Sexually Transmitted Infections

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Learning Objectives

- Describe the current epidemiology of common STIs in the U.S. and Oregon
- Select appropriate diagnostic tests based on exposure site and clinical presentation
- Implement evidence-based prevention strategies
- Recognize emerging antimicrobial resistance and novel therapeutic options

Global & U.S. Burden of STIs

>1M

New curable STIs globally per day

376M

Total annual global STI cases

+30%

U.S. reportable STIs 2015–2019

Infection	U.S. Cases 2020	Change from 2016
Chlamydia	1,600,000	Stable
Gonorrhea	677,769	+45%
Primary / Secondary Syphilis	133,945	+52%
Congenital Syphilis	2,148	+235%

StatPearls — Sexually Transmitted Infections (NCBI Bookshelf) | CDC STI Treatment Guidelines 2021

STI Trends: United States, 2015–2024

Chlamydia

Most Common
STI Reported

↑ Rising

Gonorrhea
Since 2015

↑ Rising

Syphilis
Since 2015

STIs continue to place a significant burden on public health. Chlamydia remains the most reported bacterial STI; gonorrhea and syphilis have shown sustained increases.

CDC surveillance data

STI Prevention — Core Strategies

Five Core Prevention Strategies

- Risk assessment & education
- Vaccination (HPV, HBV, HAV)
- Screening — symptomatic & asymptomatic
- Diagnosis, treatment & partner services

The Five P's — Sexual History

- Partners — number, sex, gender identity
- Practices — oral, anal, vaginal
- Protection — condoms, STI prevention
- Past STIs — prior diagnoses & treatment
- Pregnancy Prevention — contraception

Prevention — Barrier Methods & HIV

Barrier Methods & Contraception

- Condoms — most effective STI prevention method
- Diaphragms — protect vs. GC/CT/TV; NOT HIV
- IUDs, DMPA, oral pills — NO STI protection
- Emergency contraception: copper IUD or ECPs

HIV Screening & Prevention

- Routine HIV testing for ALL STI visits (opt-out)
- STI diagnosis = HIV biomarker
- PrEP for at-risk; ART suppresses VL < 200 cp/mL
- MSM: annual STI + HIV at all exposed sites

Real Talk: Patient Concerns with STIs

Clinical Presentations

- "I have a sore," or
- "something doesn't feel right."

Key Questions & Next Steps

- How did I get this?
- Who gave this to me?
- What happens next? Understanding treatment options
- Do other partners need testing or treatment?
- Confidentiality and stigma concerns
- Risk reduction going forward

One Symptom, Many Possibilities: Testing

Test	Pathogen	Advantages	Limitations
NAAT (PCR)	HSV, Mpox, Chlamydia, Gonorrhea	High sensitivity	Not POC; variable availability
Darkfield Microscopy	Syphilis	Immediate results	Requires expertise; low sensitivity
Serology	Syphilis, HSV, HIV	Widely available	Window period; false positives

What Drives STI Risk? Networks & Partners

Community Prevalence

- ZIP codes with high STI rates may increase individual risk

Partner Characteristics

- Partner's behaviors may matter more than partner count
- Ask: does your partner have other partners? Use PrEP?
- Condoms (0-10)

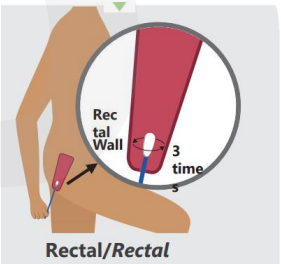
Extragenital Testing — Missed Infections

70–85%
Extragenital GC/CT missed with urine-only testing

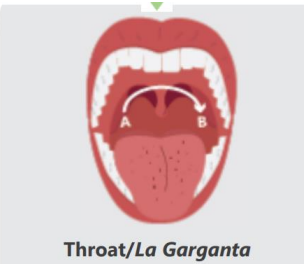
3 Sites
Pharyngeal, Rectal, Urogenital — screen all exposures

NAAT
Required for pharyngeal and rectal specimens

Symptom-based screening misses the majority of extragenital infections. Ask about all sexual practices and screen all exposed anatomic sites.



Rectal/*Rectal*



Throat/*La Garganta*

STIs as HIV Acquisition Risk Factors

2–5×

Increased HIV risk with ulcerative STIs

↑

Rectal GC/CT Amplifies HIV Risk

High

Syphilis Co-infection HIV Acquisition Risk

STIs disrupt mucosal barriers and concentrate HIV target cells. Treat STIs promptly and integrate HIV prevention (PrEP counseling) at every encounter.

Sousa et al . Viruses. 2022. Mar 5 ;14 (3). | CDC HIV Risk Factors

Gonorrhea

Gerrit van Honthorst — *Merry Company* (c. 1620–1622)

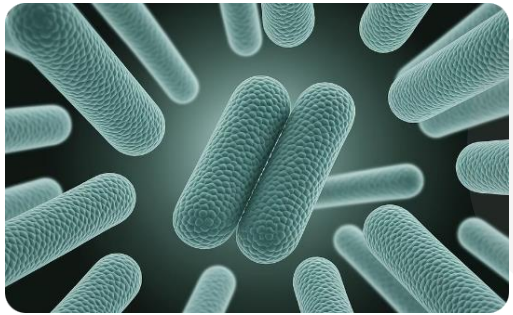
Neisseria gonorrhoeae — Epidemiology · Diagnosis · Treatment

Clapier = medieval French term for a **rabbit hutch**, which later became slang for a **brothel**.
Gonorrhea was commonly acquired in brothels, so people said someone "got it from the *clapier*," later shortened to **"the clap."**

