

Syphilis

Urogenital Tract Module

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Outlines

- Introduction
- Etiology and transmission
- Clinical features:
 - Primary syphilis
 - Secondary syphilis
 - Latent, and tertiary syphilis
 - Congenital syphilis
- Diagnosis
- Treatment

Introduction

- Syphilis is a predominantly bacterial sexually transmitted infection caused by the spirochete *Treponema pallidum*.
- **Epidemiology:**
 - Worldwide annual new cases: 11 million
 - Incidence in the United States is rising.
 - Men > women (8:1) (Homosexual)
 - Most common age group: 20–29 years old

Etiology- Pathogen

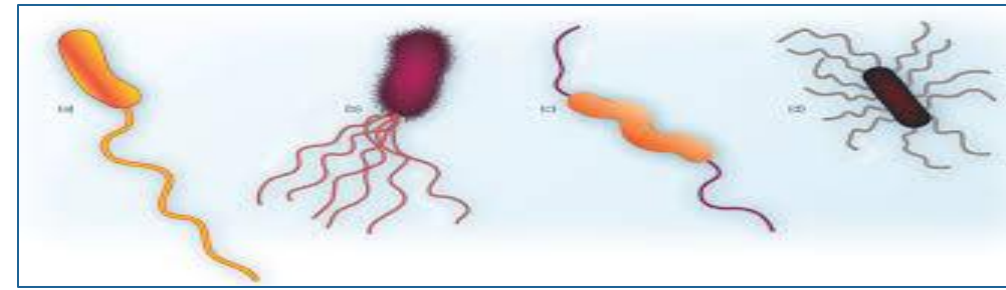
- **The causative organism:** *Treponema pallidum*
- **Basic features** of Treponema species:
 - Gram negative Spirochete (spiral shaped) bacteria
 - Slender spirals measuring about 0.2 μm in width and 5–15 μm in length.
 - Cannot be grown in culture



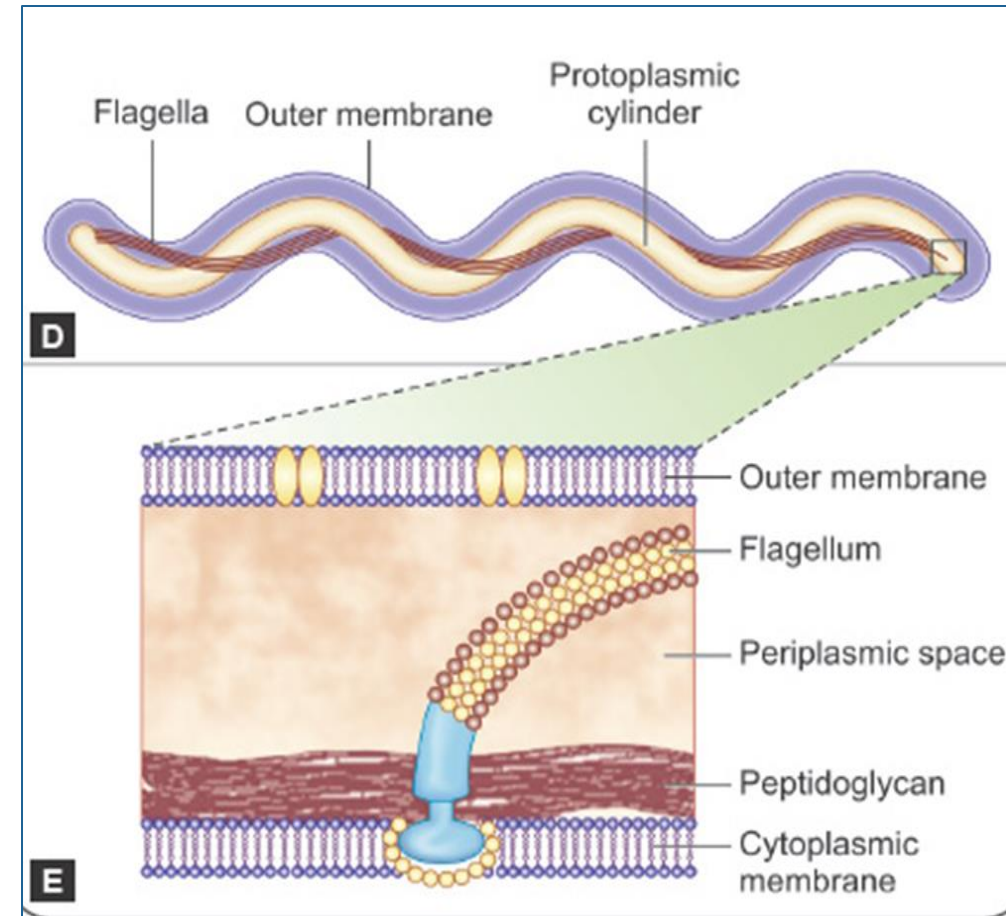
Etiology- Pathogen

- **Basic features** of Treponema species:
 - Endo-flagellated:
 - 3 flagella originate from each end.
 - Located in the periplasmic space
 - Classic motility: Rotates rapidly about its longitudinal axis

➔ **Corkscrew motility**



Exo-flagella (Typical Flagella)



Endo- flagella

Etiology- Pathophysiology

- **Transmission:**

- Humans are the only reservoir, and transmission is through human-to-human contact.
- Sexual contact
- Direct contact with infectious lesions
- Vertical (congenital syphilis)

Syphilis: Etiology- Pathophysiology



- **Obliterative endarteritis**—is a hallmark pathological finding in syphilitic lesions.

