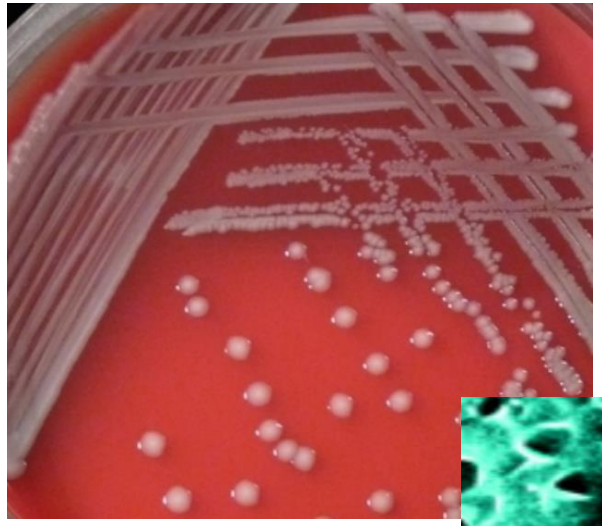
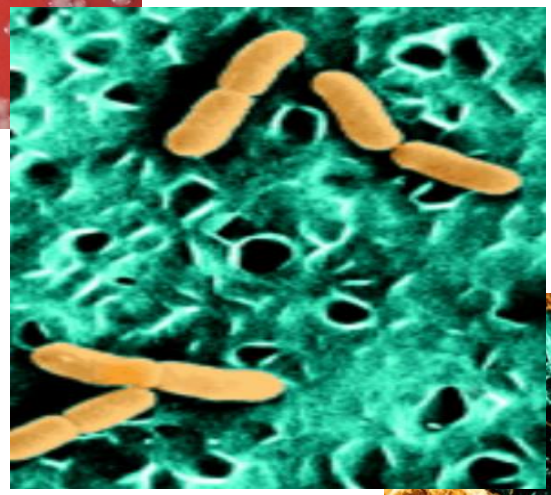
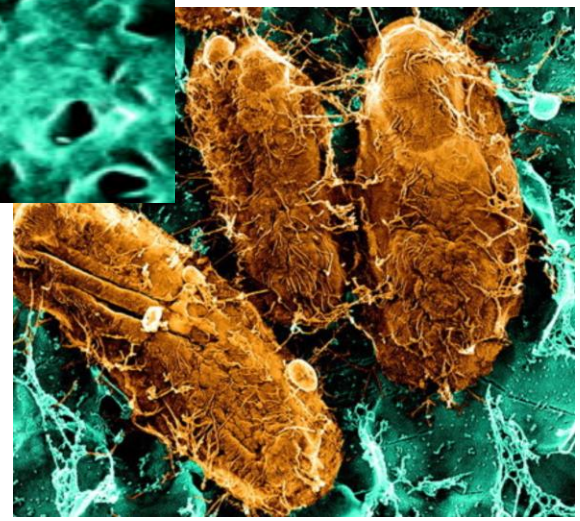
Microbiology of Urogenital system







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Lecture 6

Sexually transmitted diseases

Genital infections encompasses a variety of clinical entities, including :

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

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		

Ulcerative genital infections

- Genital ulceration reflects a set of important STIs, most of which sharply increase the risk of sexual acquisition and shedding of HIV.

- PCR testing of ulcer specimens demonstrated **HSV** in 62% o patients, **Treponema pallidum** (the cause of **syphilis**) in 13%, and **Haemophilus ducreyi** (the cause of **chancroid**) in 12–20%.

- In Asia and Africa, **chancroid** was once considered the most common type of genital ulcer, PCR testing of genital ulcers now clearly implicates **genital herpes** was by far the most common cause of genital ulceration.

FIGURE 35-7
Lymphogranuloma venereum (LGV): striking tender lymphadenopathy occurring at the femoral and inguinal lymph nodes, separated by a groove made by Poupart's ligament. This "sign-of-the-groove" is not considered specific for LGV; for example, lymphomas may present with this sign.

FIGURE 78-2
Primary syphilis with a firm, nontender chancre.

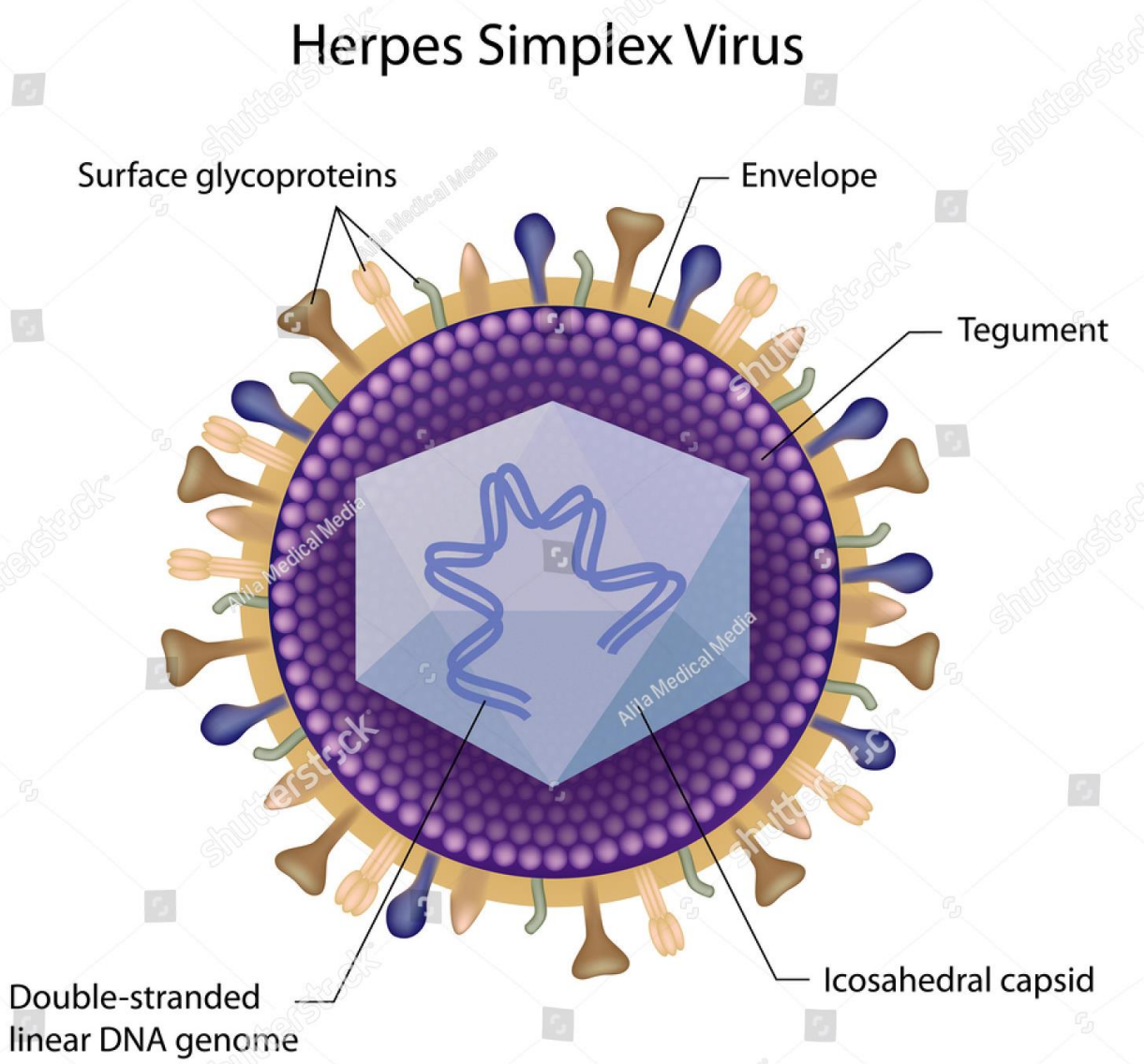
FIGURE 35-6
Genital herpes. A relatively mild, superficial ulcer is typically seen in episodic outbreaks. (Courtesy of Michael Remington, University of Washington Virology Research Clinic.)