Gonorrhea Pathogenesis

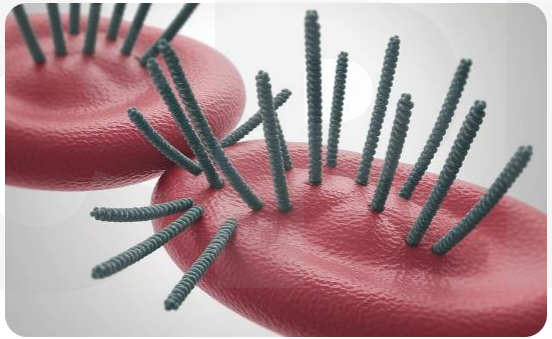
GN Diplococci

"Coffee bean" appearance under microscope — characteristic morphology



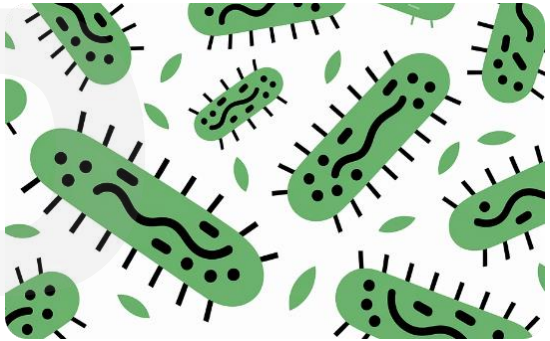
Pili for Attachment

Help bacteria adhere to mucosal surfaces and facilitate initial colonization



Antigenic Variation

Rapidly changes surface proteins to evade immune detection



Adamson et al. Clin Infect Dis. 2021;73(4):583–585

Gonorrhea — Epidemiology

>600K

Estimated U.S. cases annually

↑ M

Higher incidence in males

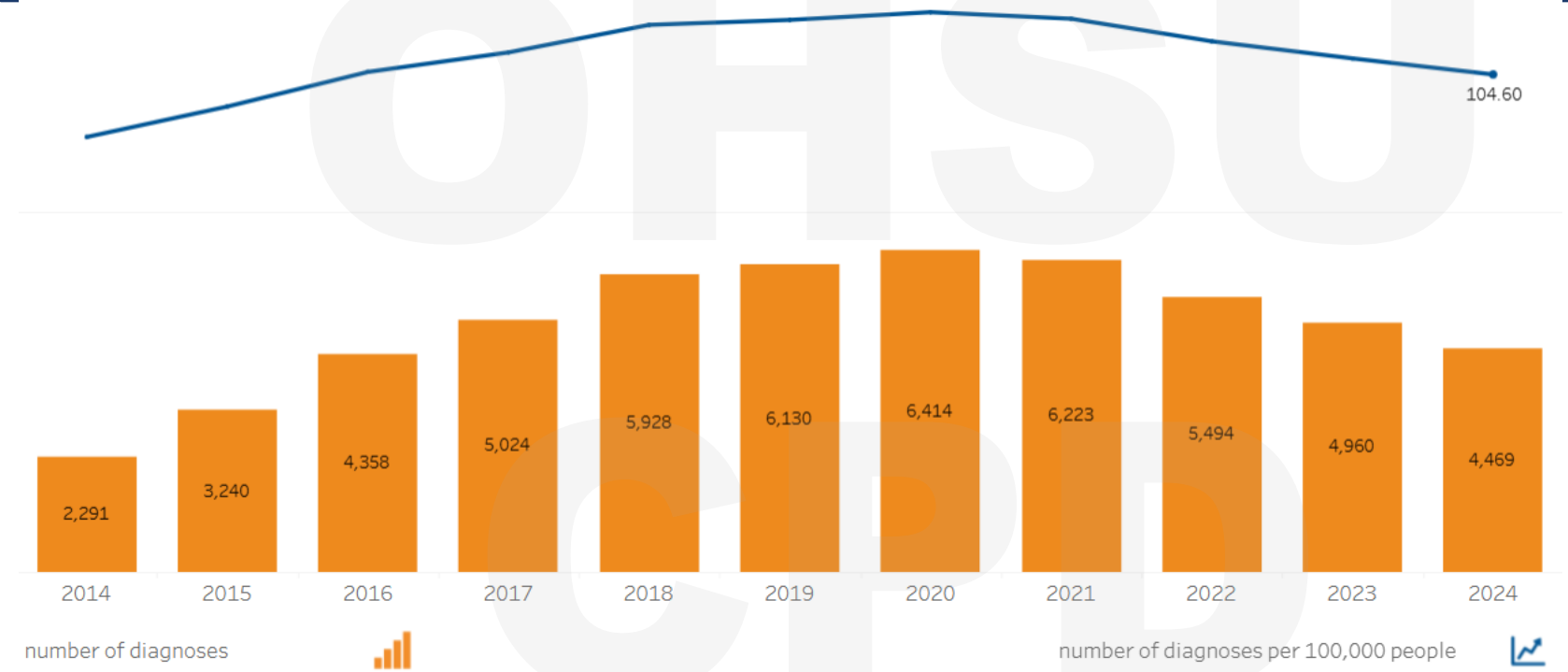
2nd

Most commonly reported STI

Rates have increased >70% since 2009. Disproportionate burden in MSM, young adults (15–24), and racial/ethnic minorities

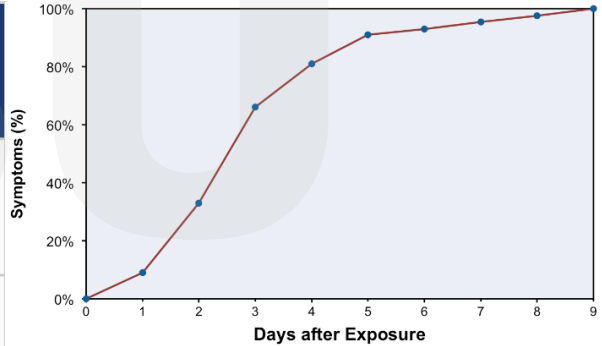
CDC STI Surveillance Report 2022

Gonorrhea in Oregon



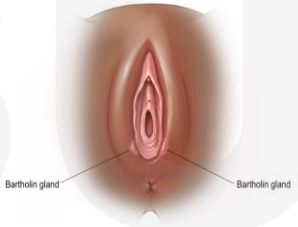
Gonorrhea in Male Patients

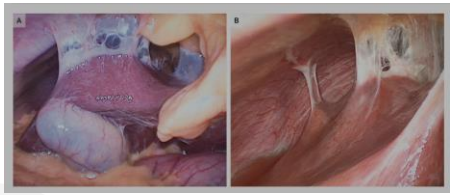
Presentation	Clinical Features
Urethritis (1–14 days)	Dysuria, mucopurulent urethral discharge — symptomatic 2–5 days
Epididymitis	Unilateral scrotal pain and swelling
Anogenital	Anal pruritus, mucopurulent discharge, proctitis, painful defecation
Asymptomatic	Pharyngeal and rectal infections often asymptomatic — screen all exposure sites



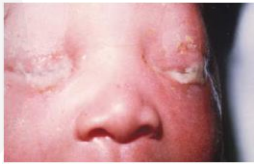
Gonorrhea in Female Patients

Presentation	Clinical Features
Incubation (~2–7 days)	Often asymptomatic; Symptomatic: Yellow/green discharge, dysuria, Bartholin's gland infection
Complications	PID, perihepatitis — Fitz-Hugh–Curtis Syndrome; Cervicitis, intermenstrual or postcoital bleeding
Pregnancy	Prematurity, neonatal conjunctivitis (ophthalmia neonatorum), meningitis





Fitz-Hugh–Curtis Syndrome (FHC)



Conjunctivitis Ophthalmia neonatorum

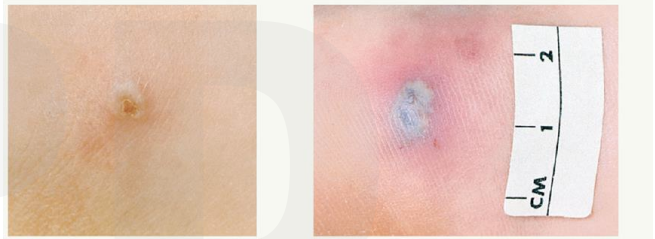
Disseminated Gonococcal Infection (DGI)

Clinical Presentation

- Polyarthralgia (small or large joints)
- Tenosynovitis
- Dermatitis: Painless skin lesions

⚠ Risk Factors & Testing

- Post-menses / Pregnancy
- Complement deficiencies (C5, C6, C7, C8)
- NAAT: urogenital, rectal, pharyngeal, Blood cultures (often negative)



c d

4–4. Skin lesions in gonococcal arthritis–dermatitis syndrome. *a*. Early papular lesions of forearm. *b*. Hemorrhagic lesion of finger. *c*. Pustule with central eschar. *d*. Large hemorrhagic pustule of foot. (Parts *a* and *b* are from the case described below. Parts *c* and *d* are from two other patients.) Lesions typically begin as nonspecific papules or petechiae, and then progress to pustules, often with a hemorrhagic component. The rulers in parts *a*, *b*, and *d* are metric.

