

Gonorrhea

Neisseria gonorrhoeae



Learning Objectives

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

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

Lessons

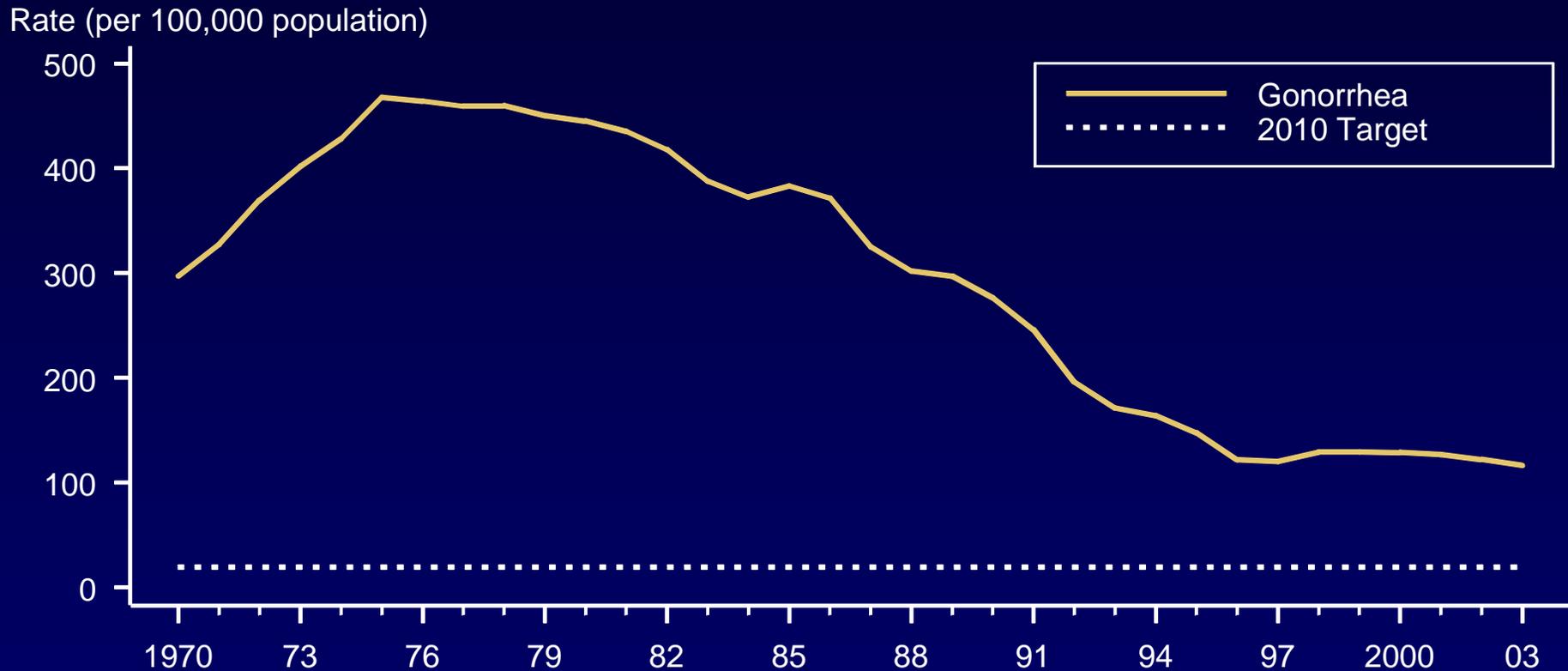
- I. Epidemiology: Disease in the U.S.
- II. Pathogenesis
- III. Clinical manifestations
- IV. Diagnosis
- V. Patient management
- VI. Prevention

