

HIV, STIs & Mpox

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Disclosures

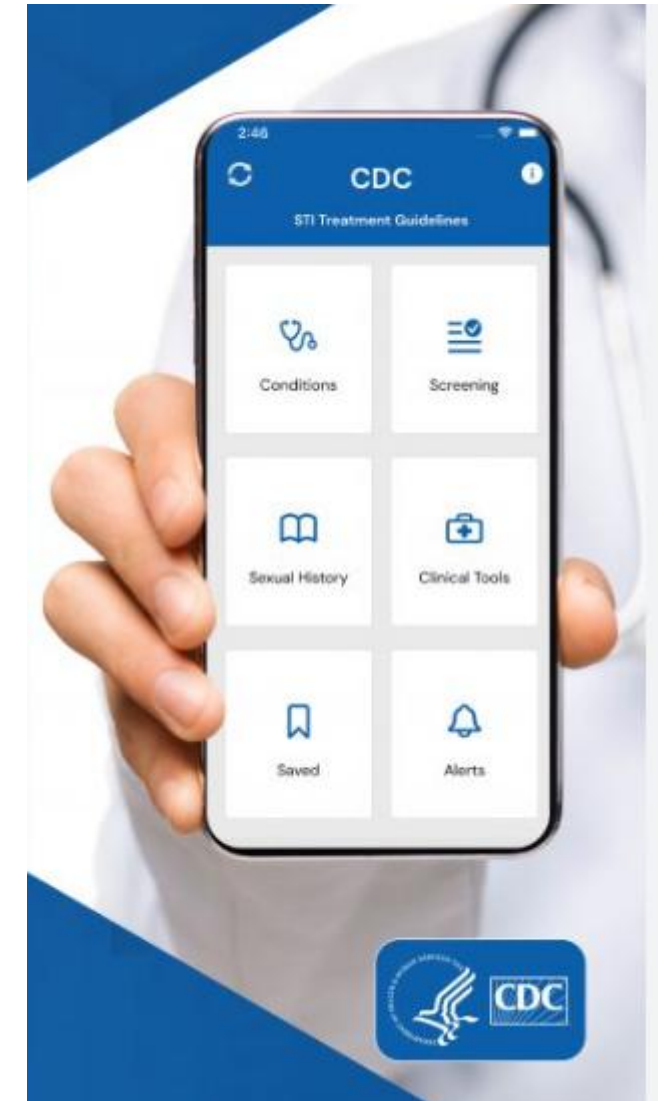
- I have no financial or other conflicts of interest to declare.
- *Any opinions expressed, trade names or vocabulary used are my own, and do not indicate endorsement by MAAETC or the U.S. government.*

Objectives

- Compare disease trends, clinical signs, and transmission routes for HIV, viral hepatitis, and other sexually transmitted infections (STIs)
- Review national guidelines for screening, testing, and treating STIs and HCV in people with HIV
- Identify clinical strategies to prevent, diagnose, and treat mpox in people with HIV

STI Treatment Guide & Mobile App

- *My goal today is not to provide comprehensive clinical review of each individual STI*
- *Focus on adults/adolescents & United States*
- *Instead:*
 - *Interesting cases*
 - *HIV-specific nuance*
 - *Other implementation concerns*
- *Note: All treatment recommendations in these slides are from CDC STI guidelines, unless otherwise cited.*



General Principles

- In most cases, prevention & treatment of various STIs among those with HIV are the same as for those without HIV infection.
- People with HIV may have more severe or persistent manifestations, especially with more advanced immunosuppression.
- Additional prevention and/or screening methods may be recommended, based on ongoing risk factors.
- Co-infections common; diagnosis of any STI = opportunity for full STI testing (and HIV testing, if not already known)

Common STIs in the U.S.

- Chlamydia
- Gonorrhea
- Syphilis
- *Mycoplasma genitalium* (Mgen)
- Mpox (formerly monkeypox)
- Trichomonas
- Viral hepatitis (A, B, and C)
- Human papilloma virus (HPV) → Cancer screening out of scope for this talk
- Herpes simplex virus (HSV)

Common STIs in the U.S.

- **Chlamydia**
- **Gonorrhea**
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- ***Mycoplasma genitalium* (Mgen)**
- **Mpox (formerly monkeypox)**
- Trichomonas
- Viral hepatitis (A, B, and C)
- Human papilloma virus (HPV)
- Herpes simplex virus (HSV)

Later today:

- *Dr. Allen's presentation at 1:30 pm for in-depth coverage of hepatitis*
- *Dr. Daftary's presentation at 3:30 pm regarding HIV & Immunizations*

Impact of STIs in the U.S.

26M

New STIs occur every year

50%

Of sexually active people will contract an STI by the age of 25

11,500

People diagnosed with cervical cancer each year

4,000

People die from cervical cancer each year

24K

Women annually become infertile because of an STI

80%

Increase in syphilis in the United States between 2018 & 2022

1,000%

Increase in congenital syphilis among newborns from 2012 to 2022

275

Congenital syphilis is responsible for the deaths of over 275 infants annually

\$16,000,000,000

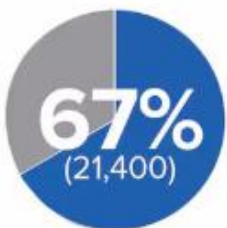
THE ANNUAL DIRECT COST OF STIS

HIV & Sexually Transmitted Infections

Epidemiology & Co-infections

HIV – Epidemiology (U.S.)

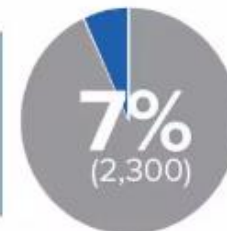
- ~1.2 million people in U.S. with HIV infection
 - ~13% unaware of their infection
 - Disproportionate impact on certain populations (racial/ethnic minorities, those with male-to-male sexual contact [MMSC])
 - Uneven distribution within U.S. (highest in South)
- >700,000 Americans have died from HIV since 1981
- US spends \$20 billion annually in direct health expenditures for HIV prevention & care



were among gay, bisexual, and other men who reported male-to-male sexual contact*



were among people who reported heterosexual contact



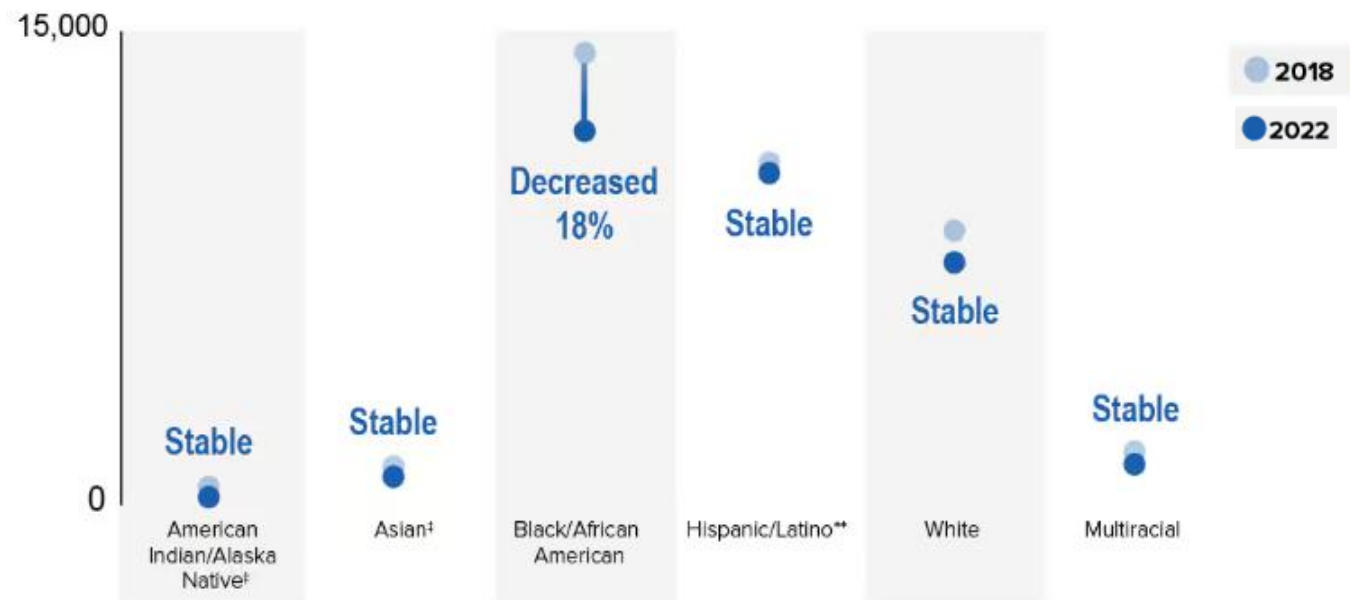
were among people who inject drugs



Recent Declines in New HIV Infections

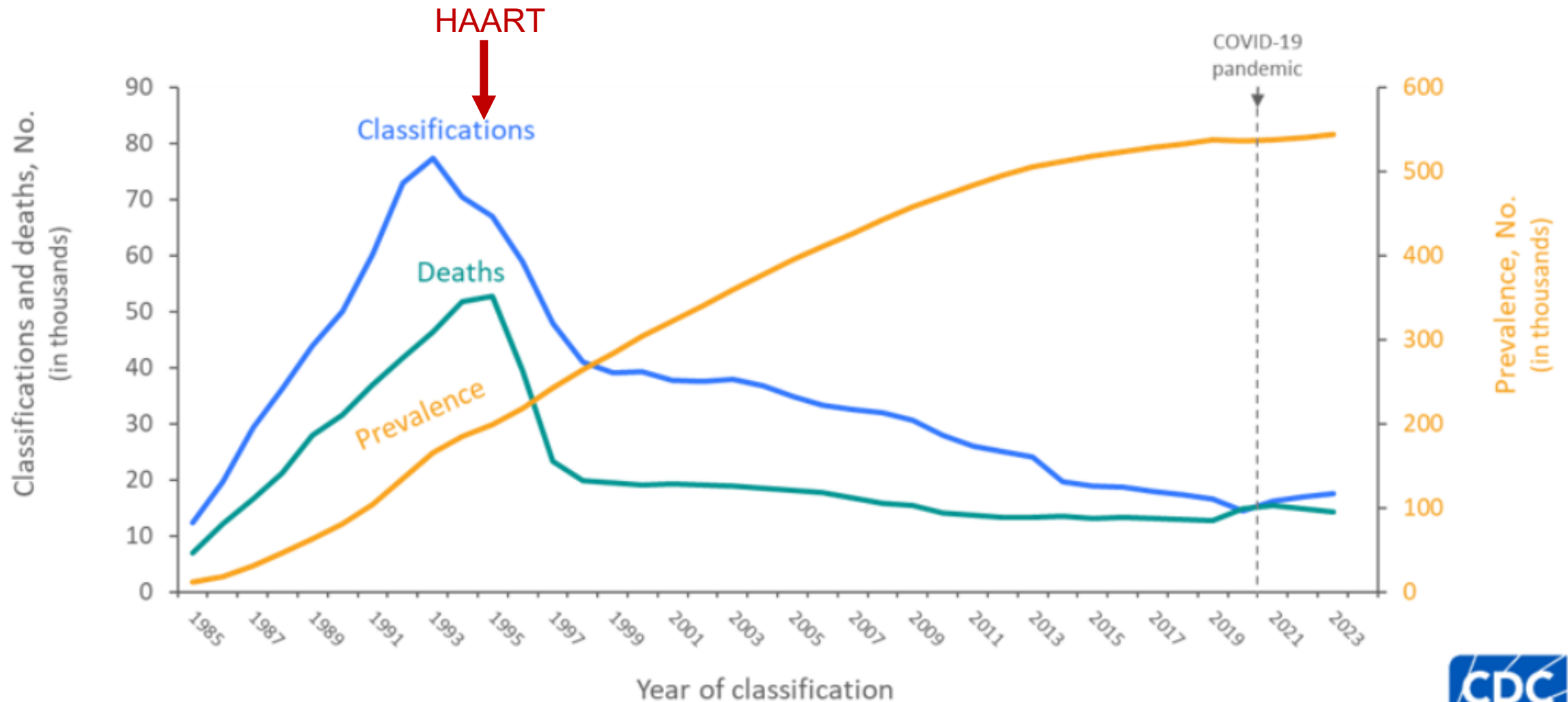
- New HIV infections (2022 data)
 - ❖ ~31,800 people acquired HIV (11.3 infections per 100,000 people)
 - ❖ 2/3 reduction in annual infections since 1980s
- From 2018-2022:
 - ↓ 12% overall
 - ↓ 30% in people 13-24y
 - ↓ 10% attributed to male-to-male sexual contact (MMSC)
 - ↓ 27% attributed to male-to-male sexual contact AND injection drug use
 - ↓ 16% in the South
 - ↓ 18% among Black/African American people

Estimated HIV infections decreased 18% among Black/African American people. However, racial and ethnic differences persist.



Estimated HIV infections in the United States over time

AIDS Classifications, 1985-2023



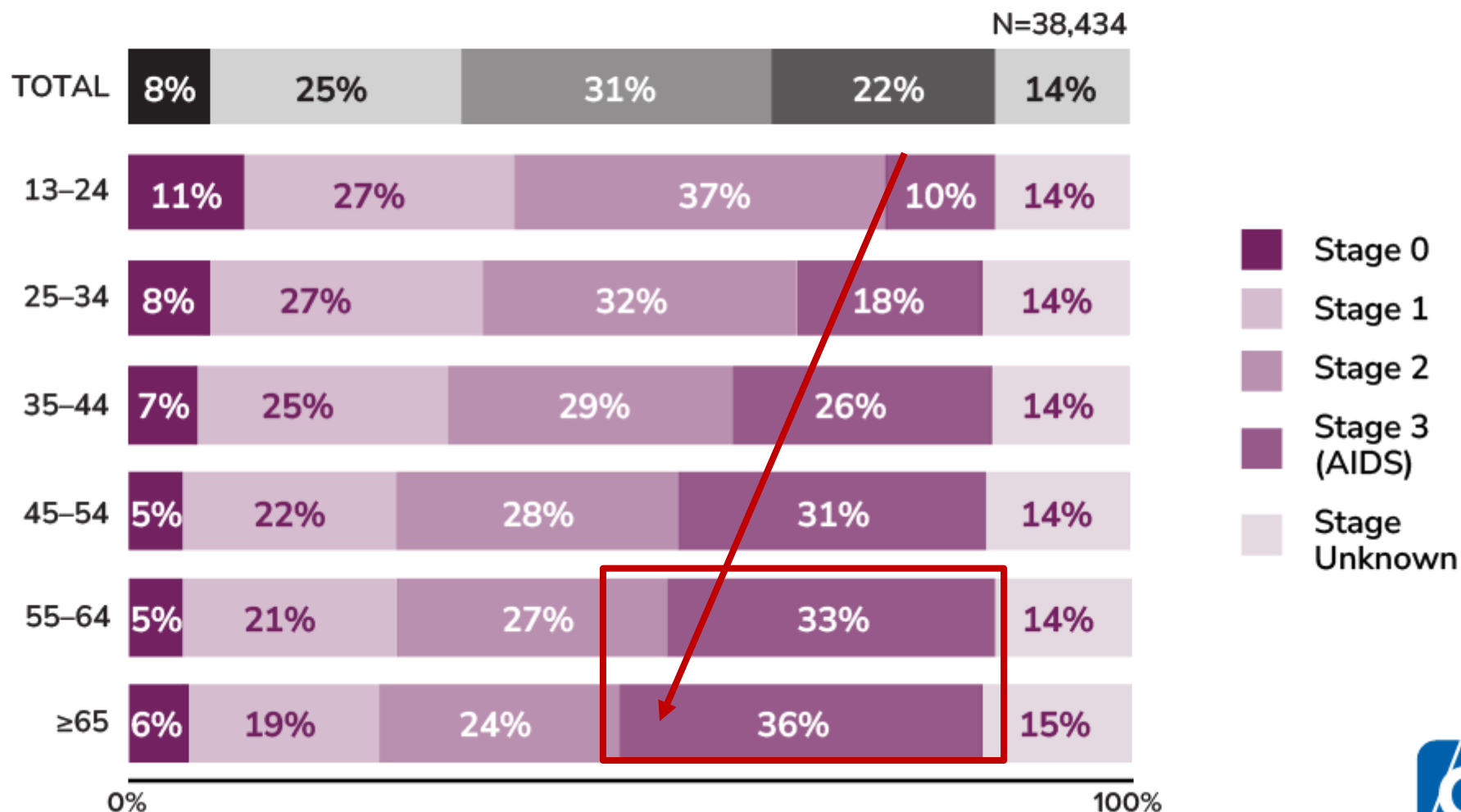
Note. Data are presented for persons of all ages.

HIV Staging

2014 CDC Case Definition for HIV Infection Among Adolescents and Adults			
Stage	CD4 Count	CD4 %*	Clinical Evidence
Stage 0	Early HIV Infection		Inferred from negative/indeterminate HIV test within prior 6 mo
Stage 1	≥500 cells/mm ³	≥26	No AIDS-defining condition
Stage 2	200-499 cells/mm ³	14-25	No AIDS-defining condition
Stage 3	<200 cells/mm ³	<14	or Documentation of AIDS-defining condition
Stage unknown	No data	No data	and No information on AIDS-defining conditions

*Use CD4 percentage only if no data available for CD4 count

Stage of disease at HIV diagnosis, by age at diagnosis, 2024—United States

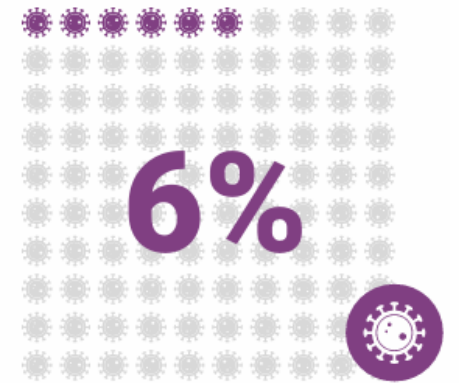


Note. Data are presented for persons aged ≥ 13 years at diagnosis.



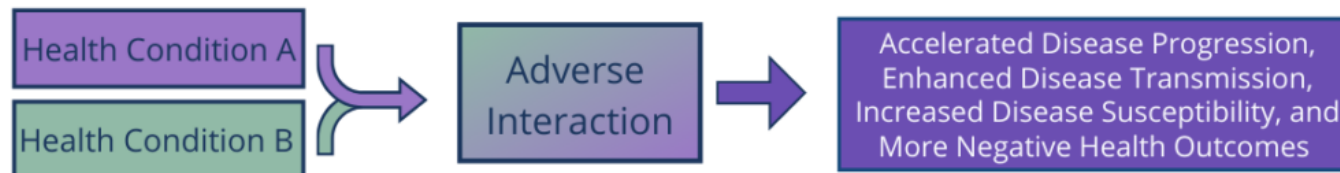
Why are STI & HIV Co-infections Important?

