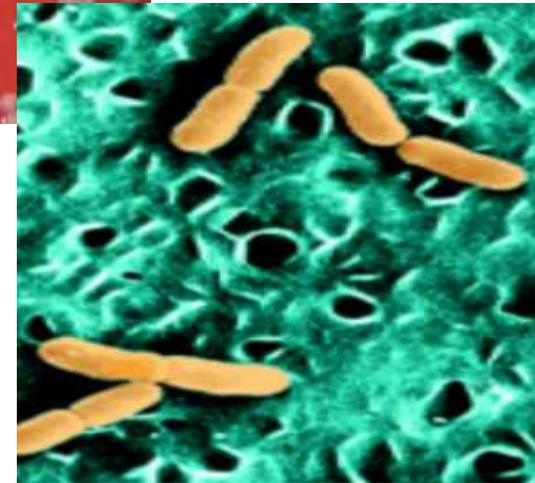
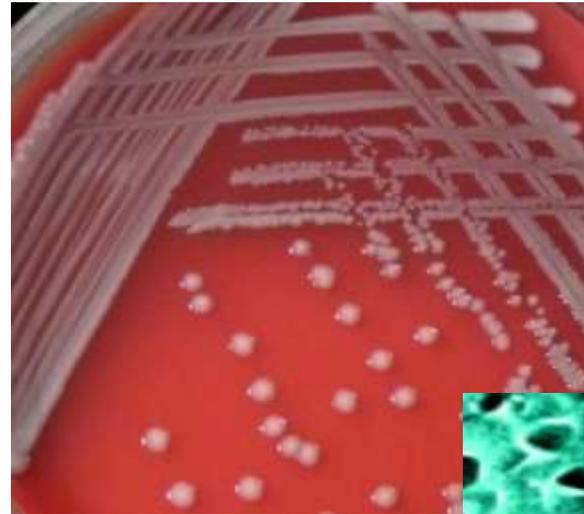


Microbiology of Urogenital system



Edited by: Dana Alwasra ♥

Anas Abu-Humaidan
M.D. Ph.D.

Lecture 4

Sexually transmitted diseases

Genital infections encompasses a variety of clinical entities, including :

- **Bacterial vaginosis**
- **Chancroid**
- **Gonorrhoea**
- **Chlamydia**
- **Syphilis**
- ***Mycoplasma genitalium***
- **Trichomoniasis**
- **Vulvovaginal candidiasis**
- **Genital warts**
- **Human immunodeficiency virus.**
- **Genital herpes**

SEXUALLY TRANSMITTED AND SEXUALLY TRANSMISSIBLE MICROORGANISMS		
BACTERIA	VIRUSES	OTHER ^a
Transmitted in Adults Predominantly by Sexual Intercourse		
Neisseria gonorrhoeae	HIV (types 1 and 2)	Trichomonas vaginalis
Chlamydia trachomatis	Human T cell lymphotropic virus type 1	Pthirus pubis
Treponema pallidum	Herpes simplex virus type 2	
Haemophilus ducreyi	Human papillomavirus (multiple genital genotypes)	
Klebsiella (Calymmatobacterium) granulomatis	Hepatitis B virus ^b	
Ureaplasma urealyticum	Molluscum contagiosum virus	
Mycoplasma genitalium		

Sexually transmitted diseases/ overview

- Symptoms and signs of disease may include **vaginal discharge**, **penile discharge**, **ulcers** on or around the genitals, and **pelvic pain**. **Dysuria** and **dyspareunia** can also happen. Many STDs can be **asymptomatic**. *asymptomatic people are more likely to spread the disease. (playing a role in epidemiology)*
- Patients with one STI should be assessed for the presence of others, because of **similar risk factors**¹ and **vulnerability of an inflamed genital epithelium to other infections**.²

- Risk factors include:

- The number of sexual partners and frequency of partner change
- Failure to use barrier contraception,
- Lower socioeconomic status,
- Age <25 years
- Symptomatic partner, *MSM: men having sex with men, are more prone to contract these infections ↓*
- Sexual orientation (syphilis, gonorrhoea, HIV, and hepatitis B are more prevalent amongst MSM in the UK), and sexual practices (orogenital and anogenital contact).

1. risk factors are the same for most STDs, so if a patient has one STD, there's a chance that they have another one.

2. genital infections damage the mucosa, making it more vulnerable to other infections.