T. pallidum shows a **marked preference** for invading the **endothelium of arterioles and capillaries**.



The host mounts an intense perivascular immune response



Thickening of the endothelial lining, Proliferation of the intima, Narrowing or occlusion of the vessel lumen, and **Ischemia of surrounding tissue**

Syphilis: Etiology- Pathophysiology

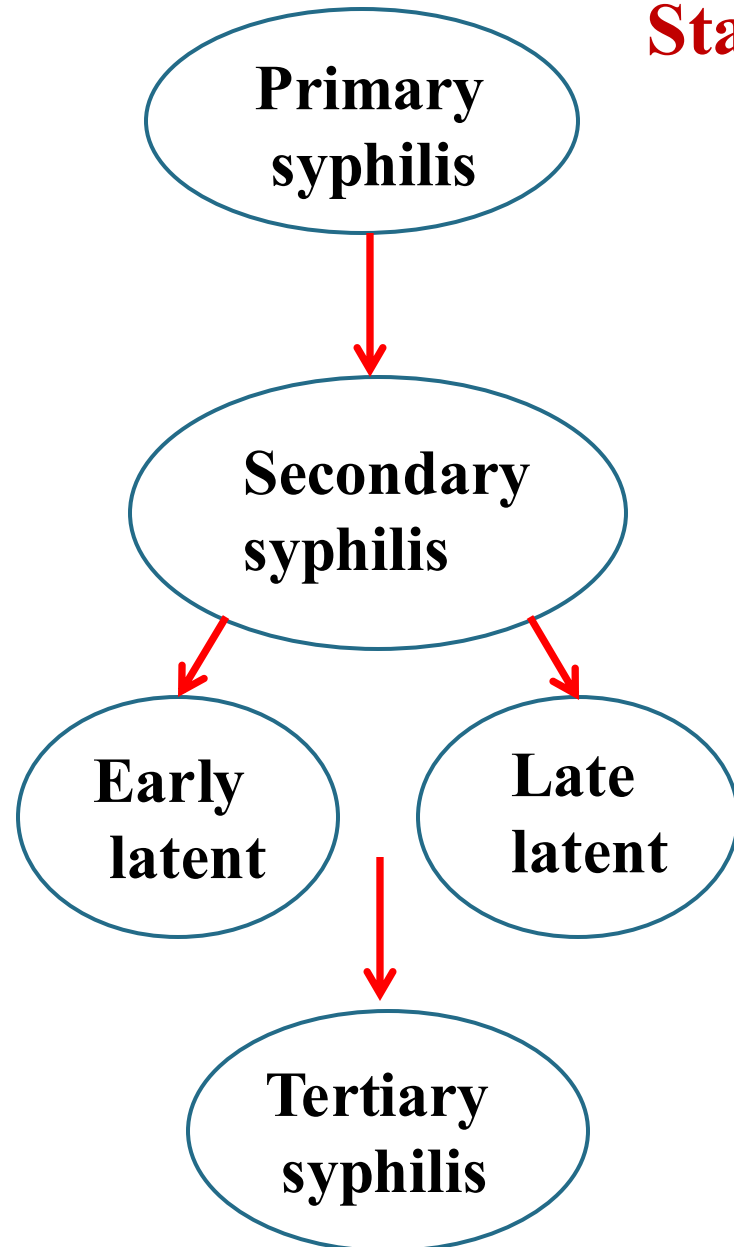
A. Acquired Syphilis

Syphilis is a multistage disease. It has 4 clinical stages: primary, secondary, latent, and tertiary, each with different pathological mechanisms and tissue involvement.