- STIs common & share many risk factors with HIV
- HIV can impact severity of STIs & response to STI treatment
- STIs can impact acquisition & transmission of HIV
 - Certain STIs (e.g., genital ulcers) increase risk of HIV acquisition
 - Inflammatory STIs increase HIV viral shedding in genital tract → increased risk of transmitting
- STIs, HIV, substance use, and viral hepatitis interact to create a **syndemic**



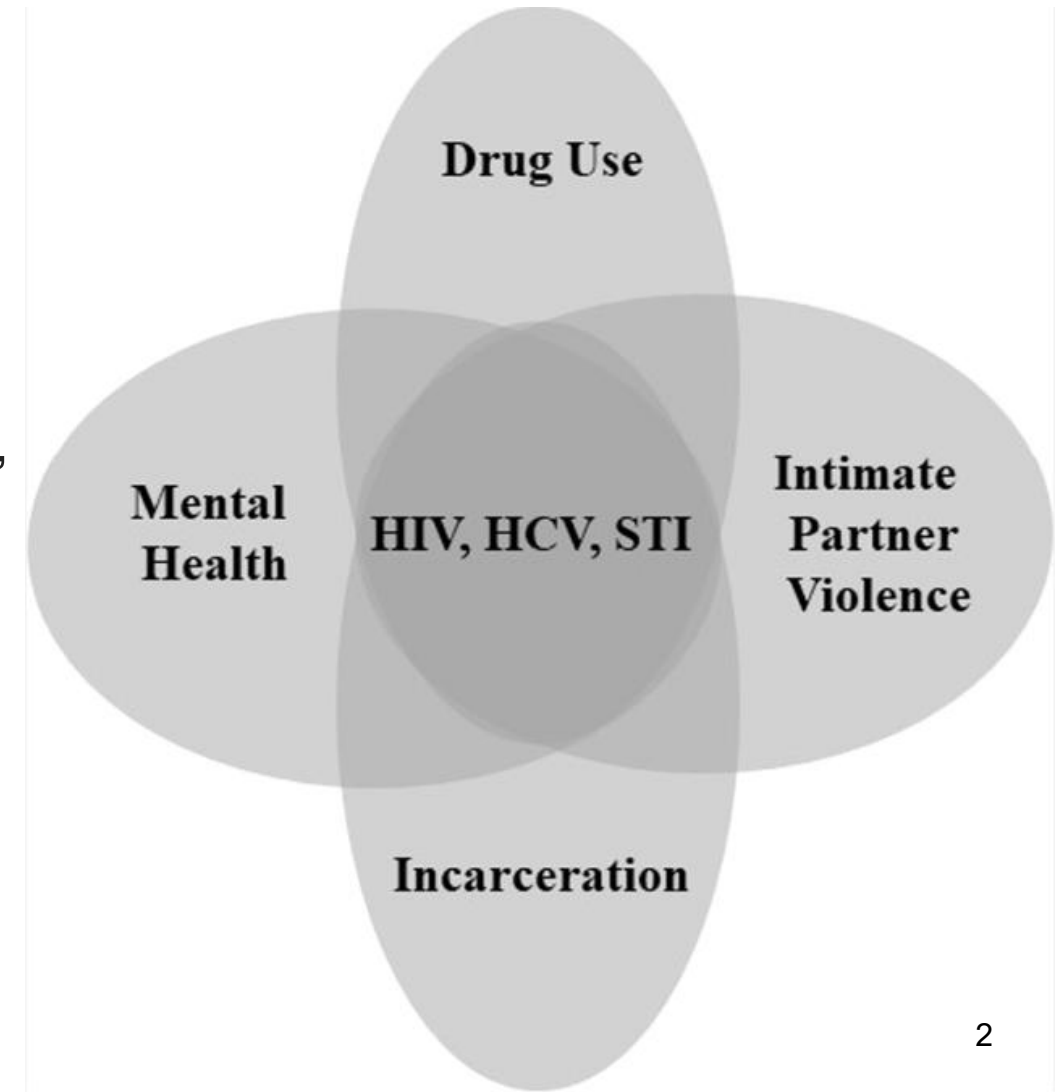
of sexually acquired HIV infections are attributed to chlamydia, gonorrhea, and syphilis.

SYNERGY + EPIDEMIC = SYNDEMIC



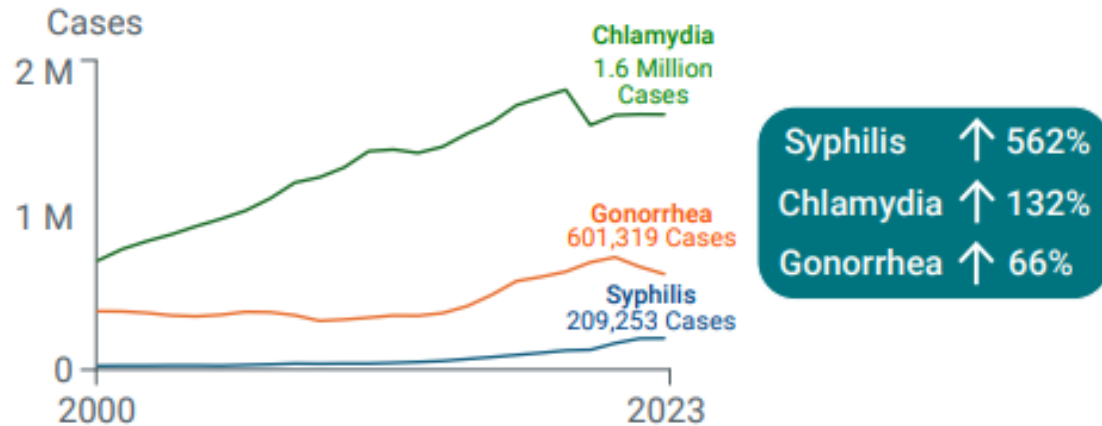
What is a “Syndemic”?

- Syndemic: population-level clustering of social & health problems
- Syndemic theory focuses on adverse interactions between diseases & social conditions in population, drawing attention to mechanisms of interactions
- Criteria:
 - 2 or more diseases/health conditions cluster within specific population(s)
 - Systems-level factors contribute to and sustain the epidemics
 - Clustering of diseases results in adverse disease interaction, either biological, social or behavioral, increasing overall health burden among affected population(s)



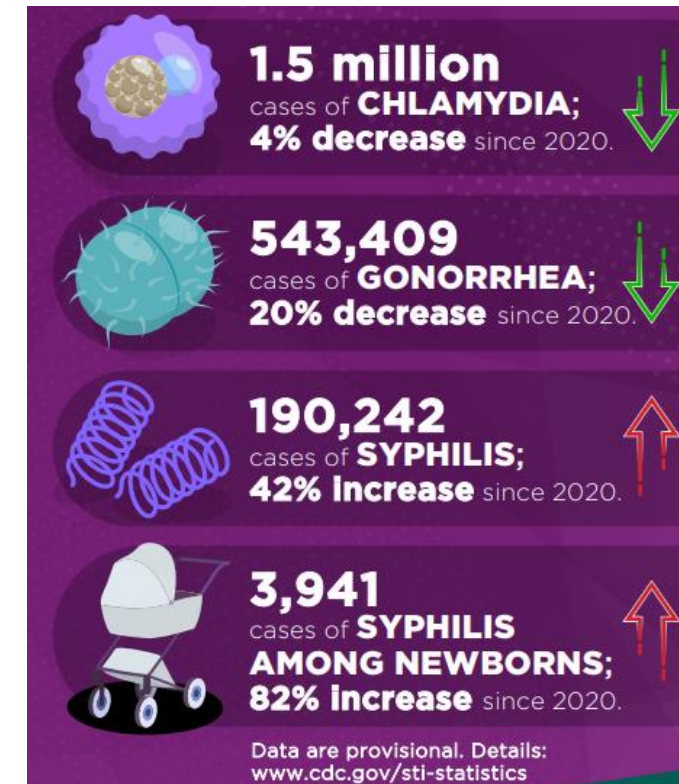
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Increasing STIs



People most affected by STIs include:

- Adolescents and people aged 15-24 years
- Gay, bisexual, and other men who have sex with men
- Pregnant women
- People from some racial and ethnic minority groups



- 2024: More than 2.2 million cases of chlamydia, gonorrhea & syphilis reported in U.S.
 - 12.7% **increase** since 2015
 - 5.9% **decrease** since 2020
 - 8.5% **decrease** from 2023

Transmission Routes

- Blood
 - HBV > HCV > HIV (“rule of 3s”)
- Sex (vaginal, anal, oral)
 - HBV > HIV >>> HCV (related to blood)
 - GC/CT, syphilis, trich, HPV, HSV, mpox, Mgen
- Non-sexual skin-skin contact
 - Mpox, HSV, syphilis, HPV
- Vertical (mother to child):
 - HBV, HIV, HCV, GC/CT, syphilis, HSV
- Other:
 - Hep A, shigella, other enteric pathogens primarily fecal-oral but can be sexually transmitted via anal intercourse

Risk of bloodborne virus after blood exposure to known positive source

Virus	Published risk of transmission
HBV	One in 3 
HCV	One in 30 
HIV	One in 300 

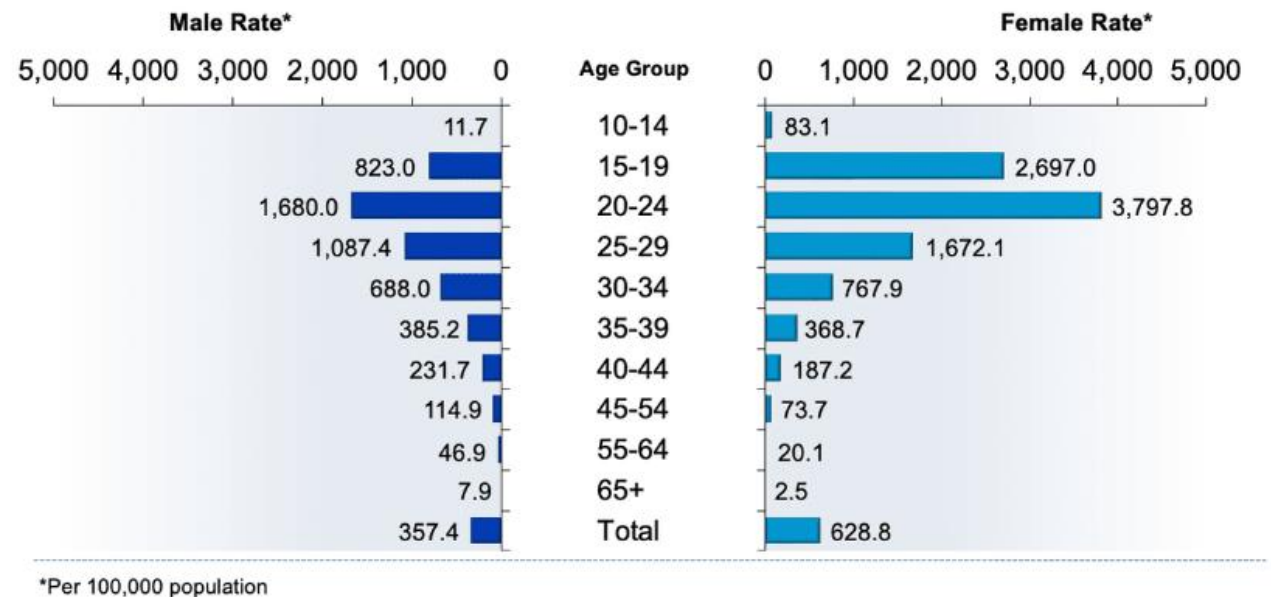
Chlamydia trachomatis

Case #1

- David is a 50-year-old man with HIV/AIDS (current CD4 350, VL <20 on BIC/TAF/FTC) who presented to PCP with severe rectal pain x 1 week. He had been self-administering enemas. External & digital rectal exam unrevealing, patient given steroid cream for presumed hemorrhoids. Risk factor: MMSC
- Patient had been diagnosed with asymptomatic early latent syphilis ~6 months prior, treated. Urine GC/CT testing at that time negative.
- Pain persisted; referred to GI for evaluation.
- On colonoscopy, 9 cm rectal mass observed; presumed rectal cancer but biopsy negative for carcinoma (granulation tissue only).
- Referred to colorectal surgery for evaluation & more extensive biopsy.
- Repeat biopsy also negative for carcinoma & syphilis.

Chlamydia trachomatis (CT)

- Intracellular bacteria
- Most commonly reported STI in U.S.
 - ~2/3 cases in females, esp. <25 y
- Co-infection with gonorrhea common, esp. if MMSC
- People with HIV & chlamydia have increased risk of transmitting due to increased shedding of HIV in genital tract



CT: Clinical Manifestations

- Asymptomatic disease common in both men & women
- Men:
 - Urethritis (most common cause of NGU)
 - Epididymitis
 - Proctitis
 - Prostatitis
- Women:
 - Cervicitis
 - Pelvic inflammatory disease (PID)
 - Neonatal infections
 - Ectopic pregnancies
 - Infertility
- Pharyngeal, anorectal colonization common
 - Clinical significance & transmission risk of pharyngeal colonization unclear
- Lymphogranuloma venereum (LGV)
 - Chronic infection caused by *C. trachomatis* serovars L1, L2, or L3
 - More virulent/invasive

Lymphogranuloma venereum (LGV)

- Previously unusual outside of tropics, rising rates of LGV in U.S., particularly among MSM, including those with HIV
- Clinical symptoms:
 - Transient, self-limited genital ulcer or papule (often goes unnoticed)
 - Unilateral tender inguinal or femoral LAD
 - Proctocolitis (anal ulcers, anal pain or pruritis, mucoid or hemorrhagic discharge, tenesmus, fever)
 - Can be confused with genital herpes, mpox
 - Can progress to colorectal fistulas, strictures, masses
- Diagnosis: (+) rectal swab for chlamydia, compatible clinical scenario & exclusion of other etiologies (no commercially available test for specific serovars)



Chlamydia Diagnosis

- Nucleic acid amplification tests (NAATs)
 - Combined with GC
 - May also include trich, Mgen, BV
- Different platforms validated for urogenital vs. pharyngeal/anorectal samples
- Same test used whether testing for symptoms or screening asymptomatic pts
- **Self-collection** has been shown to have similar sensitivity as clinician-collected samples, may be more acceptable

Sample types:

- Endocervical swabs
- **First-catch urine (preferred in males)**
- Urethral swabs
- **Vaginal swabs (preferred in females)**
 - 10% fewer CT infections may be detected using urine vs. vaginal or endocervical
- **Extragenital:**
 - Pharyngeal
 - Rectal

CT Screening in People with HIV

Urogenital screening:

- Screen all sexually active persons upon entry to care and at least annually thereafter
 - Depending on presence of ongoing risk factors & STI prevalence in community
- Screen sexually active MSM upon entry to care and every 3-6 months thereafter
 - More frequent screening based on presence of ongoing risk & STI prevalence in community
- Pregnancy:
 - Screen in 1st & 3rd TM (if <25 or at increased risk)

Extragenital screening (GC/CT):

- Routine pharyngeal screening not recommended for CT (but done anyway due to combined NAAT)
- Rectal screening:
 - MMSC: Q3-6 months recommended if having receptive anal intercourse
 - Women: Routine screening not recommended (if asymptomatic)
 - Can be offered to those who have receptive anal intercourse
 - 33-88% of women with urogenital chlamydia also tested positive at rectal site, not associated with reported receptive anorectal sexual activity

CT Treatment: General Principles

- Treatment indicated whether symptomatic or not (all sites)
- Tests of cure (TOC) generally NOT indicated except:
 - Pregnancy – perform TOC at 4 weeks
- All patients should be retested ~ 3 months later (no sooner than 4 weeks) or whenever person next seeks care within following 12 months
 - NAATs may remain positive for several weeks → don't perform too soon
 - Assessing for reinfection, not treatment failure
- Refrain from sex x 7 days and until all partners also treated

Chlamydia: Treatment

Non-pregnant Adults

Recommended:

- Doxycycline 100 mg PO BID x 7d

Alternative:

- Azithromycin 1 gm PO x 1 dose
- Levofloxacin 500 mg PO Qday x 7d

LGV:

- Doxycycline 100 mg PO BID x 21d
- PWH may have delayed response & need longer course

Pregnancy

Recommended:

- Azithromycin 1 gm PO x 1 dose

Alternative:

- Amoxicillin 500 mg PO TID x 7d

LGV:

- Limited data
- Azithromycin 1 gm PO once/week x 3 weeks

Case #1: Follow-up

- 50-year-old man with HIV/AIDS
- Current CD4 350, VL <20 on BIC/TAF/FTC
- Severe rectal pain x 1 week
- Diagnosed with early latent syphilis ~6 months prior, treated
- Urine GC/CT testing at that time negative
- 9 cm rectal mass; presumed rectal carcinoma but negative biopsy x 2

Problems/Issues

- HIV reasonably well-controlled
- Rectal mass with negative biopsies x 2
- Recent syphilis, treated
- Extragenital GC/CT testing not performed

Result

- Brought patient in for full STI testing (urine, pharyngeal & rectal)
- Patient's pharyngeal & rectal testing both positive for chlamydia
- Diagnosis: presumed LGV
- Patient treated with doxycycline x 3 weeks, all symptoms resolved
- CR surgeon had scheduled patient for surgery to remove mass → cancelled
- Follow-up flex sig pending

Neisseria gonorrhoeae

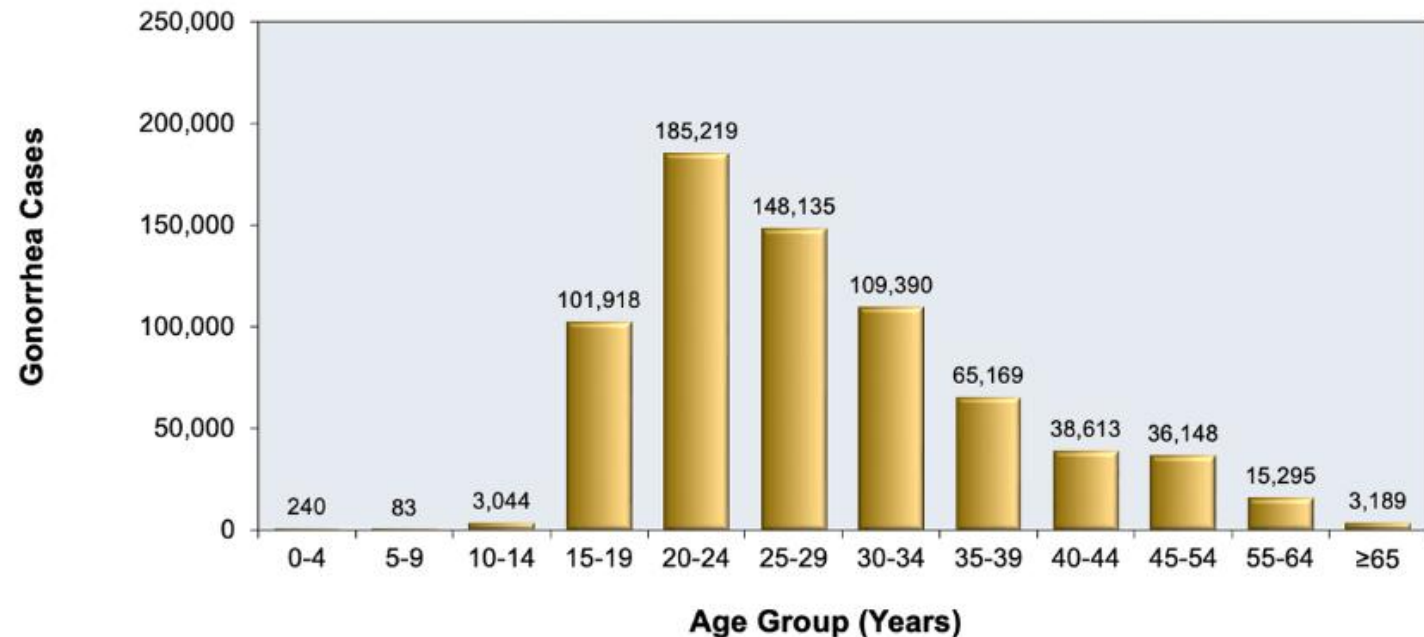
Case #2

- Steven is a 19-year-old man recently diagnosed with HIV in setting of full STI testing for school physical. Urine testing + gonorrhea, treated with 1 dose ceftriaxone. Risk factor: MMSC.
- CD4 600, VL ~60,000
- As part of HIV entry to care evaluation ~4 months later, urine/pharyngeal GC/CT obtained (rectal declined), and pharyngeal swab +gonorrhea. Pt denies any sexual activity since being diagnosed with HIV & gonorrhea.
- Patient denied ever having any pharyngeal symptoms.
- Patient started on BIC/TAF/FTC and treated with ceftriaxone 500 mg IM x 1. Test of cure performed 2 weeks later and pharyngeal GC still positive.
- Patient has severe needle phobia and is very apprehensive about getting another IM injection.

