

Slide 1

Syphilis Curriculum

# Syphilis

*Treponema pallidum*

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Slide 2

Syphilis Curriculum

## Learning Objectives

Upon completion of this content, the learner will be able to

1. Describe the epidemiology of syphilis in the U.S.
2. Describe the pathogenesis of *T. pallidum*.
3. Discuss the clinical manifestations of syphilis.
4. Identify common methods used in the diagnosis of syphilis.
5. List the CDC-recommended treatment regimens for syphilis.
6. Summarize appropriate prevention counseling messages for patients with syphilis.
7. Describe public health measures for the prevention of syphilis.

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Slide 3

Syphilis Curriculum

## Lessons

- I. Epidemiology: Disease in the U.S.
- II. Pathogenesis
- III. Clinical manifestations
- IV. Diagnosis
- V. Patient management
- VI. Prevention

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## Lesson I: Epidemiology: Disease in the U.S.

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Syphilis Curriculum Epidemiology

## Syphilis Definition

- Sexually acquired infection
- Etiologic agent: *Treponema pallidum*
- Disease progresses in stages
- May become chronic without treatment

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Syphilis Curriculum Epidemiology

## Transmission

- Sexual and vertical
- Most contagious to sex partners during the primary and secondary stages

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## Lesson II: Pathogenesis

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Syphilis Curriculum Pathogenesis

### Microbiology

- Etiologic agent: *Treponema pallidum*, subspecies *pallidum*
  - Corkscrew-shaped, motile microaerophilic bacterium
  - Cannot be cultured in vitro
  - Cannot be viewed by normal light microscopy

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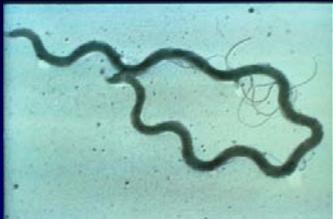
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Syphilis Curriculum Pathogenesis

### *Treponema pallidum*



Electron photomicrograph, 36,000 x.

Source: CDC/NCHSTP/Division of STD Prevention, STD Clinical Slides

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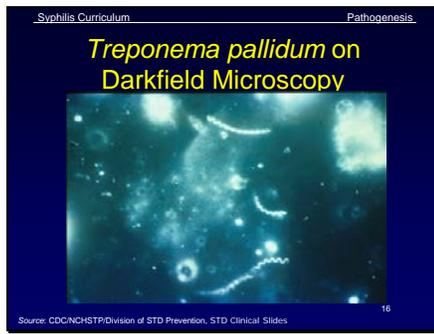
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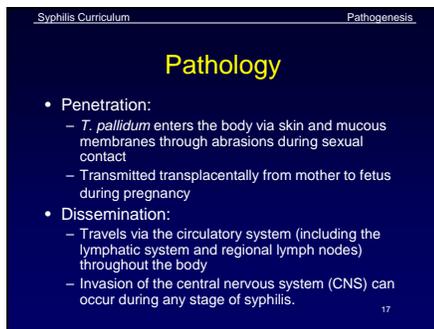
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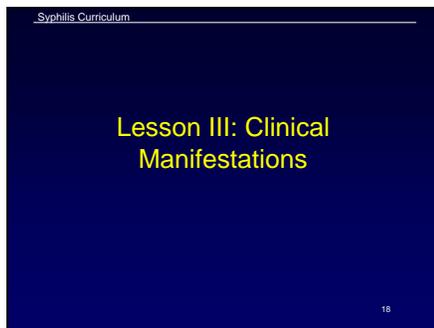
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Syphilis Curriculum Clinical Manifestations

### Primary Syphilis

- Primary lesion or "chancre" develops at the site of inoculation.
- Chancre
  - Progresses from macule to papule to ulcer;
  - Typically painless, indurated, and has a clean base;
  - Highly infectious;
  - Heals spontaneously within 3 to 6 weeks; and
  - Multiple lesions can occur.
- Regional lymphadenopathy: classically rubbery, painless, bilateral
- Serologic tests for syphilis may not be positive during early primary syphilis.