B. Congenital Syphilis

Pathogenesis and Clinical Manifestations

Stages of syphilis



100 **untreated infected** patients
with primary syphilis

If untreated will undergo
secondary syphilis

If untreated will undergo
latent syphilis

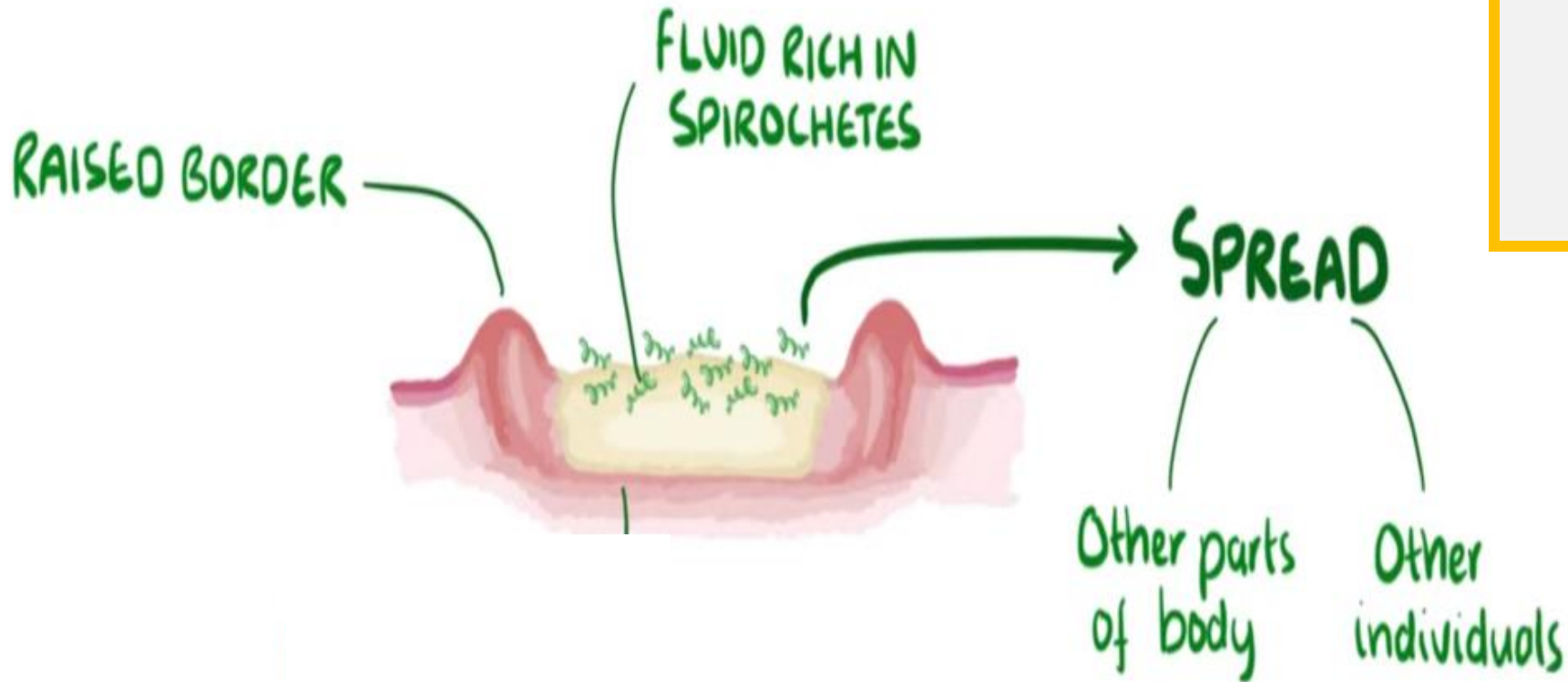
Only 33% of untreated cases will
develop tertiary syphilis

Clinical features- Primary syphilis

- **Primary lesion (chancre):**
 - Typically starts out as a solitary, raised papule (usually on the genitals)
 - Evolves into a painless ulcer, with a characteristic cartilaginous consistency on palpation of the edge and base of the ulcer
 - The primary lesion appears at the site of inoculation, usually persists for 4–6 weeks, and then **heals spontaneously**.

Clinical features- Primary syphilis

Chancre



Primary
=
Painless

Clinical features- Primary syphilis

- **Localized disease**

- 90–95%: genital primary syphilis: on penis, anal canal or rectum, the external genitalia, or the cervix
- 5–10%: extragenital primary syphilis (most commonly, the oral cavity, and finger)

- Regional (usually inguinal) lymphadenopathy accompanies the primary syphilitic lesion

- The nodes are firm, nonsuppurative, and painless.

Clinical features- Primary syphilis

Chancre



Clinical features- Secondary syphilis

- Disseminated disease due to the **systemic spread** of the spirochetes, inducing an immunologic reaction
- Begins approx. 2–12 weeks after primary infection and typically lasts 2–6 weeks
 1. Constitutional symptoms: fever, sore throat, malaise, myalgias, headaches, anorexia, weight loss, nausea
 2. **Generalized** nontender lymphadenopathy

Secondary
=
Systemic

Clinical features- Secondary syphilis

3. Polymorphic rash (all are highly contagious)

A. Generalized rash:

- The skin rash consists of nonpruritic macular, papular, and occasionally pustular syphilides
- Often more than one form is present simultaneously.
- Red, reddish-brown, or copper colour
- Involves the trunk, proximal extremities, palms, and soles

Clinical features- Secondary syphilis



Clinical features- Secondary syphilis

3. Polymorphic rash (all are highly contagious)

B. Superficial mucosal erosions (mucous patches)

- Commonly involve the oral or genital mucosa.
- The typical mucous patch is a **painless silver-gray erosion** surrounded by a red periphery.