Gonorrhea Epidemiology

Neisseria gonorrhoeae (gonococcus or GC)

- Gram-negative intracellular diplococci
- 2nd most common STI in U.S.
- Most common in 20-29 yo
- Treatment complicated by increasing rates of antimicrobial resistance



GC: Clinical Manifestations

- Asymptomatic disease common in both men & women
 - GC less likely to be asymptomatic vs. CT
- Men:
 - Urethritis
 - Epididymitis
 - Proctitis
 - Prostatitis
- Women:
 - Cervicitis
 - Pelvic inflammatory disease (PID)
 - Neonatal infections
 - Ectopic pregnancies
 - Infertility
- Pharyngeal, anorectal colonization common
- **Disseminated infections (GC only):**
 - Petechial or pustular skin rash
 - Septic arthritis
 - Tenosynovitis
 - Perihepatitis
 - Endocarditis
 - Meningitis



Same
(mostly) as
Chlamydia

Diagnosis

- Nucleic acid amplification tests (NAATs)
 - Combined with CT
 - May also include trich, Mgen, BV
- Men: Gram stain of urethral sample with Gram(-) diplococci (specific but not sensitive)
- Different platforms validated for urogenital vs. pharyngeal/anorectal samples
- Same test used whether testing for symptoms or screening asymptomatic pts
- **Self-collection** has been shown to have similar sensitivity as clinician-collected samples, may be more acceptable

Same as
Chlamydia

NAAT sample types:

- Endocervical swabs
- **First-catch urine (preferred in males)**
- Urethral swabs
- **Vaginal swabs (preferred in females)**
 - Urine ~90% sensitive in women vs. 96.5% for vaginal swab
- **Extragenital:**
 - Pharyngeal
 - Rectal

GC Screening Recommendations in PWH

Urogenital screening:

- Screen all sexually active persons upon entry to care and at least annually thereafter
 - Depending on presence of ongoing risk factors & STI prevalence in community
- Screen sexually active MSM upon entry to care and every 3-6 months thereafter
 - More frequent screening based on presence of ongoing risk & STI prevalence in community
- Pregnancy:
 - Screen in 1st & 3rd TM (if <25 or risk)

Extragenital screening (GC/CT):

- Pharyngeal screening:
 - MMSC: Q3-6 months
- Rectal screening:
 - MMSC: Q3-6 months recommended if having receptive anal intercourse
 - Women: Routine screening not recommended (if asymptomatic)

**Same as
Chlamydia**

GC Treatment: General Principles

- Treatment indicated whether symptomatic or not (all sites)
- Tests of cure (TOC) generally NOT indicated except:
 - Pregnancy – perform TOC at 4 weeks
 - **Pharyngeal gonorrhea – perform at 7-14 days (longer interval better)**
 - If TOC still + for GC, consider culture before re-treating
 - NAATs detect non-viable bacteria
- All patients should be retested ~ 3 months later (no sooner than 4 weeks) or whenever person next seeks care within following 12 months
 - NAATs may remain positive for several weeks → don't perform too soon
 - Assessing for reinfection, not treatment failure
- Refrain from sex x 7 days and until all partners also treated

Same
(mostly) as
Chlamydia

Gonorrhea: Treatment

Uncomplicated Urogenital or Anorectal Infections:

Recommended:

- Ceftriaxone **500 mg** IM x 1 dose
OR
- Ceftriaxone 1 g IM x 1 if ≥ 150 kg
AND
- Doxy x 7 d (if chlamydia not ruled out)

Alternative:

- Gentamicin 240 mg IM AND azithro **2 g** PO x 1
- Cefixime 800 mg PO x 1 dose

Uncomplicated Pharyngeal Infections

Recommended:

- Same as for urogenital/anorectal

Alternative:

- NONE

Antimicrobial resistance:

- Gonorrhea has become resistant to nearly every drug ever used to treat it
 - Fluoroquinolones
 - Azithromycin
 - Some cephalosporins
 - Doxycycline resistance increasing
- Note higher doses of Ctx (was 250 mg)

Case #2: Follow-up

- 19-year-old man recently diagnosed with HIV
- Urine also + gonorrhea, appropriately treated
- CD4 600, VL ~60,000
- Pharyngeal swab +gonorrhea
- Denied sexual activity since HIV & prior GC diagnoses
- Patient started on BIC/TAF/FTC & treated with ceftriaxone
- Test of cure performed 2 weeks later and pharyngeal GC still positive
- Severe needle phobia

Problems/Issues

- Newly diagnosed HIV
- Persistently positive pharyngeal NAAT despite adequate treatment x 2
- Patient would prefer not to get another dose of IM antibiotic

Result

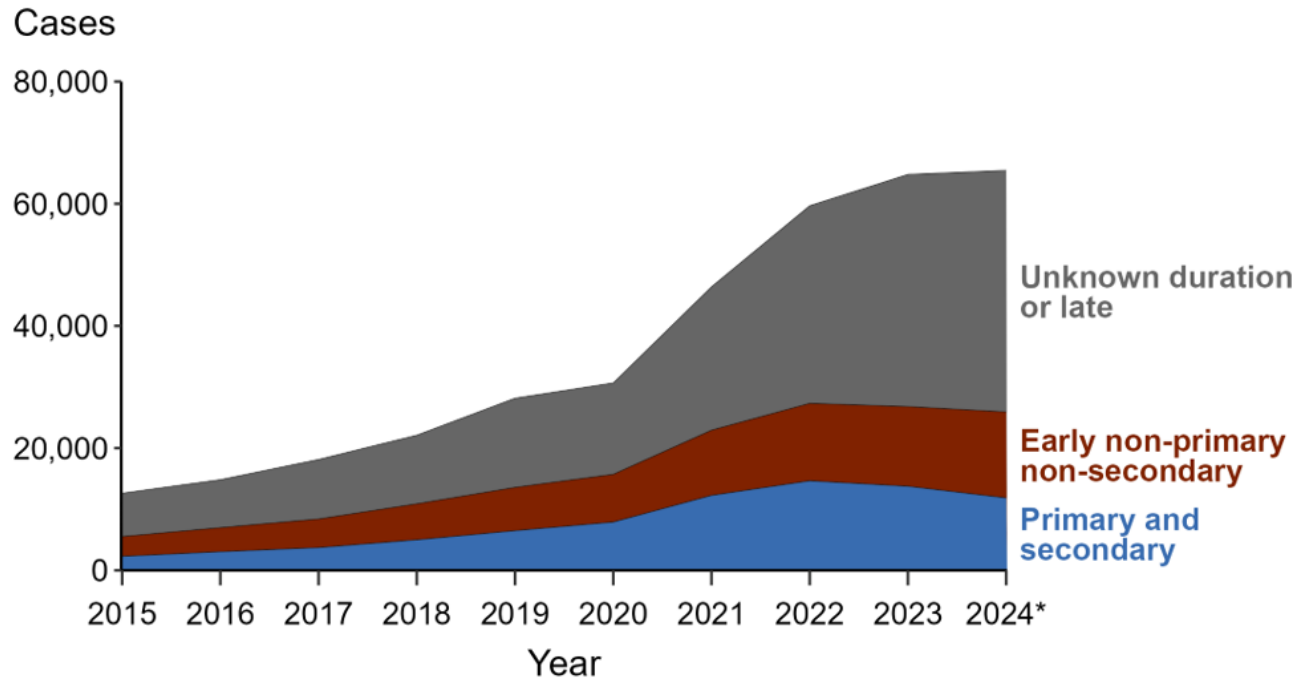
- On BIC/TAF/FTC → undetectable VL
- Prior to retreatment, brought patient back for throat GC culture
- Confirmed with lab that they would run susceptibilities if + *N. gonorrhoeae*
- Culture negative → no further treatment needed
- Repeat 3-site screening ~6 months later → all negative

Syphilis

Case #3

- Alexa is a 32-year-old woman with HIV/AIDS, h/o polysubstance abuse now on methadone, who had been out of HIV care for > 1 year, until presenting with bilateral vision loss
- CD4 103, VL ~600,000
- RPR positive with titer 1:64. Confirmatory treponemal testing is positive.
- Has PCN allergy documented in chart: *“my mom told me that when I was a child, it became hard to breathe and my throat got swollen.”*

Syphilis Increasing, esp. in Women

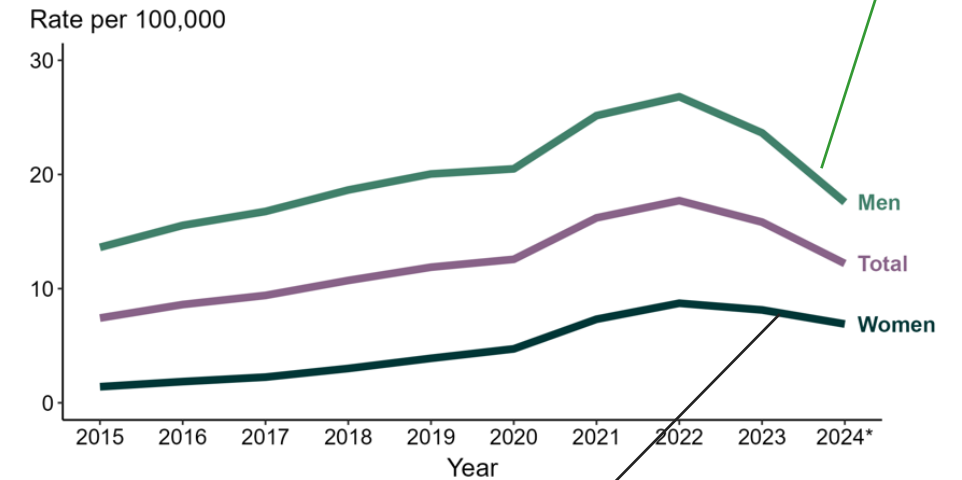


65,250 cases (all stages) reported in women in 2024

11,859 cases (P&S) reported in women in 2024

Majority (~60%) staged as unknown or late

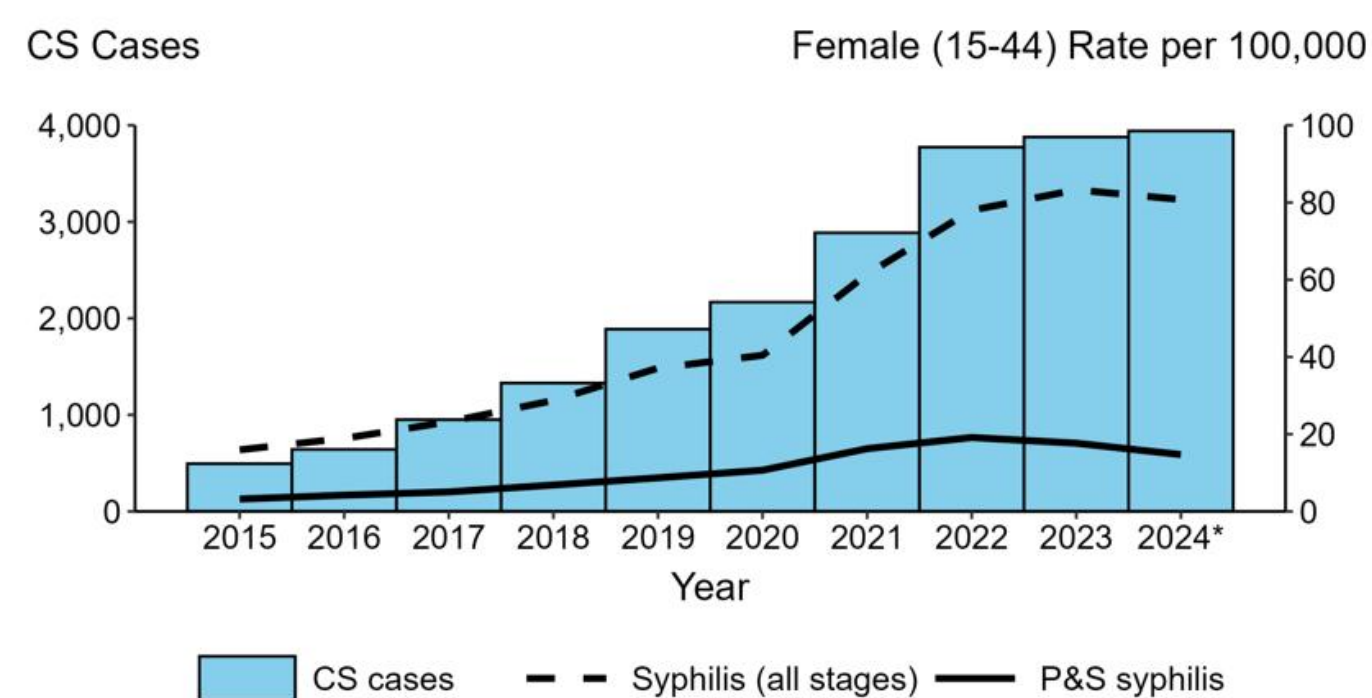
Primary and Secondary Syphilis — Rates of Reported Cases by Sex and Year, United States, 2015–2024



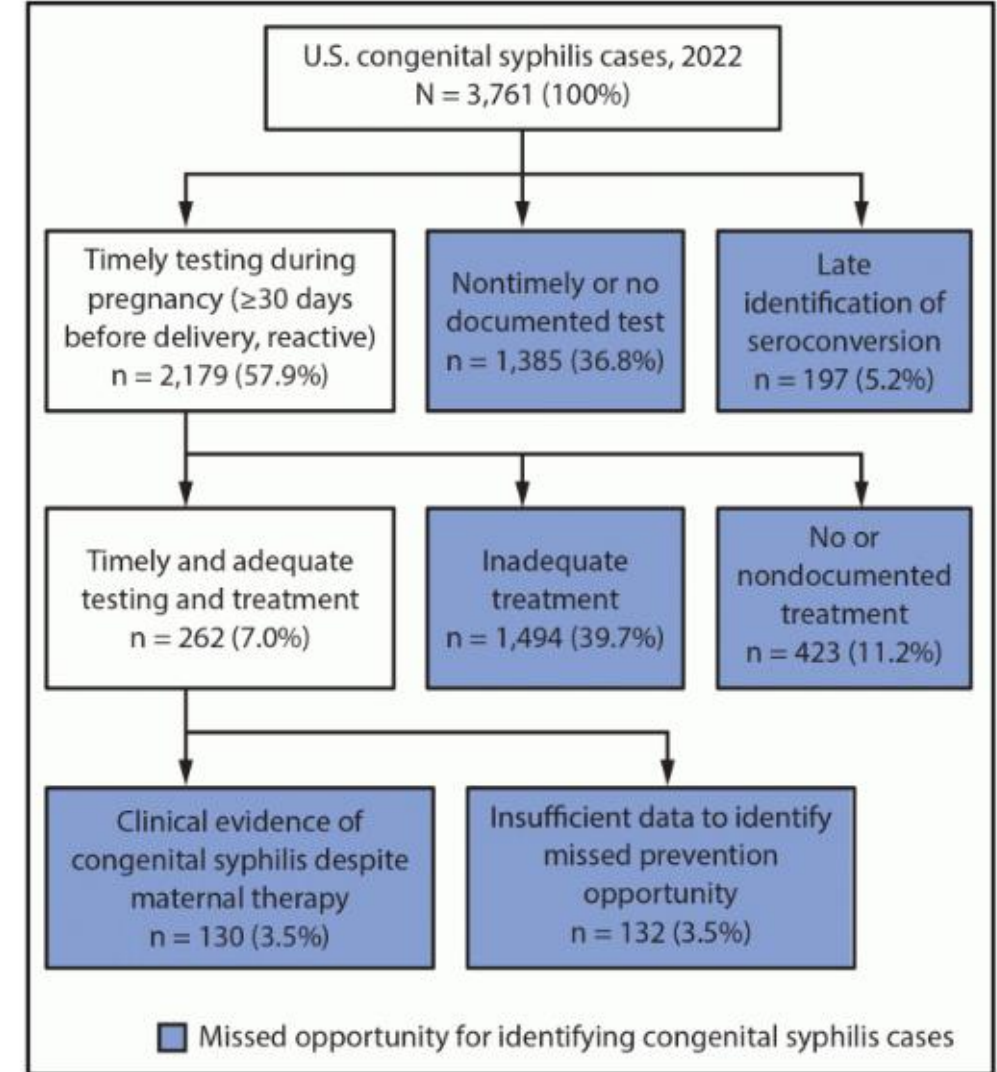
29.4% INCREASE
(from 13.6 to 17.6 per 100,000)