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Syphilis Curriculum Clinical Manifestations

### Primary Syphilis—Penile Chancre



Source: CDC/ NCHSTP/ Division of STD Prevention, STD Clinical Slides

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Syphilis Curriculum Clinical Manifestations

### Primary Syphilis—Labial Chancre



Source: CDC/ NCHSTP/ Division of STD Prevention, STD Clinical Slides

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Syphilis Curriculum Clinical Manifestations

### Primary Syphilis—Perianal Chancere



Source: CDC/ NCHSTP/ Division of STD Prevention, STD Clinical Slides 22

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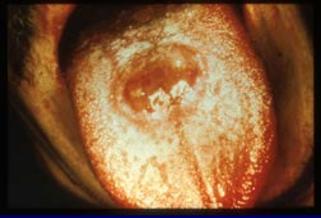
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Syphilis Curriculum Clinical Manifestations

### Primary Syphilis—Chancre of the Tongue



Source: CDC/ NCHSTP/ Division of STD Prevention /STD Clinical Slides 23

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Syphilis Curriculum Clinical Manifestations

### Secondary Syphilis

- Secondary lesions occur several weeks after the primary chancre appears; and may persist for weeks to months.
- Primary and secondary stages may overlap
- Mucocutaneous lesions most common
- Clinical Manifestations:
  - Rash (75%–100%)
  - Lymphadenopathy (50%–86%)
  - Malaise
  - Mucous patches (6%–30%)
  - Condylomata lata (10%–20%)
  - Alopecia (5%)
  - Liver and kidney involvement can occur
  - Splenomegaly is occasionally present
- Serologic tests are usually highest in titer during this stage.

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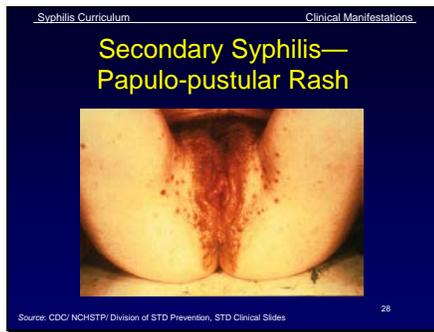
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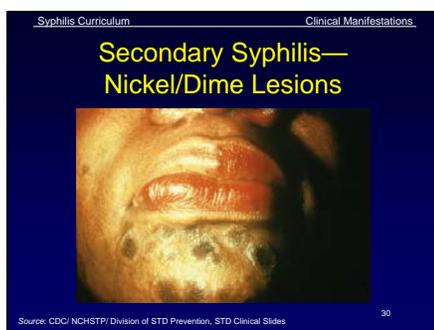
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Syphilis Curriculum Clinical Manifestations

## Secondary Syphilis— Alopecia



Source: CDC/ NCHSTP/ Division of STD Prevention, STD Clinical Slides 31

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Syphilis Curriculum Clinical Manifestations

## Latent Syphilis

- Host suppresses infection, but no lesions are clinically apparent
- Only evidence is a positive serologic test
- May occur between primary and secondary stages, between secondary relapses, and after secondary stage
- Categories:
  - Early latent: <1 year duration
  - Late latent: ≥1 year duration

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Syphilis Curriculum Clinical Manifestations

## Neurosyphilis

- Occurs when *T. pallidum* invades the central nervous system (CNS)
- May occur at any stage of syphilis
- Can be asymptomatic
- Early neurosyphilis occurs a few months to a few years after infection
  - Clinical manifestations can include acute syphilitic meningitis, meningovascular syphilis, and ocular involvement
- Neurologic involvement can occur decades after infection and is rarely seen
  - Clinical manifestations can include general paresis, tabes dorsalis, and ocular involvement
- Ocular involvement can occur in early or late neurosyphilis.