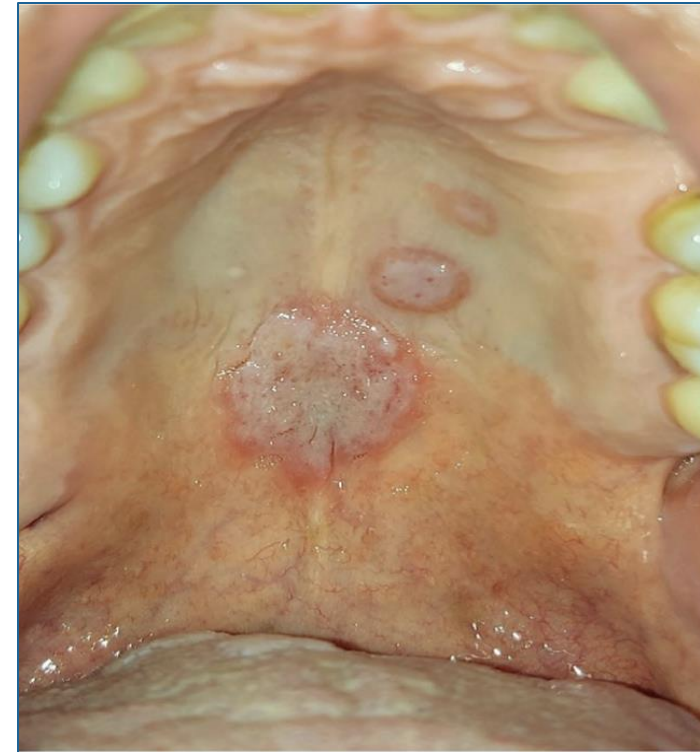


Clinical features- Secondary syphilis

3. Polymorphic rash (all are highly contagious)

C. Condylomata lata

- **In warm, moist**, intertriginous folds (commonly the perianal region, vulva, and scrotum), papules can enlarge to produce **painless broad, moist, pink or gray-white, highly infectious lesions (condylomata lata)**.
- Cauliflower-like mass
- In 10% of patients with secondary syphilis



Clinical features- Latent syphilis

A. Positive serologic tests for syphilis.

B. Normal CSF examination and the absence of clinical manifestations of syphilis

- *T. pallidum* may still seed the blood stream intermittently during the latent stage
 - Pregnant women may infect the fetus.
 - Could be transmitted through blood transfusion or organ donation from patients with latent syphilis.
- Classified based on the duration since initial infection:
 - Early: < 1 year after initial infection → relapses of secondary syphilis can occur in the first year
 - Late: > 1 year after initial infection → not sexually transmissible
- The disease can **resolve ??**, relapse with skin/mucosal lesions, **or progress to tertiary syphilis.**

Syphilis: Clinical features- Tertiary syphilis “Immune-Mediated Destruction”

- Seen in 30% of untreated cases
- Occurs 1–30 years after the initial infection
- Caused by **delayed-type hypersensitivity reactions** to *T. pallidum* antigens, not by direct spirochete activity.

Gummas:

- Soft, solitary, granulomatous lesions with central necrosis
- Painless, indurated nodular or ulcerative lesions variable in size
- Destructive (leaves scars)
- Occurs on skin, bones, or any other organs
- Bone involvement may cause deep, boring pain



Clinical features- Neurosyphilis

- Symptomatic Neurosyphilis Although mixed features are common, the major clinical categories of symptomatic neurosyphilis include **meningeal**, **meningovascular**, and **parenchymatous** syphilis.
- Clinical features: highly variable
 - Acute syphilitic meningitis
 - Subacute stroke, meningitis, and/or cranial nerve disorders
 - **Paretic Neurosyphilis** (also called **general paresis of the insane**): *T. pallidum* invades the cerebral cortex, particularly the frontal and temporal lobes.

Clinical features- Neurosyphilis

NEUROSYPHILIS



BRAIN

SLURRED SPEECH

ALTERED BEHAVIOR

MEMORY LOSS

DIFFICULTY COORDINATING
MUSCLE MOVEMENTS

PARALYSIS

SPIROCHETES



Clinical features- Cardiovascular Syphilis

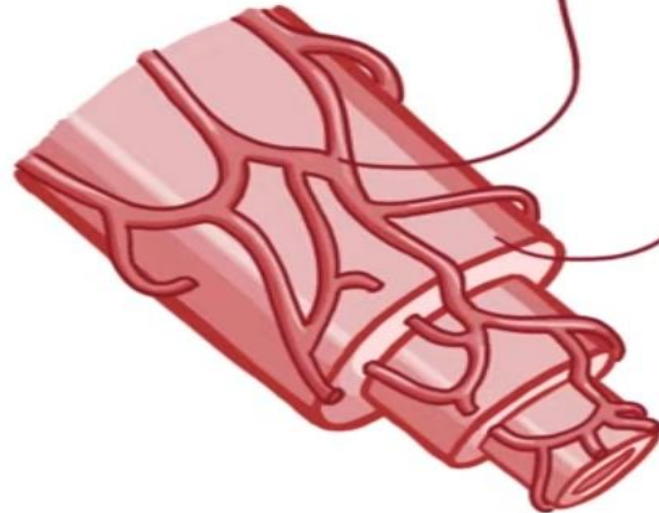
- Cardiovascular manifestations, usually appearing 10–40 years after infection
- Attributed to endarteritis obliterans of the vasa vasorum, which provide the blood supply to large vessels.
- This condition results in uncomplicated aortitis, aortic regurgitation, ascending aortic aneurysm, or coronary ostial stenosis.