392.9% INCREASE
(from 1.4 to 6.9 per 100,000)

Congenital Syphilis



696.2% increase in CS between 2015 and 2024



Timely testing & treatment during pregnancy could have prevented 90%

Syphilis & HIV

- Associated with increased risk of sexual acquisition & transmission of HIV
- Most cases present similarly to non-HIV-infected patients
- Atypical or multiple lesions more apparent
 - Ulceronodular syphilis ("malignant" lues)
- Primary & secondary symptoms may overlap
- Clinical manifestations of neurosyphilis may be more common in those with HIV
- Accelerated progression of syphilis can be seen in those with advanced immunosuppression
- Primary/secondary syphilis can cause transient decrease in CD4 & increase in HIV viral load

Percentage of those with 1^o/2^o syphilis who also have HIV:

- MSM 41.7%
- MSW: 6.3%
- Women: 4%

[2022 STI Surveillance Report](#)

Staging Syphilis

- Often picked up by routine screening in asymptomatic individuals
- Careful physical exam → chancres often go unnoticed, esp. if perirectal
- Review of symptoms within past year & sexual exposures
- Past serologies critical
 - Prior negative within past year vs. > 1 yr → early latent vs. late latent
 - Local Dept. of Health (DOH) can be super-helpful (syphilis nationally reportable)

Natural History of Syphilis

Sexual transmission (only occurs in early stages)

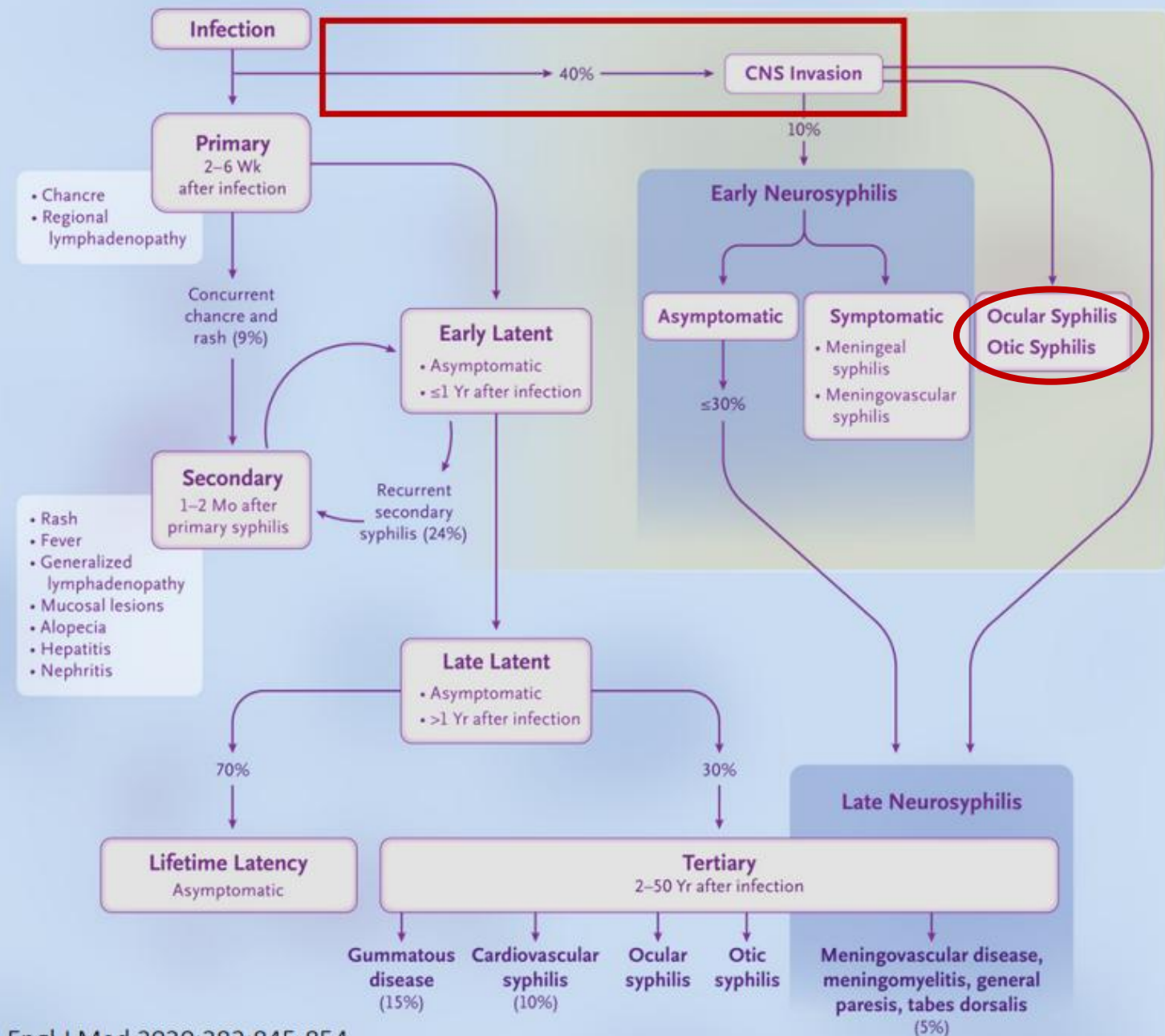
- Risk of infection after 1 exposure: 40%
- Index patient is most contagious during 1^o and 2^o stage, less so in early latent stage

Vertical transmission (may occur during any stage)

- ~80% transmission in the early stages
- ~10% transmission in the late stages

Rarely, transmission may occur through **blood transfusions** and **organ transplantations**

It is estimated that 2-7% of persons with syphilis will develop CNS complications



N Engl J Med 2020;382:845-854.

Neurosypphilis

Early

- Weeks to months after infection (typically <2 years)
- Abnormal CSF in 50%, even if asymptomatic (resolve after treatment of early syphilis)
- Meningitis
 - HA, confusion, N/V, stiff neck
 - Often basilar form with cranial nerve abnormalities
- Meningovascular
 - May present as ischemic stroke in young person
- Ocular/otic syphilis

Late (3^o syphilis)

- 5-12 years after initial infection (mean 7 yrs in pre-Abx era)
 - Meningovascular, may include:
 - Hemiplegia
 - Aphasia
 - Seizures
 - Spinal cord vessel involvement
- Parenchymatous forms
 - General paresis
 - Irritability, cognitive impairment, emotional lability, delusions, paranoia
 - Tabes dorsalis
 - Lightning pains, ataxia, bladder disturbances, visceral crises, rectal incontinence

Ocular & Otic Syphilis

Ocular Syphilis

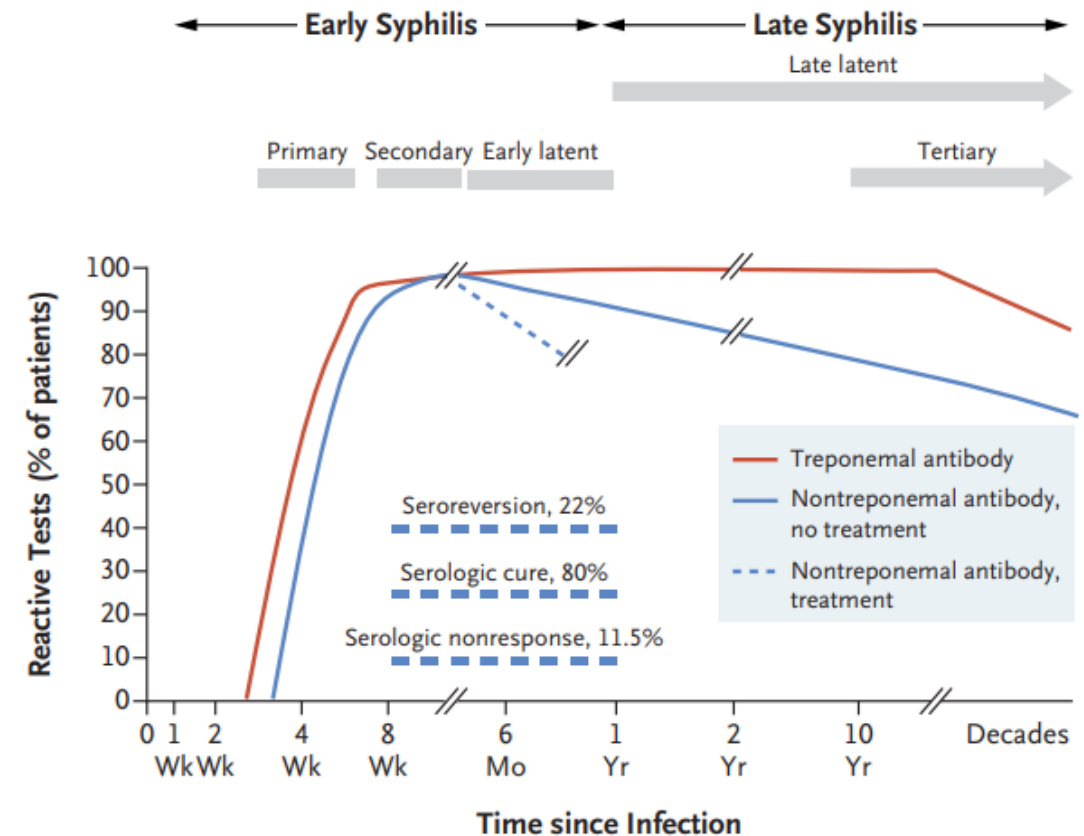
- Occurs at any stage, with or without neurologic manifestations
 - May be initial presentation of syphilis
- Can involve almost any eye structure, but posterior uveitis & panuveitis most common
- Also anterior uveitis, optic neuropathy, retinal vasculitis, interstitial keratitis
- May lead to decreased visual acuity and permanent blindness
- Consider screening for syphilis for any new onset visual changes

Otosyphilis

- Can occur at any stage
- Infection of cochleovestibular system
- Typically presents with sensorineural high-frequency hearing loss, tinnitus, or vertigo
- Unilateral or bilateral (50%)
- Can have sudden onset & progress rapidly, can result in permanent hearing loss
- May also have manifestations of ocular & neurosyphilis (esp. CN VIII)

Syphilis Diagnosis

- Non-treponemal tests (NTT)
 - RPR, VDRL
 - Titers followed over time to assess response to treatment
 - False (-): prozone reaction (less common with RPR vs. VDRL)
 - Biologic false (+): older age, autoimmune disease, infections (e.g. HIV, yaws, TB, malaria, HBV/HCV, Lyme disease), ? drug use, ? Pregnancy
- Treponemal tests (TT)
 - Fluorescent treponemal antibody absorption (FTA-ABS)
 - Microhemagglutination test for antibodies to *T. pallidum* (MHA-TP)
 - *T. pallidum* particle agglutination assay (TPPA)
 - *T. pallidum* enzyme immunoassay (TP-EIA)
 - Chemiluminescence immunoassay (CIA)
 - Biologic false (+): spirochete & other infections (e.g., Lyme disease), autoimmune diseases, older age

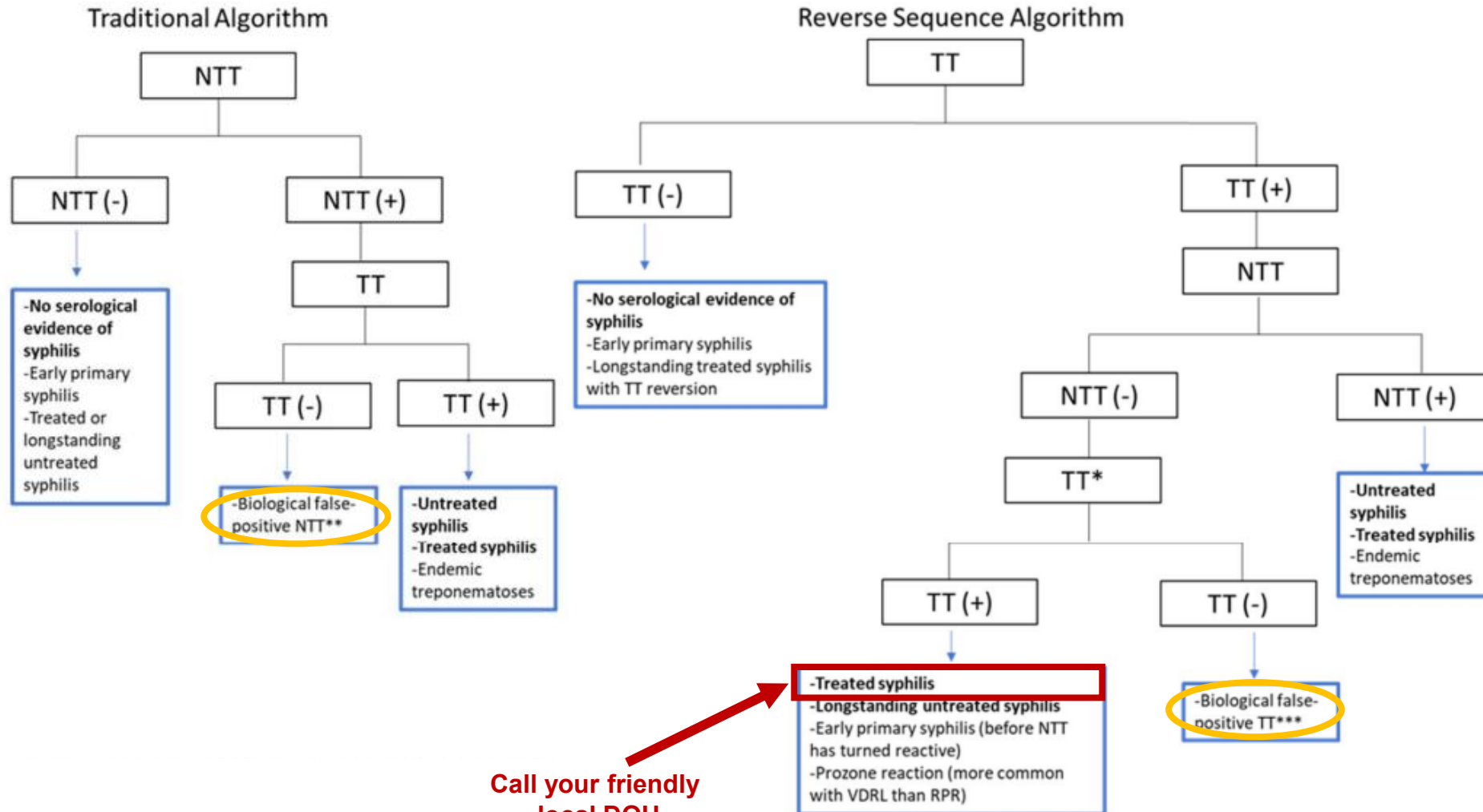


Notes:

- Serologic tests negative in up to 30% of persons with 1° syphilis (repeat in 2 weeks)
- TT remain reactive but up to 24% may serorevert years later

Syphilis Testing Algorithms

NTT = non-treponemal test (e.g., RPR)
TT = treponemal test



To LP or not to LP?

- All people with newly diagnosed syphilis need thorough neuro exam
- CSF abnormalities common in early-stage syphilis & in those with HIV, even without Sx
- In setting of HIV, abnormal CSF associated with $CD4 \leq 350$ and/or with RPR titer $\geq 1:32$
 - No known benefit of treatment if neurologic signs/symptoms absent
- Isolated ocular/otic syphilis: LP typically will not change management, often normal
- Diagnosis of neurosyphilis relies on CSF tests (cell count, protein, CSF-VDRL), reactive serologic tests & neurologic signs/Sx
 - Mononuclear pleocytosis ($6-200$ cells/mm³), mildly elevated protein
 - Higher cutoff of >20 cells/mm³ may increase specificity in PWH
 - Reactive CSF-VDRL (as long as CSF not contaminated with blood) considered diagnostic, but very low sensitivity
 - Consider adding FTA-ABS or TP-PA on CSF
- Repeat LPs to monitor response to treatment not needed

Syphilis Treatment

- Consider repeating RPR if delay in getting patient back for treatment
- PCN G truly treatment of choice
 - No PCN resistance among *T. pallidum*
 - PCN allergy assessment & de-labeling
 - Desensitization may be needed
- IV PCN G for neurosyphilis (including ocular/otic)
- Partner management
 - If Sx → treat as appropriate
 - If ASx → treat empirically if:
 - If partner w/ 1°, 2° or early latent within past 90d
 - If partner w/ late latent within past 90d & titer >1:32 (likely more recent infection)
 - If ASx & partner (+) >90d, treat based on serologic testing, if available; if not available or follow-up uncertain → empiric tx
 - If in doubt → treat

For primary and secondary syphilis in nonpregnant adults, including HIV-infected adults:

Penicillin G benzathine, 2.4 million units in a single IM dose
 Doxycycline, 100 mg orally twice a day for 14 days (first alternative)
 Ceftriaxone, 1–2 g daily, IM or IV, for 10–14 days (second alternative)

For latent syphilis in nonpregnant adults, including HIV-infected adults:

Early latent: penicillin G benzathine, 2.4 million units in a single IM dose
 Late latent: penicillin G benzathine, 7.2 million units total, administered in 3 IM doses of 2.4 million units each at 1-week intervals
 Doxycycline, 100 mg orally twice a day for 28 days (alternative)

For late syphilis (gummas and cardiovascular manifestations) but not neurosyphilis:

Penicillin G benzathine, 7.2 million units total, administered in 3 IM doses of 2.4 million units each at 1-wk intervals

For neurosyphilis and ocular syphilis:

Aqueous crystalline penicillin G, 18–24 million units per day, administered in IV doses of 3–4 million units every 4 hr or as a continuous infusion, for 10–14 days

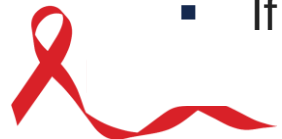
Penicillin G procaine, 2.4 million units in a single IM dose daily, plus probenecid, 500 mg administered orally four times a day, both for 10–14 days (alternative)

For primary and secondary syphilis in pregnancy:

Penicillin G benzathine, 2.4 million units in a single IM dose†

For latent syphilis in pregnancy:

Early latent: penicillin G benzathine, 2.4 million units in a single IM dose
 Late latent: penicillin G benzathine, 7.2 million units total, administered in 3 IM doses of 2.4 million units each at 1-wk intervals