Gonorrhea Screening Recommendations

Population	Recommendation
Women < 25 yrs	Screen all annually
Pregnant women	Retest 3rd trimester if < 25 or ongoing risk
Women ≥ 25 yrs	Screen only if at "increased risk"
Men (heterosexual)	No routine screening recommended
MSM — standard risk	Screen annually at ALL exposure sites (urogenital, rectal, pharyngeal)
MSM — high risk (PrEP, multiple partners)	Screen every 3–6 months

CDC STI Treatment Guidelines 2021

GC Diagnostics: Swab, Stain, or Amplify?

NAAT. (PCR)

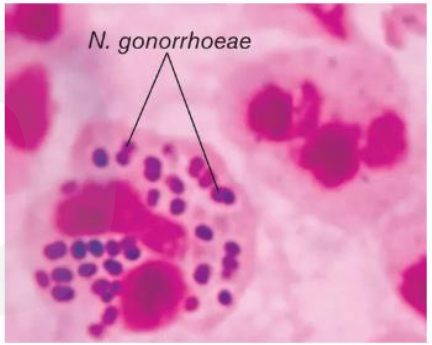
Highest sensitivity — preferred at all exposure sites
Gold Standard

Culture

Chocolate/Thayer-Martin Agar — CO_2-enriched environment
Essential for antimicrobial resistance testing

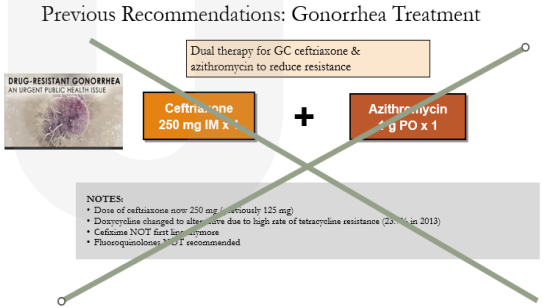
Gram Stain

Gram-negative diplococci — rapid but less sensitive
Best in symptomatic males with urethritis



Uncomplicated Gonorrhea Treatment

Regimen	Details
First-Line Therapy	Ceftriaxone 500 mg IM ×1 (< 150 kg) Ceftriaxone 1 g IM ×1 (≥ 150 kg)
If Chlamydia Not Excluded	Doxycycline 100 mg PO × 7 days (Avoid doxycycline in pregnancy)
Alternative (Nonpregnant)	Cefixime 800 mg PO × 1 (Lower efficacy for pharyngeal infection)
Cephalosporin Allergy	Gentamicin 240 mg IM + Azithromycin 2 g PO × 1



Partners w/in 60 days: test and presumptively treat. Retest at 3 months. | CDC STI Treatment Guidelines 2021

GC Treatment Failure: Test of Cure

Pharyngeal infections: Retest 7–14 days after treatment

When to Suspect Treatment Failure

- Persistent symptoms without sexual re-exposure
- Positive NAAT 7–10 days post-treatment
- Most failures occur at the pharyngeal site

More than 2.4 million cases of syphilis, gonorrhea and chlamydia infections were reported in the United States last year, the Centers for Disease Control and Prevention said in its annual report. Richard Levine/Alamy

GC Treatment Failure: Recommended Actions

- NAAT + culture with antibiotic susceptibility testing
- Repeat treatment with ceftriaxone if an alternative regimen was previously used
- Consider gentamicin 240 mg IM + azithromycin 2 g PO
- Report suspected treatment failure to Health Department and CDC

Novel Oral Agents for Gonorrhea

Mechanism: Bacterial Topoisomerase Inhibitors (not fluoroquinolones)

Gepotidacin

- FDA Approved Dec 2025
- Dosing: 3 g PO twice, 10–12 hours apart

Zoliflodacin

- FDA Approved Dec 2025
- Dosing: 3 g PO single dose

First new oral treatment options for uncomplicated gonorrhea in decades.

https://medicaldialogues.in/h-upload/2023/11/03/224556-zoliflodacin.webp

Non-gonococcal Urethritis (NGU)

Infectious Causes

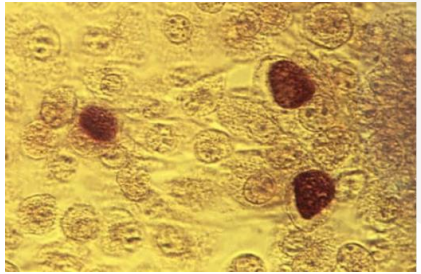
- Chlamydia trachomatis
- Mycoplasma genitalium
- Trichomonas vaginalis
- Herpes simplex virus (HSV)

Non-Infectious Causes

- Local irritation (soaps, detergents, hygiene products)
- Contraceptives (spermicides, condoms, topical products)

Chlamydia:

"Chlamydia" derives from the Greek chlamys, meaning "cloak" — reflecting the organism's cloak-like intracellular inclusions.



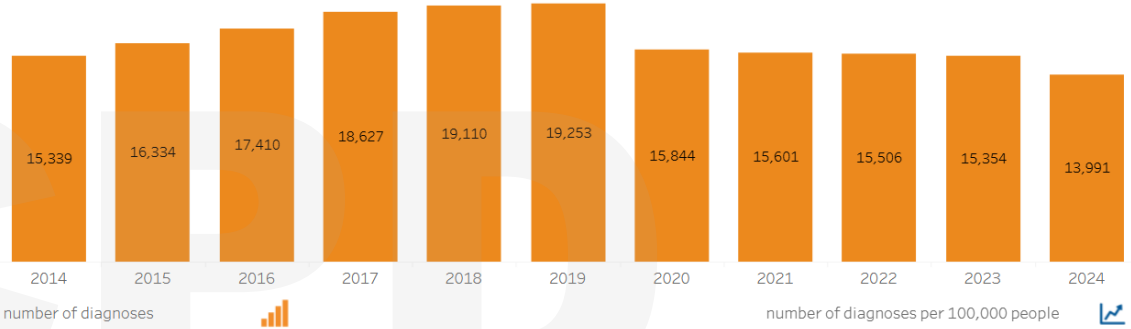
Chlamydia — Epidemiology

1.65M
Cases reported in the U.S. (2023)

F >

Rates consistently higher in females

Rate of Chlamydia in OR 2014-2024



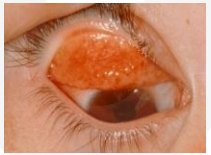
Chlamydia — Screening Guidelines

Population	Recommendation	Retest
All sexually active women <25	Annual NAAT screening	3 months after treatment
Women ≥25 with risk factors	Annual screening	3 months after treatment
MSM (sexually active)	Annual minimum; q3–6 mo if high-risk — all sites	3 months
Pregnant women	First visit; 3rd trimester if <25 or at risk	3 months post-treatment
Men (heterosexual)	Insufficient evidence; consider if in high-prevalence setting	3 months

Chlamydia Clinical Infections

Species	Serovars / Disease
C. trachomatis	Serovars A–C: Trachoma Serovars D–K: Urogenital infections Serovars L1–L3: Lymphogranuloma Venereum (LGV)
C. pneumoniae	Respiratory infections; pneumonia in young populations
C. psittaci	Psittacosis (from birds)

Trachoma



Urogenital

C. Psittaci

CDC/Dr. E. Arum; Dr. N. Jacobs

Chlamydia: Male Patients

Condition	Clinical Features
Incubation	5–14 days post-exposure (Serovars D-K)
Urethritis	Dysuria; clear to mucoid urethral discharge
Epididymitis	Scrotal pain, swelling
Prostatitis	Pelvic/perineal discomfort
Proctitis	Rectal pain, discharge; ~50% asymptomatic
Complications	Reactive arthritis; circinate balanitis; conjunctivitis

Penile discharge

Epididymitis

University of Washington STI Curriculum.
https://www.ecdc.europa.eu/en/chlamydia/facts#:~:text=At%20least%2070%25%20of%20genital,asymptomatic%20infections%20is%20not%20uncommon.