Clinical features- Cardiovascular Syphilis

**CARDIOVASCULAR
SYPHILIS**

- ENDARTERITIS

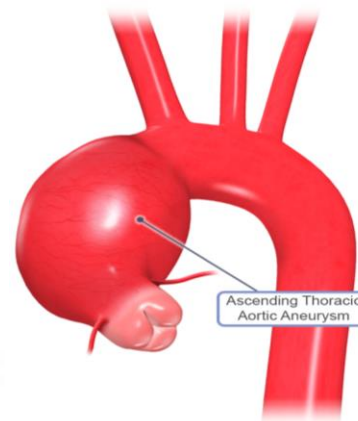
**INFLAMMATION in the
VASA VASORUM**

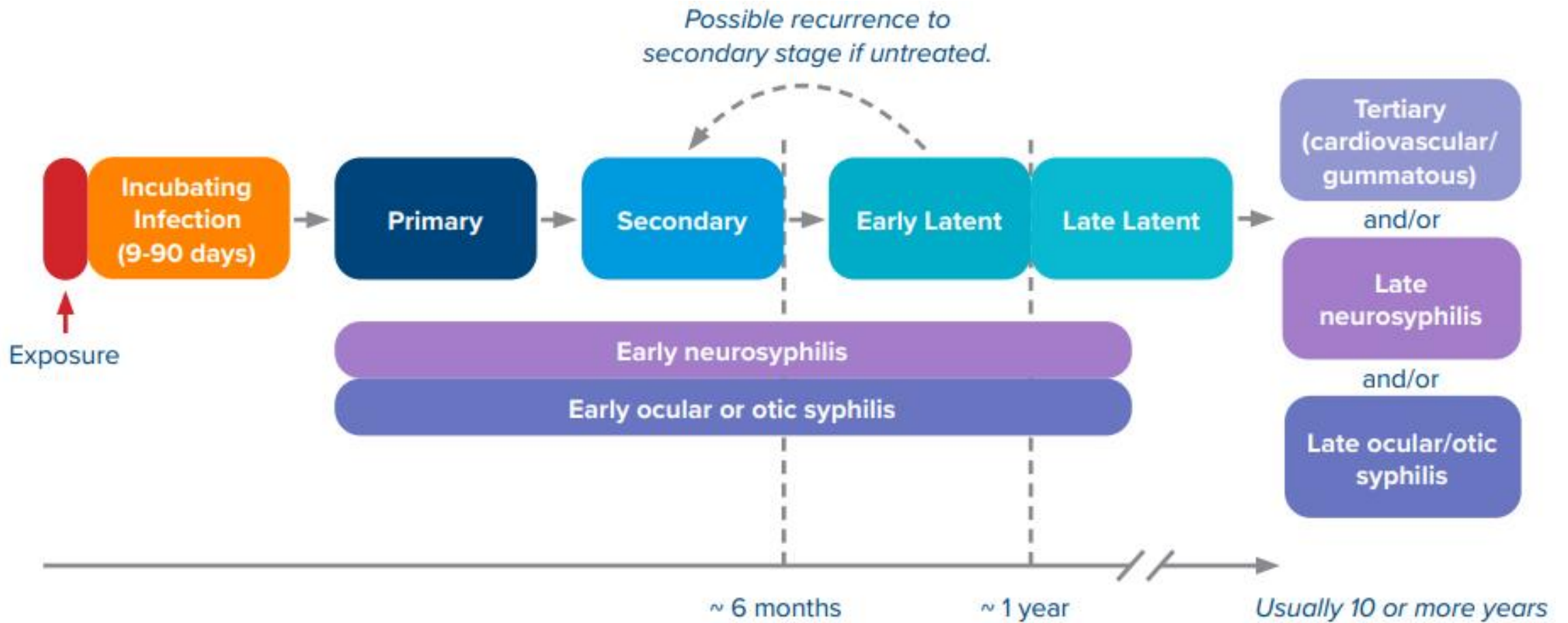


AORTA

**AORTITIS
&**

AORTIC ANEURYSMS





Adapted from New York City Department of Health and Mental Hygiene and New York City STD Prevention

Clinical features- Congenital syphilis

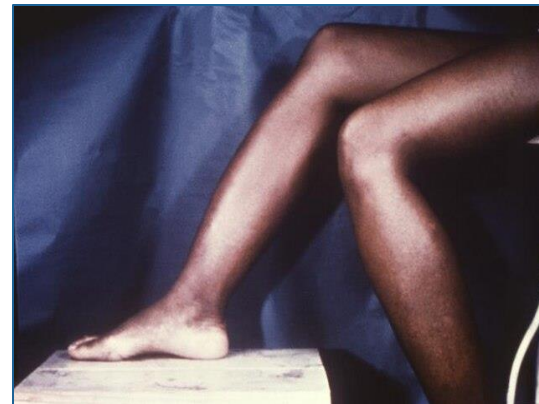
- **Transplacental transmission** from infected mother
- Clinical features of congenital syphilis:
 - In utero syphilis: Miscarriage, Stillbirth
 - Early congenital syphilis (onset < 2 years of age)
 - Resemble the manifestations of severe secondary syphilis in the adult
 - Rhinorrhoea with white or bloody nasal discharge (also called “snuffles”)
 - Maculopapular rash on palms and soles
 - Hepatomegaly and jaundice