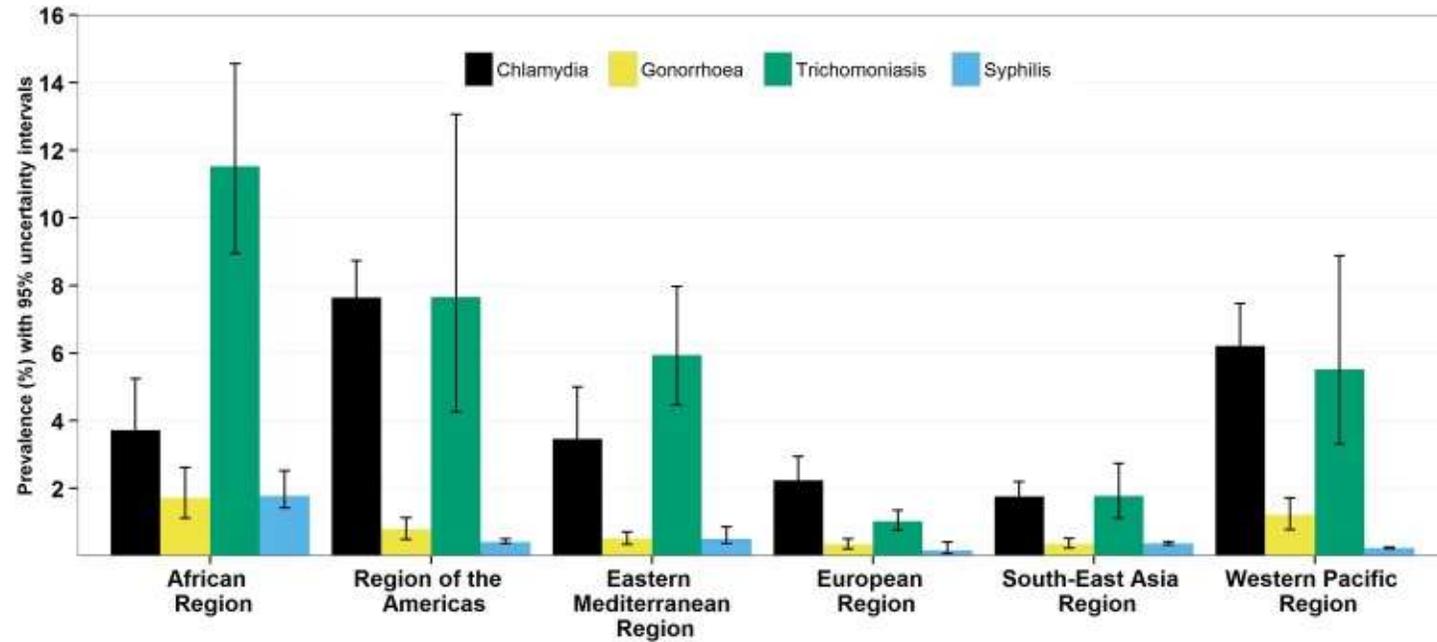
WHO estimates of new cases of chlamydia, gonorrhoea, trichomoniasis, and syphilis among adults for 1995, 1999, 2005, and 2008 using various methods [4 –7].

	Estimated number of new cases (millions)			
	1995	1999	2005	2008
Chlamydia	89	92	101	106
Gonorrhoea	62	62	88	106
Trichomoniasis	170	174	248	276
Syphilis	12	12	11	10

- In 2012, among **women aged 15–49 years**, the estimated **global prevalence of chlamydia was 4.2%** (3.7–4.7%), **gonorrhoea 0.8%** (0.6–1.0%), **trichomoniasis 5.0%** (4.0–6.4%), and **syphilis 0.5%** (0.4–0.6%); among **men**, estimated **chlamydia prevalence was 2.7%** (2.0–3.6%), **gonorrhoea 0.6%** (0.4–0.9%), **trichomoniasis 0.6%** (0.4–0.8%), and **syphilis 0.48%** (0.3–0.7%). **Prevalence and incidence estimates varied by region and sex.**
- **Nearly one million new infections with curable STI each day.**

chlamydia and trichomoniasis are the most common among women

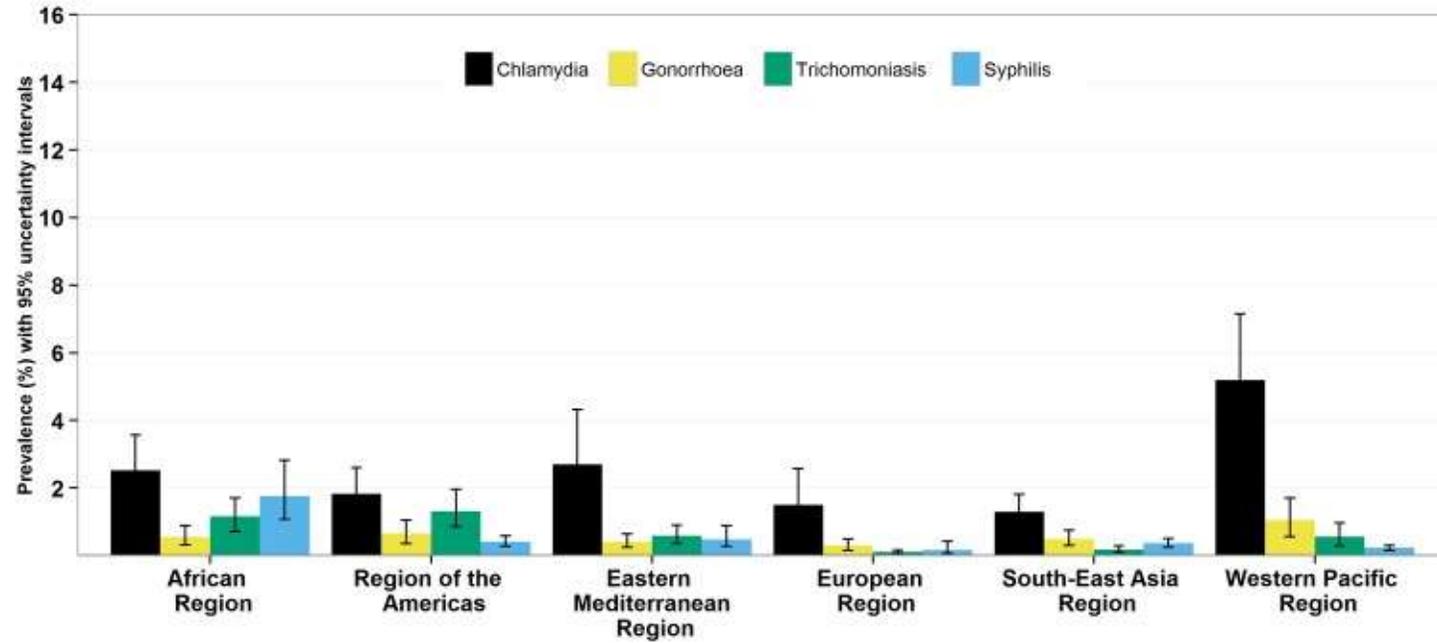
Women



in the Eastern Mediterranean region, the prevalence is not as high as in other regions since sexual practices are not the same, also, social stigma plays a role in reporting cases.