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

Incidence and Prevalence

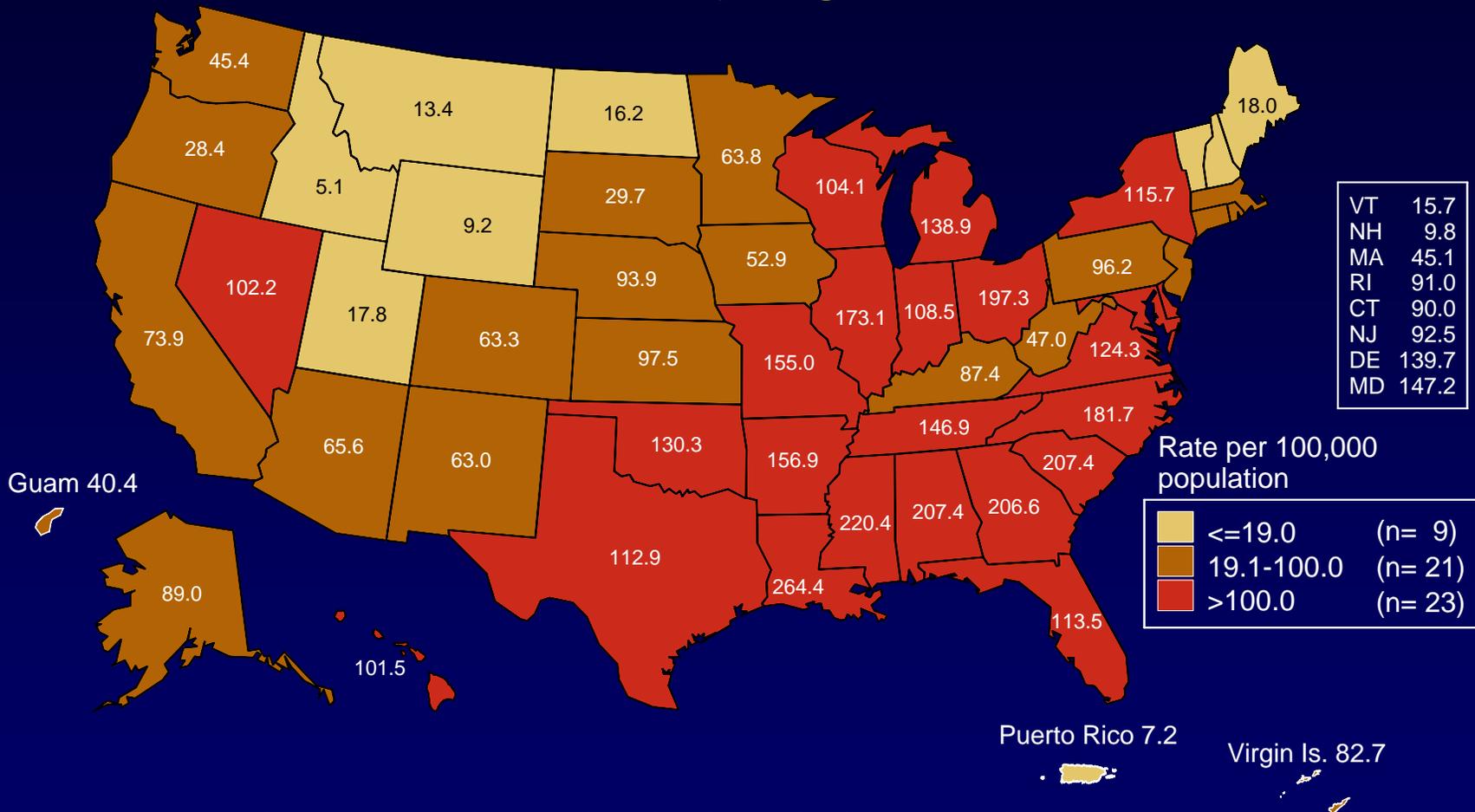
- Significant public health problem in U.S.
- Number of reported cases underestimates incidence
- Incidence remains high in some groups defined by geography, age, race/ethnicity, or sexual risk behavior
- Increasing proportion of gonococcal infections caused by resistant organisms

Gonorrhea — Rates: United States, 1970–2003 and the Healthy People 2010 target



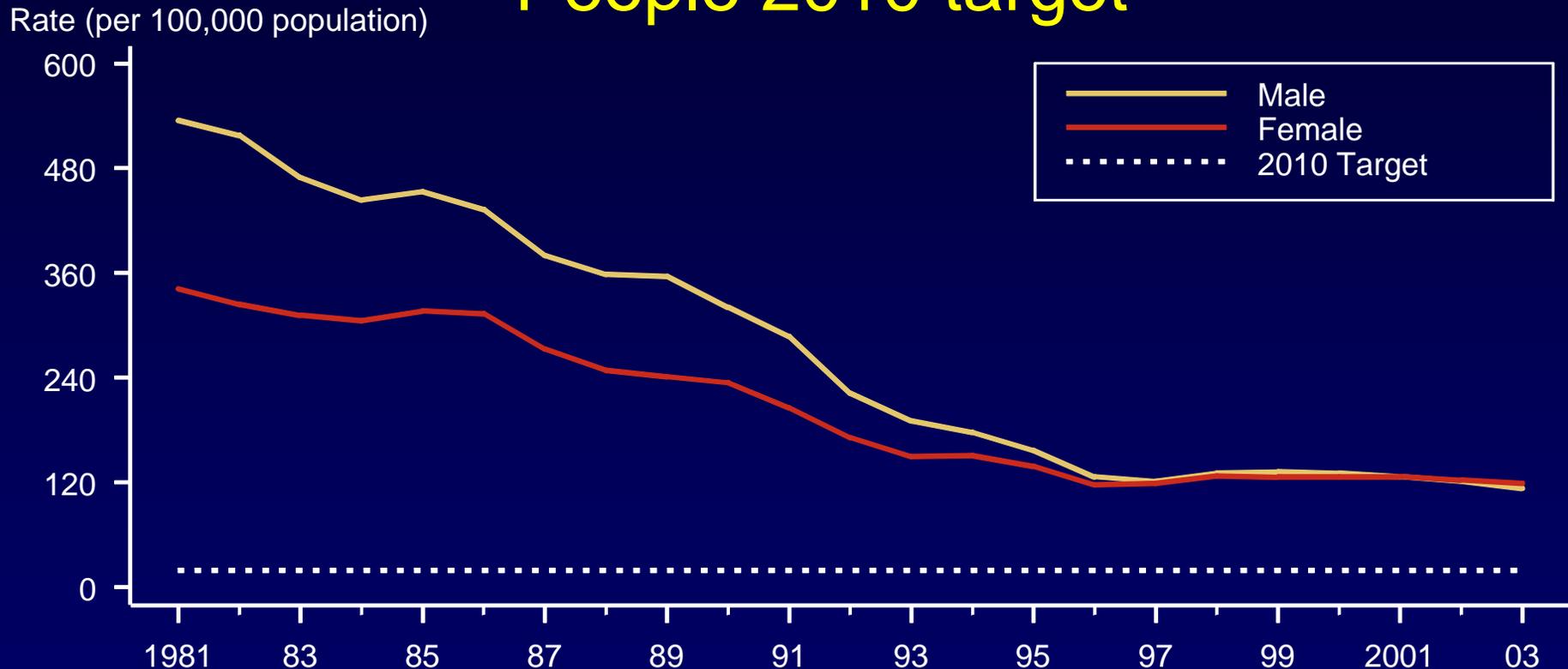
Note: The Healthy People 2010 target for gonorrhea is 19.0 cases per 100,000 population.