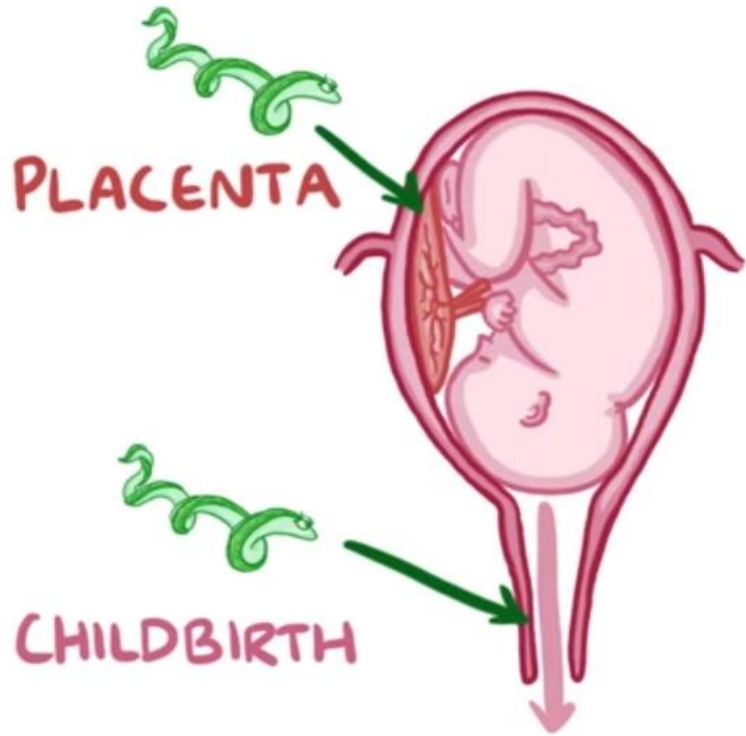
Snuffles nose

Clinical features- Congenital syphilis

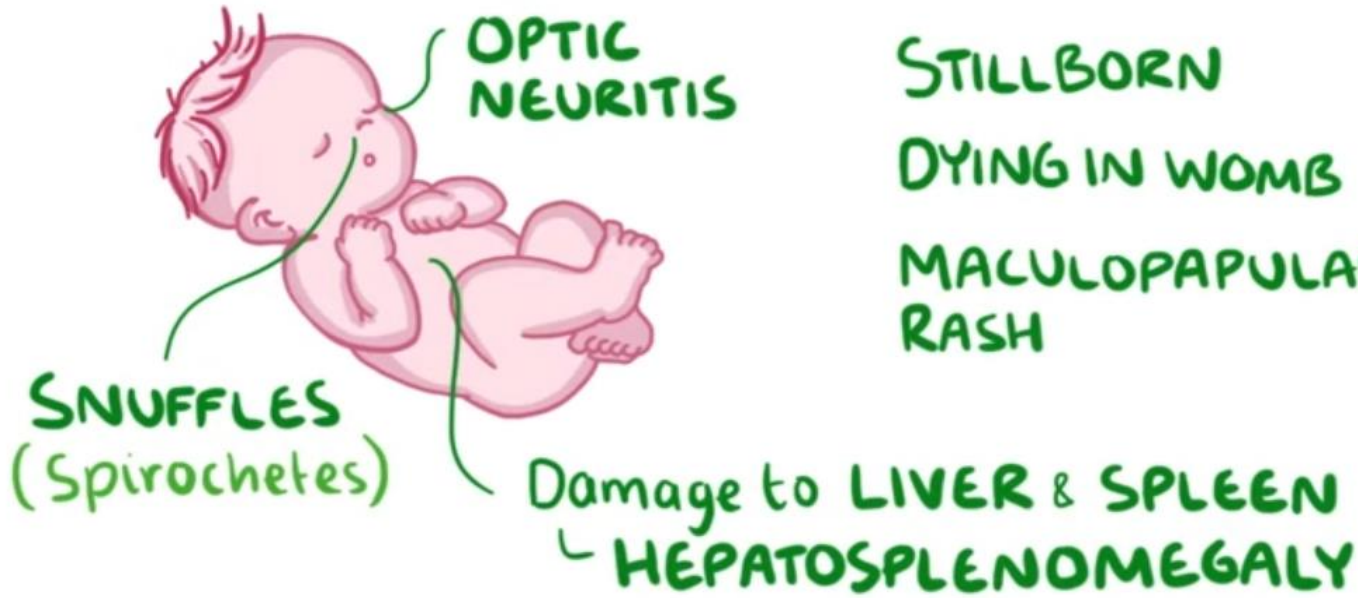
- Late congenital syphilis (onset > 2 years of age)
 - Typical facial features: saddle nose, frontal bossing
 - Dental findings: Hutchinson's teeth (notched, widely spaced teeth)
 - Saber shins: An anterior bowing of the tibia
 - Hearing loss