Chlamydia: Female Patients

Condition	Clinical Features
Incubation	~5–14 days after infection (Serovars D-K)
Asymptomatic	Up to 80% have no symptoms
Cervicitis	Mucopurulent discharge, postcoital bleeding, friable cervix
Upper Tract	PID, salpingitis, perihepatitis (Fitz-Hugh–Curtis syndrome)
Reproductive	Tubal scarring → infertility, ectopic pregnancy, preterm labor
Neonatal	Neonatal conjunctivitis and pneumonia

Lymphogranuloma Venereum (LGV)

1

Primary

Painless papule/ulcer at site — often missed

3–12 days post-exposure

2

Secondary

Inguinal lymphadenopathy (buboes)

2–6 weeks after infection

3

Anorectal

Severe proctocolitis, mucopurulent bloody discharge

Mimics IBD

Chlamydia — Diagnostics & Treatment

Diagnostics

- NAAT preferred — sensitivity > 95%
- Urogenital: urine or vaginal swab
- Extragenital: rectal & pharyngeal swabs (MSM)
- Pregnancy: test of cure 4 wks post-Tx; retest 3 mo

Chlamydia — Treatment

Indication	Regimen
Uncomplicated CT (urogenital/rectal)	Doxycycline 100 mg PO BID × 7 days (preferred)
Alternative (lower efficacy)	Azithromycin 1g PO × 1 (not preferred — inferior for rectal)
Pregnant	Azithromycin 1g PO × 1; test-of-cure at 4 weeks
LGV	Doxycycline 100 mg PO BID × 21 days
Sex partner treatment	EPT with doxycycline 100 mg BID × 7 days

Mycoplasma genitalium (Mgen)

- **Emerging pathogen**
  - Persistent and recurrent NGU in men
  - Associated with cervicitis, PID, preterm birth in women
- **Diagnosis:**
  - NAAT — FDA-cleared assays available (Aptima Mgen)
- **Treatment strategy:**
  - High macrolide resistance: azithromycin resistance ~50% in U.S. — treat-and-test strategy preferred

Mycoplasma genitalium — Treatment

Scenario	Regimen
Initial (macrolide resistance unknown)	Doxycycline 100 mg BID × 7 days (bioload reduction) → Azithromycin 1g × 1 then 500 mg × 3 days
Macrolide-resistant (23S rRNA mutation)	Doxycycline 100 mg BID × 7 days → Moxifloxacin 400 mg daily × 7 days
Moxifloxacin failure / PID	Consult ID; pristinamycin or doxycycline + minocycline (limited data)
Test-of-cure	4 weeks post-treatment; required given high resistance rates

Syphilis

Treponema pallidum — The Great Pretender

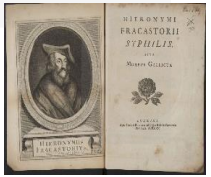
"He who knows syphilis knows medicine"

Sir William Osler — Father of Modern Medicine

The Name "Syphilis"

1521

Girolamo Fracastoro's poem — story of a shepherd named Sifilo, cursed by the sun god



The Great Pox

"Polish disease" (Russians) · "Spanish disease" (Dutch) — stigma traveled with the disease

Syphilis (Treponema pallidum)

PRIMARY	SECONDARY	LATENT	TERTIARY
Painless chancre 3 wks post-exposure Heals 3–8 wks	Rash palms/soles Condylomata lata Fever 2–4 wks later	Asymptomatic Early: < 1 year Late: > 1 year	Gummas, cardiac Neurosyphilis 33% Tabes dorsalis

Epidemiology

- 133,945 P/S U.S. cases 2020 (+52%)
- 2,148 congenital cases (+235% from 2016)
- > 80% in men; 47% MSM; 44% MSM HIV+

Neuro & Congenital

- Neurosyphilis: meningitis, stroke, cranial nerve palsies
- Ocular syphilis: uveitis, iritis
- Congenital: rash, snuffles, osteochondritis

Four Stages · Rising U.S. Rates · Congenital Crisis | StatPearls — Sexually Transmitted Infections (NCBI Bookshelf) | CDC STI Treatment Guidelines 2021

Syphilis — Overview

- Caused by Treponema pallidum — obligate intracellular spirochete
- Multistage disease with highly variable clinical presentation
- **Classic teaching: 'The Great Pretender' — mimics many other conditions**
- Stages: Primary → Secondary → Latent (early/late) → Tertiary
- Early syphilis (primary + secondary + early latent): highest transmission risk
- Increasing rates in U.S. since 2000; congenital syphilis at highest rate in 30 years

Oregon Syphilis — Epidemiologic Trends

↑↑

Early syphilis cases increasing significantly

↑ CS

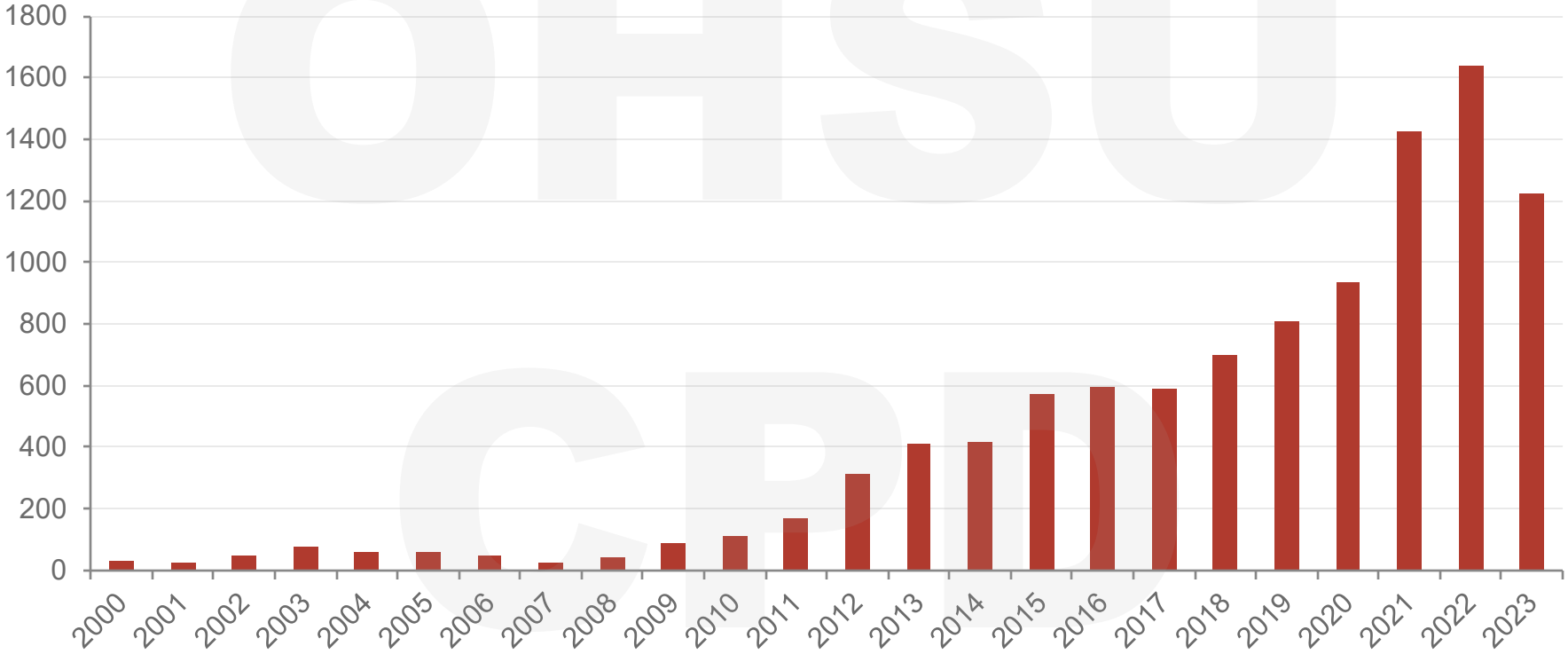
Congenital syphilis cases rising in Oregon