females' genital tract is more susceptible to infections than males', contributing to the relatively low prevalence of STDs among men.

Men



Prevalence of sexually transmitted infections among sexually active Jordanian females.

Mahafzah AM¹, Al-Ramahi MQ, Asa'd AM, El-Khateeb MS.

RESULTS: The prevalence of *C. trachomatis* infection was 0.6% and 0.5%, among symptomatic and asymptomatic women respectively, that of *N. gonorrhoeae* was 0.9% and 2.2%, that of *T. pallidum* 0.0% and 0.0%, and that of *Tr. vaginalis* was 0.7% and 0.5%. These prevalence rates did not differ significantly between symptomatic and asymptomatic women.

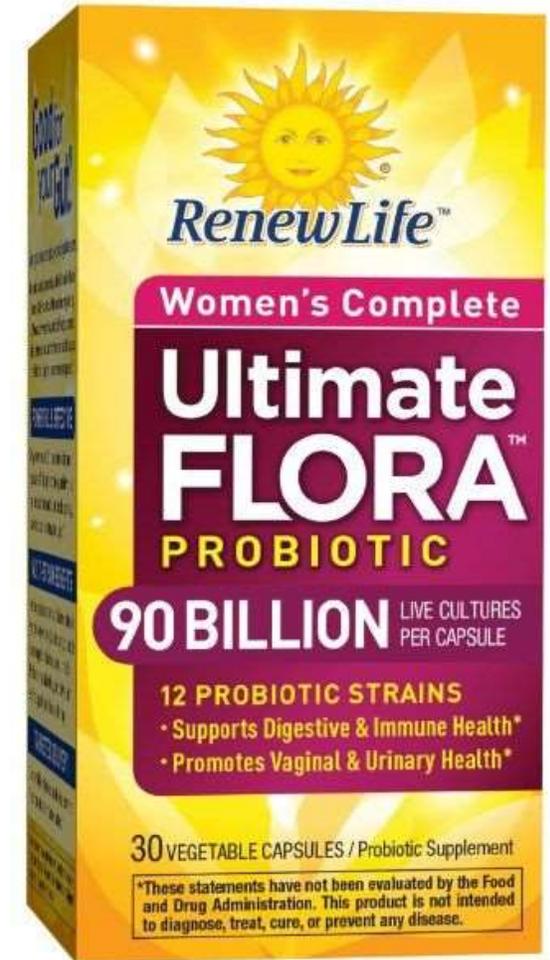
CONCLUSIONS: Based on the low prevalence of sexually transmitted infections detected in this study among Jordanian women, the need for screening programs for such infections is questioned.

Prevalence of STDs in Jordan is low for all types of infections, therefore, screening tests are not necessary. However, some sources claim that the true prevalence is different due to lack of reporting.

Bacterial vaginosis / etiology

because it doesn't have a counterpart in males, and it's not caused by one single pathogen.

- Bacterial vaginosis (BV) is a common[↑] cause of unusual vaginal discharge. BV isn't a sexually transmitted infection (STI), but it can increase your risk of getting an STI such as chlamydia
- Normal **vaginal flora** appears **dominated by one or two species of *Lactobacillus***. Rather than being due to a single organism, **BV is caused by complex changes in the balance of the microbiological flora.**
- **Lactobacilli** produce H₂O₂ which **lowers the pH**— the loss of these organisms permits an increase in pH and **overgrowth of vaginal anaerobes** (e.g. *Bacteroides*, *Mobiluncus*) .
- The newly found bacterial species **degrade vaginal peptides into offensive- smelling products and promote discharge and exfoliation of the epithelial layers.**