CONGENITAL SYPHILIS



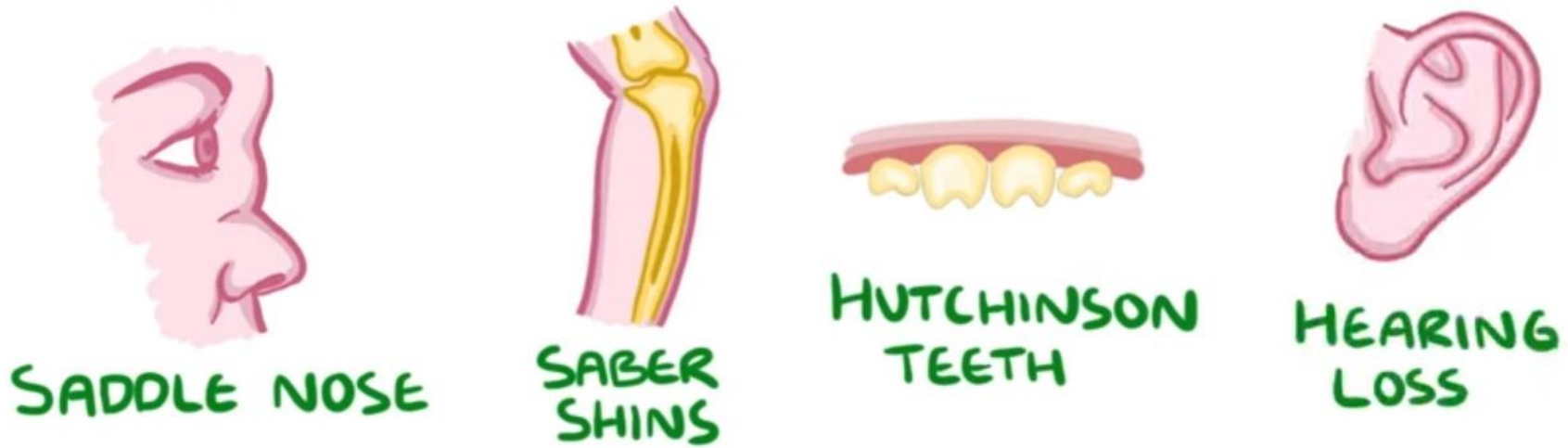
EARLY DISEASE (First 2 years)



STILLBORN
DYING IN WOMB
MACULOPAPULAR RASH



LATE DISEASE (> 2 years)



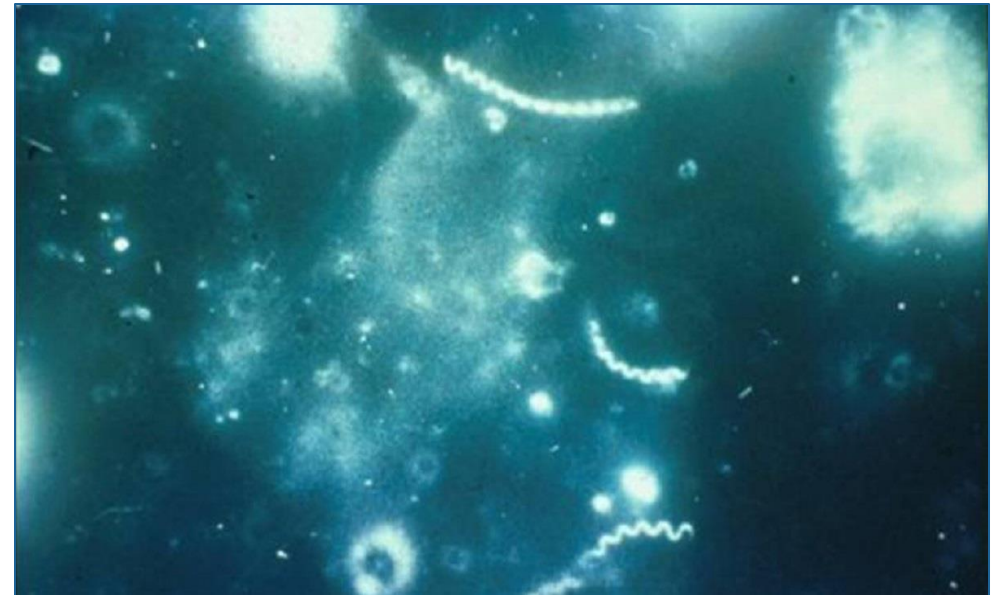
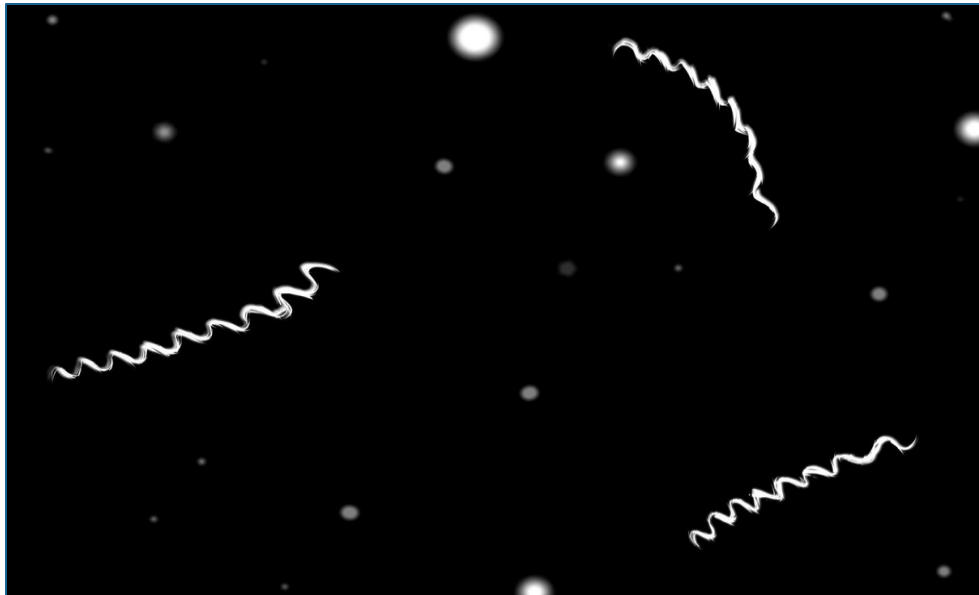
Diagnosis

