1]</sup>

During sexual arousal and sexual intercourse, the amount of fluid in the vagina increases due to engorgement of blood vessels surrounding the vagina. This engorgement of blood vessels increases the volume of transudate from the vaginal walls.<sup>[3]</sup> Transudate has a neutral pH, so increases in its production can temporarily shift vaginal pH to be more neutral.<sup>[3]</sup> Semen has a basic pH and can neutralize the acidity of the vagina for up to 8 hrs.<sup>[3]</sup>

- Normal bacterial flora is dominated by lactobacilli – other potential pathogens present.
- Acidic environment (pH 3.8-4.2) inhibits the overgrowth of bacteria
- Some lactobacilli also produce H<sub>2</sub>O<sub>2</sub>, a potential microbicide

Normal physiological discharge of vagina changes with the menstrual cycle. It is thick and sticky for most of the cycle, but becomes clearer, wetter, and stretchy for a short period around the time of ovulation. These changes do not occur in women using oral contraceptives .

Abnormal vaginal discharge is characterized by a change of colour, consistency, volume, or odor, and may be associated with symptoms such as itch, soreness, dysuria, pelvic pain, or intermenstrual or post-coital bleeding .

Only the patient can be aware of her own “normal” amount and type of discharge. **The normal discharge may increase:**

- Premenstrually
- At time of ovulation
- When commenced on HRT (Hormone replacement therapy ) or hormonal contraception

### **Causes of Abnormal Vaginal Discharge**

Abnormal vaginal discharge is most commonly caused by infection; less commonly, abnormal vaginal discharge can have a non-infective cause .

#### **Infective cause:**

- a) Vaginal candidiasis caused by fungal infection with *Candida albicans*.

- b) Bacterial vaginosis caused by an overgrowth of anaerobic bacteria, particularly *Gardnerella vaginalis*. Endocervical infections caused by *Chlamydia trachomatis* and *Neisseria gonorrhoeae* may cause vaginal discharge or other symptoms such as; dysuria, post coital/intermenstrual bleeding, deep dyspareunia, pelvic pain and tenderness (if there is ascending pelvic infection), or reactive arthritis.
- c) Trichomoniasis, a sexually transmitted infection caused by the protozoan *Trichomoniasis vaginalis* (TV)
- d) Herpes simplex may rarely be associated with discharge.

**Non-infective cause :**

- A retained foreign body such as a tampon, condom, or vaginal sponge.
- Inflammation due to allergy or irritation caused by substances such as deodorants, lubricants, and disinfectants.
- Tumours of the vulva, vagina, cervix, and endometrium.
- Atrophic vaginitis in post-menopausal women.
- Cervical ectopy or polyps

## Specimen Transport and Storage

- Vaginal swab specimens must be transported to the laboratory in the provided swab specimen transport medium and tube.
- Vaginal swab specimens must be transported to the laboratory at 2°C to 30°C and tested within 60 days of collection.
- If longer storage is needed, freeze at -20°C to -70°C for up to 12 months after collection

- 1-Place the patient in dorsal position, supported by a pillow
- 2- ask her to bring her heels together,
- 3- bend her legs and then draw her heels towards her bottom.
- 4- Open the swab package
- 5- Remove the swab; do not touch the soft tip or lay the swab down.
- 6- Hold the swab
- 7- Insert the swab into the lower part of the vagina (about two inches ).
- 8- Gently but firmly rotate the swab for 10 to 30 seconds in the vagina.
- 9- Withdraw the swab without touching the skin.
- 10- Place the swab into the test tube so that the tip of the swab is visible below the tube label Ensure that the swab is labeled accurately and place, with the completed request form
- 12- transport bag to the Department of Medical Microbiology.



- Vaginitis Usually characterized by:
  - Vaginal discharge
  - Vulvar itching
  - Irritation
  - Odor
- Common types
  - Trichomoniasis (15%-20%)
  - Bacterial vaginosis (40%-45%)
  - Vulvovaginal candidiasis (20%-25%)

### Diagnosis of Vaginitis

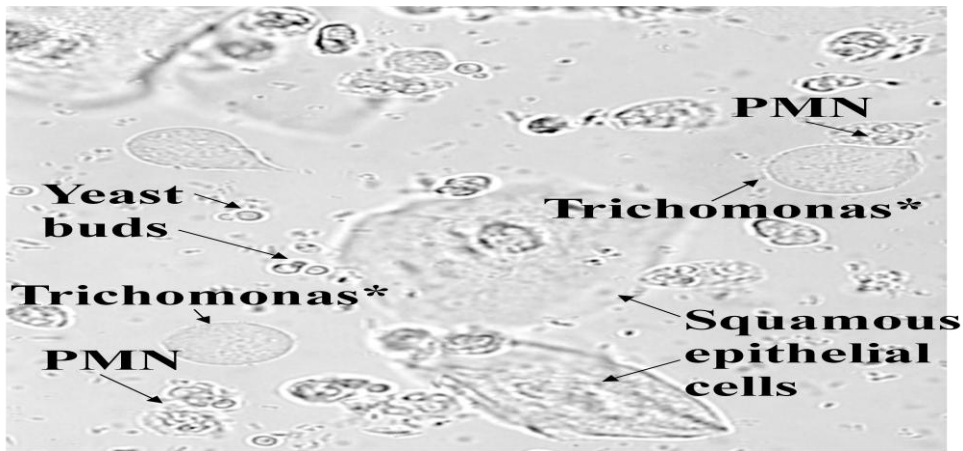
- Patient history
- Visual inspection of internal/external genitalia
- Appearance of discharge
- Collection of specimen
- Preparation and examination of specimen slide





## Male diagnosis - Culture

- First void urine concentrated
- Urethral swab



- Affirm method : A DNA probe test for *T. vaginalis*, *Candida* spp., and *Gardnerella vaginalis*
- single swab treated to release and stabilize RNA
- capture probes on a probe analysis card
- after exposure of card to sample, exposed to detection probes with bound enzyme
- in the presence of enzyme substrate a blue color develops to indicate a positive test