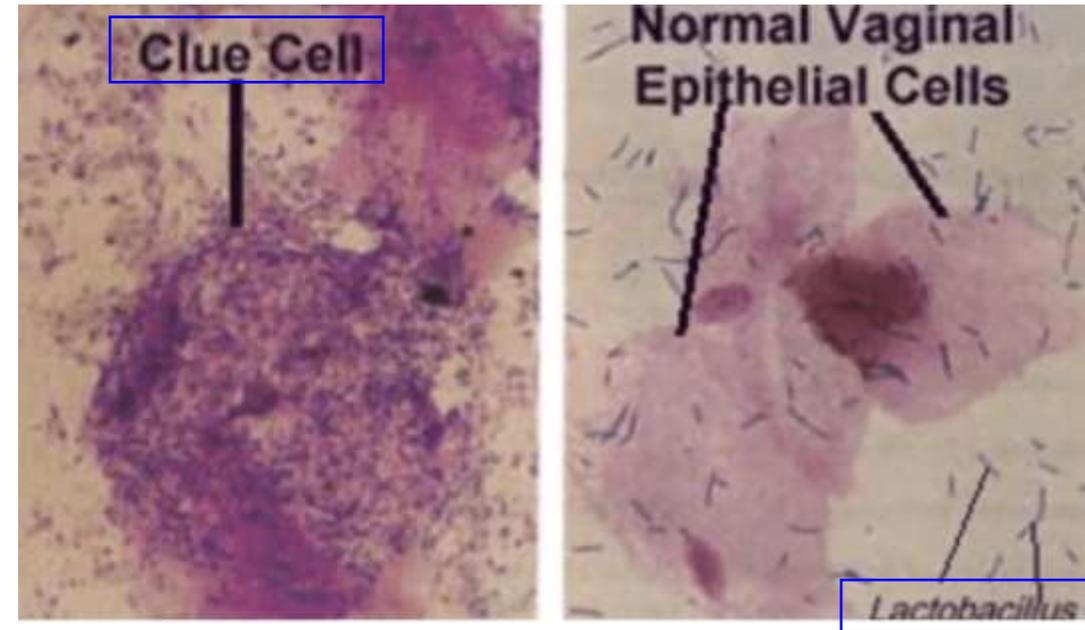
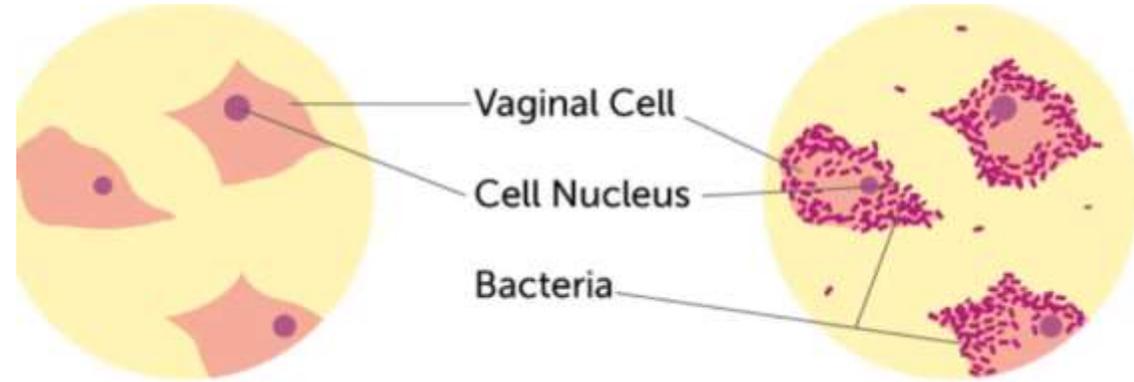
probiotic supplements probably contain *Lactobacilli* to restore the normal vaginal flora, although efficiency is still undetermined.

- Worldwide prevalence ranges from **11% to 48% in women** of childbearing age.
- Risk factors for acquisition— **new or multiple sexual partners, vaginal douching, smoking**. It can occur in women **who have never had vaginal intercourse**.
- **50 to 75% of cases are asymptomatic**. In symptomatic cases, there is **thin, white, fishy smelling discharge**, most noticeable after intercourse.
- **Pregnant women with BV have a higher rate of preterm delivery and pregnancy complications**.
- BV also **increases the risk of contracting other STDs** like HIV.

Bacterial vaginosis / **diagnosis** → *through discharge examination*

The diagnosis of BV is usually based on **Amsel criteria**. The first three findings are sometimes also present in patients with trichomoniasis;