FIGURE 35-5
Chancroid: multiple, painful, punched-out ulcers with undermined borders on the labia occurring after autoinoculation.

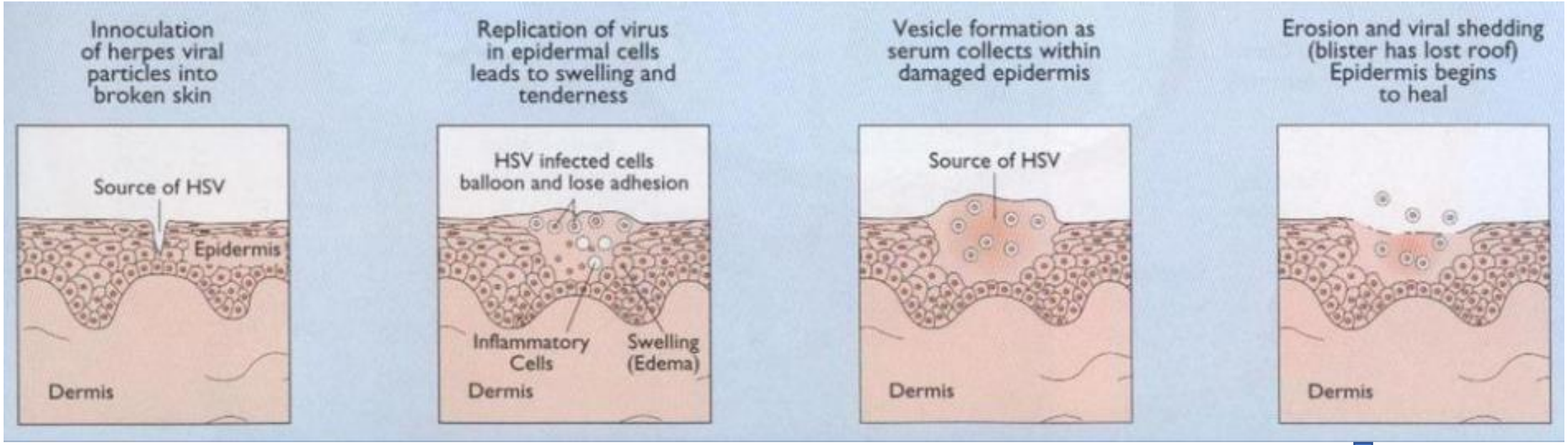
- **Genital herpes** is a common sexually transmitted disease, affecting **more than 400 million persons worldwide**

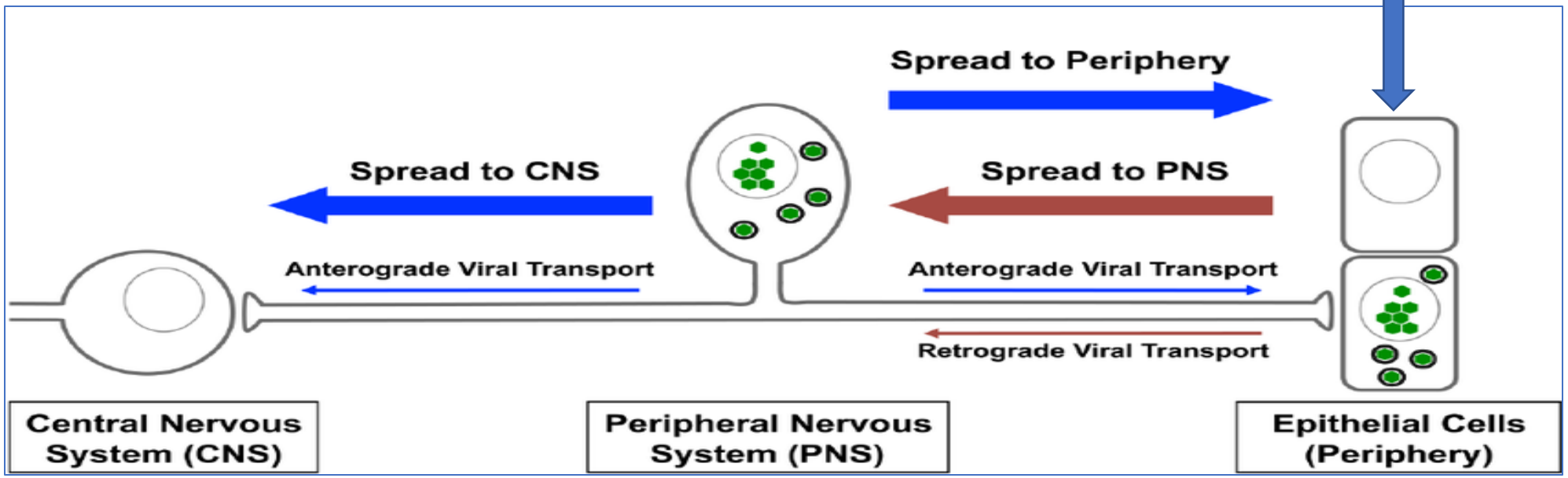
- In the United States, nearly **one in five adults** (approximately 50 million persons) has **HSV-2** infection, with 1 million new infections occurring each year.