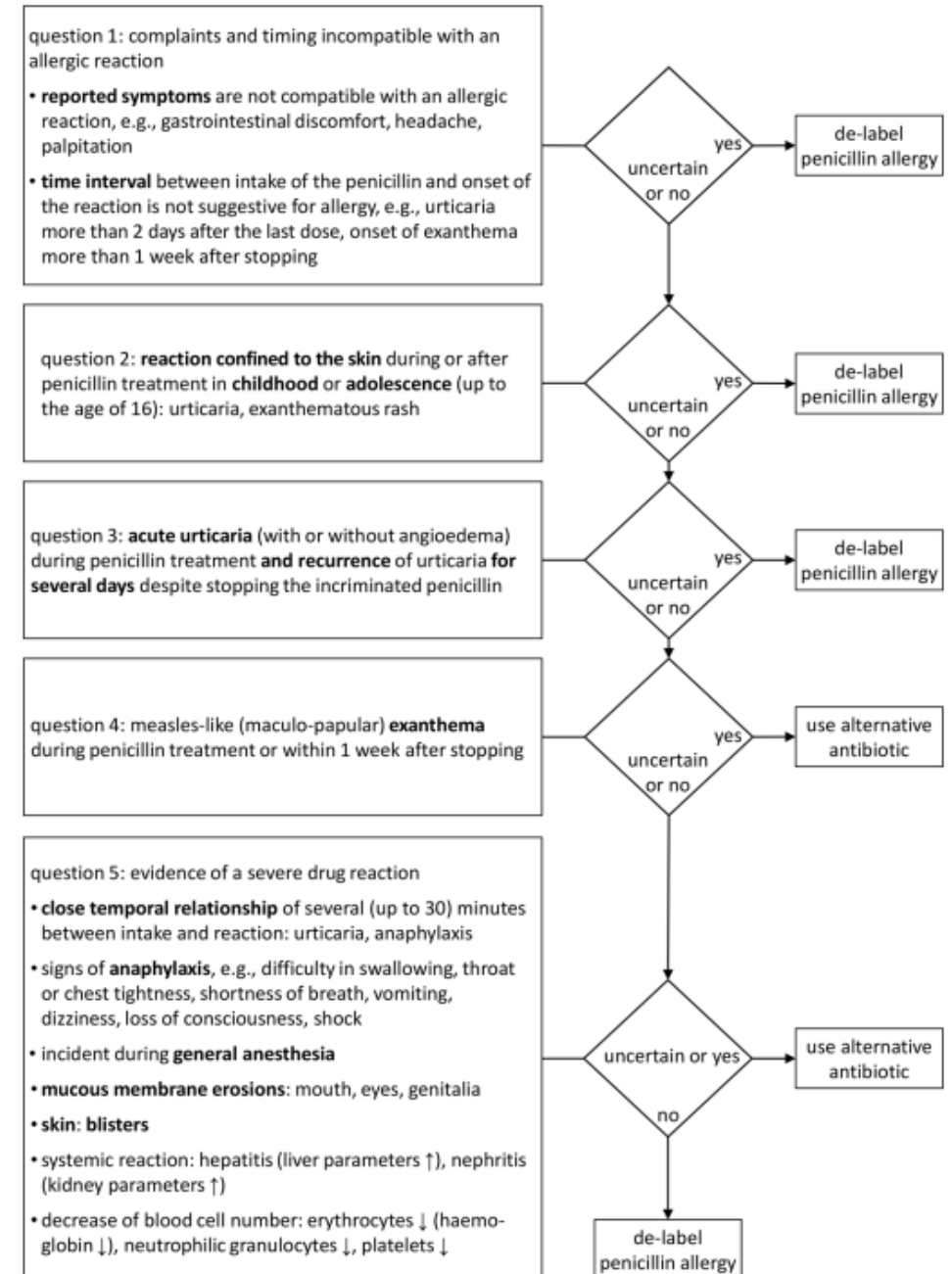
Penicillin Allergies (Treatment of Syphilis or GC)

- Among most commonly reported drug allergies
- Fewer than 10% of persons reporting PCN allergy truly allergic
 - Even if truly allergic, most outgrow after ~10 years
- Fewer than 1% of persons with true PCN allergy will react to 3rd generation cephalosporin
- Most people with PCN allergy can receive ceftriaxone
 - Different β -lactam side chain
- If severe PCN or ceftriaxone allergy
 - Syphilis → doxycycline (14d for early, 28d for late)
 - GC → gent + azithro (significantly less effective for pharyngeal/rectal infections)
- PCN allergy “de-labeling” → significant benefits to patients & health systems
 - 2nd line antibiotics often less effective, more expensive, have potentially serious side effects
 - In some cases, no second-line available



PCN De-labeling Algorithms

- Work with your pharmacy department or use published algorithm
- Many “allergies” based on family history or are actually intolerances (e.g., N/V)
- Assessment includes:
 - Type of reaction (Type 1 hypersensitivity vs. not)
 - Timing (after 10 years, most lose their reactivity)
 - Tolerance of other β -lactams since
- Determine which patients to refer to allergists for skin testing
- Similar algorithms for cephalosporin allergies

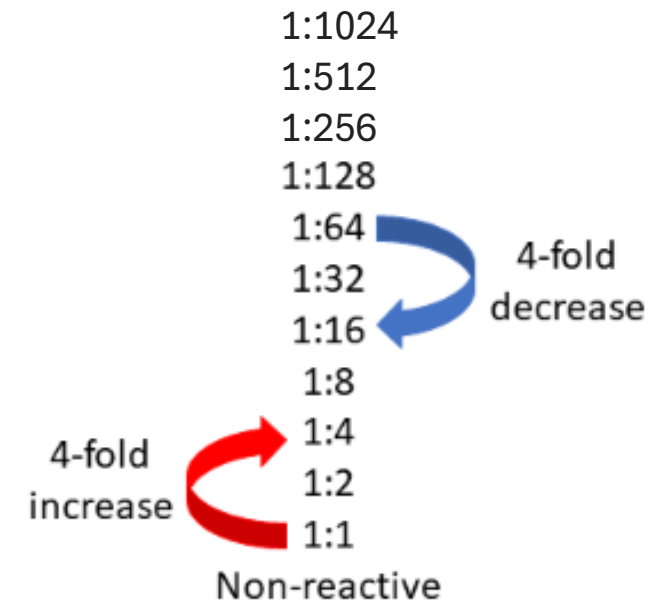


PCN G Benzathine (Bicillin L-A[®]) Shortages

- Intermittent since 2023
- Why?
 - Increasing cases; single manufacturer in U.S. (recall issued in July 2025)
- FDA: importation of reconstituted options (e.g., Lentocilin) temporarily approved
- Recommendations:
 - Review inventory & typical usage
 - Prioritize existing supply for pregnant patients & CS (only available treatment option)
 - Use doxycycline for men & non-pregnant women (assuming good adherence)
 - Accurately stage syphilis cases
 - Thorough physical exam
 - Past serologic history (may need to contact DOH)
 - Sexual partner history
 - History of symptoms within past 1 year
 - **If any of above suggest infection within 1 year → only 1 dose needed**

Response to Treatment

- Cure = ≥ 4 -fold (2 dilution) decrease at 12 months (for early syphilis) or 24 months (for late syphilis)
- Failure = never achieve 4-fold decrease
- Reinfection = documented 4-fold decrease, then 4-fold increase
- Incomplete serologic response (a.k.a., serofast) = persistent low-level titers (usually 1:8 or less) after successful treatment



RPRs are typically 1-2 titre dilutions higher than a VDRL. It is preferable to compare the same non-treponemal tests.

No need to obtain follow-up RPRs any sooner than 3 months

In people with HIV: consider LP if treatment failure

Case #3: Follow-up

- 32-year-old woman with HIV/AIDS, h/o polysubstance abuse now on methadone, who had been out of HIV care for > 1 year
- Presenting with bilateral vision loss
- CD4 103, VL ~600,000
- RPR positive with titer 1:64
Treponemal testing positive
- PCN allergy with possible anaphylaxis as young child

Problems/Issues

- Uncontrolled HIV with low CD4, loss to follow-up due to polysubstance abuse
- New syphilis dx in setting of vision loss
- PCN allergy

Result

- Referred urgently to Ophtho who confirmed ocular syphilis
- Pt admitted for IV PCN G & desensitization
- PCN skin test negative
- LP benign (VDRL negative)
- Completed 2 weeks of IV PCN G
- RPR reverted to non-reactive
- Regained full vision in R eye but not in L (due to retinal detachment), despite multiple surgeries

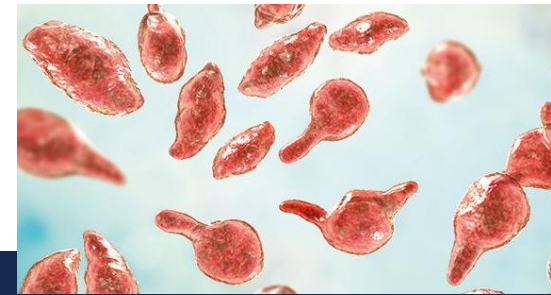


Mycoplasma genitalium

Case #4

- Jess is a 32-year-old woman with HIV (CD4 700, VL < 20 on DTG/ABC/3TC) who recently suffered a spontaneous abortion at 20 weeks of gestation. On pathology, the placenta grew *Mycoplasma genitalium*.
- At her follow-up visit with her OB, she was tested for *M. genitalium* via vaginal swab and was positive.
- She was treated with doxycycline & azithromycin because her insurance did not cover moxifloxacin. She states that she took all the medication as prescribed.
- A test of cure was performed 4 weeks later and is still positive.
- She is monogamous with a male partner, who has not been tested or treated.

Mycoplasma genitalium (Mgen)



- Smallest known free-living organisms
- Lack cell wall, not visible on Gram stain, fastidious & slow-growing (thus difficult to culture)
- Not reportable disease in U.S.
- Prevalence:
 - Globally: 1-4% of males, 1-6.4% females
 - U.S.: 1.7% of reproductive-age adults (14-49y) in general population
 - More common than gonorrhea (1%), less common than chlamydia (2.3%)

- Risk Factors:
 - Younger age (<20-22 years)
 - Smoking
 - Recent sexual intercourse
 - Increasing number of sexual partners (≥ 2 in past year)
 - Bacterial vaginosis
 - One study found increased prevalence among those with HIV
 - Partner with *M. genitalium*
 - 39-50% of male partners of infected women
 - 40-50% of female partners of infected males

Co-Infections Common

- Bacterial & parasitic STIs
 - Chlamydia most common coinfection overall
 - Males with urethritis: 35% of those with chlamydia, 14% of those with gonorrhea, and 19% of those with both → also had *M. genitalium*
 - Trichomonas also commonly reported in females with *M. genitalium*
- HIV
 - Multiple studies have found increased risk of HIV acquisition in patients with recent *M. genitalium* infection
 - In vitro studies: *M. genitalium* reduces integrity of endocervical epithelial barrier & activated HIV target cells → possible mechanism for increased transmissibility

Mgen: Clinical Syndromes

- Infections limited to human genital tract
- Men:
 - Nongonococcal urethritis (NGU)
 - More frequently symptomatic than chlamydia
 - 15-30% of NGU
 - Balanitis, posthitis (inflammation of foreskin), rarely epididymitis
 - Proctitis (Mgen commonly detected among MSM but unclear causation)
- Women:
 - Frequently asymptomatic
 - 10-30% of cervicitis but inconsistent association
- Pelvic Inflammatory Disease (PID)
 - Lower risk of developing PID (~5%) vs. chlamydia (~15%) if untreated
 - Found in 4-18% of women with PID
 - Generally less severe than gonorrheal PID
- Inconsistent data re: tubal infertility (some suggest 4-5 X increased risk)
- Reduced fecundability (probability of conception during single menstrual cycle)
- Associated with preterm birth, spontaneous abortion



Testing/Screening

Whom to test:

- **Symptomatic** patients with urethritis, cervicitis (“consider” for PID)
 - CDC: only recommended if persistent symptoms after standard treatment of GC/CT
 - Most other guidelines: appropriate for initial testing with GC/CT
 - Anyone with persistent symptoms after empiric treatment
- Sex partners of the above
 - If partner known +*M. genitalium*; OR
 - If seen before index case’s result available
- **No role for asymptomatic screening, including in pregnancy**
 - Unclear whether treatment of asymptomatic infection improves outcomes
- Extragenital testing **not recommended**
 - Persistent proctitis: can be considered if GC/CT ruled out

Testing:

- PCR or other nucleic acid amplification tests (NAATs)
 - Combined vs. separate
 - Consider ordering with reflex macrolide susceptibility
- Preferred samples:
 - First-catch urine in men
 - Vaginal swab (clinician- or self-collected) in women
 - More sensitive than urine or cervical swab

M. genitalium Treatment

- Relatively antibiotic-resistant
- Inability to culture → difficulty determining susceptibility
- Options:
 - Azithromycin
 - Inherently susceptible but resistance increasing globally (10% in 2010 → 51% in 2016-17)
 - Resistance due to single mutation; can develop on treatment
 - Certain fluoroquinolones (moxifloxacin)
 - Usually $\geq 90\%$ effective
 - FQ resistance mutations reported in 7.7% of isolates globally
 - ~3% globally resistant to both (rare in U.S.)
 - Doxycycline susceptible in vitro but 60-70% clinical failure rate

Treatment if Resistance Testing Available/Utilized

- Reflex testing for macrolide resistance available
- No commercially available resistance tests for fluoroquinolones

If no macrolide resistance*:

- Doxycycline 100 mg BID x 7 days

followed by

- High-dose azithromycin
 - 1 gm on day 1, then
 - 500 mg on days 2-4

If macrolide resistance*:

- Doxycycline 100 mg BID x 7 days

followed by

- Moxifloxacin 400 mg daily x 7 days

* And not pregnant

- Role of doxy: reduce bacterial load and reduce risk of development of FQ/macrolide resistance
- If doxy given as initial empiric treatment, do not need to repeat (if within the past week)

Treatment if Resistance Testing NOT Available/Utilized

Non-pregnant

Doxycycline 100 mg bid x 7 days, followed by moxifloxacin 400 mg qd x 7 days

- Microbiologic cure rate >90%

Alternative (if cannot take FQ): doxy x 7 days followed by high-dose azithro (1 gm, followed by 500 mg x 3 days)

- Microbiologic cure rates low, but clinical cure rates 65-75%
- Test of cure recommended after 21 days

Pregnant

High-dose azithromycin (1 gm, followed by 500 mg qd x 3 days)

- Clinical cure rates 65-75%
- Test of cure recommended after 21 days

Treatment Failures

- Test of cure NOT recommended (unless azithro used without macrolide susceptibility confirmed)
- If performing, TOC should be at least 21 days later
- Assess adherence, partner treatment
- If persistent symptoms or +TOC, optimal approach unknown
 - Recommended management in consultation with STI expert
- Options:
 - Minocycline 100 mg bid x 14 days – cure rate 71%
 - Metronidazole 500 mg bid x 14 days (or possibly tinidazole)

Partner Management

- Sexual partners of lab-confirmed cases should be tested for *M. genitalium*, and treated if positive
 - Any partner within the past 60 days (incubation unknown)
- If testing not possible, empiric treatment recommended
- Patients should be counseled to abstain from sexual contact until both partners have completed treatment

Case #4: Follow-up

- 32-year-old woman with HIV (CD4 700, VL < 20 on DTG/ABC/3TC)
- Spontaneous abortion at 20 weeks of gestation
- Placenta grew *Mycoplasma genitalium*
- Patient's follow-up testing + for *M. genitalium*
- Treated with doxycycline & azithromycin (no insurance coverage for moxifloxacin)
- Took all medication as prescribed
- Test of cure 4 weeks later still positive
- Monogamous with 1 male partner (not tested or treated)

Problems/Issues

- Persistent Mgen infection despite treatment (2nd line)
- Macrolide resistance testing not performed → doxy/moxi treatment of choice (no longer pregnant)
- Inability to obtain moxifloxacin due to cost & lack of insurance coverage
- Partner not treated simultaneously

Result

- Received approval for moxifloxacin from state Medicaid on case-by-case basis
- Sufficient doses prescribed for her partner
- Patient and partner both successfully treated with doxy 7 d + moxi 7 d
- Working to update state Medicaid formulary to include moxi for this clinical situation

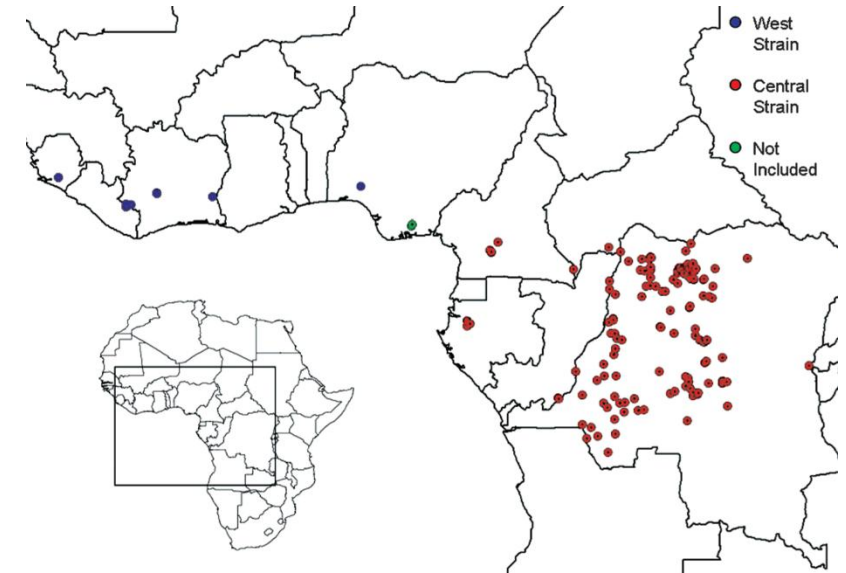
Mpox

Case #5

- Marco is a 47-year-old man with HIV/AIDS with intermittent adherence to visits and ARVs (CD4 148, VL 60 – self-restarted BIC/TAF/FTC ~3 weeks ago)
- Presented for routine HIV visit with new rash on arms, shoulders, back & chest, consistent with mpox in appearance
- No prodromal or genital lesions
- Admits to new sexual partner about 3 weeks previously with unprotected oral and anal receptive sexual activity
- Shares bedroom/bed with regular male partner, who also has HIV
- Neither he nor his regular partner have received mpox vaccinations

Mpox (formerly Monkeypox): History & Virology

- Discovered in 1958
 - Two outbreaks of pox-like disease in research monkeys
- First human case identified in 1970 in Democratic Republic of Congo (DRC) during intense smallpox elimination campaign
- Orthopoxvirus related to:
 - Variola virus (smallpox)
 - Vaccinia virus (used in smallpox vaccines)
 - Cowpox virus
- 2 separate clades:
 - Clade I – endemic in Central Africa
 - Historically has caused more severe disease (case fatality rate ~11%)
 - Possibly more transmissible
 - Clade II – endemic in West Africa
 - Case fatality ~1-3%
 - 2 sub-clades: IIa and IIb (2022 outbreak)