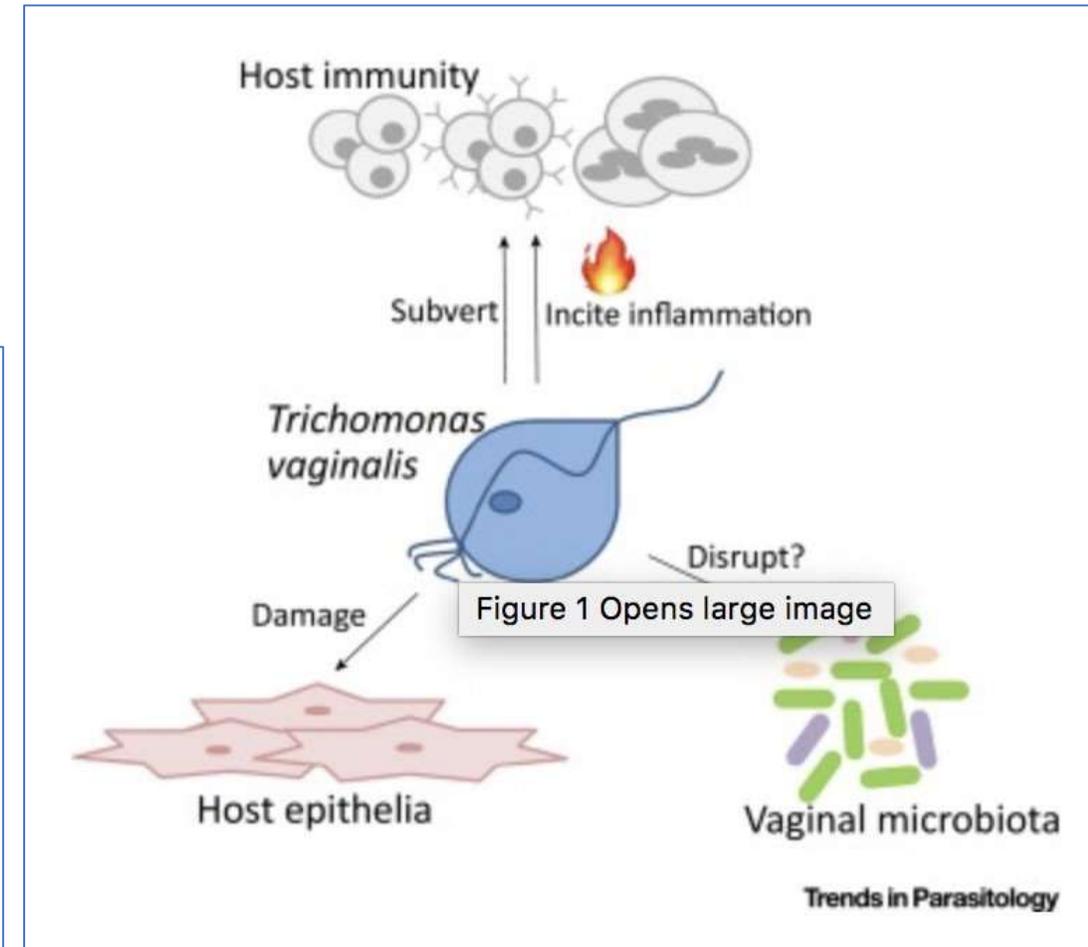
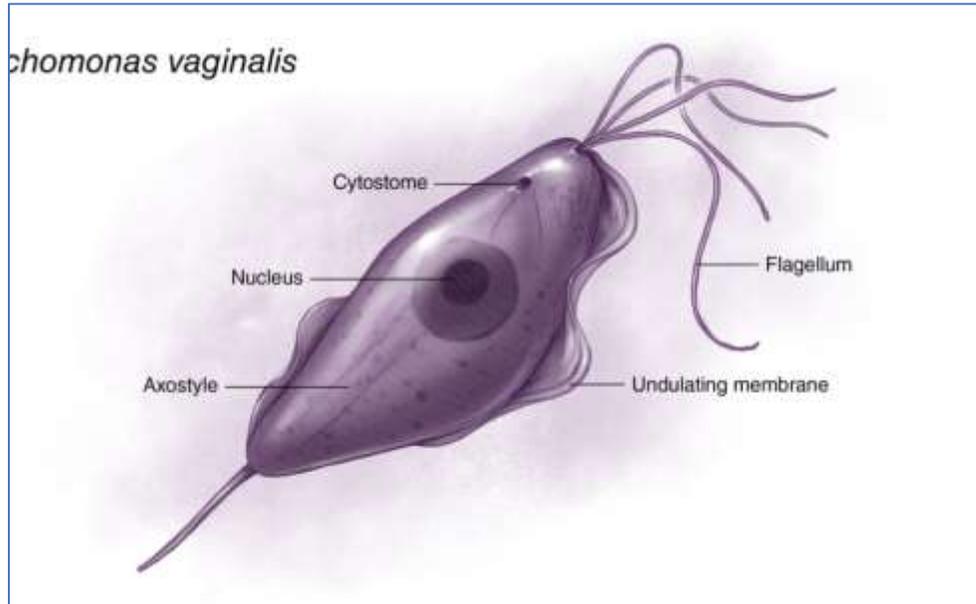
- **homogeneous, watery, white- grey discharge** coating the vaginal walls;
- **vaginal pH > 4.5**;
- **positive amine test**— add **10% KOH** to a sample of discharge— positive if produces a **fishy odour**;
- the presence of '**clue cells**' (epithelial cells studded with **adherent coccobacilli**) on a saline wet mount— the single best predictor of BV.



- **Infection resolves spontaneously in one- third of cases.**
- Treatment may **reduce the risk of acquiring other STDs**. And includes:
metronidazole— 500mg bd PO for 7 days or **clindamycin**— 300mg bd PO for 7 days
- **Thirty per cent of patients experience recurrence** within 3 months. A prolonged (e.g. 14 days) or alternative treatment course should be used in such patients.