- It is characterized by **lifelong** infection and periodic **reactivation**



Ulcerative genital infections / Genital herpes / pathophysiology





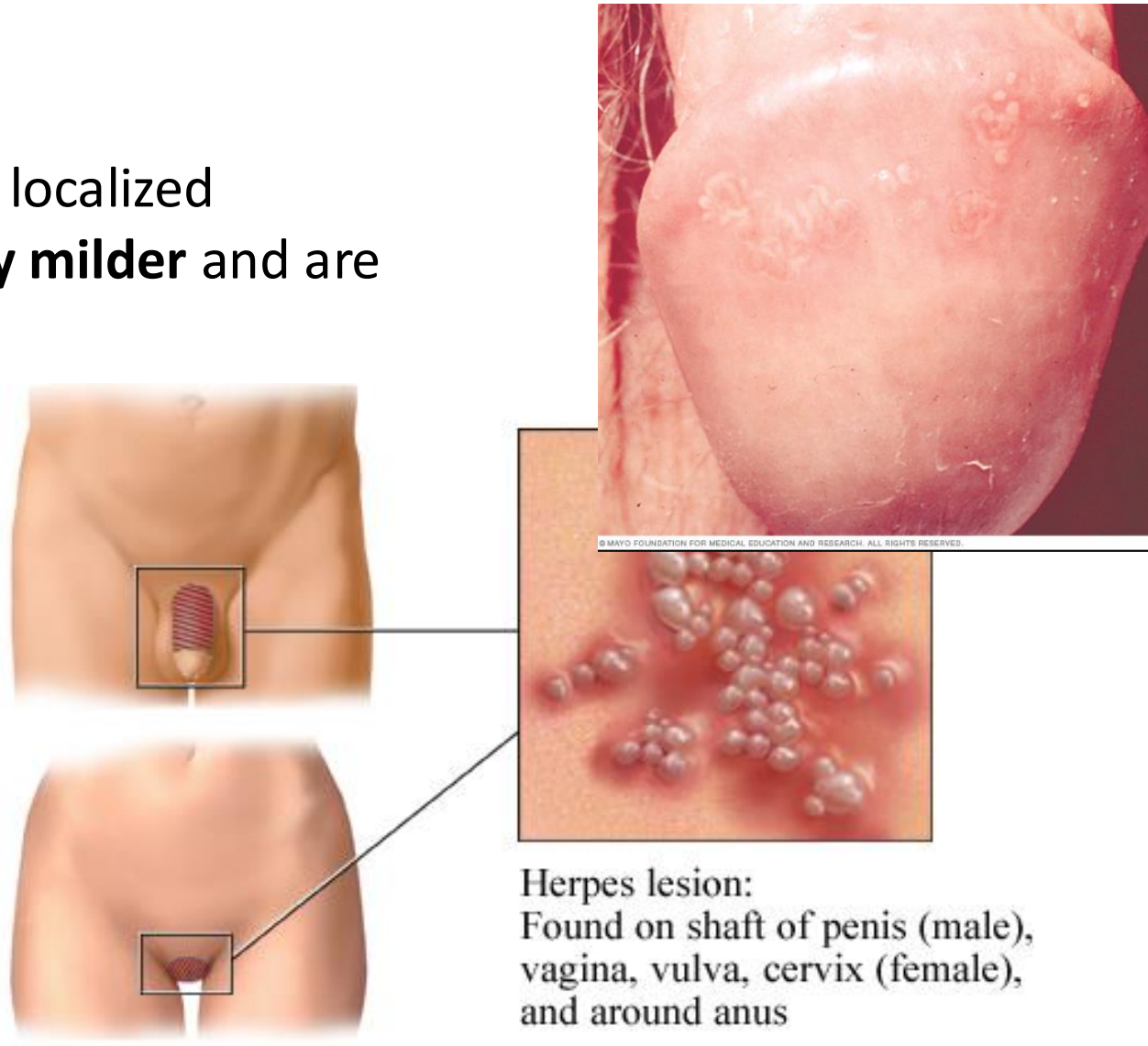
Ulcerative genital infections / Genital herpes/ signs and symptoms

- A visible outbreak consists of **single or clustered vesicles** on the genitalia that **ulcerate before resolving**.

- Primary infections may cause malaise, fever, or localized adenopathy, **Subsequent outbreaks are usually milder** and are caused by reactivation of latent virus.

  - Patients with HSV-1 infection average zero to one recurrence per year, whereas **HSV-2 recurs four to five times annually**

  - **Asymptomatic viral shedding** is common, occurring on 10% to 20% of all days, and facilitates viral transmission.



Herpes lesion:
Found on shaft of penis (male), vagina, vulva, cervix (female), and around anus

- **Viral culture** from vesicular fluid and ulcerated lesions are useful for definitive diagnosis

- **PCR- based viral detection** is rapid and specific. And so is **Viral antigen detection**.

- **Systemic antiviral drugs** especially **acyclovir, valacyclovir, and famciclovir** can partially control the signs and symptoms of genital herpes when used to treat first clinical and recurrent episodes or when used as daily suppressive therapy.

- These drugs **do not eradicate latent virus** nor affect the risk, frequency, or severity of recurrences after the drug is **discontinued**.

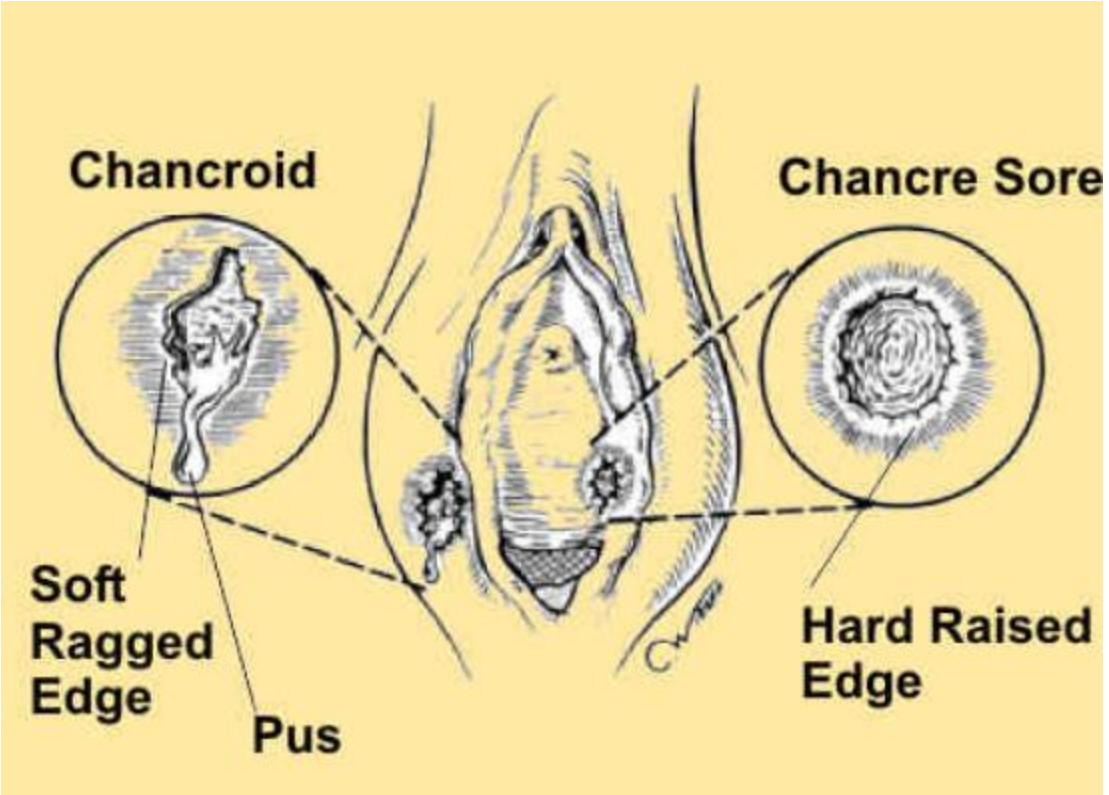
- **Symptomatic treatment**— saline bathing, analgesia, and topical local anaesthetic agents (e.g. 5% lidocaine) ointment for painful micturition.