Gonorrhea — Rates by state: United States and outlying areas, 2003



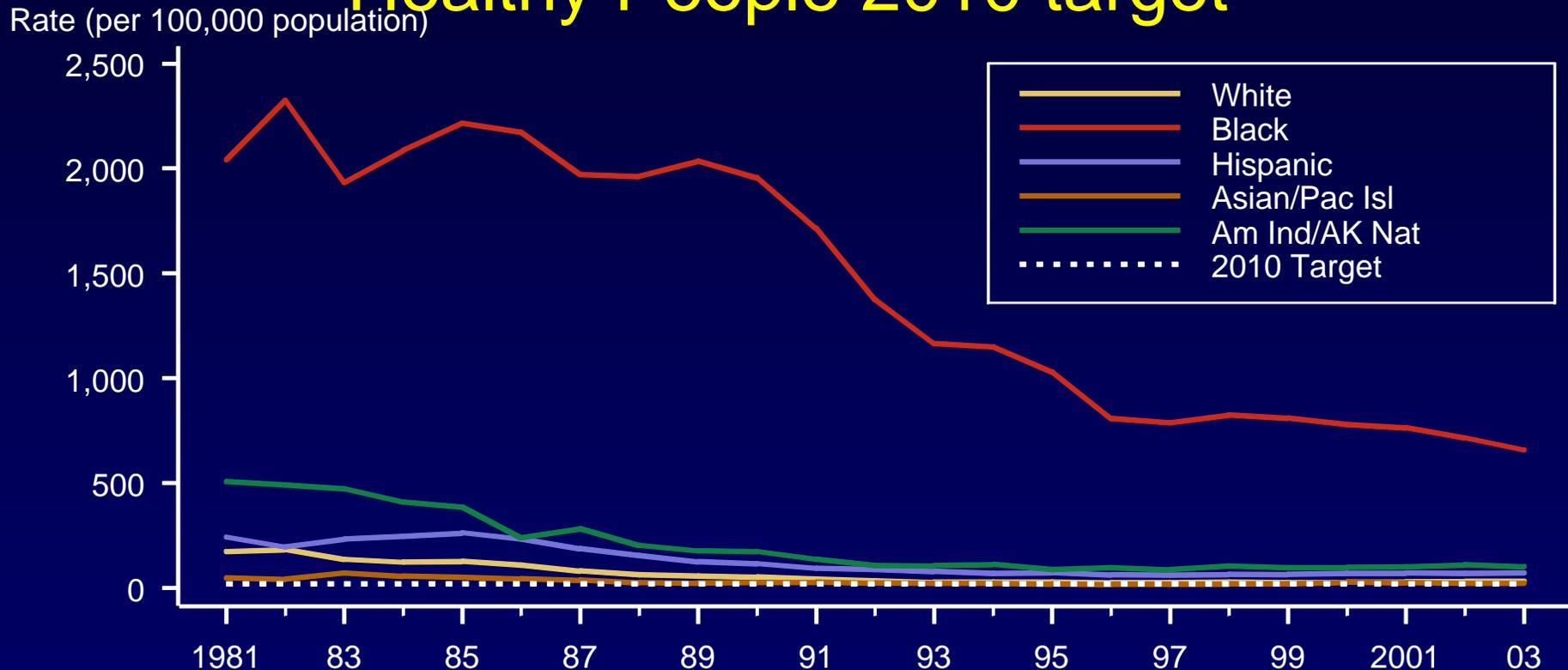
Note: The total rate of gonorrhea for the United States and outlying areas (Guam, Puerto Rico and Virgin Islands) was 114.7 per 100,000 population. The Healthy People 2010 target is 19.0 cases per 100,000 population.

Gonorrhea — Rates by sex: United States, 1981–2003 and the Healthy People 2010 target