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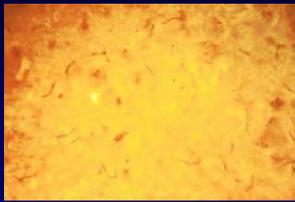
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Syphilis Curriculum Clinical Manifestations

### Neurosyphilis—Spirochetes in Neural Tissue



Silver stain, 950x

Source: CDC/ NCHSTP/ Division of STD Prevention, STD Clinical Slides 34

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Syphilis Curriculum Clinical Manifestations

### Tertiary (Late) Syphilis

- Approximately 30% of untreated patients progress to the tertiary stage within 1 to 20 years.
- Rare because of the widespread availability and use of antibiotics
- Manifestations
  - Gummatous lesions
  - Cardiovascular syphilis

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Syphilis Curriculum Clinical Manifestations

### Late Syphilis—Serpiginous Gummata of Forearm



Source: CDC/ NCHSTP/ Division of STD Prevention, STD Clinical Slides 36

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Syphilis Curriculum Clinical Manifestations

### Late Syphilis - Ulcerating Gumma



Source: CDC/ NCHSTP/ Division of STD Prevention, STD Clinical Slides 37

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Syphilis Curriculum Clinical Manifestations

### Late Syphilis—Cardiovascular



Source: CDC/ NCHSTP/ Division of STD Prevention, STD Clinical Slides 38

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Syphilis Curriculum Clinical Manifestations

### Congenital Syphilis

- Occurs when *T. pallidum* is transmitted from a pregnant woman to her fetus
- May lead to stillbirth, neonatal death, and infant disorders such as deafness, neurologic impairment, and bone deformities
- Transmission can occur during any stage of syphilis; risk is much higher during primary and secondary syphilis
- Fetal infection can occur during any trimester of pregnancy
- Wide spectrum of severity exists; only severe cases are clinically apparent at birth
  - Early lesions (most common): Infants <2 years old; usually inflammatory
  - Late lesions: Children >2 years old; tend to be immunologic and destructive

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Slide 43

Syphilis Curriculum

## Lesson IV: Syphilis Diagnosis

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Syphilis Curriculum

Diagnosis

## Aspects of Syphilis Diagnosis

1. Clinical history
2. Physical examination
3. Laboratory diagnosis

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Syphilis Curriculum

Diagnosis

## Clinical History

Assess

- History of syphilis
- Known contact to an early case of syphilis
- Typical signs or symptoms of syphilis in the past 12 months
- Most recent serologic test for syphilis

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Syphilis Curriculum Diagnosis

### Physical Examination

- Oral cavity
- Lymph nodes
- Skin of torso
- Palms and soles
- Genitalia and perianal area
- Neurologic examination
- Abdomen

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Syphilis Curriculum Diagnosis

### Laboratory Diagnosis

- Identification of *Treponema pallidum* in lesion exudate or tissue
  - Darkfield microscopy
  - Tests to detect *T. pallidum*
- Serologic tests to allow a presumptive diagnosis
  - Nontreponemal tests
  - Treponemal tests

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Syphilis Curriculum Diagnosis

### Darkfield Microscopy

- What to look for
  - *T. pallidum* morphology and motility
- Advantage
  - Definitive immediate diagnosis
  - Rapid results
- Disadvantages
  - Requires specialized equipment and an experienced microscopist
  - Possible confusion with other pathogenic and nonpathogenic spirochetes
  - Must be performed immediately
  - Generally not recommended on oral lesions
  - Possibility of false-negatives

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Syphilis Curriculum Diagnosis

### Serologic Tests for Syphilis

- Two types
  - Treponemal (qualitative)
  - Nontreponemal (qualitative and quantitative)
- The use of only one type of serologic test is insufficient for diagnosis

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Syphilis Curriculum Diagnosis

### Nontreponemal Serologic Tests

- Principles
  - Measure antibody directed against a cardiolipin-  
lecithin-cholesterol antigen
  - Not specific for *T. pallidum*
  - Titers usually correlate with disease activity and results are reported quantitatively
  - May be reactive for life, referred to as "serofast"
- Nontreponemal tests include VDRL, RPR, TRUST, USR

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Syphilis Curriculum Diagnosis

### Nontreponemal Serologic Tests (continued)

<p><b>Advantages</b></p> <ul style="list-style-type: none"> <li>• Rapid and inexpensive</li> <li>• Easy to perform and can be done in clinic or office</li> <li>• Quantitative</li> <li>• Used to follow response to therapy</li> <li>• Can be used to evaluate possible reinfection</li> </ul>	<p><b>Disadvantages</b></p> <ul style="list-style-type: none"> <li>• May be insensitive in certain stages</li> <li>• False-positive reactions may occur</li> <li>• Prozone effect may cause a false-negative reaction (rare)</li> </ul>
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Syphilis Curriculum

## Lesson VI: Prevention

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Syphilis Curriculum Prevention

## Patient Counseling and Education

- Nature of the disease
- Transmission
- Treatment and follow-up
- Risk reduction

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Syphilis Curriculum Prevention

## Management of Sex Partners

- For sex partners of patients with syphilis in any stage
  - Draw syphilis serology
  - Perform physical exam
- For sex partners of patients with primary, secondary, or early latent syphilis
  - Treat presumptively as for early syphilis at the time of examination, unless
    - The nontreponemal test result is known and negative and
    - The last sexual contact with the patient is > 90 days prior to examination.