Ulcerative genital infections / Chancroid

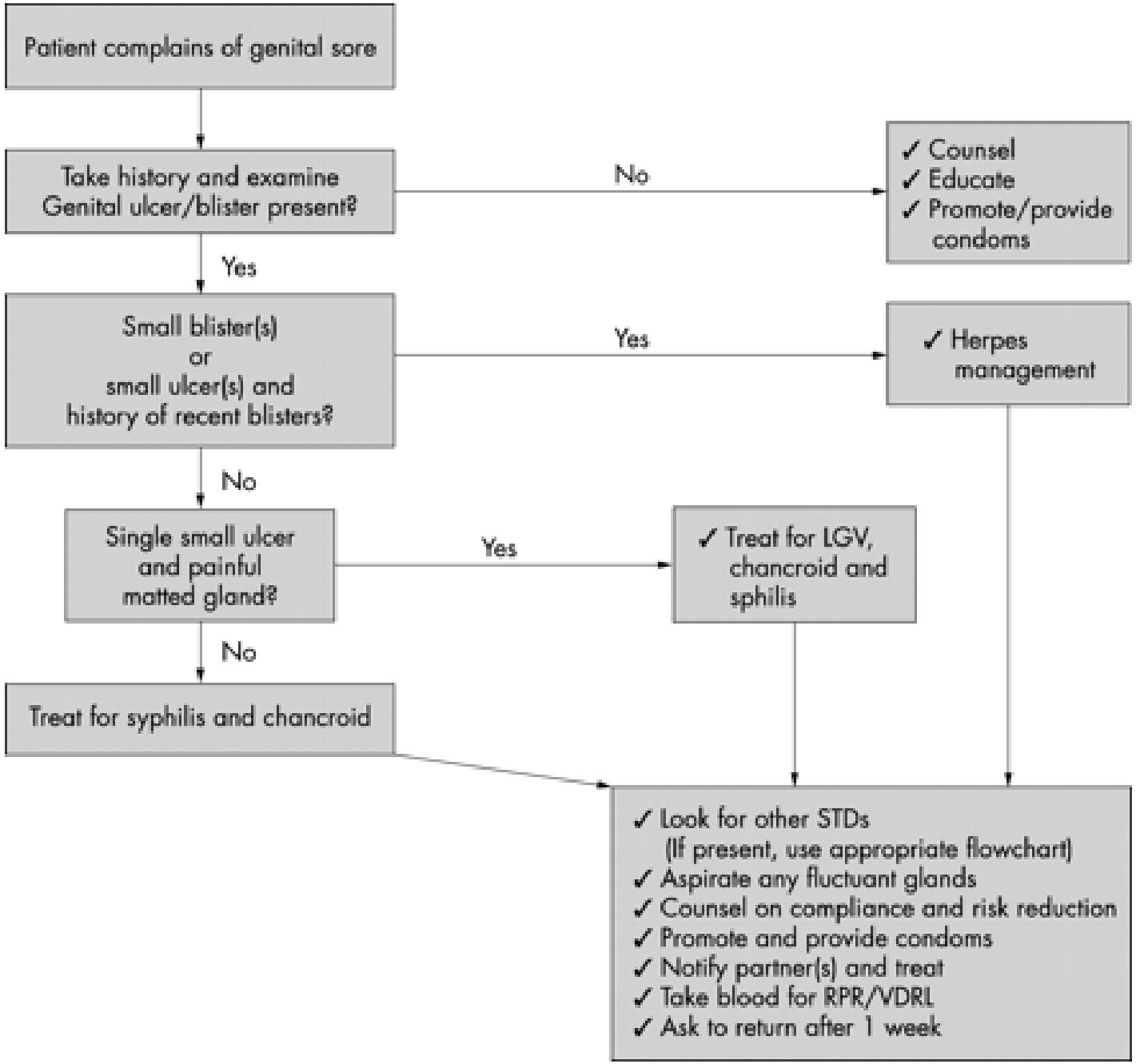
- Chancroid is a sexually transmitted disease (STD) caused by the Gram negative bacterium **Haemophilus ducreyi** and is characterised by **necrotising genital ulceration**

- Painful, erythematous papules develop on the external genitalia develop into pustules, and then erode into **sloughy**, **non- indurated haemorrhagic ulcers**

- Single dose oral **azithromycin** or **ciprofloxacin** and intramuscular **ceftriaxone** regimens offer advantages in terms of improved patient compliance.



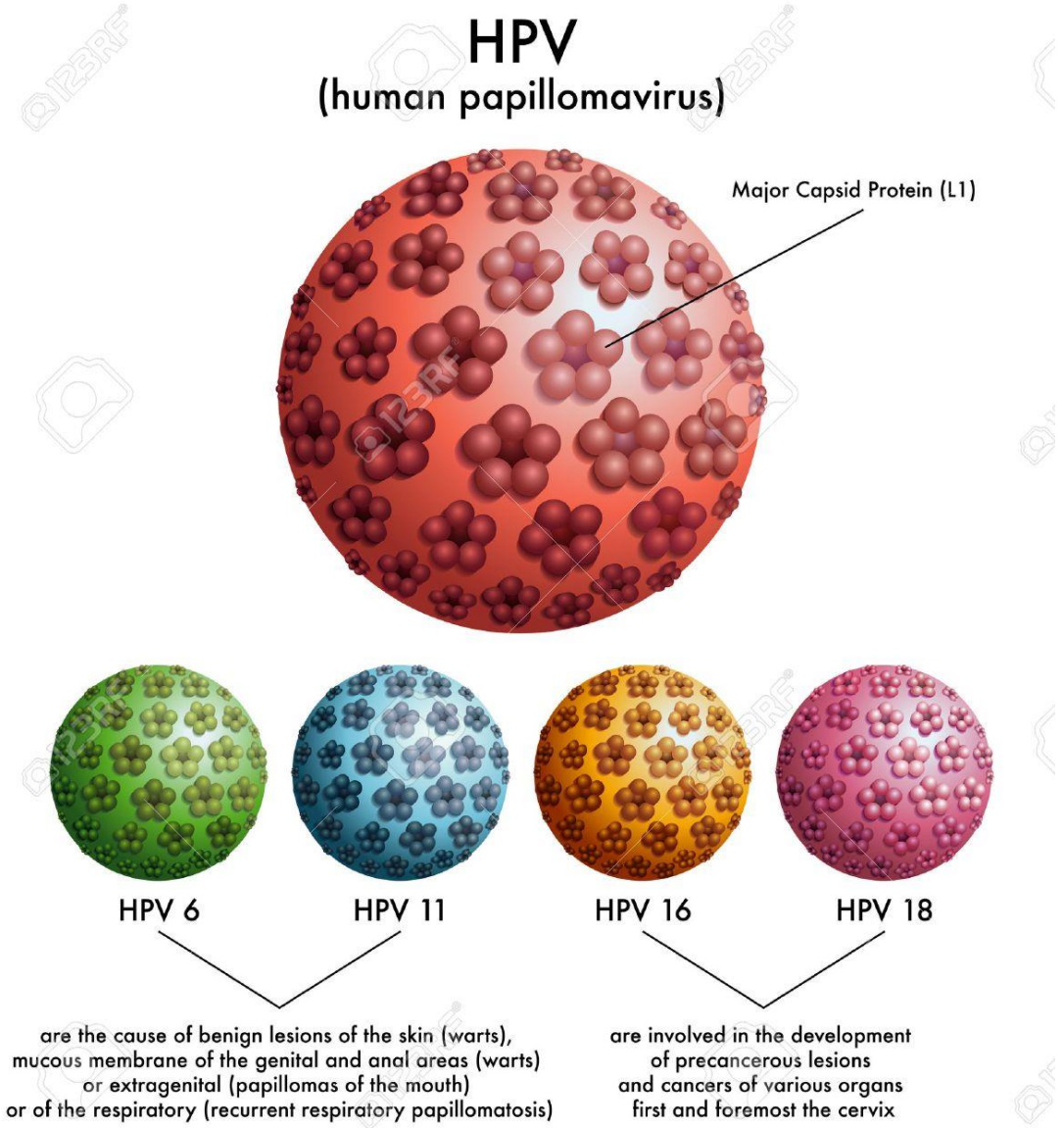
- WHO recommended syndromic management for genital ulceration includes therapy for both chancroid and syphilis.