All

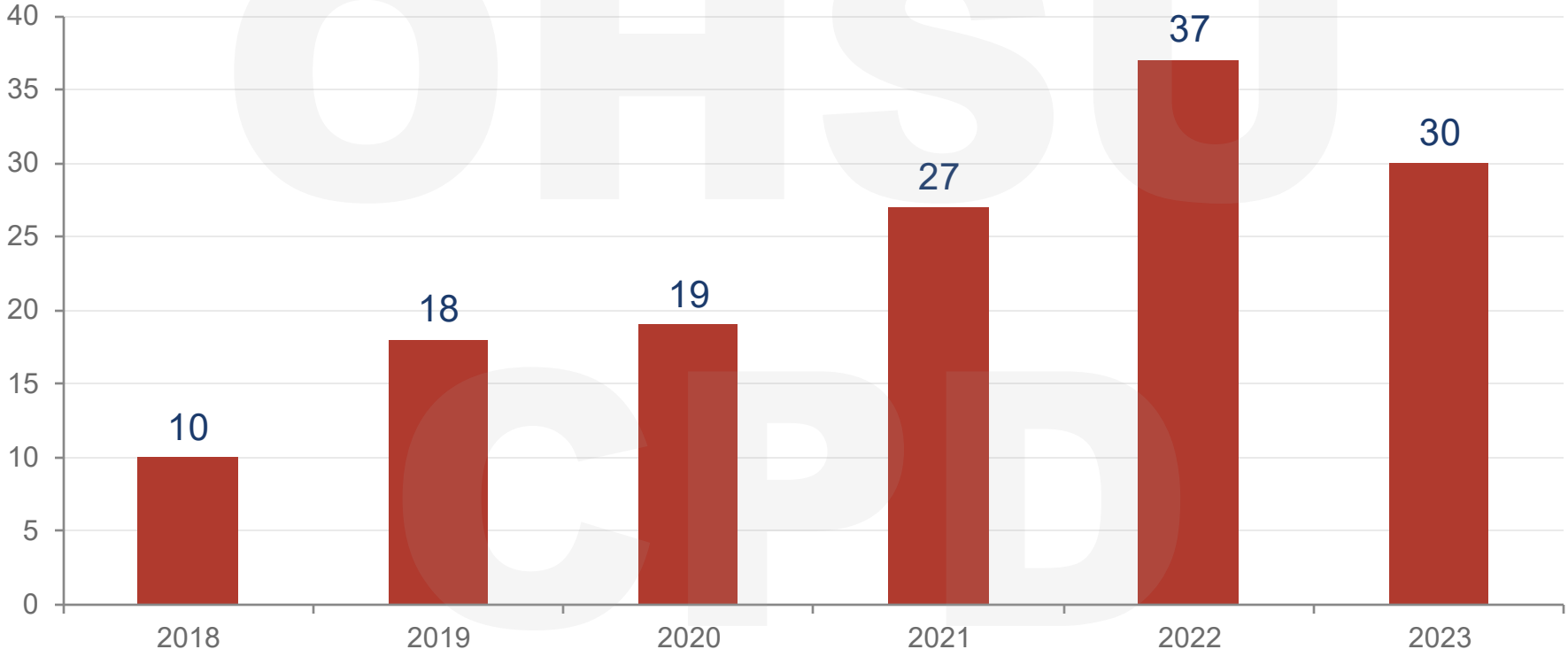
Populations affected (MSM, heterosexual, PWID)

Oregon Health Authority reported a >400% increase in congenital syphilis 2018–2023. Gaps in prenatal screening and care access are key drivers.

Cases of Early Syphilis, Oregon 2000–2023



Congenital Syphilis — Oregon 2018–2023



Syphilis May Look Like Other Conditions

Pityriasis Rosea vs. Syphilis

Pityriasis : Herald patch followed by salmon-colored oval lesions

- Trunk and proximal extremities
- Usually self-limiting 6–12 weeks

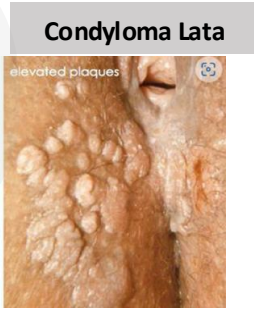
Syphilis: Maculopapular rash — characteristically involving PALMS/Soles

Warts vs Conyloma Lata

Condyloma accuminata (warts). **Raised**, irregular, "**cauliflower-like**" growths

Condyloma lata (Syphilis).

- Broad, **flat**, smooth lesions
- Moist, soft, often **grayish or white**
- May merge into plaques



Atypical Secondary Syphilis in People Living with HIV

Morphologies of secondary syphilis in PLHIV: (A) Annular · (B) Psoriasiform · (C) Nodular

- People living with HIV may present with atypical or more severe secondary syphilis manifestations
- Higher rates of multiple ulcers in primary syphilis
- May have concurrent primary + secondary syphilis
- Higher RPR titers and slower serological response to treatment

Forrester. J Am Acad Dermatol. January 2020

Syphilis — Clinical Stages

Stage	Timing	Manifestations
Primary	10–90 days post-exposure	Painless chancre at inoculation site; regional lymphadenopathy
Secondary	4–10 weeks after chancre	Disseminated rash (incl. palms/soles), condyloma lata, mucous patches, constitutional sx
Early Latent	<1 year from infection	Asymptomatic; seropositive; still transmissible
Late Latent	>1 year from infection	Asymptomatic; not transmissible (except vertical)

Early syphilis (primary + secondary + early latent) carries the highest transmission risk

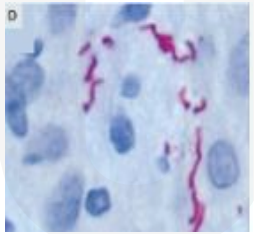
Primary Syphilis

Chancre — Key Features

- Solitary, painless ulcer
- Clean base (0.5–2 cm)
- Round or oval shape — ⚠ Highly infectious
- Heals in 3–6 weeks even without treatment
- ⚠ May be multiple, painful, or atypical

Common Sites & Incubation

- Incubation: 10–90 days post-exposure (avg. 3 weeks)
- Genital area, Rectum, Oral (oral sex)
- Examine all exposure sites
- Regional lymphadenopathy accompanies chancre



Secondary Syphilis

Occurs 2–6 weeks after initial lesion — reflects systemic bacterial dissemination