Levine RS, et al. PLOS ONE 2007

Epidemiology (Traditional)

- Zoonosis with incidental human infections
- Natural reservoir unclear
 - Multiple species susceptible (rope squirrels, tree squirrels, Gambian pouched rats, dormice, non-human primates and other species)
- Human cases typically travel-related, contact with infected animals, with limited human-to-human transmission
- Cases increasing since 1970 with cessation of smallpox vaccination

Monkeypox cases over time

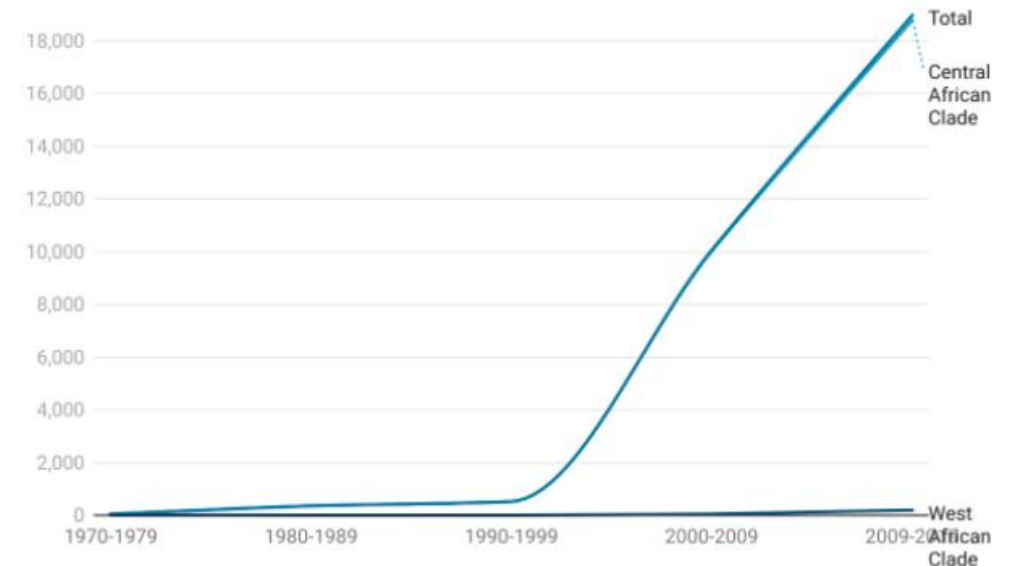


Chart: Katelyn Jetelina, YLE • Source: Bunge et al., 2022. • Created with Datawrapper

2022-23 Global Mpox Cases

Confirmed Cases

95,340

Total Cases

92,590

in locations that have not historically reported mpox

2,750

in locations that have historically reported mpox

Confirmed Deaths

184

Total Deaths

163

in locations that have not historically reported mpox

21

in locations that have historically reported mpox

<1% case-fatality rate



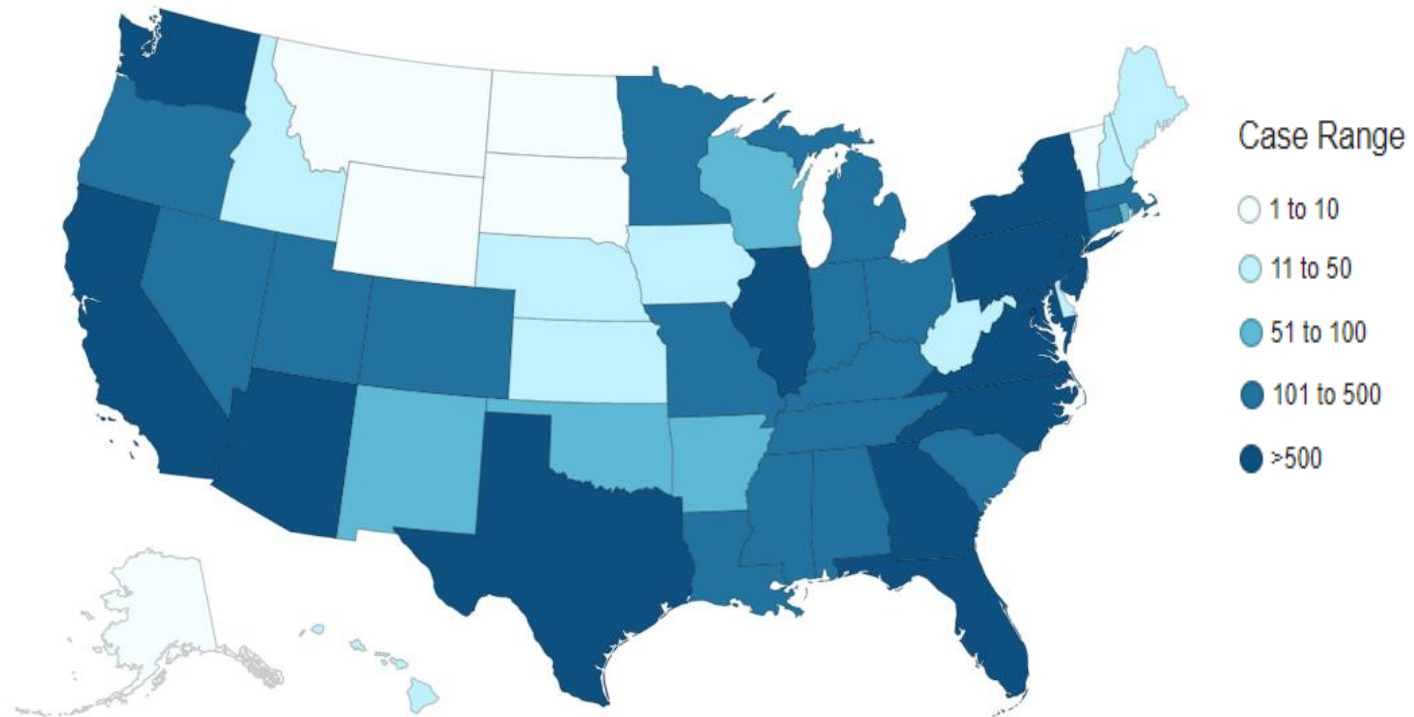
2022-23 U.S. Mpox Cases

U.S. Cases

Total Cases
32,063

U.S. Deaths

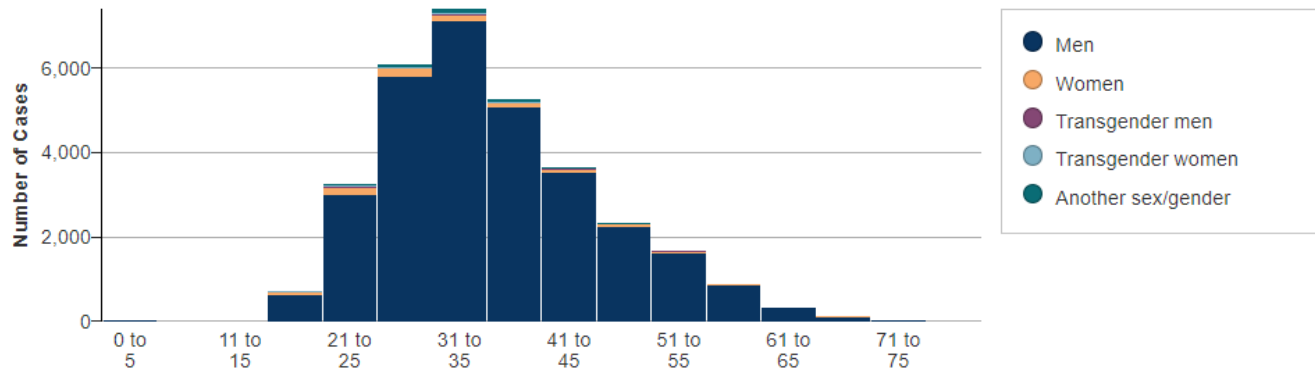
Total Cases
58



Territories **PR**

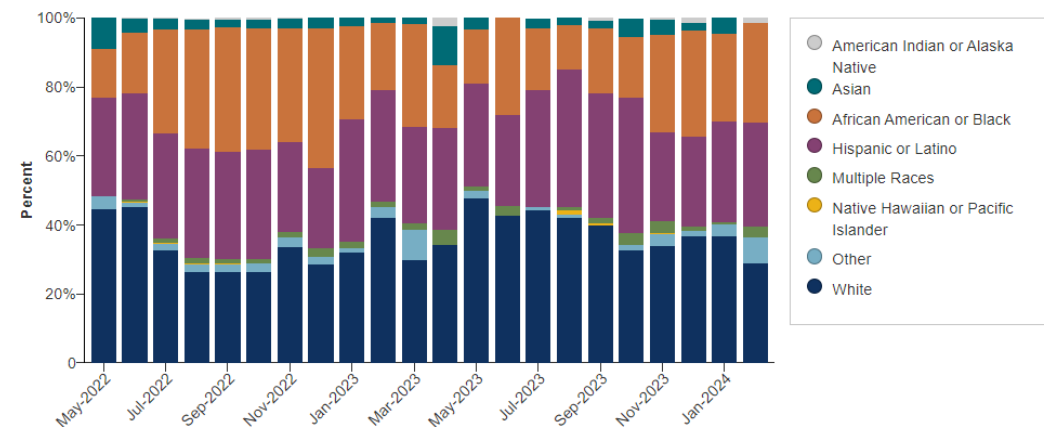
U.S. Mpox Case Demographics, 2022-23

Mpox cases reported to CDC: Age and Gender



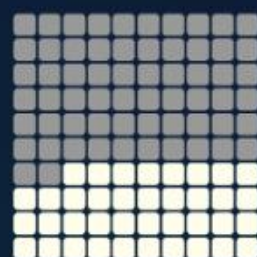
Race and Ethnicity+	Count	Percent
African American or Black	9,732	32.18%
Hispanic or Latino	9,382	31.03%
White	8,997	29.75%
Asian	869	2.87%
Other	634	2.1%
Multiple Races	419	1.39%
American Indian or Alaska Native	127	0.42%
Native Hawaiian or Pacific Islander	78	0.26%

Proportion of All Cases by Race and Ethnicity by Month

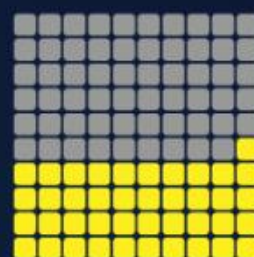


In the U.S., HIV or recent sexually transmitted infections (STIs)* are common among people with monkeypox

Among nearly 2,000 people with monkeypox:†



38%
had HIV



41%
had an STI in the past year



61%
had either HIV or an STI

It is important to

Prioritize people with HIV and STIs for monkeypox vaccination

Offer HIV and STI screening for people evaluated for monkeypox



*Diagnosed with an STI other than HIV in the past year

† People diagnosed with monkeypox in eight jurisdictions during May 17–July 22, 2022

bit.ly/mm7136a1

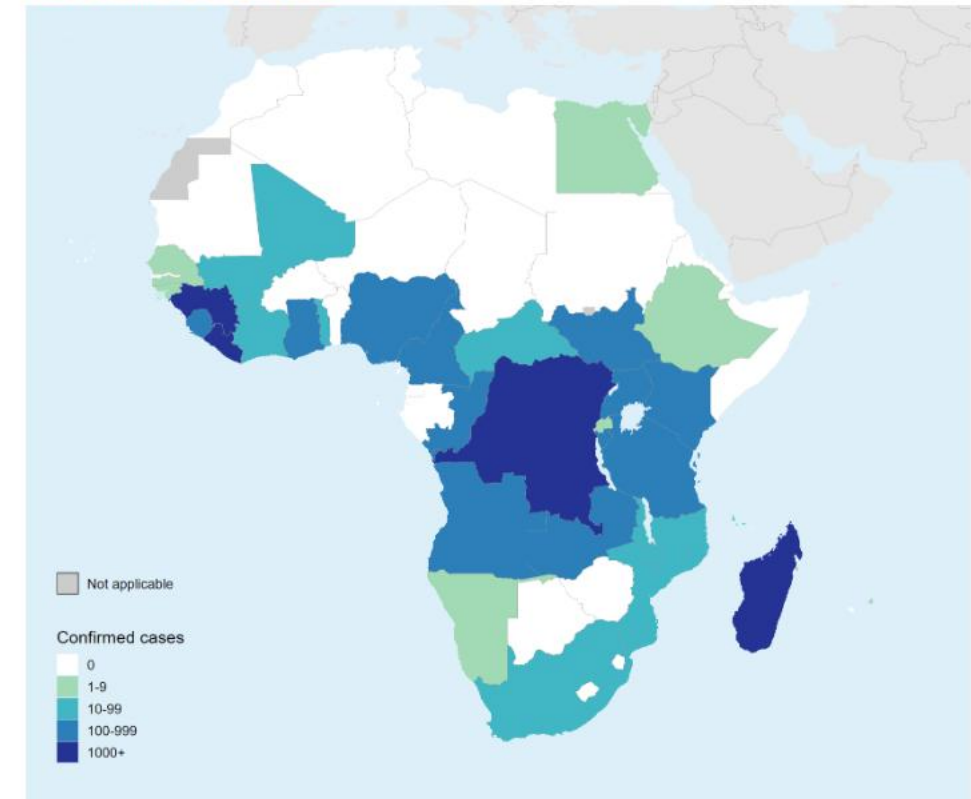
SEPTEMBER 9, 2022

MMWR

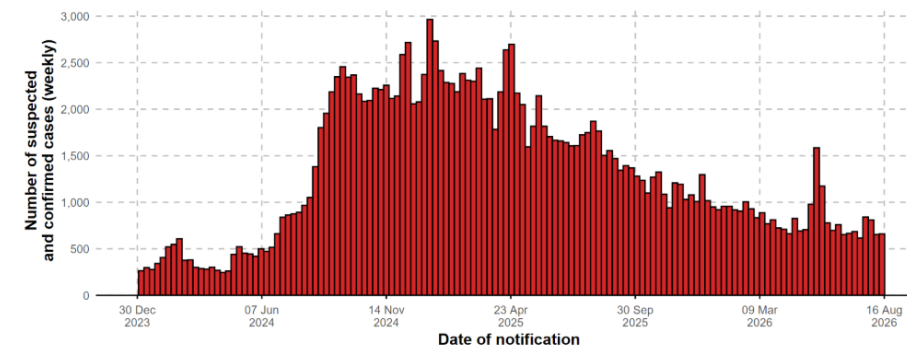
So Where Are We Now?

- Democratic Republic of Congo (DRC) experiencing its largest mpox outbreak in history
 - Since Jan 2024: >34,000 laboratory-confirmed cases, >75 deaths
 - Median annual cases 3767
 - **Both Clade I & II** mpox viruses
 - Some clusters associated with sexual transmission, including among MMSC (not previously reported)
 - Case fatality rate ~2.4%
- Multiple other African countries with mpox activity (both clades)

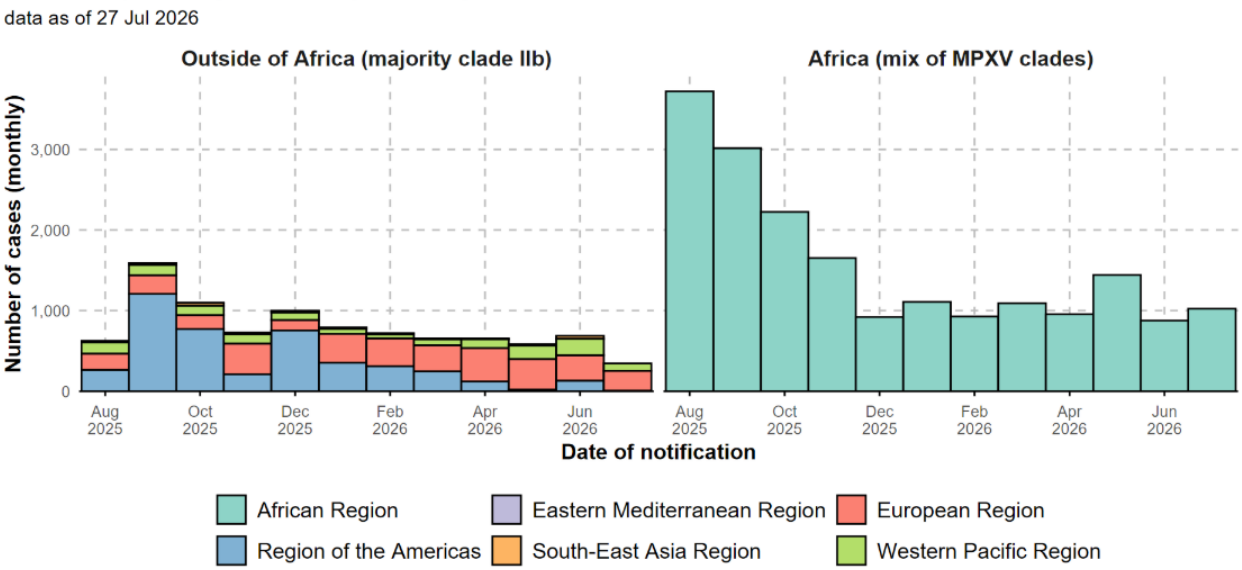
Total confirmed mpox cases, Africa
Past 12 months, as of 16 Aug 2026