Direct detection:

- Darkfield microscopy: visualization of motile spirochetes on wet mount under a dark-field microscope
- Direct fluorescent antibody for *T. pallidum*: visualization of immunofluorescent antibodies on the specimen
- Nucleic acid amplification (e.g., PCR)

Etiology- Pathogen

- **Basic features** of Treponema species:
 - Visualization: Dark-field microscopy because its too slender to be visualized using Gram or Giemsa stain



Diagnosis

Serological studies

A. Nontreponemal testing

- Use for screening purposes since the tests are sensitive, but not specific.
- Detects anticardiolipin antibodies
- Options: Rapid plasma reagin test, VDRL

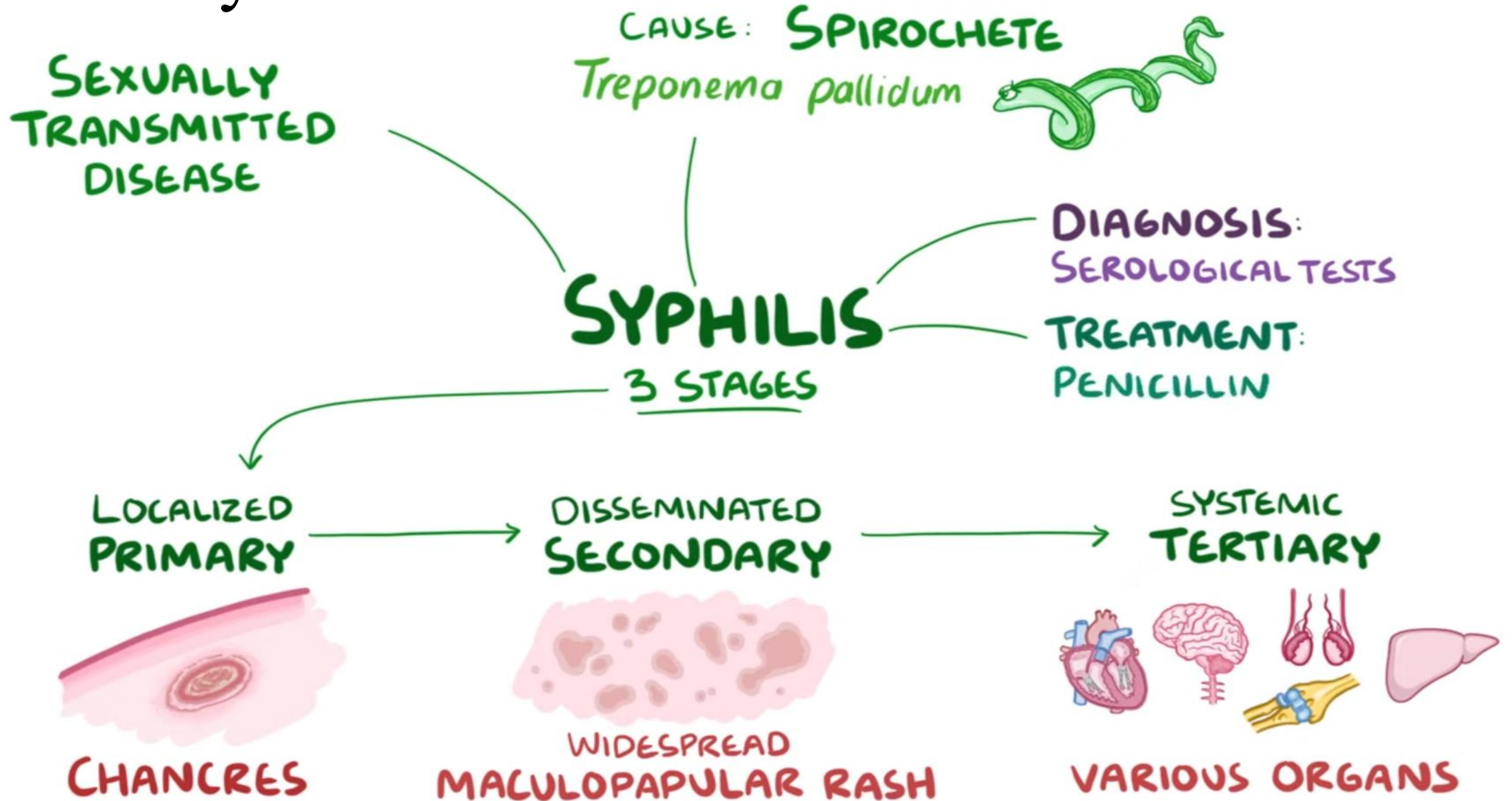
B. Treponemal testing

- Confirmatory tests that detect antibodies to Treponema antigens
- *T. pallidum* particle agglutination test (TPPA)
- *T. pallidum* enzyme immunoassay (TP-EIA)

Treatment

Penicillin G is the first-line therapy for all patients.

Summary...



Thank you