	Genital Herpes	Primary Syphilis	Chancroid	LGV
				
Diagnostic clue	Painful, vesicular lesions -->multi-superficial ulcer	Painless, indurated border	Extremely painful deep ulceration, ragged undermined edge	painless ulcer, heal within a few days " Groove sign "
Treatment	Acyclovir	Benzathine pen G *alternative* Doxycycline Tetracycline Erythromycin	Ceftriaxone Ciprofloxacin Erythromycin Azithromycin	Doxycycline Erythromycin

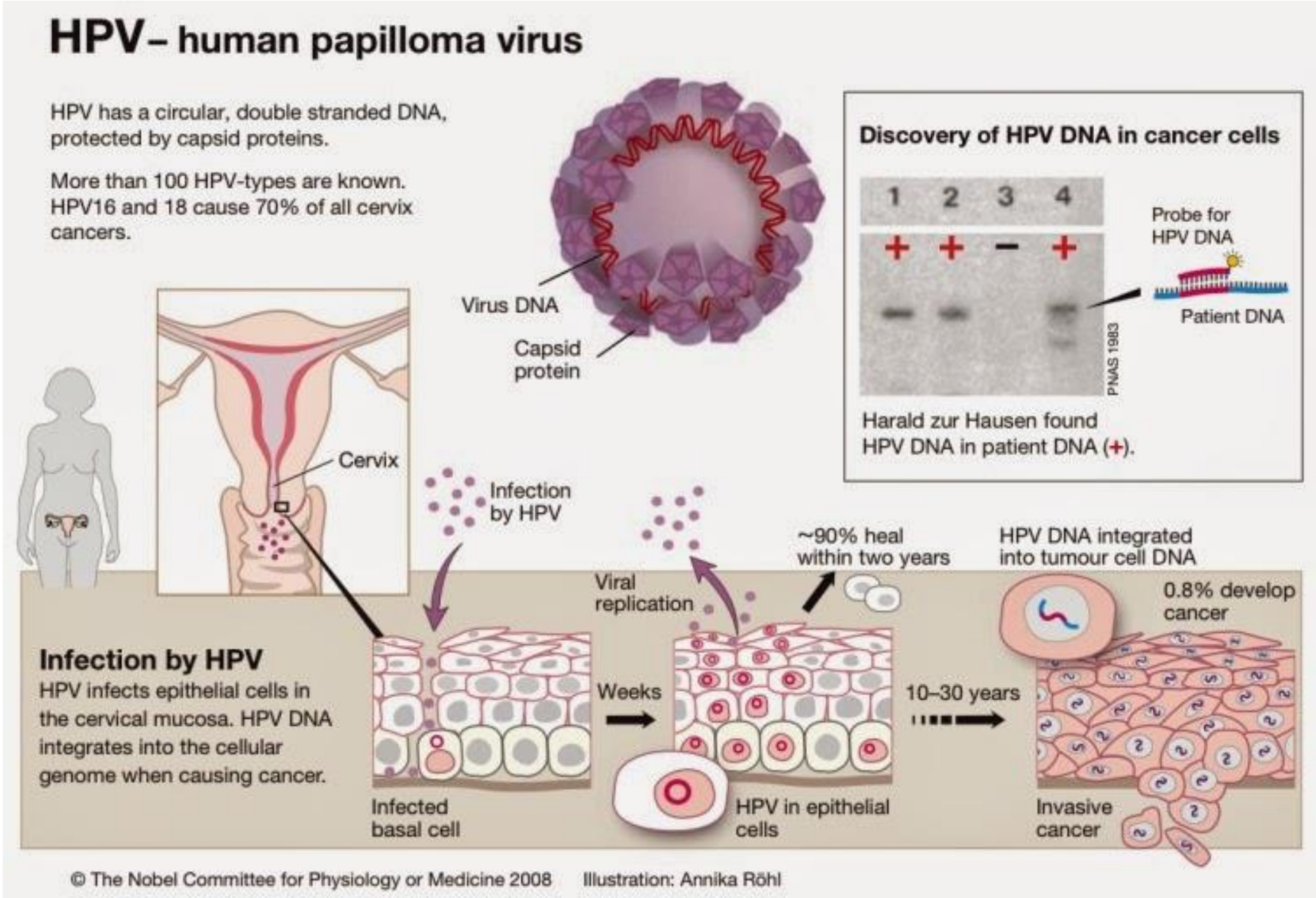
Genital warts/ etiology and epidemiology

- Genital warts are a **sexually transmitted infection** caused by certain types of **human papillomavirus** (HPV)
- Genital warts are a common cause of morbidity, with estimates of up to 50% of the population HPV at some point in their lifetime
- **90% of cases** are related to **HPV subtypes 6 and 11**.
- **HPV Subtypes 16 and 18** are associated with **squamous cell carcinoma**.
- **Women** tend to be affected **more than men** in most settings.



Genital warts/ pathophysiology

Histopathologicaly, the hallmark of an HPV-infected cell is the development of morphologically **atypical keratinocytes known as koilocytes**. These are enlarged cells with eccentric, pyknotic nuclei that are often surrounded by a perinuclear halo



Genital warts/ Signs and symptoms

- On average, physical symptoms begin approximately 2 to 3 months after initial contact, Many studies estimate the rate of **subclinical** HPV infection to be as high as **40%**

- Approximately 30 percent of all warts will regress within the first four months of infection.