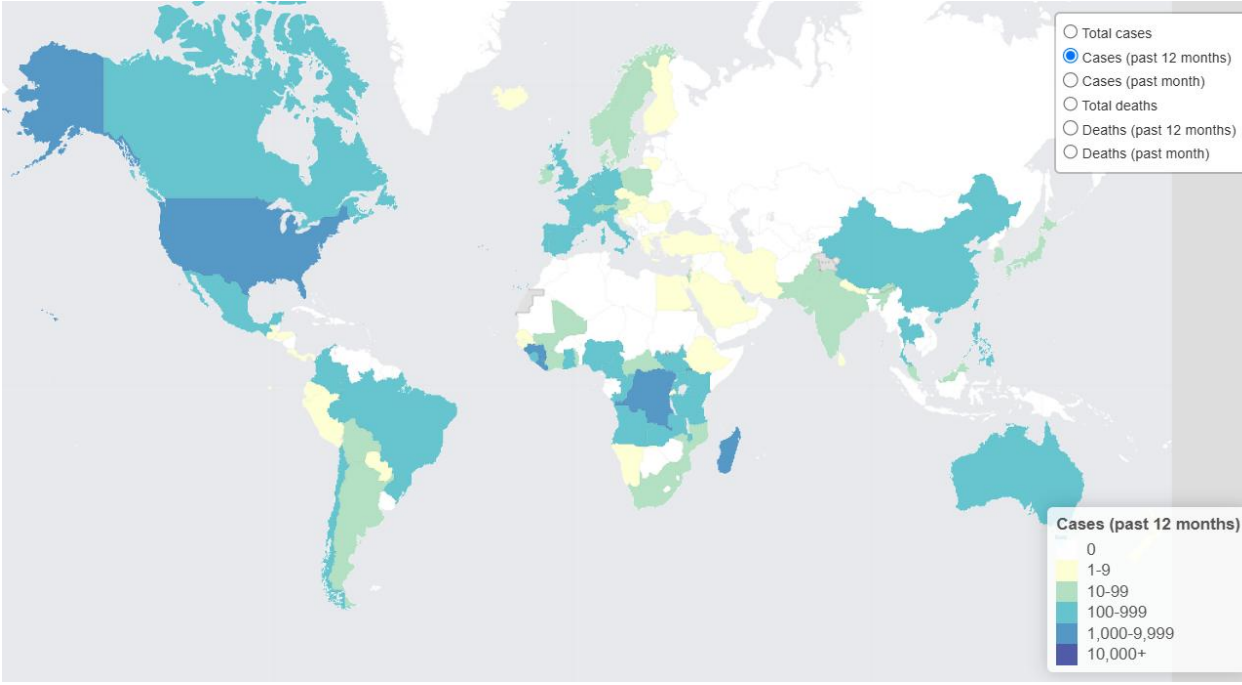
Trends in suspected and confirmed mpox cases in the Democratic Republic of the Congo
data as of 16 Aug 2026



Global Mpox Activity

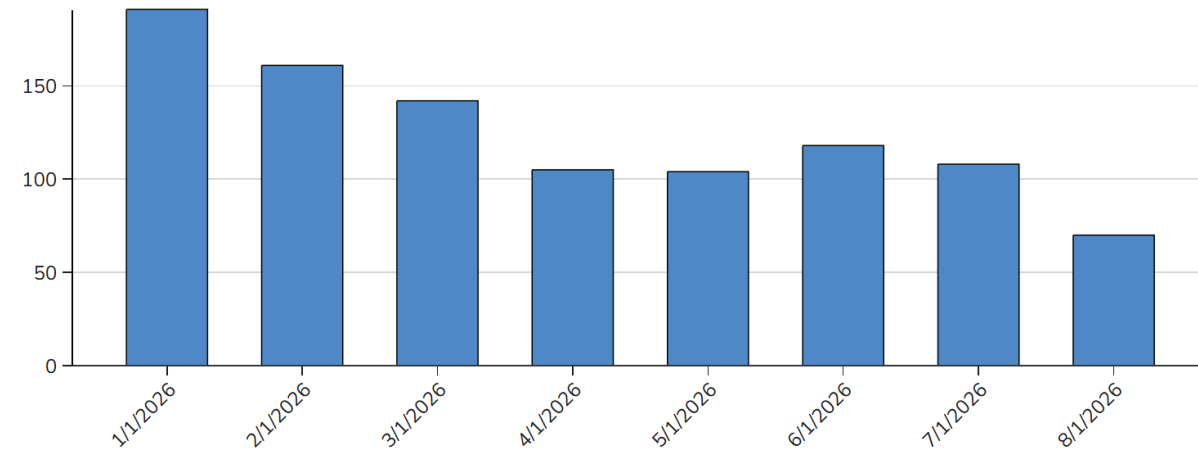
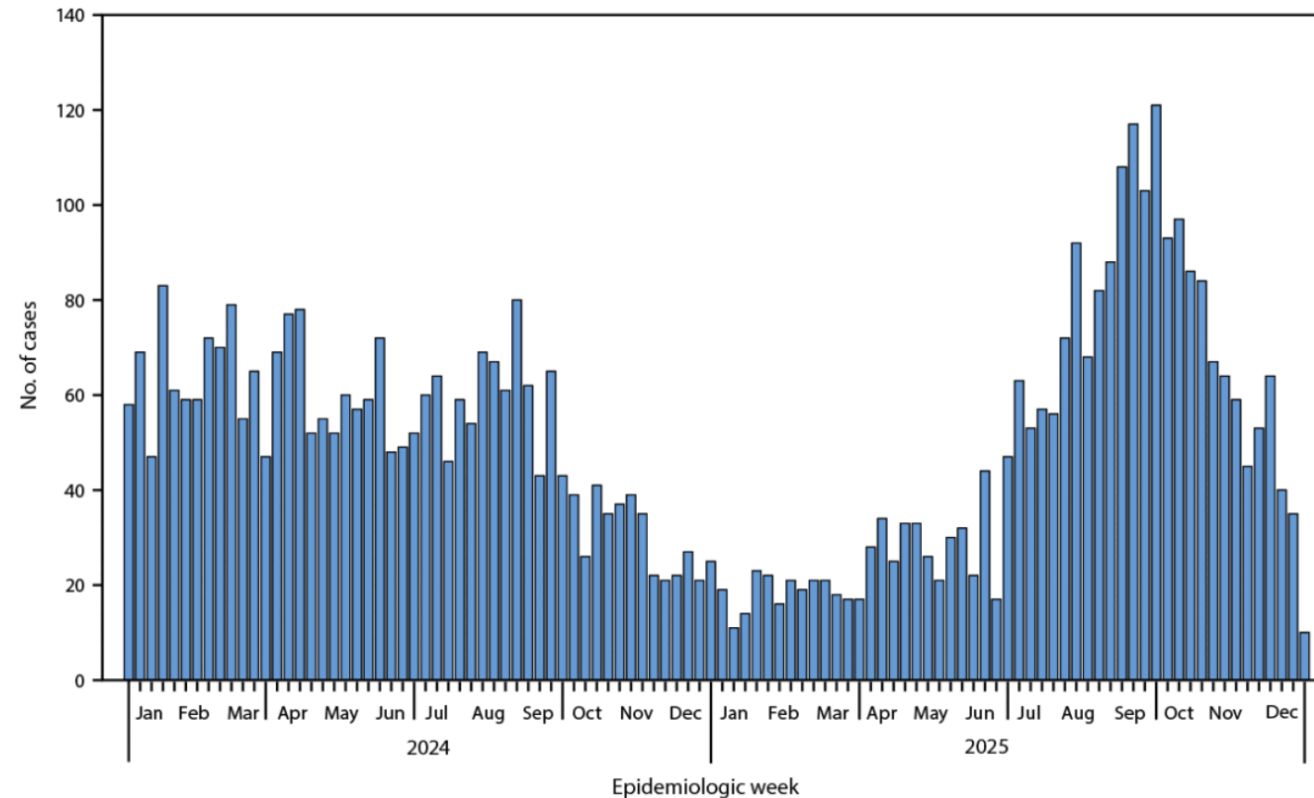


Source: WHO



U.S. Mpox Activity

- 2024-25:
 - 5,322 cases reported
 - 1 travel-related clade 1b case in 2024
 - 10 clade 1b cases in 2025
 - 96.5% male, of whom 79% reported MMSC
 - **42% known to be HIV-infected**
 - 6 deaths reported (CFR 0.4%)
 - Majority have unknown vaccination status; of those known, only ~15% fully vaccinated
- Clade 1b cases
 - Oct 2025: Cluster of 3 non-travel-associated cases in CA, linked to same travel-associated case
 - No evidence of sustained transmission
- Overall data suggest transition toward endemic circulation



Mpox Transmission (U.S.)

- Close or intimate contact:
 - Oral, anal or vaginal sex, or touching genitals
 - Direct skin-to-skin contact with mpox rash or scabs
 - Contact with saliva, upper respiratory secretions or bodily fluids or lesions around anus, rectum or vagina of person with mpox
 - Hugging, massage, kissing
 - Prolonged face-to-face interactions (such as talking or breathing)
 - Maternal-fetal transmission (in utero or during/after birth)
- Touching objects
 - Via handling items (including clothing, linens, fetish gear, sex toys) contaminated by person with mpox

Cases Outside of Africa (WHO):

Variable	Case Profile			
	Overall		Past 12 months ¹	
	Responded Yes	Total cases with response	Responded Yes	Cases with response
Men who have sex with men	35 639 (87.4%)	40 766	1688 (92.9%)	1817
Persons living with HIV	20 423 (50.3%)	40 602	516 (34.4%)	1498
Health worker	1332 (3.1%)	42 691	5 (0.5%)	1032
Travel History	5791 (17.6%)	32 812	456 (25.9%)	1764
Sexual Transmission	22 713 (89.1%)	25 494	1309 (95.7%)	1368
Hospitalized ²	7245 (8.9%)	81 414	249 (12.4%)	2002
ICU	41 (0.3%)	12 416	0	584
Died	203 (0.3%)	65 403	2 (0.1%)	1546

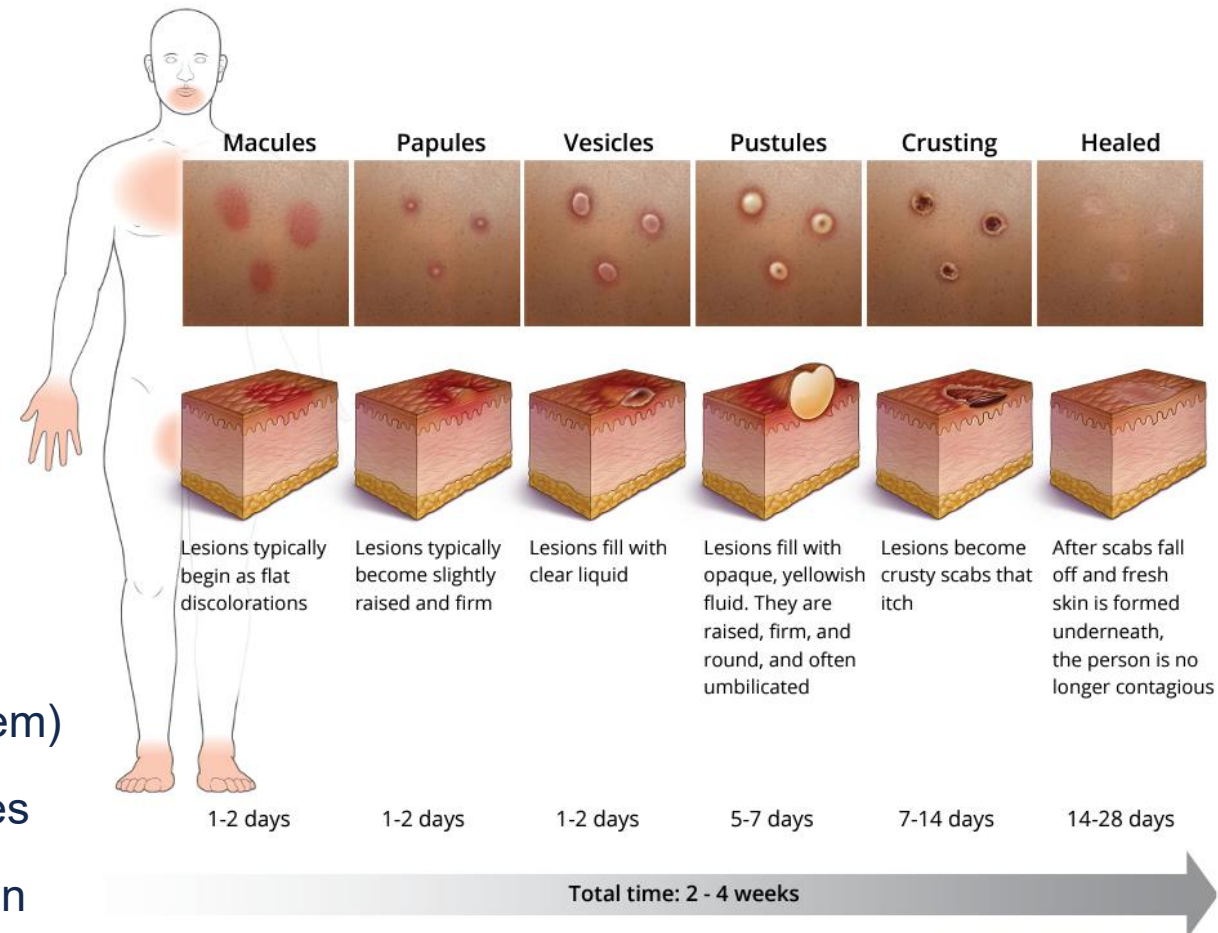
¹ From 31 Jul 2025 to 31 Jul 2026

² May be hospitalized for isolation or medical treatment

Clinical Progression

- Incubation period: 3-17 days
 - Not contagious to others
 - Unclear frequency of asymptomatic/pre-symptomatic spread
- Prodrome: fever, malaise, headache, sore throat, cough, swollen lymph nodes (cervical/submandibular, axillary, inguinal)
 - May be contagious
 - Not all patients will experience prodrome
- Rash
 - May first develop on tongue and in mouth (enanthem)
 - May be diffuse/localized (e.g., genitals/rectum)
 - Typical progression (macules → papules → vesicles → pustules → scabs) over 7-14 days
 - Contagious until all lesions have scabbed and fallen off, and fresh skin underneath

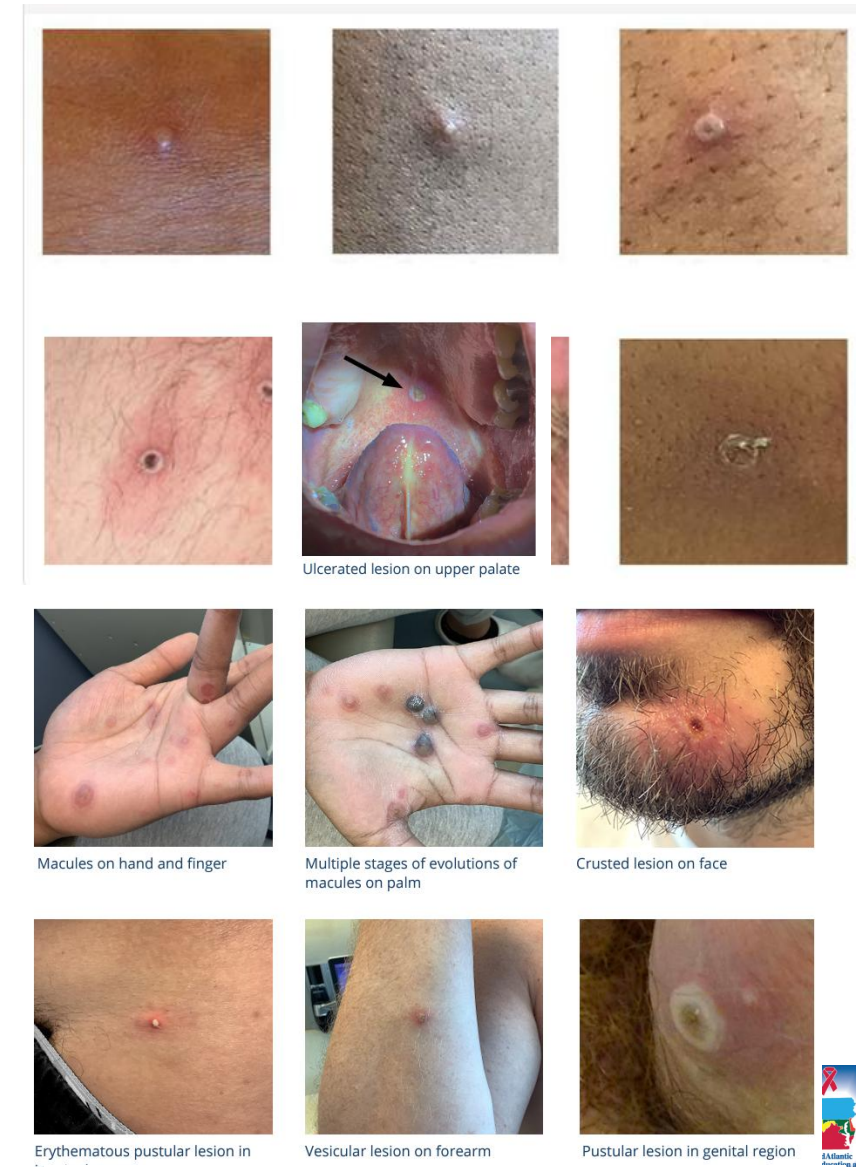
MPOX LESION PROGRESSION DESCRIPTION AND TIMELINE



[Mpox Clinical Guide - Clinical Guides - National STD Curriculum](#)

Who Should be Tested?

- Testing only recommended if rash consistent with mpox present
 - Sores inside mouth, vagina or anus
 - Proctitis (may not have visible sores)
- Epidemiologic factors informing clinical suspicion:
 - Within 21 days of onset:
 - Contact with person(s) with similar rash or diagnosis of confirmed/ probable mpox
 - Close or intimate contact with individuals in social network experiencing mpox activity
 - Travel outside US to country with confirmed cases (or endemic)
 - Contact with dead or live animal or exotic pet or product derived from such animals (game meat, lotions, powders, etc.)



Mpox Testing

- Optimal diagnostic samples from skin lesions:
 - Roof or fluid from vesicles and pustules, and dry crusts
 - Mucosal lesions can also be swabbed
 - Tests not validated for rectal swab when no lesions visible
- Available from commercial labs or Public Health Laboratory
 - DPHL will perform initial orthopoxvirus PCR
 - If negative → no further workup (clinical discretion needed)
- Serology available but not recommended
- Differential diagnosis:
 - Swab for HSV/VZV PCR (usual collection kit/process)
 - Serology for syphilis (RPR)
 - Rectal/pharyngeal swabs & urine for gonorrhea & chlamydia
- Co-infections common
- **HIV testing if not known to be infected**
 - HIV Ag/Ab screen +/- viral load

Specimen Collection

- **Use appropriate PPE!!**
- More than one lesion should be sampled, preferably from different locations on body and/or from lesions with differing appearances (2-3 lesions total)
- Applying firm pressure, swab lesion with two separate sterile dry swabs for each lesion
 - Use synthetic, not cotton, swabs
 - Do not wipe or clean lesion before swabbing
 - De-roofing lesion **not recommended** (pain, needlestick injury); but if lesions break, sample fluid
 - Crusts can be sampled as well (lab-dependent)
- Determine what type of transport media (if any) lab will accept
 - Dry swabs & crusts vs. viral transport media (VTM) or universal transport media (UTM)

MONKEYPOX



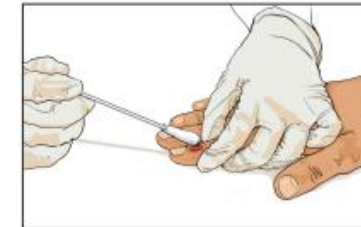
Testing Patients for Monkeypox

What lesion specimens to collect

- Collect lesion specimens for initial monkeypox testing at Laboratory Response Network (LRN) laboratories located within your public health department or at authorized commercial laboratories.
 - Skin lesion material is recommended.
 - Contact the laboratory (LRN or commercial) for specifics on acceptable specimen type.
- For further characterization of a specimen at CDC, three types of specimens are accepted.
 - Dry swabs of lesion material
 - Swabs of lesion material in viral transport media (VTM)
 - Lesion crusts

How to collect lesion specimens

1. Wear appropriate personal protective equipment (PPE).
2. Collect two swabs from each lesion, preferably from different locations on the body or from lesions which differ in appearance.
 - Use sterile, dry synthetic swabs (including, but not limited to polyester, nylon, or Dacron swabs) with a plastic, wood, or thin aluminum shaft. (Any type of shaft is acceptable as long as it can be broken or cut).
 - Do not use cotton swabs.