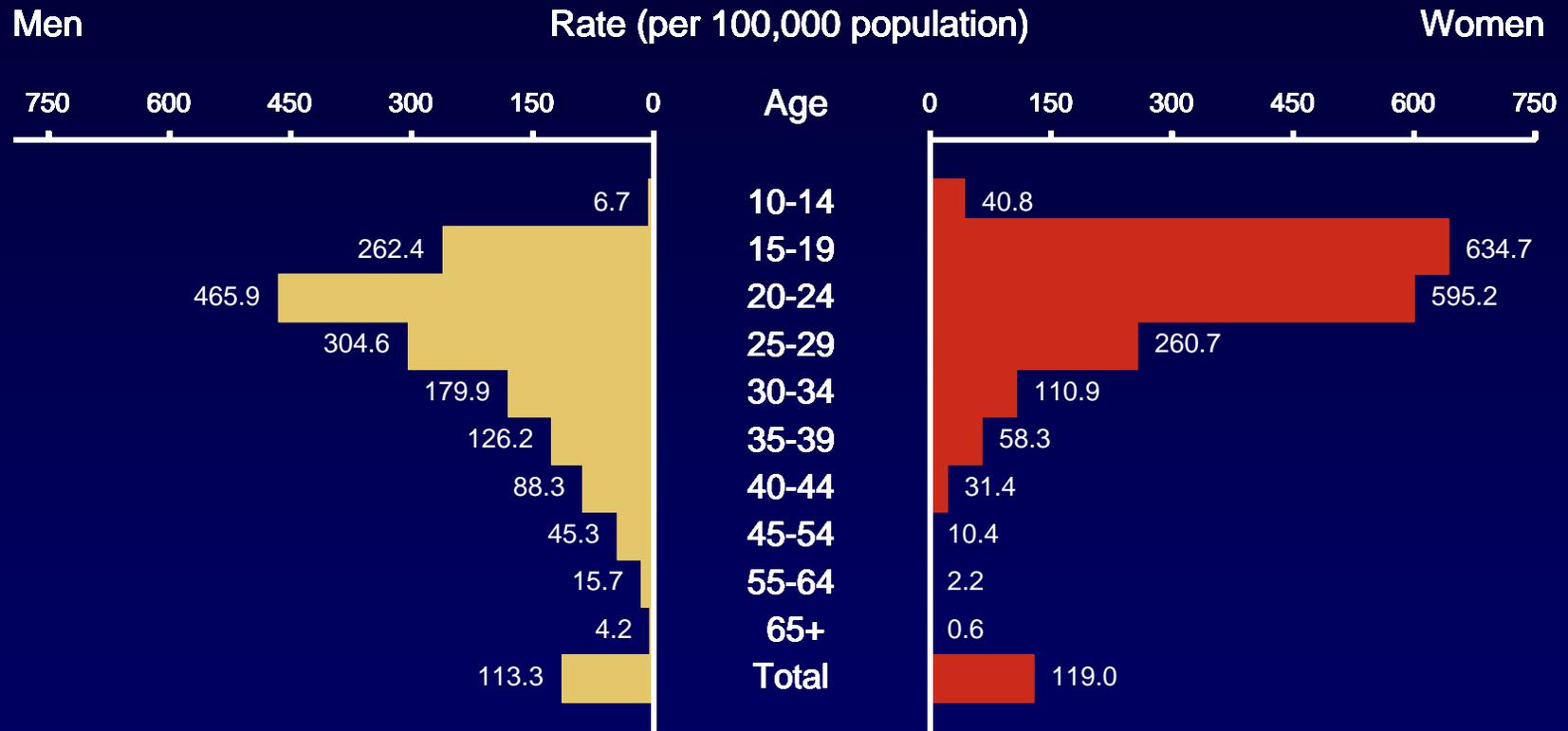
Note: The Healthy People 2010 target for gonorrhea is 19.0 cases per 100,000 population.

Gonorrhea — Rates by race and ethnicity: United States, 1981–2003 and the Healthy People 2010 target