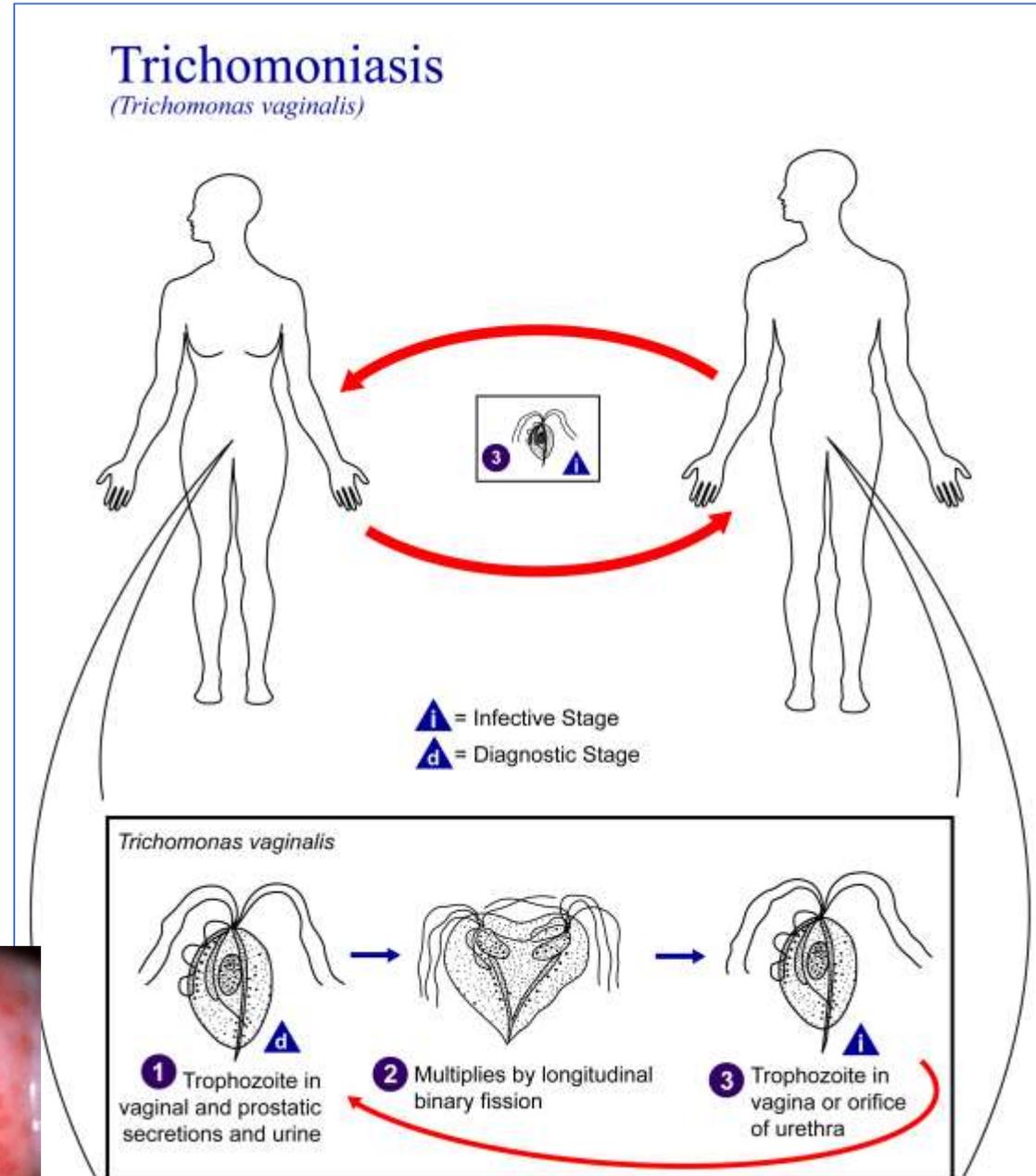
Trichomoniasis / etiology

- An STI caused by the **flagellated protozoan *T. vaginalis* (TV)**.
- TV **pathogenesis** include damage to host tissue mediated by parasite **killing of host cells**, **disruption of steady-state vaginal microbial ecology**, and eliciting inflammation by **activating the host immune response**.



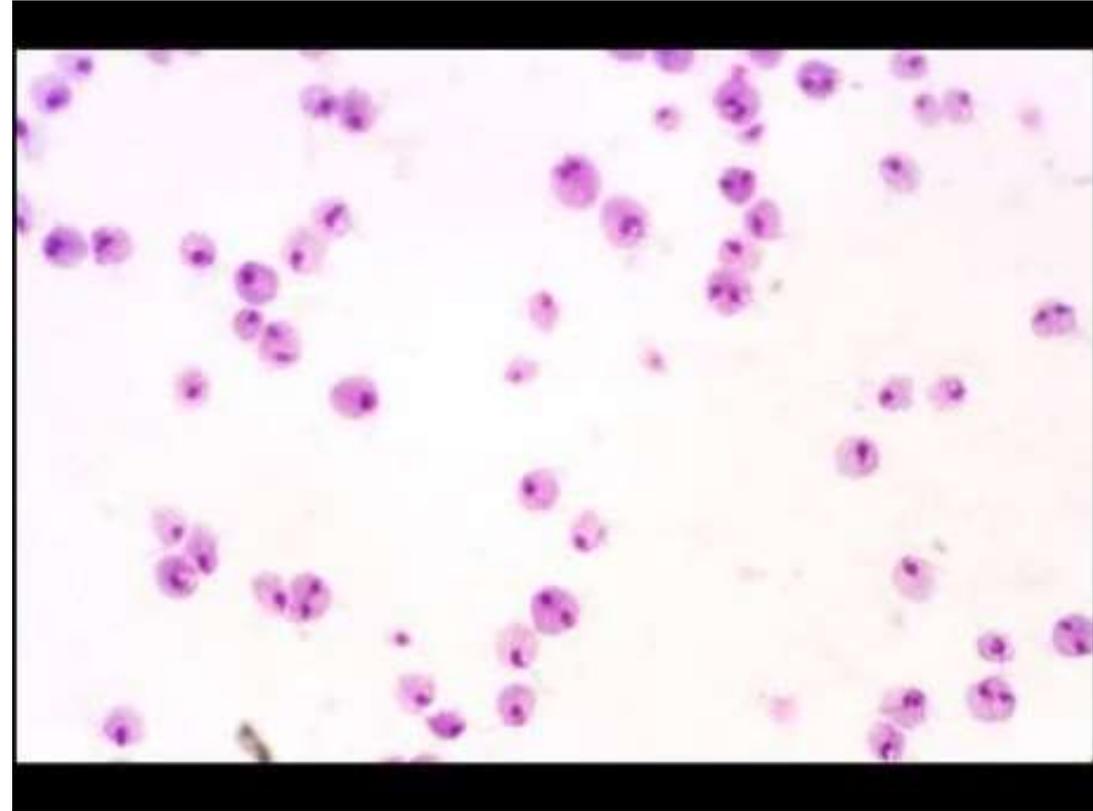
Trichomoniasis / epidemiology/ signs and symptoms

