

STIs 101

Christopher B. Hurt, MD, FIDSA

2023 Update



AETC Program – National Resources

- **National Coordinating Resource Center** – serves as the central web-based repository for AETC Program training and capacity building resources; its website includes a free virtual library with training and technical assistance materials, a program director, and a calendar of trainings and other events. Learn more: <https://aidsetc.org/>
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- **National HIV Curriculum** – provides ongoing, up-to-date HIV training and information for health professionals through a free, web-based curriculum; also provides free CME credits, CNE contact hours, CE contact hours, and maintenance of certification credits. Learn more: www.hiv.uw.edu

Disclosures

- This program is supported by the Health Resources and Services Administration (HRSA) of the U.S. Department of Health and Human Services (HHS) under grant number U1OHA30535 as part of an award totaling \$4.2m. The contents are those of the author(s) and do not necessarily represent the official views of, nor an endorsement, by HRSA, HHS, or the U.S. Government. For more information, please visit: <https://www.hrsa.gov>
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Christopher B. Hurt, MD, FIDSA

Associate Professor of Medicine

Associate Chief for Clinical Operations, UNC Division of ID
Director, North Carolina HIV Training & Education Center
Site PI, Ryan White HIV/AIDS Program Part D, UNC ID Clinic

Institute for Global Health & Infectious Diseases
University of North Carolina at Chapel Hill
School of Medicine

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The views expressed are not necessarily those of HRSA or the NIH.

- Describe STI trends in the United States.
- Explain the signs and symptoms of major STIs in terms that clients can understand.
- Explain the clinical and laboratory diagnosis of syphilis and a rationale for annual testing.