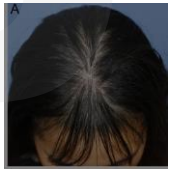
Symptoms & Signs

- Maculopapular rash — palms and soles (pathognomonic)
- Condyloma lata (wart-like lesions)
- Mucous patches, patchy alopecia
- Lymphadenopathy, fever

Organ Involvement

- Nephrotic syndrome or nephritis
- Hepatitis (↑ alkaline phosphatase)
- Resolves in 2–5 weeks without treatment
- Infection persists → latency or relapse

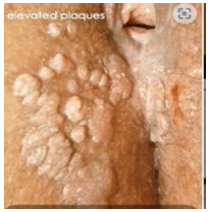
Rash



Patchy alopecia

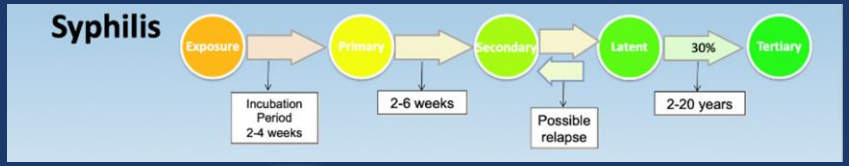
Mucus patches

Rash



Condyloma lata

Latent Syphilis



Host suppresses infection → asymptomatic. Occurs between primary and secondary stages; can also occur after secondary stage.

Early Latent (< 1 year)

- Still infectious
- May have recurrent secondary symptoms
- Needs TWO dates to confirm duration
- High-risk for ongoing transmission

Late Latent (≥ 1 year)

- Not infectious (except vertical transmission)
- Asymptomatic .titers may persist
- ~70% will maintain lifelong latency untreated
- ~30% progress to tertiary disease

Congenital Syphilis Screening: 3 Time Points

1st Visit

Test all pregnant women at first prenatal visit — regardless of risk

28 Weeks

Retest at 28 weeks' gestation — especially in high-prevalence areas

Delivery

Retest at delivery for high-risk patients and in high-prevalence settings

⚠ Test for syphilis in ALL fetal deaths ≥ 20 weeks gestation

- New STI, new/multiple partners = high-risk indicators

Number of babies born with syphilis in US hits 20-year high, report finds

Centers for Disease Control recorded 918 cases of syphilis in infants in 2017, a 46% increase on the previous year

Physical Findings in Congenital Syphilis [Birth to 2 Years]

Key manifestations of Congenital Syphilis







- Splenomegaly
- Mucocutaneous lesions
- Pneumonia Alba ("white pneumonia")
- Hemolytic anemia
- Lymphadenopathy
- Snuffles

Tertiary Syphilis — Late Complications

Manifestation	Features
Gummas	Granulomatous lesions — skin, bone, viscera
Cardiovascular syphilis	Aortitis, aortic aneurysm (ascending), aortic regurgitation
Late Neurosyphilis	Tabes dorsalis, general paresis — LP required for all tertiary disease

All Tertiary Syphilis Requires LP — Evaluate for Late Neurosyphilis Before Treatment

Ghanem KG, et al. NEJM 2020. Adam Inc. Moon et Ann Dermatol. 2018 Dec; 30(6): 749–751.

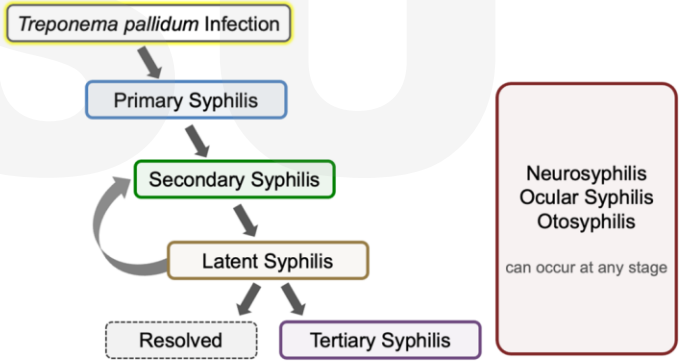
Neurosyphilis — CNS Involvement

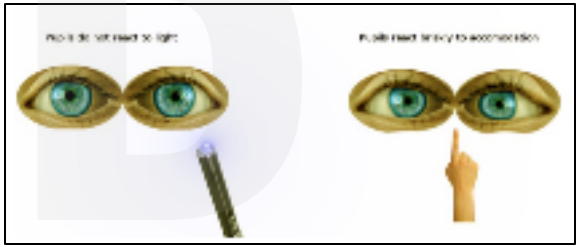
Early Neurosyphilis

- Meningitis or stroke
- Cranial nerve abnormalities (III, VI, VII, VIII)
- Crosses blood–brain barrier within days of infection

Late Neurosyphilis

- Tabes dorsalis (progressive sensory ataxia)
- Argyll Robertson pupil: no light response, contracts to accommodation
- Paresis of the insane — personality changes





KG Ghanem et al. N Engl J Med 2020;382:845-854

Non-Treponemal Tests (Screening)

Rapid & Cheap

VDRL & RPR — Low-cost, fast turnaround
Screening AND treatment monitoring

Quantitative Titers

Ratios (e.g., 1:8) — Titer declines after treatment
4-fold drop = treatment success

Non-Specific

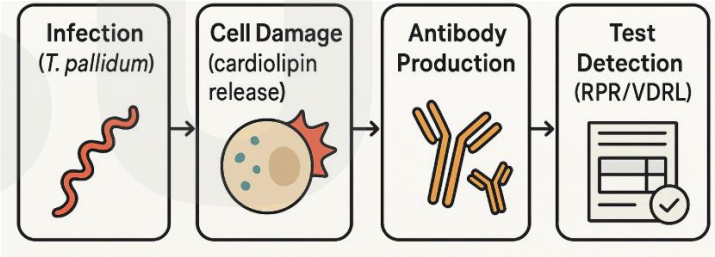
False positives: Autoimmune conditions, pregnancy, infections
Confirm with treponemal test

Non-treponemal tests (RPR/VDRL) are used for SCREENING and MONITORING — not for definitive diagnosis.

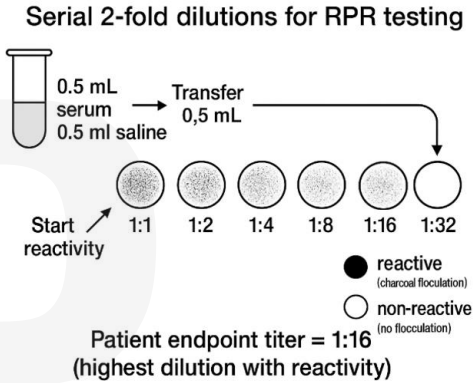
What is an RPR? (Nonspecific Screening Test)

How It Works

- Detects antibodies to cardiolipin released by cell damage
- NOT specific for T. pallidum
- Confirm with TP-PA or FTA-ABS



Disease Category	False Positive RPR/VDRL?
Autoimmune Diseases (SLE, APS)	Yes
Dermatologic Diseases	Yes
Drug Abuse	Yes
Febrile Illness	Yes