- Significant risk factors for long-term wart **persistence** include host **immunosuppression**, infection with **high-risk HPV subtypes**, and an **older patient age**

- Lesions are **rarely** considered to be **painful**; however, they are **often** associated with severe **discomfort**, **burning**, and **pruritis**

Female genital warts

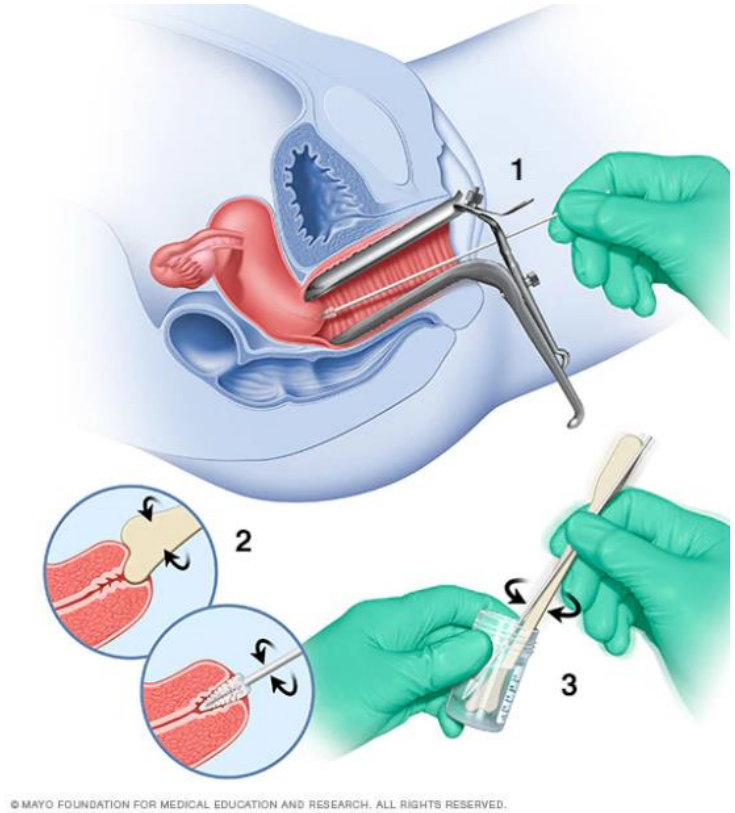
Severe case of genital warts around the anus of a female

Genital warts/ prevention

- A **vaccine** known as Gardasil protects against four strains of HPV that cause cancer, and is used to prevent genital warts

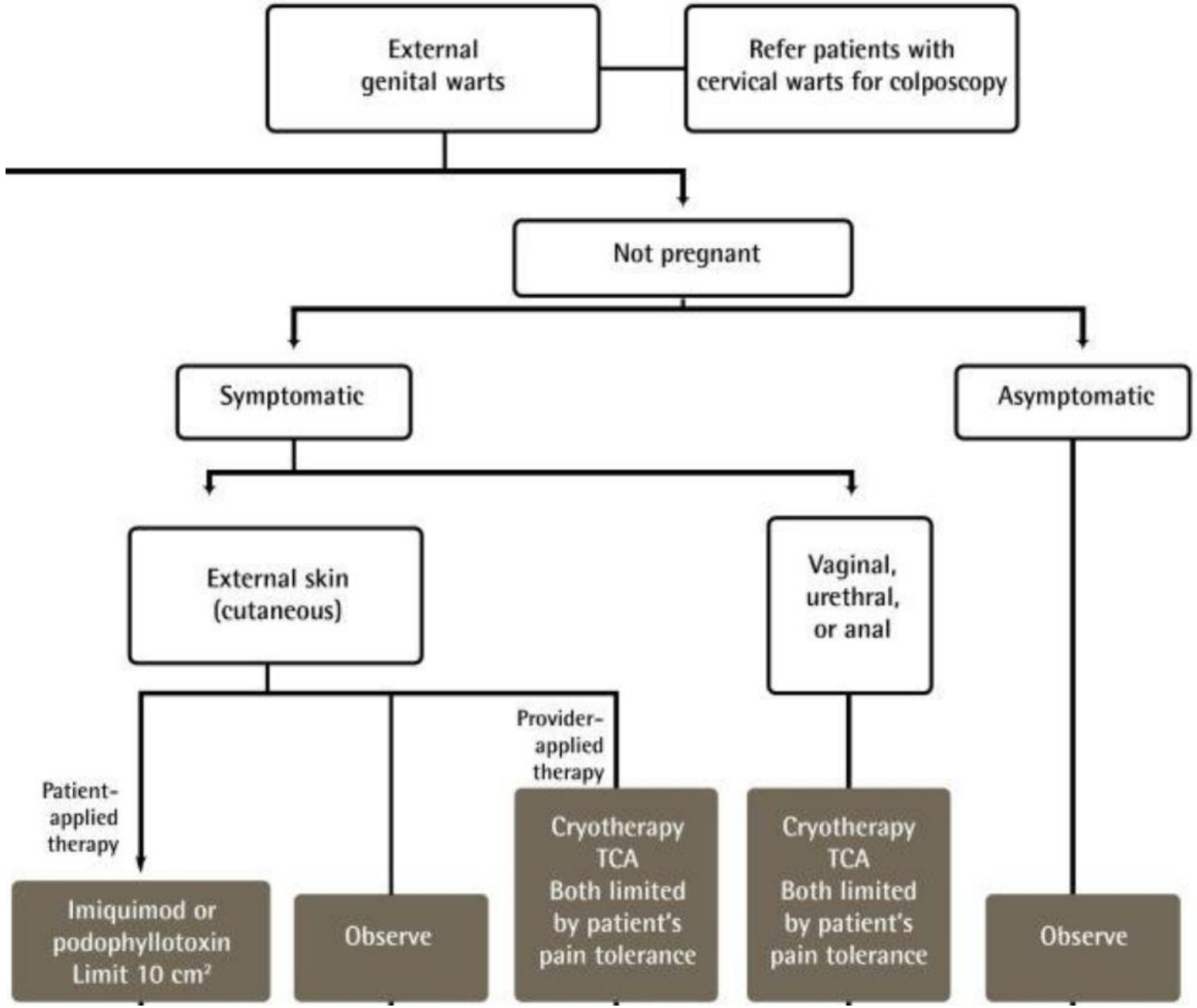
- These vaccines are most effective if given to children **before they become sexually active**

- **Pap tests**, can help **detect vaginal and cervical changes** caused by genital warts or the early signs of cervical cancer