Please be aware this presentation includes some graphic images



STI rates in the United States, 1941-2021

All Americans, all ages

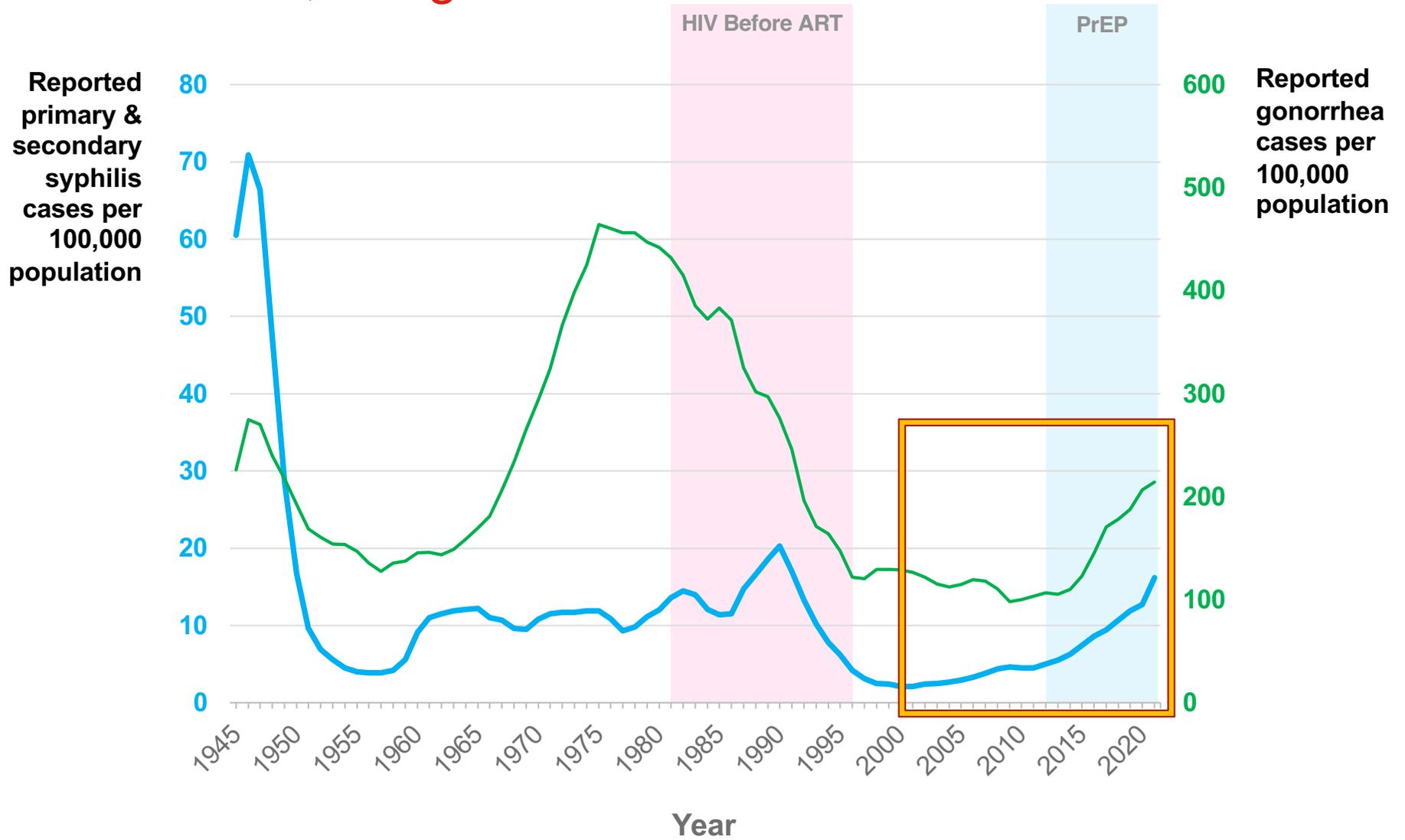


Figure by Christopher Hurt