3. Generally, with **vigorous** swabbing, sufficient monkeypox virus DNA is present on the surface of a lesion, and you don't need to de-roof the lesion before swabbing. Put each swab into a separate container, either:
 - By breaking off or cutting the end of each swab's applicator into a 1.5- or 2-mL screw-capped tube with O-ring or other sterile leak-proof container (e.g. sterile urine cup) or
 - By putting the entire swab in a sterile container that has a gasket seal. Use a plastic container instead of a glass container, when possible.

How to ship specimens

- Specimens can be shipped as UN 3373 Biological Substance, Category B.
- Specimens should first be tested by an LRN or authorized commercial laboratory unless you are authorized to send specimens directly to CDC.
- If you are authorized to send specimens directly to CDC, or if you are sending specimens to CDC for viral characterization:
 - Store refrigerated (2-8°C) or frozen (-20°C or lower) within an hour of collection.
 - Ship specimens on dry ice, when possible. Specimens received outside of acceptable temperature ranges will be rejected.
 - Include an electronic Global File Accessioning Template (GFAT) form and ensure that each specimen is labeled with a unique identifier GFAT.
 - If less than 20 specimens are being submitted to CDC, a [CDC 50.34 form](#) for each specimen may be submitted instead of a GFAT.
 - Please include a printed manifest of your specimens with your shipment.
 - Email the GFAT form to Poxviruslab@cdc.gov

For patients with confirmed monkeypox, health care providers may send serum to CDC directly for pox serology test. See [CDC Poxvirus Serology](#) for details. For more information, see [CDC's 2022 Monkeypox Information for Healthcare Professionals](#).

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Mpox Treatment

- Most with mild disease will recover with supportive care
 - Pain control; NSAIDS, acetaminophen, opioids if needed; gabapentin?
 - Proctitis/severe rectal pain: topical lidocaine, stool softeners, sitz baths
 - Pharyngitis: viscous lidocaine, salt-water gargle
 - Consider hospitalization if: intractable pain, inability to swallow, severe N/V, ocular disease
- Pharmacologic treatment:
 - Tecovirimat (TPOXX): Studies in African and U.S. (STOMP) have not found benefit for most patients in terms of decreased pain or duration of lesions
 - Others: Brincidofovir, cidofovir, vaccinia immune globulin
 - Consider if:
 - Severe disease (hemorrhagic disease, large confluent lesions, secondary infections, sepsis, ocular involvement, unmanageable pain)
 - Severe immune compromise
 - Pediatric or pregnant/breastfeeding
 - Skin conditions compromising skin integrity

Mpox Prevention

- Patient counseling
 - Risk reduction (awareness of lesions)
 - Limited effectiveness of condom use for mpox
- JYNNEOS™ vaccine now commercially available
 - Prevention
 - Post-exposure prophylaxis
- Vaccination will be discussed at later session today

Case #5: Follow-up

- 47-year-old man with HIV/AIDS with intermittent adherence to visits and ARVs
- CD4 148, VL 60
- New rash on arms, shoulders, back & chest
- No prodromal or genital lesions
- New sexual partner about 3 weeks prior with unprotected oral and anal receptive sexual activity
- Not vaccinated against mpox
- Shares bedroom/bed with regular male partner (also PWH)

Problems/Issues

- New rash concerning for mpox
- Advanced immunosuppression
- Susceptible partner

Result

- Lesions swabbed for mpox and HSV/VZV
- Commercial lab only did HSV/VZV (argh)
- State DOH attempted to re-test but unable to reach patient
- Due to low CD4, went through IND process to obtain tecovirimat, which he tolerated without issues
- Partner eventually vaccinated, never developed lesions

Trichomonas vaginalis

Trichomoniasis

- *Trichomonas vaginalis* most common non-viral STI worldwide
 - Up to 53% of women with HIV infected
 - Prevalence in men less clear (routine screening not recommended)
- Infection increases HIV transmission (both men & women), and increases HIV acquisition in women
- Screening:
 - **Women with HIV: upon entry to care & then annually**
 - Men with HIV: no screening recommendation

Clinical manifestations:

- Usually asymptomatic/minimally symptomatic
- Women:
 - Vaginal discharge (diffuse, malodorous, yellow-green)
 - Vulvar irritation
 - May increase risk of PID
- Men:
 - Urethritis

Trich: Diagnosis & Treatment

Diagnosis

- NAAT assays preferred
 - May be in combination with GC/CT, BV, and/or Mgen
 - Vaginal (can be self-collected) or endocervical
 - First catch urine (less sensitive)
 - Urethral swab more sensitive in men
- Wet mount of vaginal secretions
- Rapid antigen tests, culture less sensitive
- Trichomonads sometimes detected on cervical cytology
- Retest in 3 months, regardless of whether partners treated

Treatment

- Women with HIV:
 - Metronidazole 500 mg PO BID x 7 days
 - **Single-dose therapy not recommended**
 - Alternative therapies not recommended in those with HIV
- Men with HIV:
 - Metronidazole 2 gm PO x 1
 - Tinidazole 2 gm PO x 1
- Presumptive treatment of sex partners

Screening for STIs in People With HIV

Entry to Care: STI Evaluation

- HAV antibody (IgG or total)
- HBV surface antigen (sAg), core antibody (cAb), surface antibody (sAb)
- HCV Ab (with reflex to viral load if Ab+)
- Syphilis testing (treponemal or non-treponemal)
 - Obtain old RPR titers/treatment hx if previously infected, if possible
- Gonorrhea/chlamydia NAAT (+ trich if female)
 - Extragenital testing for MMSC

What NOT To Order:

- HAV antibody (IgM) – included in many lab “hepatitis panels”
- HBV DNA or HCV RNA in absence of suspected viral hepatitis or positive Ab
- HSV 1/2 antibodies in absence of symptoms
 - HSV-2 Ab can be considered
- *Mycoplasma genitalium* screening

Follow-up STI Screening (Summary)

- **Screen all sexually active MSW & women at least annually**
 - Depending on presence of ongoing risk factors & STI prevalence in community
 - Syphilis, urine/vaginal CT/GC, trich (women only)
 - HBV sAg if not immune
 - Extragenital testing not routinely recommended but can be offered to women who have receptive anal intercourse
- **Screen all sexually active MMSC every 3-6 months**
 - More frequent screening based on presence of ongoing risk & STI prevalence in community
 - Syphilis, GC/CT every 3-6 months
 - HCV Ab or RNA every 6-12 months
 - Extragenital screening (GC/CT): Screen at all anatomic sites of exposure every 3 to 6 months
- **Pregnancy:**
 - GC/CT: Screen in 1st & 3rd TM (if <25 or at increased risk)
 - Syphilis: Screen at first prenatal visit; if at high risk of infection repeat at 28-32 wk AND at delivery
 - If not screened during pregnancy OR if stillbirth after 20 weeks → screen at delivery
 - HBV: 1st trimester; repeat in 3rd TM if high risk
 - HCV: 1st trimester if ≥18y and never screened, or at risk

Other Screening Considerations

- Screening should take into account both sexual practices & anatomy
- If person has a cervix: GC, CT, cervical cancer/HPV screening
- Syphilis and pharyngeal/rectal GC/CT screening based on reported sexual practices & exposure



Partner Management

Partner Notification

- If both partners are your patients
 - Create opportunity for infected partner to speak privately; cannot share with partner without patient's permission
- Gonorrhea, chlamydia, mpox, syphilis (also chancroid) reportable nationally
 - Patient should be informed that public health will be reaching out to identify and notify partners (anonymously)
 - Patients encouraged to notify partners themselves and encourage testing and/or treatment
 - Patient should refrain from sexual activity with recurrent partners until both treated
 - Encourage patient to bring partner with to follow-up appointment



Partner Management

- Sex partners should be referred for evaluation, testing, and presumptive treatment
 - If sexual contact during prior 60 days of patient's onset of symptoms or diagnosis
 - Even if partner's testing done concurrently and negative
- If last sexual partner was > 60 days prior, most recent sex partner should be evaluated and treated
- Expedited partner therapy (EPT)
 - 20% reduction in chlamydia reinfection of index patient
 - 50% reduction in gonorrhea

Expedited Partner Therapy (EPT)

- Provision of extra prescription for STI treatment to patient, for them to give to partner(s) (not your patient[s]) exposed within last 60 days
- Encourage partner evaluation/testing, but if not able to, can offer EPT
- Typically focused on GC, CT & trichomonas
- Target population: male partners of infected women
- Not routinely recommended for MSM because of high co-infection rate (including undiagnosed HIV)
- How to do it (refer to your state's laws):
 - Generate 2 separate prescriptions under patient's name (can be electronic or written)
 - On one of the prescriptions, write "Expedited Partner Therapy" or "EPT"
 - Provide information sheet for patient and/or partner
 - Allergies, side effects, complications, pregnancy warning, etc.



STI Prevention

Case #6

- Derek is a 40-year-old single gay man with HIV (CD4 750, VL < 20 on DTG/3TC)
- He states that he typically has 1-2 new partners per month and uses condoms “most of the time.”
- He is seen every 6 months for HIV follow-up and STI testing.
- He had syphilis several years ago that was successfully treated.
- 6 months ago, he had an episode of urethritis and was diagnosed with chlamydia.
- Today, routine rectal screening was positive for gonorrhea. He is asymptomatic.
- He states he will try be more consistent with condom use but asks if there is anything else he can do.

Methods to Prevent STIs

- Behavioral & lifestyle counseling
- Provision of condoms, lube, etc.
- Needle exchange & drug treatment programs
- Regular testing
- Vaccination
 - Hepatitis B (for those with HIV: check post-vaccination sAb > 1 month after last dose)
 - Hepatitis A (for those with HIV: check post-vaccination sAb > 1 month after last dose)
 - HPV (to age 45)
 - Mpox
- **DoxyPEP**

What is DoxyPEP?

- Recommended by CDC June 2024 (AI): 200 mg of doxycycline given as post-exposure prophylaxis for chlamydia, gonorrhea & syphilis
 - Rx as: 200 mg (1 tab) or **100 mg (2 tabs)**
 - Ideally within 24 hr but no later than 72 hr after condomless anal or oral sex
 - No more than 200 mg/day; can take up to 4 doses/week
- Consider for MSM with ≥ 1 bacterial STI in past 12 months
 - Insufficient data for other populations



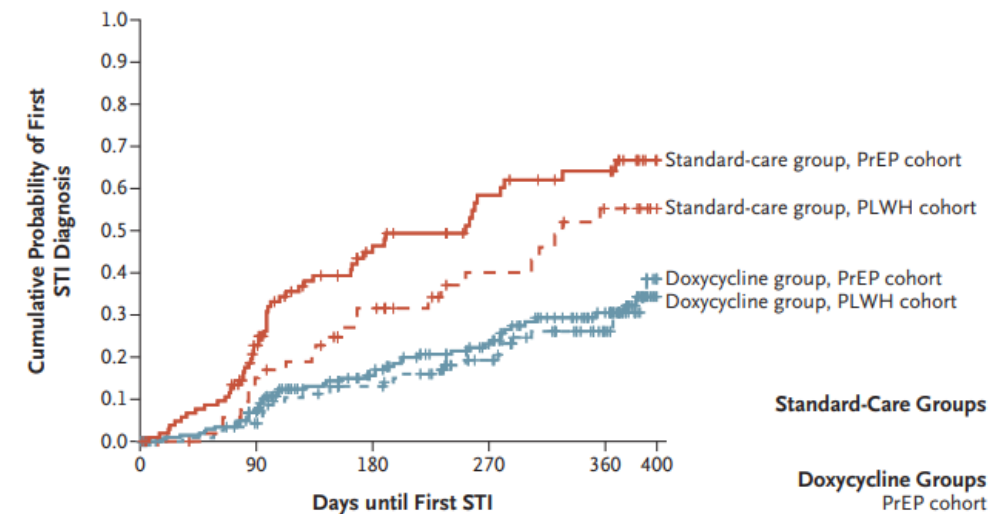
DoxyPEP: Efficacy

- Initial pilot/sub-studies published 2015-18
- Clinical trial data (published 2023):
 - 501 participants (MSM with HIV or taking PrEP)
 - STI dx'd in ~11% of doxyPEP group vs. 31% in standard care group
 - RR: 0.45 for GC, 0.12 for CT, 0.13 for syphilis
- Real-world studies:
 - >2000 patients at LA LGBT Center prescribed doxyPEP between 2019-2024
 - 85-90% reduction in syphilis & chlamydia
 - ~55% reduction in gonorrhea
- Other studies have not found doxyPEP to be effective in cis gender women (adherence)

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Postexposure Doxycycline to Prevent Bacterial Sexually Transmitted Infections



[Luetkemeyer AF, et al. NEJM 2023;388:1296](#)

[Osmundson J et al., Open Forum Infect Dis, 2/15/2025](#)



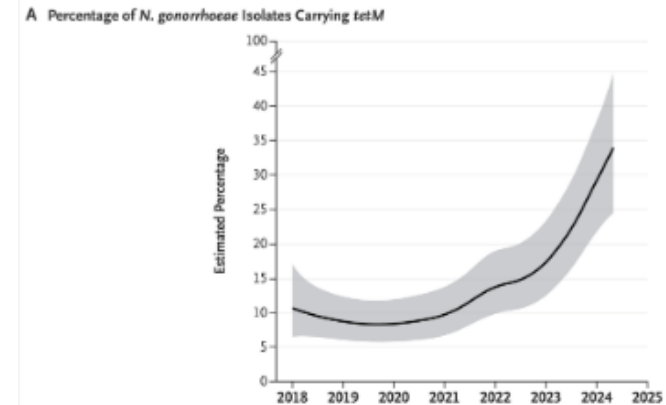
DoxyPEP: Risks

Side Effects

- Stomach upset
 - May be taken with food
- Sun sensitivity
 - Counsel re: sunscreen, sun avoidance
- Erosive esophagitis
 - Should be taken with 8oz water & remain upright x 30 minutes
- Intracranial hypertension (rare)
 - HA, blurred/double vision, vision loss
- Drug-drug interactions
 - Antacids, carbamazepine, calcium, iron, fosphenytoin, PPIs, others

Antimicrobial Resistance

- Gonorrhea
 - Less effective in locations with high tetracycline resistance among GC
 - High-level tetR rose from 2% to 65% in 3-year period
 - Associated with taking > 3 doses/mo.
 - Doxy concurrently became 1° treatment for chlamydia
- “Bystander” bacteria
 - *Staph aureus*
 - Colonization less common (27% vs. 36%) among doxyPEP users, but tetR more common (18% vs. 8%)
 - Among those + for *S. aureus*, tetR 66% in doxyPEP users (vs 22%)



Case #6: Follow-up

- 40-year-old single gay man with HIV (CD4 750, VL < 20 on DTG/3TC)
- 1-2 new partners per month, uses condoms “most of the time”
- Syphilis several years ago, treated
- Episode of chlamydial urethritis 6 months ago, treated
- Today, routine rectal screening positive for gonorrhea (asymptomatic)
- He states he will try be more consistent with condom use but asks if there is anything else he can do.

Problems/Issues

- Multiple different STIs over the past two years.
- Current rectal gonorrhea

Result

- Patient treated for GC & offered doxyPEP, in which he was very interested
- Taking ARVs consistently & appropriately; known to be immune to HAV & HBV; vaccinated vs. HPV & mpox
- Appropriate counseling regarding administration, risks and benefits, as well as safer sex practices
- Continues to follow up every 3 months for STI testing
- To date, no further STIs diagnosed (1 year later)



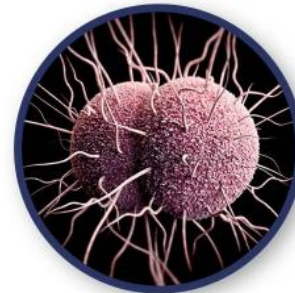
Additional Resources

Want to Learn More?

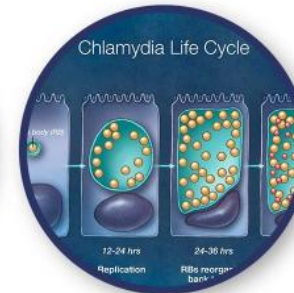


National STD Curriculum

THE MOST RECENT CDC STD
TREATMENT GUIDELINES INTEGRATED
INTO A FREE, UP-TO-DATE,
EDUCATIONAL WEBSITE. **FREE CE.**



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CLINICIANS, Got a Tough STI Question?

GET FREE EXPERT STI CLINICAL
CONSULTATION AT YOUR FINGERTIPS



Ask your question



National STI experts review



Response within 1-5 business
days, depending on urgency

GO

*THIS SERVICE IS FOR CLINICAL PROVIDERS, INQUIRIES FROM THE GENERAL PUBLIC WILL NOT BE ANSWERED

References

- [National HIV Prevention and Care Objectives: 2026 Update | HIV Data | CDC](#)
- [National STD Curriculum](#)
- [STI Treatment Guidelines | CDC \(2021\)](#)
- <https://endthesyndemicn.org/learn-more/>
- [Vital Signs: Missed Opportunities for Preventing Congenital Syphilis — United States, 2022 | MMWR](#)
- <https://hivinfo.nih.gov/understanding-hiv/fact-sheets/hiv-and-hepatitis-b>
- <https://hivinfo.nih.gov/understanding-hiv/fact-sheets/hiv-and-hepatitis-c>
- [Core Concepts - Sexually Transmitted Infections - Co-Occurring Conditions - National HIV Curriculum](#)
- [Ghanem K, et al. The Modern Epidemic of Syphilis. *NEJM* 2020;382:845-54](#)
- [Shrüfer P et al. Allergy, Asthma & Clinical Immunology 2022;18:26](#)
- [National Network of STI Clinical Prevention Training Centers](#)

THANK YOU SO MUCH

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Any Questions?