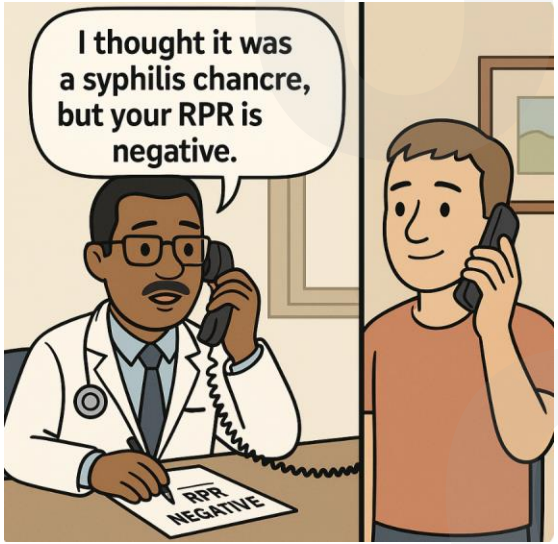


Seña AC et al. Clin Infect Dis. 2010;51:700-8

Treponemal Tests: Confirmatory

- **Tests: EIA, FTA-ABS, TP-PA — detect T. pallidum antibodies**
  - Turn positive 3–4 weeks post-infection (peak sensitivity)
  - Remain positive for life — even after successful treatment
- ⚠️ **NOT used for monitoring treatment response — titers do not decline**
  - Clinical example: Jan 2022: RPR 1:16 → TP-PA (+) → treated
  - Nov 2023: RPR non-reactive → TP-PA (+) still — this is EXPECTED

Sensitivity & Specificity of Tests in Untreated Syphilis Stages



Test	Primary	Secondary	Latent	Late	Specificity (% range)
VDRL	78 (74–87)	100	96 (88–100)	71 (37–94)	98 (96–99)
RPR	86 (77–99)	100	98 (95–100)	73	98 (93–99)
FTA-ABS	84 (70–100)	100	100	96	97 (94–100)
TP-PA	88 (86–100)	100	100	NA	96 (95–100)
ELISA (IgG)	100	100	100	NA	100

Seña AC, White BL, Sparling PF. Novel *Treponema pallidum* serologic tests: a paradigm shift in syphilis screening for the 21st century. Clin Infect Dis. 2010;51:700-8.

Syphilis Treatment — Early Disease

Stage	Preferred Treatment	Penicillin Allergy
Primary / Secondary / Early Latent	Benzathine penicillin G 2.4M units IM × 1 dose	Doxycycline 100 mg PO BID × 14 days (limited data)
Pregnancy	Benzathine PCN G 2.4M units IM × 1	Desensitize — penicillin required; NO alternatives in pregnancy

⚠ Jarisch-Herxheimer reaction is NOT a penicillin allergy — manage with fluids and antipyretics

⚠ Only benzathine PCN G (Bicillin LA) — NOT procaine penicillin | CDC STI Treatment Guidelines 2021

Bicillin L-A Shortage — Syphilis Treatment Updates

Pfizer makes Bicillin L-A and has reported a nationwide shortage

- Use doxycycline 100 mg BID × 14 days for non-pregnant patients with early syphilis
- Use doxycycline 100 mg BID × 28 days for late latent if shortage persists
- Restart 28-day doxycycline if only 1–2 Bicillin doses were given (late latent syphilis)
- Do NOT mix regimens: avoid switching between penicillin and doxycycline — no efficacy data

Syphilis Treatment — Late / Unknown / Tertiary

Stage	Preferred Treatment	Penicillin Allergy
Late Latent / Latent Unknown Duration	Benzathine PCN G 2.4M units IM weekly × 3 doses	Doxycycline 100 mg PO BID × 28 days
Tertiary (non-neurosyphilis)	Benzathine PCN G 2.4M units IM weekly × 3 doses	Consult ID

All tertiary syphilis: LP required to evaluate for neurosyphilis before treatment

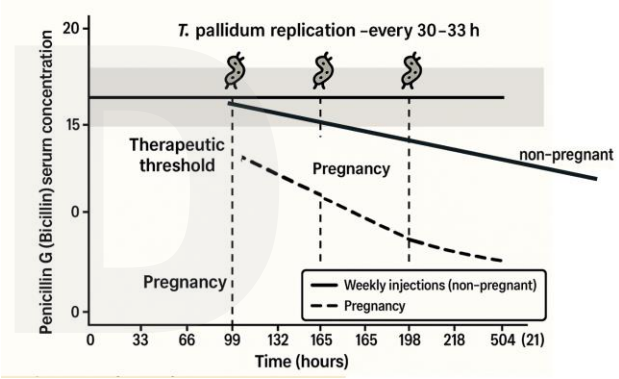
Missed Doses: Late Latent Syphilis (3 Weekly Doses)

Pregnant

- Bicillin L-A every 7–9 days (increased volume distribution in pregnancy)
- Do NOT exceed >9 days between doses — drug levels fall too low
- RESTART treatment if dose missed >9 days

Not Pregnant

- 10–14 days between doses may be acceptable before restarting
- Do NOT mix regimens — avoid switching between penicillin and doxycycline
- No data on mixed-regimen efficacy

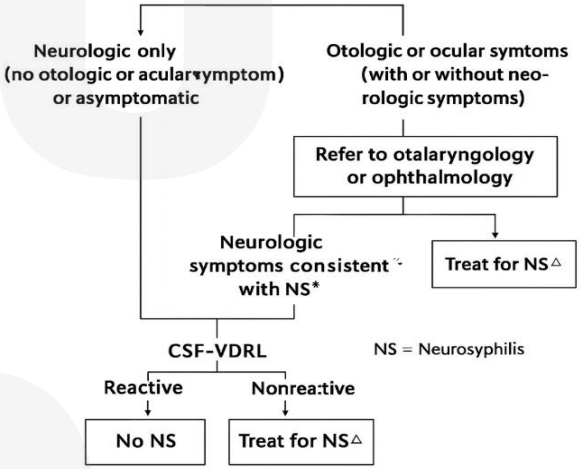


Fretz G, et al. Eur J Clin Microbiol 1984;3:147-149

Ocular & Otosyphilis

Ocular Syphilis

- Common: Posterior uveitis (any part of eye involved)
- Pain, floaters, flashing lights, ↓ visual acuity
- ~50% have bilateral vision loss
- CSF normal in ~30% of cases
- Get ophthalmology exam + cranial nerve evaluation



Otosyphilis

- Symptoms: Hearing loss, tinnitus, vertigo
- ~50% bilateral involvement
- CSF normal in ~40% of cases
- LP if: cranial nerve dysfunction, meningitis, stroke, or sensory loss. Do NOT delay treatment for LP

Neurosyphilis Treatment

Regimen	Details
Preferred (IV)	Aqueous crystalline penicillin G 18–24M units/day IV (3–4M units q4h or continuous infusion) × 10–14 days
Penicillin Allergy	Desensitization recommended; ceftriaxone 2g IV/IM daily × 10–14 days if allergy confirmed

Jarisch-Herxheimer Reaction

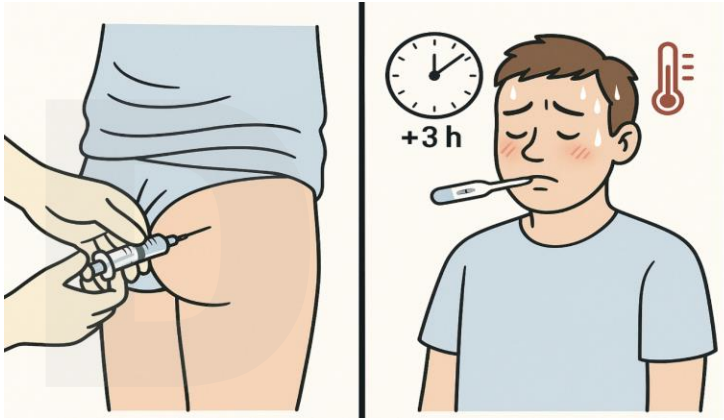
Cause

Endotoxins from dying treponemes → self-limited inflammatory response

Timing & Treatment

- Usually within 24 hours of the FIRST dose of antibiotics
- Fluids + antipyretics (acetaminophen or NSAIDs)
- NOT a penicillin allergy