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Syphilis Curriculum Prevention

### Screening Recommendations

- Screen pregnant women at least at first prenatal visit.
  - In high prevalence communities, or patients at risk
    - Test twice during the third trimester, at 28 weeks, and at delivery, in addition to routine early screening.
  - Any woman who delivers a stillborn infant after 20 weeks gestation should be tested for syphilis.
- Screen other populations based on local prevalence and the patient's risk behaviors.

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Syphilis Curriculum Prevention

### Reporting

- Laws and regulations in all states require that persons diagnosed with syphilis are reported to public health authorities. Reporting can be provider or laboratory based.
- The follow-up of patients with early syphilis is a public health priority.

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Syphilis Curriculum

### Case Study

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Syphilis Curriculum Case Study



### History

- Stan Carter is a 19-year-old male who presents to the STD clinic.
- Chief complaint is a penile lesion for 1 week
- Last sexual exposure was 3 weeks prior, without a condom.
- No history of recent travel
- Predominantly female partners (3 in the last 6 months), and occasional male partners (2 in the past year)
- Last HIV antibody test (2 months prior) was negative

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Syphilis Curriculum Case Study

### Physical Exam

- No oral, perianal, or extra-genital lesions
- Genital exam discloses a lesion on the ventral side near/at the frenulum. Lesion is red, indurated, clean-based, and non-tender.
- Two enlarged tender right inguinal nodes, 1.5 cm x 1 cm
- Scrotal contents without masses or tenderness
- No urethral discharge
- No rashes on torso, palms, or soles. No alopecia. Neurologic exam with normal limits.

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Syphilis Curriculum Case Study

### Questions

1. What are the possible etiologic agents that should be considered in the differential diagnosis?
2. What is the *most likely* diagnosis?
3. Which laboratory tests would be appropriate to order or perform?

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Syphilis Curriculum Case Study

### Stat Lab Results

The results of stat laboratory tests showed the following:  
RPR: Nonreactive  
Darkfield examination of penile lesion: Positive for *T. pallidum*

4. What is the diagnosis?  
5. What is the appropriate treatment?

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Syphilis Curriculum Case Study

### Reference Lab Results

- RPR: Nonreactive
- FTA-ABS: Reactive
- HSV culture: Negative
- Gonorrhea NAAT: Negative
- Chlamydia NAAT: Negative
- HIV antibody test: Negative

6. Do the reference laboratory results change the diagnosis?  
7. Who is responsible for reporting this case to the local health department?

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Syphilis Curriculum Case Study

### Stan's Sex Partners



Tracy – last sexual exposure 3 weeks ago



Danielle – last sexual exposure 6 weeks ago



Jonathan – last sexual exposure 1 month ago



Tony – last sexual exposure 8 months ago



Carrie – last sexual exposure 6 months ago



8. Which of Stan's partners should be evaluated and treated prophylactically, even if their test results are negative?

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Syphilis Curriculum Case Study

### Sex Partner Follow-Up

Stan's partner, Tracy, is found to be infected and is diagnosed with primary syphilis. She is also in her second trimester of pregnancy and is allergic to penicillin.



9. What is the appropriate treatment for Tracy?

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Syphilis Curriculum Case Study

### Follow-Up

Stan returned to the clinic for a follow-up exam 1 week later. Results were as follows

- His penile lesion was almost completely healed.
- He had not experienced a Jarisch-Herxheimer reaction.
- The RPR (repeated at the follow-up visit because the initial one was negative) was 1:2.

10. What type of follow-up evaluation will Stan need?

11. What are appropriate prevention counseling messages for patients with syphilis?

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