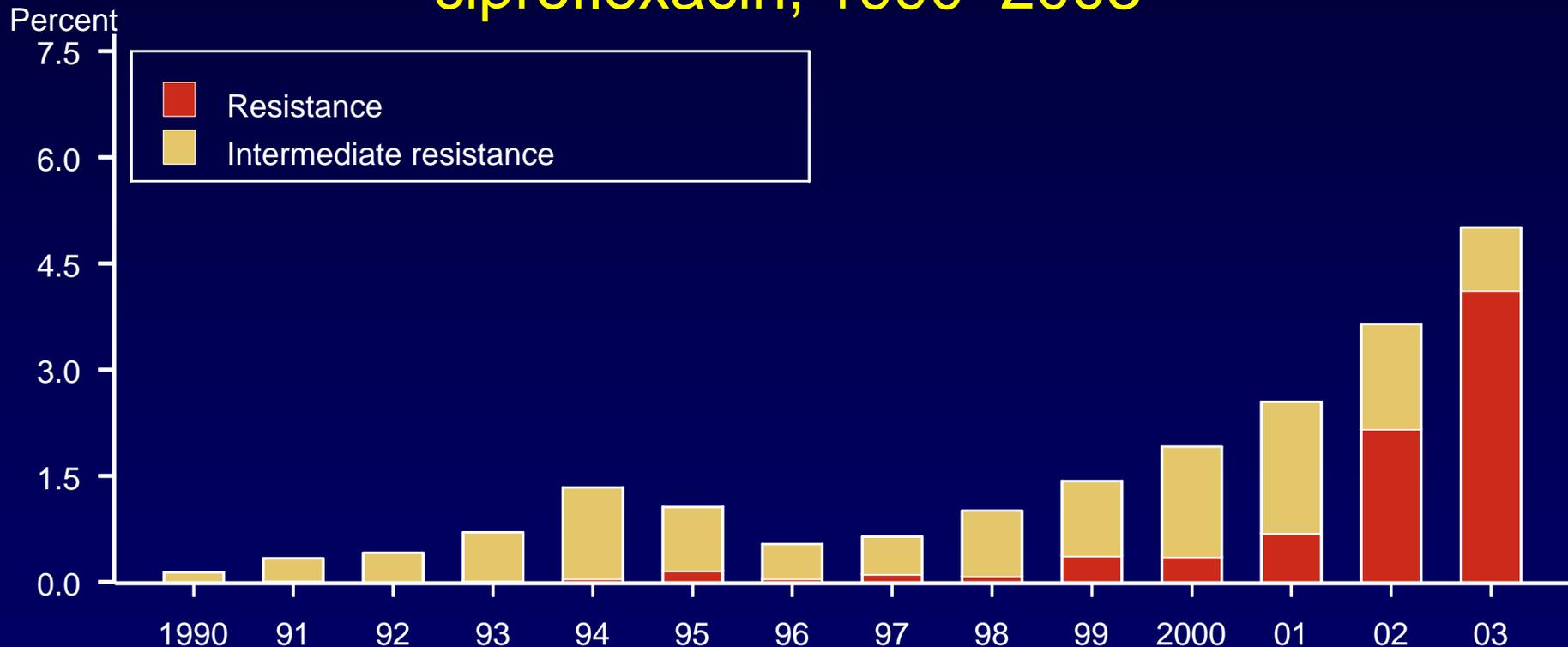


Note: The Healthy People 2010 target for gonorrhea is 19.0 cases per 100,000 population.

Gonorrhea — Age- and sex-specific rates: United States, 2003



Gonococcal Isolate Surveillance Project (GISP) — Percent of *Neisseria gonorrhoeae* isolates with resistance or intermediate resistance to ciprofloxacin, 1990–2003



Note: Resistant isolates have ciprofloxacin MICs ≥ 2 $\mu\text{g/ml}$. Isolates with intermediate resistance have ciprofloxacin MICs of 0.125 - 0.5 $\mu\text{g/ml}$. Susceptibility to ciprofloxacin was first measured in GISP in 1990.

Risk Factors

- Multiple or new sex partners or inconsistent condom use
- Urban residence in areas with disease prevalence
- Adolescents, females particularly
- Lower socio-economic status
- Use of drugs
- Exchange of sex for drugs or money

Transmission

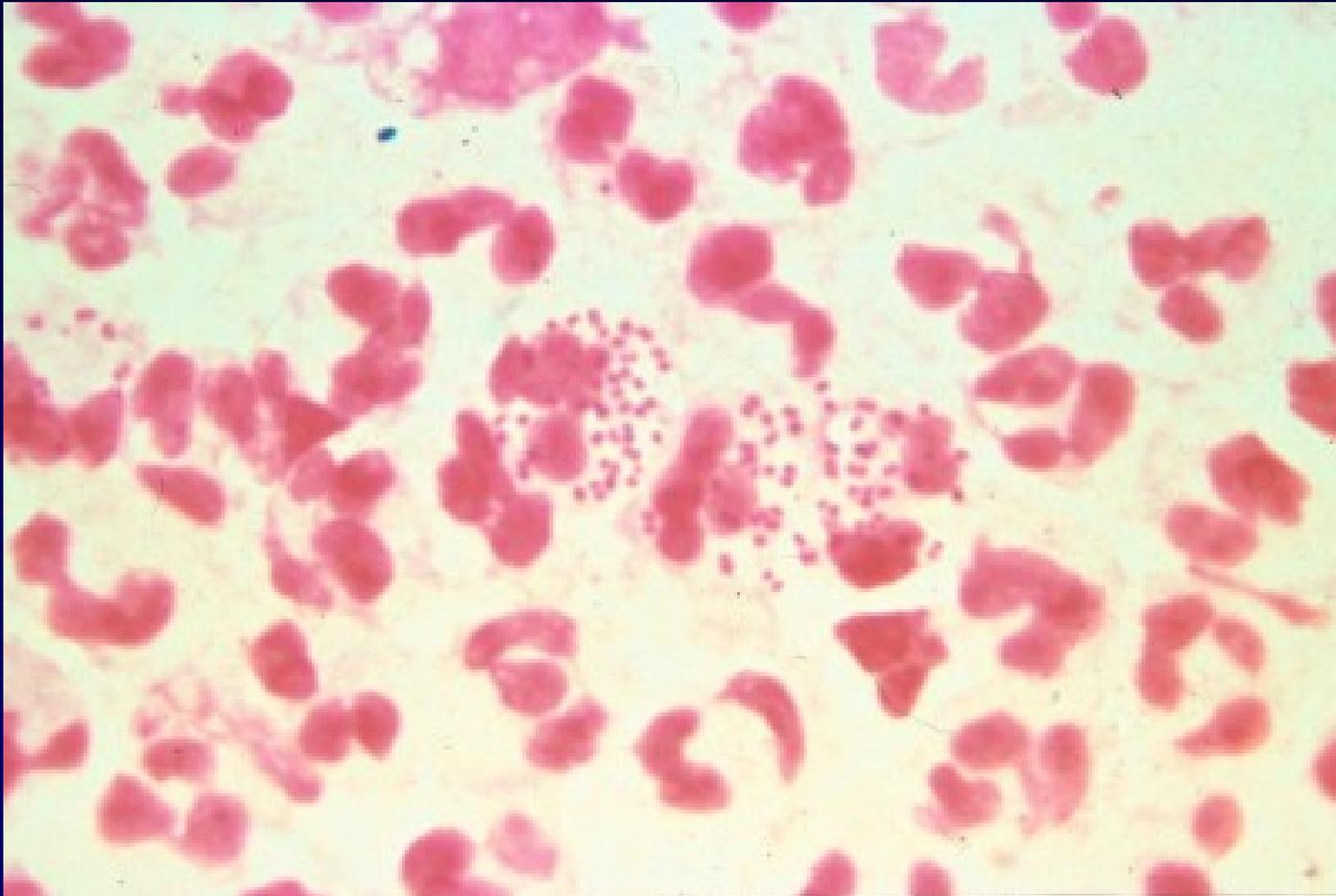
- Efficiently transmitted by:
 - Male to female via semen
 - Female to male urethra
 - Rectal intercourse
 - Fellatio (pharyngeal infection)
 - Perinatal transmission (mother to infant)
- Gonorrhea associated with increased transmission of and susceptibility to HIV infection