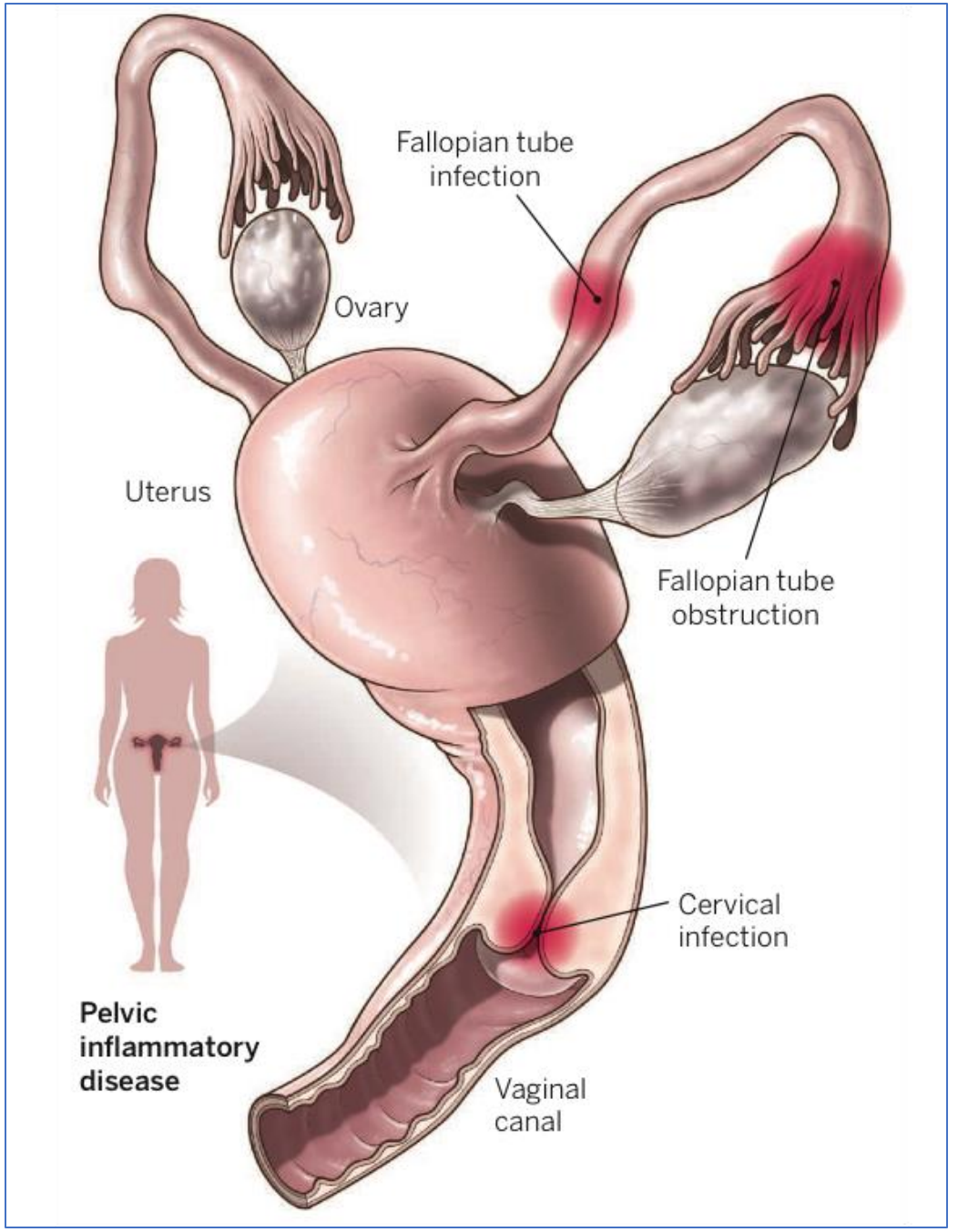
Pap test

Genital warts/ treatment



Pelvic inflammatory disease (PID)

- The term pelvic inflammatory disease usually refers to **infection** that ascends from the cervix or vagina to involve the **endometrium** and/ or **fallopian tubes** and **ovaries**.
- Infection can extend beyond the reproductive tract to cause **peritonitis** and **pelvic abscess**.
- Other than primary infections from STDs, infection can also be **secondary** to invasive **intrauterine surgical procedures** (e.g. termination of pregnancy).
- Rarely, infection is not related to specific sexually transmitted pathogens, and originates from **another focus of infection**.



Pelvic inflammatory disease (PID)

Table 1. Clinical Classification of Pelvic Inflammatory Disease and Likely Microbial Causes.

Clinical Syndrome	Causes
Acute pelvic inflammatory disease (≤30 days' duration)	Cervical pathogens (*Neisseria gonorrhoeae*, *Chlamydia trachomatis*, and *Mycoplasma genitalium*) Bacterial vaginosis pathogens (peptostreptococcus species, bacteroides species, atopobium species, leptotrichia species, *M. hominis*, *Ureaplasma urealyticum*, and clostridia species) Respiratory pathogens (*Haemophilus influenzae*, *Streptococcus pneumoniae*, group A streptococci, and *Staphylococcus aureus*) Enteric pathogens (*Escherichia coli*, *Bacteroides fragilis*, group B streptococci, and campylobacter species)
Subclinical pelvic inflammatory disease	*C. trachomatis* and *N. gonorrhoeae*
Chronic pelvic inflammatory disease (>30 days' duration)	*Mycobacterium tuberculosis* and actinomyces species

Pelvic inflammatory disease/ Signs and symptoms

- The hallmark of the diagnosis is **pelvic tenderness** (cervical motion tenderness, adnexal tenderness, or uterine compression tenderness) combined with **inflammation of the lower genital tract**; women with pelvic inflammatory disease often have **very subtle** symptoms and signs

- **Fever** can occur, but systemic manifestations are **not a prominent feature** of PID.

- The abrupt **onset** of severe lower abdominal pain **during or shortly after menses** has been the classic symptom used to identify acute PID.

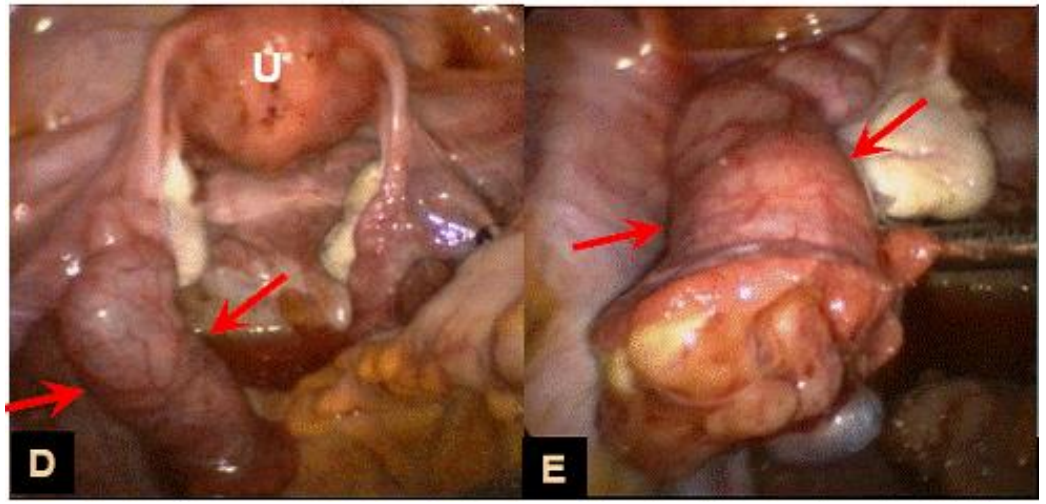
- Clinical diagnosis is **often imprecise** and more tests are needed to confirm diagnosis.

- Although **laparoscopy** has been considered the standard for the diagnosis of pelvic inflammatory disease, it has high interobserver variability and is invasive.