Data from Table 1 → <https://www.cdc.gov/std/statistics/2021/tables/1.htm>

STI rates in the United States, 2000-2021

All Americans, all ages

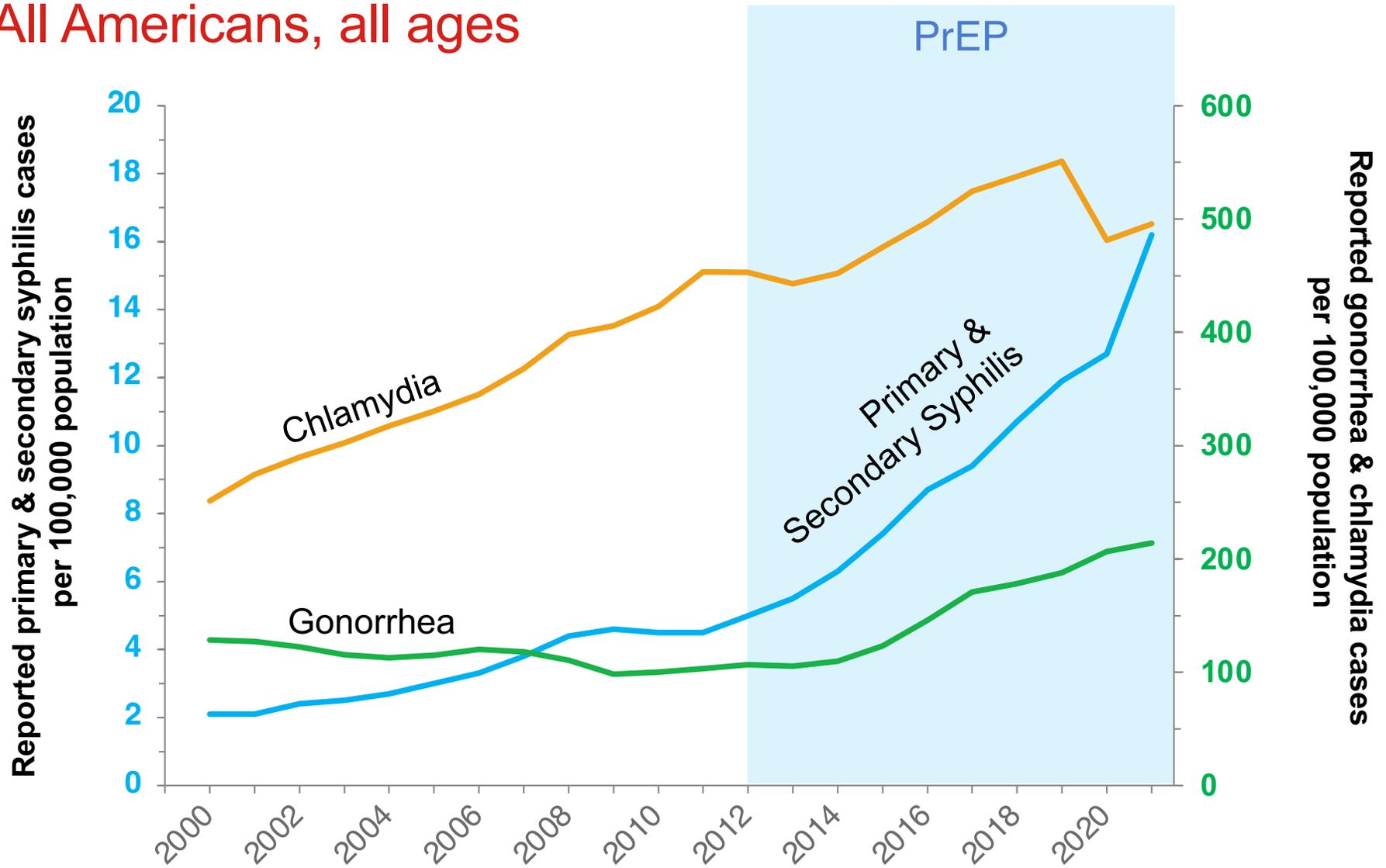
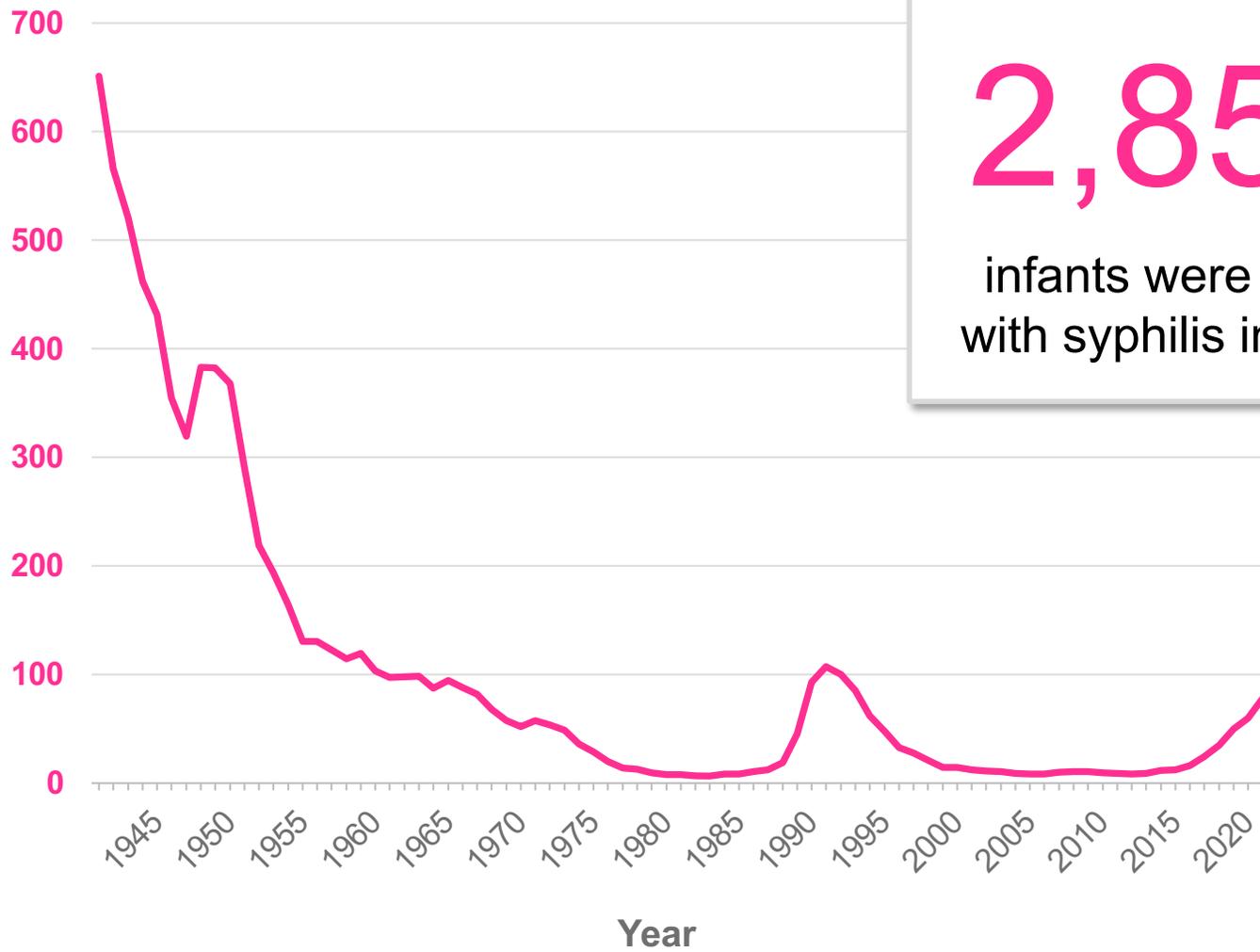