Lesson II: Pathogenesis

Microbiology

- Etiologic agent: *Neisseria gonorrhoeae*
- Gram-negative intracellular diplococcus
- Infects mucus-secreting epithelial cells

Gonorrhea: Gram Stain of Urethral Discharge



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

Lesson III: Clinical Manifestations

Genital Infection in Men

- Urethritis – Inflammation of urethra
- Epididymitis – Inflammation of the epididymis

Male Urethritis

- Symptoms
 - Typically purulent or mucopurulent urethral discharge
 - Often accompanied by dysuria
 - Discharge may be clear or cloudy
- Asymptomatic in 10% of cases
- Incubation period: usually 1-14 days for symptomatic disease, but may be longer

Gonococcal Urethritis: Purulent Discharge



Source: Seattle STD/HIV Prevention Training Center at the University of Washington:
Connie Celum and Walter Stamm

Epididymitis

- Symptoms: unilateral testicular pain and swelling
- Infrequent, but most common local complication in males
- Usually associated with overt or subclinical urethritis

Swollen or Tender Testicles (Epididymitis)



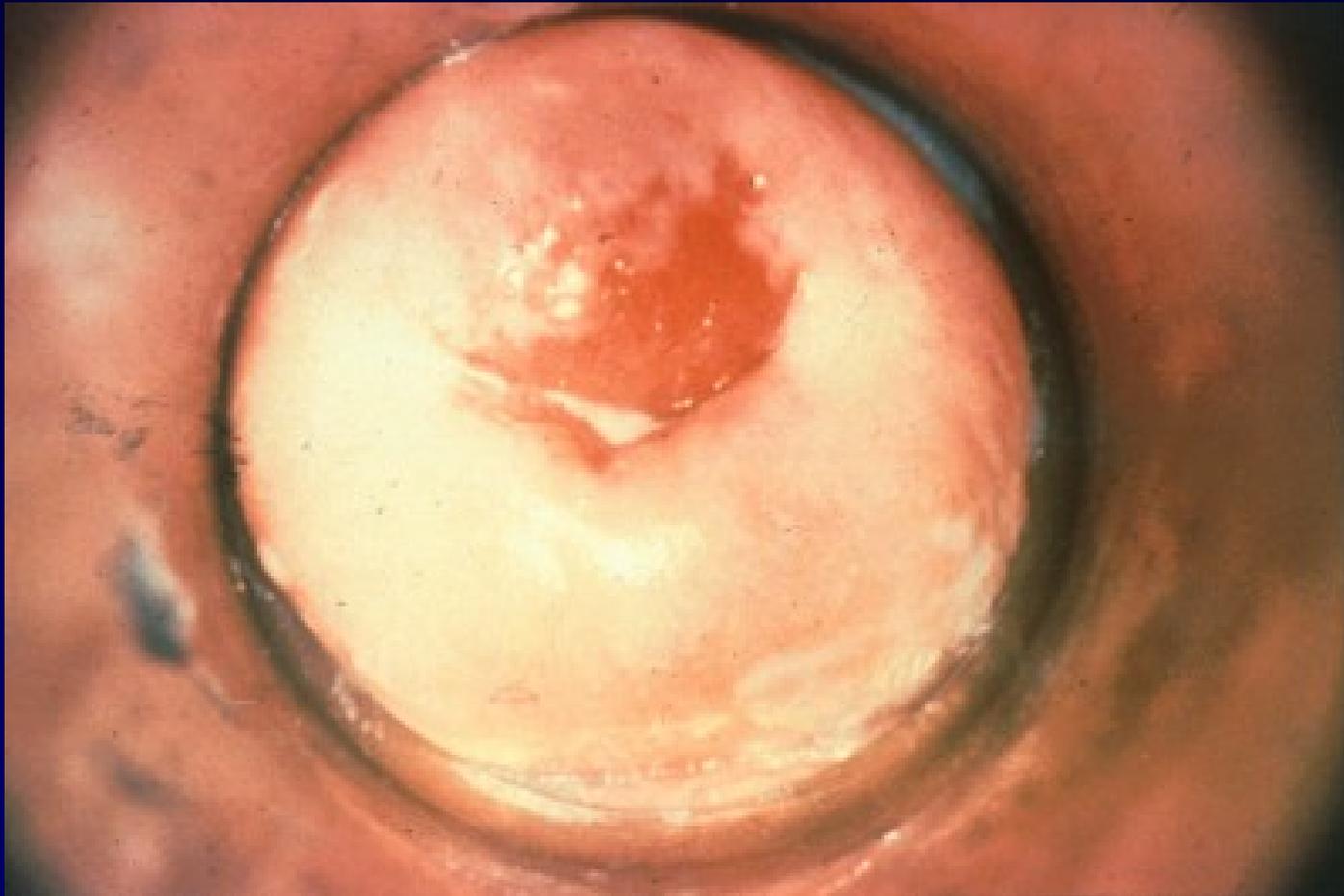
Genital Infection in Women

- Most infections are asymptomatic
- Cervicitis – inflammation of the cervix
- Urethritis – inflammation of the urethra