⚠️ In pregnancy: may precipitate early labor — monitor closely



Fun Syphilis Fact: The Connection Between Malaria and Syphilis

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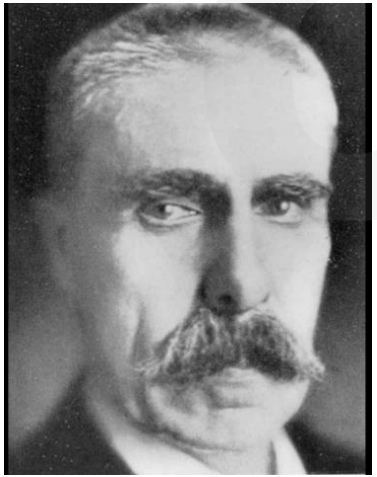


Plasmodium Vivax malariotherapy

- 1927: Nobel Prize to Julius Wagner-Jauregg
- Treated neurosyphilis with **Plasmodium vivax** malaria
- Fevers sometimes improved symptoms
- Stopped after 1940s: **penicillin safer, effective**

Washington Post

Syphilis — Post-Treatment Monitoring

Stage / Population	RPR Check Intervals	Expected Response
Primary / Secondary (HIV-neg)	6, 12 months	4-fold decline by 6–12 months
Primary / Secondary (HIV-pos)	3, 6, 9, 12, 24 months	4-fold decline; may be slower
Late Latent / Latent Unknown	6, 12, 24 months	Stable or declining titer; some serofast

4-fold titer decline = treatment success · "Serofast" = stable low titer without symptoms — not failure

Treatment Failure in Syphilis

Treatment Failure

- Definition: Recurrence or persistence of clinical signs/symptoms after treatment
- Causes: Inadequate treatment, re-infection, neurosyphilis
- Evaluation: LP for neurosyphilis; retreat if new infection

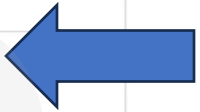
Serologic Failure

- Definition: No 4-fold RPR drop by 12 mo (early) or 24 mo (late) — no symptoms
- Causes: Low starting titer, older age, HIV, lab variability
- Evaluation: Consider LP if titer ≥1:32 persists >2 years

Syphilis and Missing information are confusing

Date	RPR Titer
1/2022	NR
6/2022	1:128
1/2023	1:64
1/2024	1:4

Date	RPR Titer
1/2022	NR
6/2022	1:128
1/2023	1:64
6/2023	1:1
1/2024	1:4



Missing info

4X increase
New infection

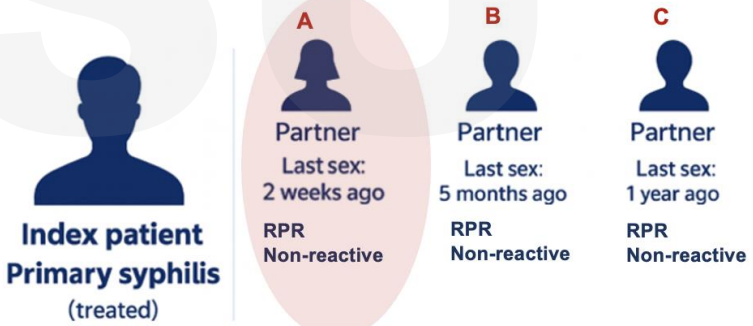
Slide Credit: J. O'Donnell ACTHIV

RPR Interpretation — Clinical Decision Making

RPR Change	Interpretation	Action
4-fold increase (e.g., 1:4 → 1:16)	New infection or reactivation	Re-treat for early syphilis; investigate exposure
4-fold decrease (e.g., 1:16 → 1:4)	Treatment success	Continue scheduled follow-up monitoring
Stable low titer (e.g., 1:1 or 1:2)	Serofast — common after late latent	No re-treatment if no symptoms; monitor
No decline at 12 months	Serologic failure or re-infection	LP if titer ≥1:32; investigate re-exposure

Public Health & Syphilis

- **Early False Negative:**
  - Treat contacts of primary, secondary, or early latent syphilis within 90 days presumptively — even if RPR is NEGATIVE
- **Mandatory Reporting:**
  - Health care providers AND labs are required to report syphilis cases to the health authority
- **Partner Services:**
  - Public health partner notification and treatment is available — engage health department early



Mpox — STI Considerations

Clinical Features & Diagnosis

- Genital, perianal, oral lesions — can mimic syphilis/HSV
- Painful versus syphilitic chancre (painless)
- Proctitis with rectal lesions in MSM
- Systemic features variable; may be absent
- Diagnosis: PCR swab of active lesion

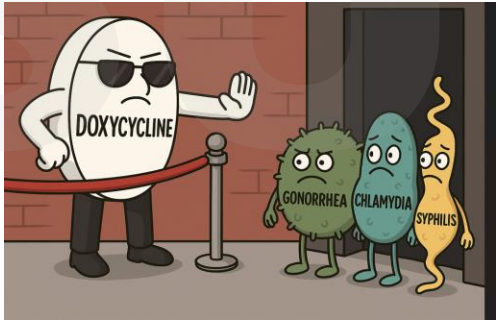
Prevention

- JYNNEOS vaccine (2-dose series) for high-risk individuals
- MSM with multiple partners, sex workers, close mpox contact
- Post-exposure prophylaxis (PEP) within 4 days of exposure
- Pre-exposure vaccination in sustained high-risk settings

CDC Mpox Clinical Guidance 2023 |Dorkin. CROI 2023. Patel A, Bilinska J, Tam JC, et al.: . BMJ. 2022, 378:e072410. 10.1136/bmj-2022-072410

Doxycycline Post-Exposure Prophylaxis (DoxyPEP)

Infection	Risk Reduction (PrEP)	Risk Reduction (PLWH)
Gonorrhea	55% (CI: 35–68%), $p<0.0001$	57% (CI: 29–74%), $p=0.001$
Chlamydia	88% (CI: 75–95%), $p<0.0001$	74% (CI: 43–88%), $p=0.0007$
Syphilis	87% (CI: 41–97%), $p=0.0084$	77% (CI: 71–96%), $p=0.095$



Dosing: Doxycycline 200 mg PO within 72 hours of unprotected sexual contact. Recommended for MSM and transgender women on PrEP or with recent STI. Monitor for resistance.

STI Prevention Strategies

Biomedical Prevention

- HIV PrEP: TDF/FTC, CAB-LA, or LEN
- DoxyPEP for high-risk MSM / transwomen
- HPV vaccine (routine through age 26; 27–45 shared decision)
- HAV/HBV vaccination
- JYNNEOS (Mpox) for eligible persons

Behavioral & Structural

- Expedited partner therapy (EPT)
- Routine STI screening (asymptomatic detection)
- Partner notification and follow-up

Summary — Key Clinical Takeaways

Screen broadly All exposed sites, all high-risk populations, routinely — not symptom-driven

Treat appropriately Right drug, right dose, right duration — confirm penicillin formulation in syphilis

Prevent reinfection Partner treatment, EPT, test-of-cure, retest at 3 months

Integrate HIV prevention Every STI encounter is an opportunity for PrEP counseling