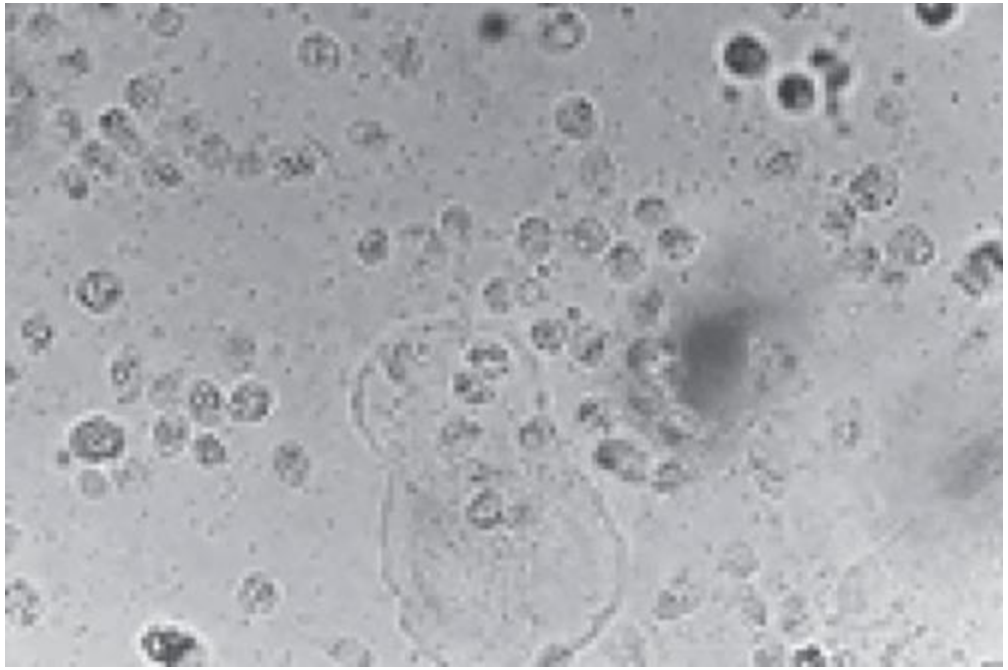
- Transcervical endometrial aspiration with **histopathological findings** of increased WBCs is more commonly used to confirm the diagnosis of pelvic inflammatory disease

- **MRI** has high sensitivity, reveals thickened, fluid-filled tubes

- All patients with suspected PID should undergo cervical or vaginal **NAATs** for *N. gonorrhoeae* and *C. trachomatis* infection



Laparoscopy image and close-up image of same patient show sausage-shape dilated right fallopian tube (arrow)

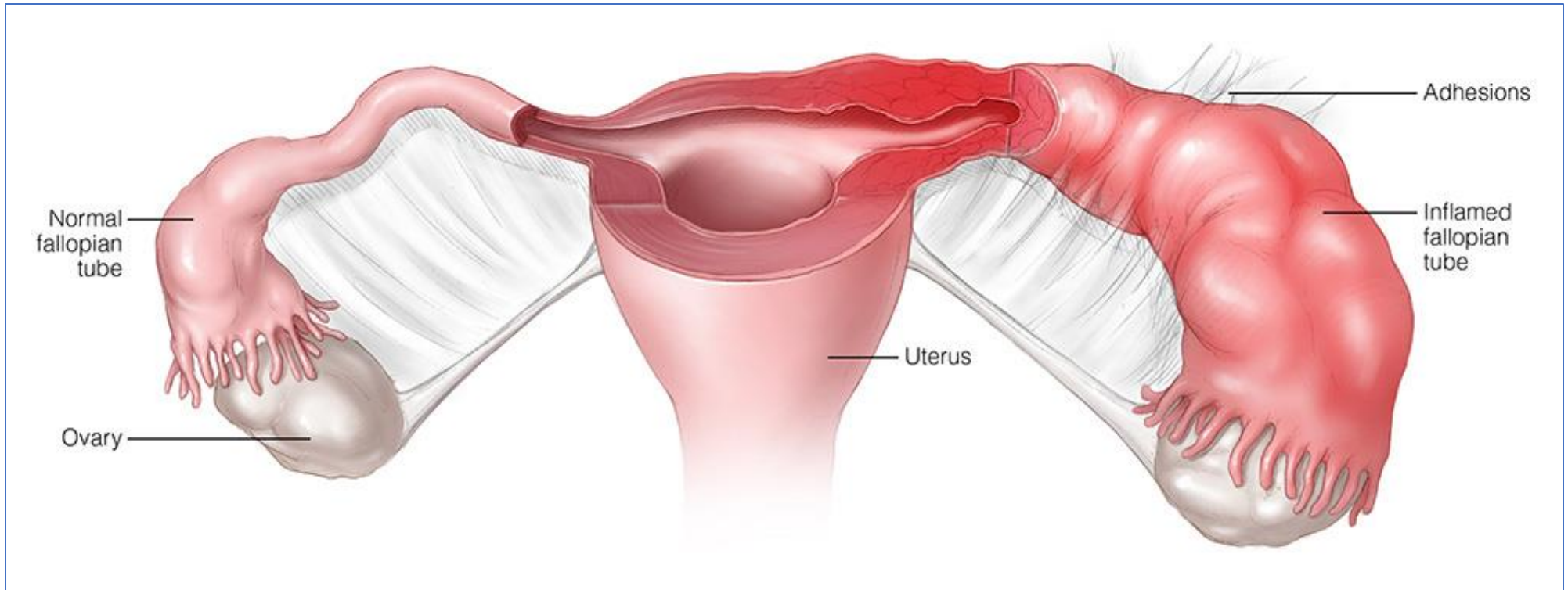


increased numbers of white cells (≥1 per vaginal epithelial cell)

Pelvic inflammatory disease/ Sequalae

- Infection results in **fibrinous** or suppurative **inflammatory damage** along the epithelial surface of the fallopian tubes and the peritoneal surface of the fallopian tubes and ovaries, which leads to **scarring**, **adhesions**, and possibly partial or total **obstruction of the fallopian tubes**

- Can result in long-term reproductive disability, including **infertility**, **ectopic pregnancy**, and **chronic pelvic pain**.



Pelvic inflammatory disease/ Treatment

- The treatment of pelvic inflammatory disease is **empirical** and involves the use of **broad-spectrum combination** regimens of antimicrobial agents to cover likely pathogens.

Table 2. First-Line Antimicrobial Treatment Recommended by the Centers for Disease Control and Prevention (CDC) for Pelvic Inflammatory Disease.*

Outpatient regimen for mild-to-moderate pelvic inflammatory disease
Doxycycline (100 mg orally twice daily for 2 wk) with or without metronidazole (500 mg orally twice daily for 2 wk), plus one of the following:
Ceftriaxone (250 mg intramuscularly in a single dose)
Cefoxitin (2 g intramuscularly) with probenicid (1 g orally) concurrently in a single dose
Other parenteral third-generation cephalosporin (cefotaxime or ceftizoxime)
Inpatient regimen for moderate-to-severe pelvic inflammatory disease with or without tubo-ovarian abscess†
One of the following:
Cefotetan (2 g intravenously every 12 hr) plus doxycycline (100 mg orally or intravenously every 12 hr)
Cefoxitin (2 g intravenously every 6 hr) plus doxycycline (100 mg orally or intravenously every 12 hr)
Clindamycin (900 mg intravenously every 8 hr) plus gentamicin (3 to 5 mg per kilogram of body weight intravenously once daily)

* Complete treatment information, including alternative regimens and additional considerations, is available at the CDC website.[33]

† Transition to oral therapy can usually be initiated within 24 to 48 hours after clinical improvement, and oral therapy should be continued to complete 2 weeks of therapy.

Further reading:

- Oxford handbook of infectious diseases and microbiology-

Part4: Clinical syndroms

Chapter 18: Sexually transmitted infections

- Harrison's Infectious Diseases 3rd Edition

SECTION III Infections in organ systems

Chapter 35