Cervicitis

- Non-specific symptoms: abnormal vaginal discharge, intermenstrual bleeding, dysuria, lower abdominal pain, or dyspareunia
- Clinical findings: mucopurulent or purulent cervical discharge, easily induced cervical bleeding
- 50% of women with clinical cervicitis have no symptoms
- Incubation period unclear, but symptoms may occur within 10 days of infection

Gonococcal Cervicitis



Urethritis

- Symptoms: dysuria, however, most women are asymptomatic
- 40%-60% of women with cervical gonococcal infection may have urethral infection

Complications in Women

- Accessory gland infection
 - Bartholin's glands
 - Skene's glands
- Pelvic Inflammatory Disease (PID)
- Fitz-Hugh-Curtis Syndrome
 - Perihepatitis

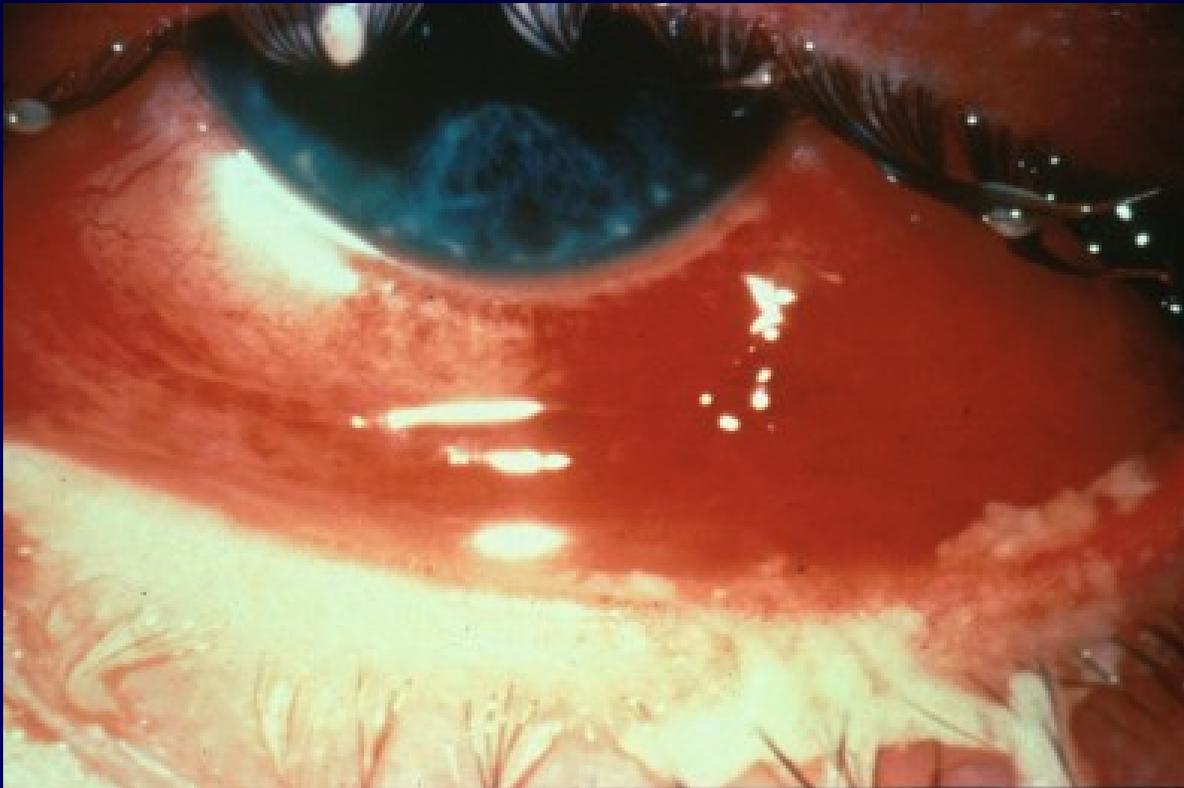
Bartholin's Abscess



Syndromes in Men and Women

- Anorectal infection
- Pharyngeal infection
- Conjunctivitis
- Disseminated gonococcal infection (DGI)

Gonococcal Ophthalmia



Disseminated Gonorrhea— Skin Lesion



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

Gonorrhea Infection in Children

- Perinatal: infections of the conjunctiva, pharynx, respiratory tract
- Older children (>1 year): considered possible evidence of sexual abuse

Lesson IV: Diagnosis

Diagnostic Methods

- Culture tests
- Non-culture tests
 - Amplified tests (NAATs)
 - Polymerase chain reaction (PCR) (Roche Amplicor)
 - Transcription-mediated amplification (TMA) (Gen-Probe Aptima)
 - Strand displacement amplification (SDA) (Becton-Dickinson BD ProbeTec ET)
 - Non-amplified tests
 - DNA probe (Gen-Probe PACE 2, Digene Hybrid Capture II)
 - Gram stain

Clinical Considerations

- In cases of suspected sexual abuse
 - Legal standard is **culture with multiple tests** to confirm the identity of *Neisseria gonorrhoeae*

Lesson V: Patient Management

Antimicrobial Susceptibility of *N. gonorrhoeae*

- Fluoroquinolones are no longer recommended for therapy for gonorrhea acquired in Asia, the Pacific Islands (including Hawaii), and California.
- CDC no longer recommends fluoroquinolones as a first-line therapy for gonorrhea in MSM.