- Transmission is by sexual contact, and its incidence is highest in women with multiple sexual partners and those with other STIs.
- Infection is asymptomatic in 10– 50% of women and 15– 50% of men
- Symptoms include frothy, yellow vaginal discharge (may be itchy and smelly), dyspareunia, dysuria, and lower abdominal pain.
- punctate haemorrhages on the cervix ('strawberry cervix') in 2% of patients
- Can lead to urethritis in men. + urethral discharge



Bacterial vaginosis / diagnosis and treatment

- **Microscopy**— phase- contrast or dark- ground microscopy of wet preparation of genital specimens will demonstrate the **motile flagellated protozoans** in 48– 80% of infected women and 50– 90% of infected men.
- **Point- of- care tests**, e.g. **OSOMR Trichomonas rapid test** has a sensitivity of 80– 94% and a specificity of >95%.
↗ nucleic acid amplification tests, e.g. PCR
- **NAATs** offer the highest sensitivity and are becoming the gold standard
- **Metronidazole** 2g stat dose or tinidazole 2g stat dose. **Partners and asymptomatic individuals should be treated** *treating partners is a general rule in treating STDs*



Syphilis / etiology

- Spirochetes are **thin, helical gram-negative** bacteria. The most important treponemal species that causes human disease is ***Treponema pallidum*, the causative agent for Syphilis**
- *T. pallidum* **has not been cultured** regularly in vitro because they **are dependent on host cells** for many metabolites (e.g. purines, pyrimidines, amino acids). Moreover, they're **extremely sensitive to oxygen** (microaerophilic or anaerobic).

↙ therefore, inanimate objects (e.g. clothes, towels) do not transmit the disease.

dark field microscopy can be used for diagnosis

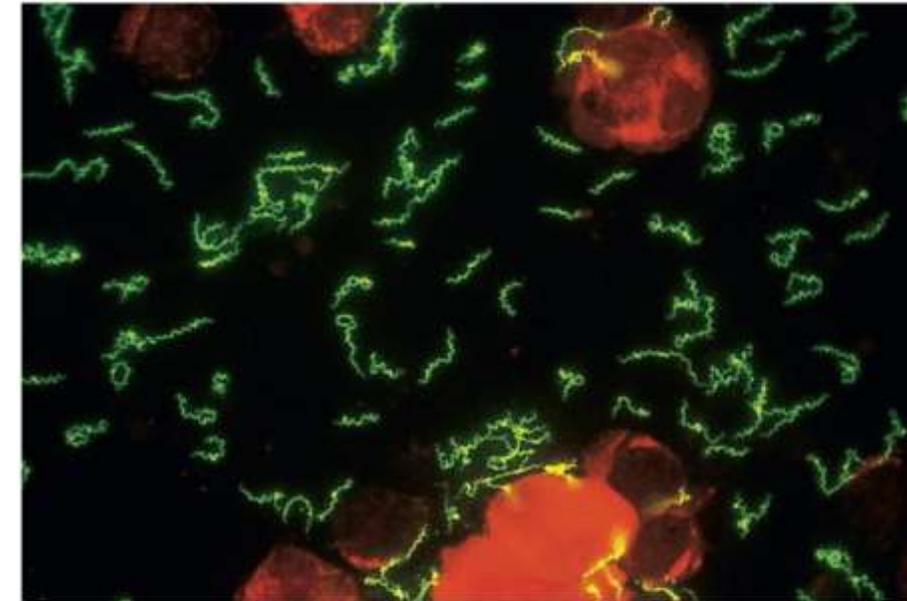
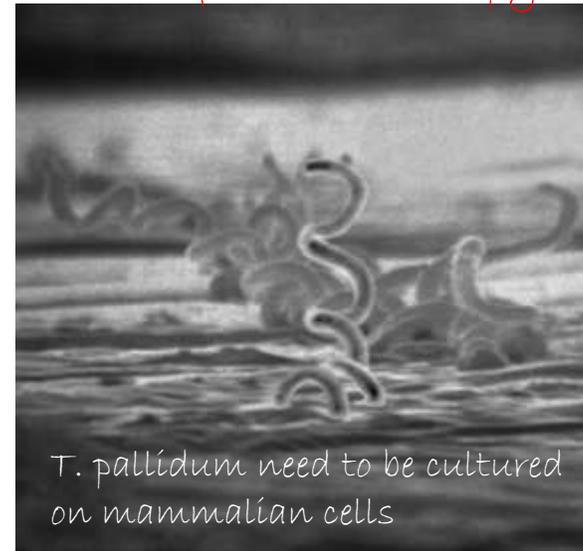


FIGURE 32-3 *Treponema pallidum* in the direct fluorescent antibody test for *T. pallidum*. (From Morse SA, Ballard RC, Holmes KK

Syphilis / epidemiology

- Between 2000 and 2012, the incidence of newly acquired disease has **increased** each year.
- Patients infected with syphilis are at **increased risk for transmitting and acquiring HIV** when genital lesions are present
- Syphilis **cannot be spread through contact with inanimate objects** such as toilet seats (since the bacteria is very labile to drying and disinfectants) .
The most common route of spread is by direct sexual contact.
- Other routes include **congenitally** (from an infected mother) or **by transfusion** with contaminated blood.