Treatment for Uncomplicated Infections of the Cervix, Urethra, and Rectum

Cefixime	400 mg	Orally	Once	or
Ceftriaxone	125 mg	IM	Once	or
¹ Ciprofloxacin	500 mg	Orally	Once	or
¹ Ofloxacin	400 mg	Orally	Once	or
¹ Levofloxacin	250 mg	Orally	Once	

¹ Contraindicated in pregnancy and children. Not recommended for infections acquired in California, Asia, or the Pacific, including Hawaii.

Co-treatment for *Chlamydia trachomatis*

If chlamydial infection is not ruled out:

Azithromycin	1 g	Orally	Once or
Doxycycline	100 mg	Orally	Twice a day for 7 days

Special Considerations: Pregnancy

- Pregnant women should NOT be treated with quinolones or tetracyclines
- Treat with alternate cephalosporin
- If cephalosporin is not tolerated, treat with spectinomycin 2 g IM once

Alternative Regimens

- Spectinomycin 2 g in a single IM dose
- Single-dose cephalosporin regimens
 - Ceftriaxone 500 mg IM
 - Cefixime 2 g IM with Probenecid 1 g orally

Follow-Up

- A test of cure is not recommended if a recommended regimen is administered.
- If symptoms persist, perform culture for *N. gonorrhoeae*.
 - Any gonococci isolated should be tested for antimicrobial susceptibility.

Lesson VI: Prevention

Screening

- Pregnancy
 - A test for *N. gonorrhoeae* should be performed at the first prenatal visit for women at risk or those living in an area in which the prevalence of *N. gonorrhoeae* is high.
 - Repeat test during the 3rd trimester for those at continued risk.
- Other populations can be screened based on local disease prevalence and patient's risk behaviors.

Partner Management

- Evaluate and treat all sex partners for *N. gonorrhoeae* and *C. trachomatis* infections if contact was within 60 days of symptoms or diagnosis.
- If a patient's last sexual intercourse was >60 days before onset of symptoms or diagnosis, the patient's most recent sex partner should be treated.
- Avoid sexual intercourse until therapy is completed and both partners no longer have symptoms.

Reporting

- Laws and regulations in all states require that persons diagnosed with gonorrhea are reported to public health authorities by clinicians, labs, or both.

Patient Counseling/Education

- Nature of disease
 - Usually symptomatic in males and asymptomatic in females
 - Untreated infections can result in PID, infertility, and ectopic pregnancy in women and epididymitis in men
- Transmission issues
 - Efficiently transmitted
- Risk reduction
 - Utilize prevention strategies

Case Study



History: Robert Forbes

- 33-year-old male who presents to his doctor reporting a purulent urethral discharge and dysuria for 3 days
- Lives in Dallas with history of travel to Hawaii 3 weeks ago
- New female sex partner (Laura) for 2 months. They have unprotected vaginal intercourse 4 times/week, the last time being 2 days ago. No oral or rectal sex.
- Also had a one-time sexual encounter with a woman he met in Hawaii 3 weeks ago (Monica)
- No history of urethral discharge or STDs, no sore throat or rectal discomfort. Negative HIV test 1 year ago.

Physical Exam

- Vital signs: blood pressure 98/72, pulse 68, respiration 14, temperature 37.2° C
- Cooperative, good historian
- Chest, heart, musculoskeletal, and abdominal exams within normal limits
- No flank pain on percussion, normal rectal exam, no sores or rashes
- The genital exam reveals a reddened urethral meatus with a purulent discharge, without lesions or lymphadenopathy.

Questions

1. What should be included in the differential diagnosis?
2. Which laboratory tests are appropriate to order or perform?
3. What is the appropriate treatment regimen?

Laboratory

Results of laboratory tests:

- Urethral culture: showed growth of a Gram-negative diplococcus that was oxidase-positive. Biochemical and FA conjugate testing confirmed this isolate to be *N. gonorrhoeae*.
 - DNA probe for chlamydia: negative
 - RPR: nonreactive
 - HIV antibody test: negative
- 4) What is the diagnosis based on all available information?
 - 5) Who is responsible for reporting this case to the local health department?



Partner Management



Robert's sex partners within the past 3 months:

- Laura: Last exposure - Unprotected vaginal sex 2 days ago
- Monica: Last exposure - Unprotected oral (Robert was receptive partner) and vaginal sex 3 weeks ago while he was in Hawaii
- Jerilyn: Last exposure - Unprotected vaginal sex 3 months ago



- 6) Laura was examined and her lab results came back negative for gonorrhea and chlamydia. How should Laura be managed?
- 7) What tests should Jerilyn and Monica have?

Follow-Up

Robert returns 1 month later for an employer-sponsored flu shot. He took his medications as directed, is asymptomatic, and has had no sex partners since his office visit to you.

8) Does Robert need a test of cure?

9) What are appropriate prevention counseling messages for Robert?