The face of a newborn infant displaying **snuffles** indicative of **congenital syphilis**



Portrait of Gerard de Lairesse by Rembrandt van Rijn, circa 1665–67, oil on canvas - De Lairesse, himself a painter and art theorist, had **congenital syphilis** that **deformed his face** and eventually blinded him.^[54]

congenital syphilis can cause facial deformities e.g. saddle nose. and newborns will have symptoms similar to secondary stage of syphilis



Secondary stage rash on the palms of the hands.

Syphilis / signs and symptoms

- The clinical course of syphilis evolves through three phases. If the patient is not treated, syphilis cause **systemic devastating damage**.

very contagious, but disappears after 2-8 weeks and the bacteria disseminate to blood

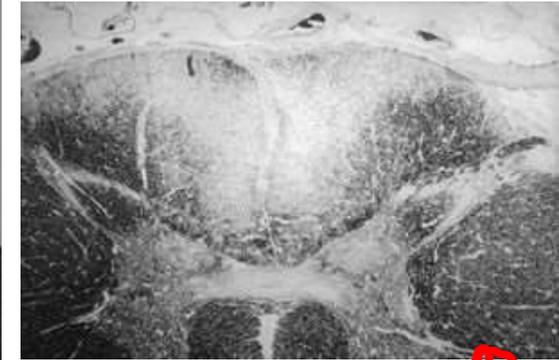


primary phase is characterized by **skin lesions (chancres)** at the site where **the spirochete penetrated**

on genitals, or around the mouth



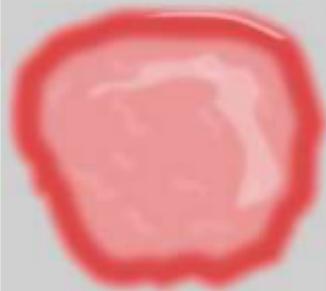
In the secondary phase, the clinical signs of **disseminated disease** appear, (e.g. **skin lesions over the entire body**, fever, headache). Symptoms **resolve within weeks**.



- Late syphilis severely **damages organs involved** (e.g., **neurosyphilis, tabes dorsalis**, cardiovascular syphilis) leading to various symptoms (e.g. **dementia or blindness**,)

The Stages of Syphilis

Primary



The **chancre lesion** is the hallmark of primary syphilis. It may appear 10-90 days after exposure. Common sites include penis and labia. Other sites include anus, oral mucosa. Without treatment, chancre disappears in 2-8 weeks.

Secondary



Rash, pink to brown macules. Involves palms/soles in 50% of cases.

Oral lesions called "mucous patches" resembling snail tracks.

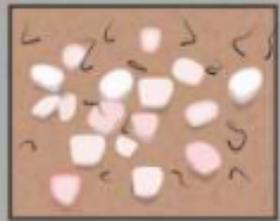


Symptomatic **early neurosyphilis**, cranial nerve deficits and/or aseptic meningitis presentation.

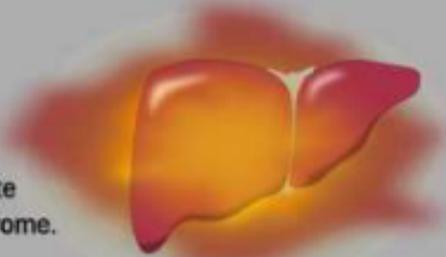
Ocular syphilis manifestations including anterior or posterior **uveitis**.



Genito-inguinal rashes, including tinea-mimicker or heaped-up wart-like lesions called **condyloma lata**.



Less common internal organ manifestations including acute **hepatitis** and nephrotic syndrome.



Latent

Latent syphilis refers to asymptomatic infection after the period of primary and secondary syphilis (noticed or unnoticed) has passed.

Early Latent

Early latent refers to asymptomatic patients with positive testing, in whom history can confirm exposure to or symptoms of primary or secondary syphilis within the last year. This is group may receive single-dose penicillin like primary or secondary.

Late Latent

Late latent patients have positive serology but do not meet criteria for early. Thus, multiple doses of penicillin.

Late (Tertiary)



Late Neurosyphilis, including tabes dorsalis, gait impairments, and dementia. Tabes dorsalis damages the dorsal columns and sensory nerve roots, causing a syndrome of pain and sensory deficits similar to those of B12 deficiency.

Gumma

are **ulcerating granulomas** on skin, bone, and internal organs.



Cardiovascular effects of late syphilis include **aortic aneurysm** and **coronary arteritis**.

- **Darkfield microscopy, immuno-fluorescent stains, or PCR** can be used on immediate samples (**from a chancre**) for visualization and diagnosis.

- **Serology** is the most important tool; *antibodies against the pathogen in the blood*

screening tests (sensitive but not very specific)

↓
non-treponemal/ cardiolipin tests, e.g. venereal disease research laboratory (**VDRL**)/ Rapid plasma regain test (**RPR**). A quantitative test should be done to **screen**, stage the disease and monitor treatment.

specific treponemal tests *Treponema pallidum* particle agglutination (**TP-PA**) test can be used for diagnosis *looks for antibodies against T.pallidum*

- Syphilis **be controlled** only through **the practice of safe-sex** techniques and adequate **treatment with antibiotics**

↓ *treatment is simple and effective, that's why tertiary syphilis is not common these days*

- **Penicillin is the drug of choice. (Benzathine benzylpenicillin / Penicillin G) .**