Figure by Christopher Hurt

Data from Table 1 → <https://www.cdc.gov/std/statistics/2021/tables/1.htm>

Congenital syphilis rates in the US, 1941-2021

Reported congenital syphilis cases per 100,000 live births

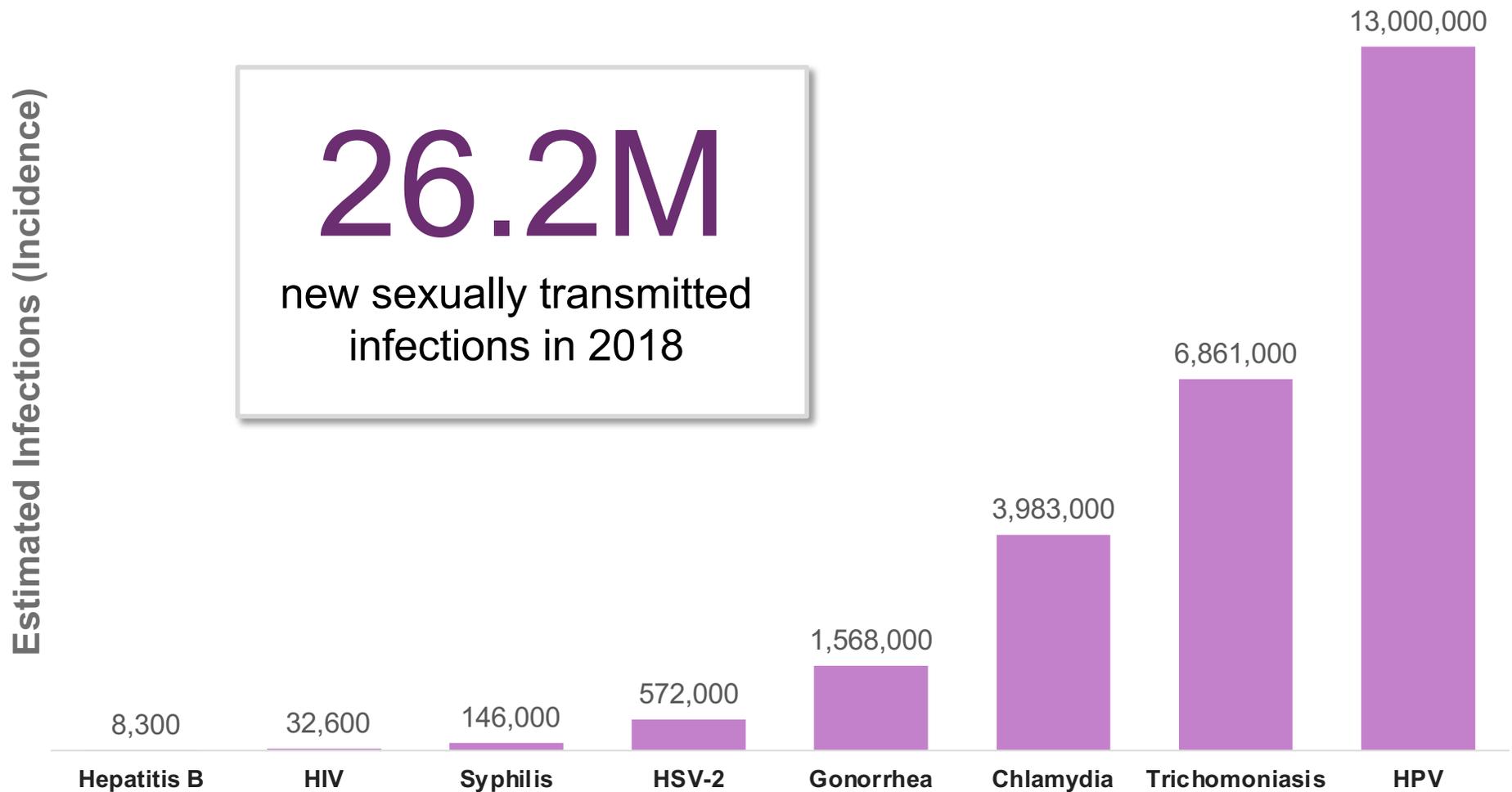


2,855
infants were born with syphilis in 2021

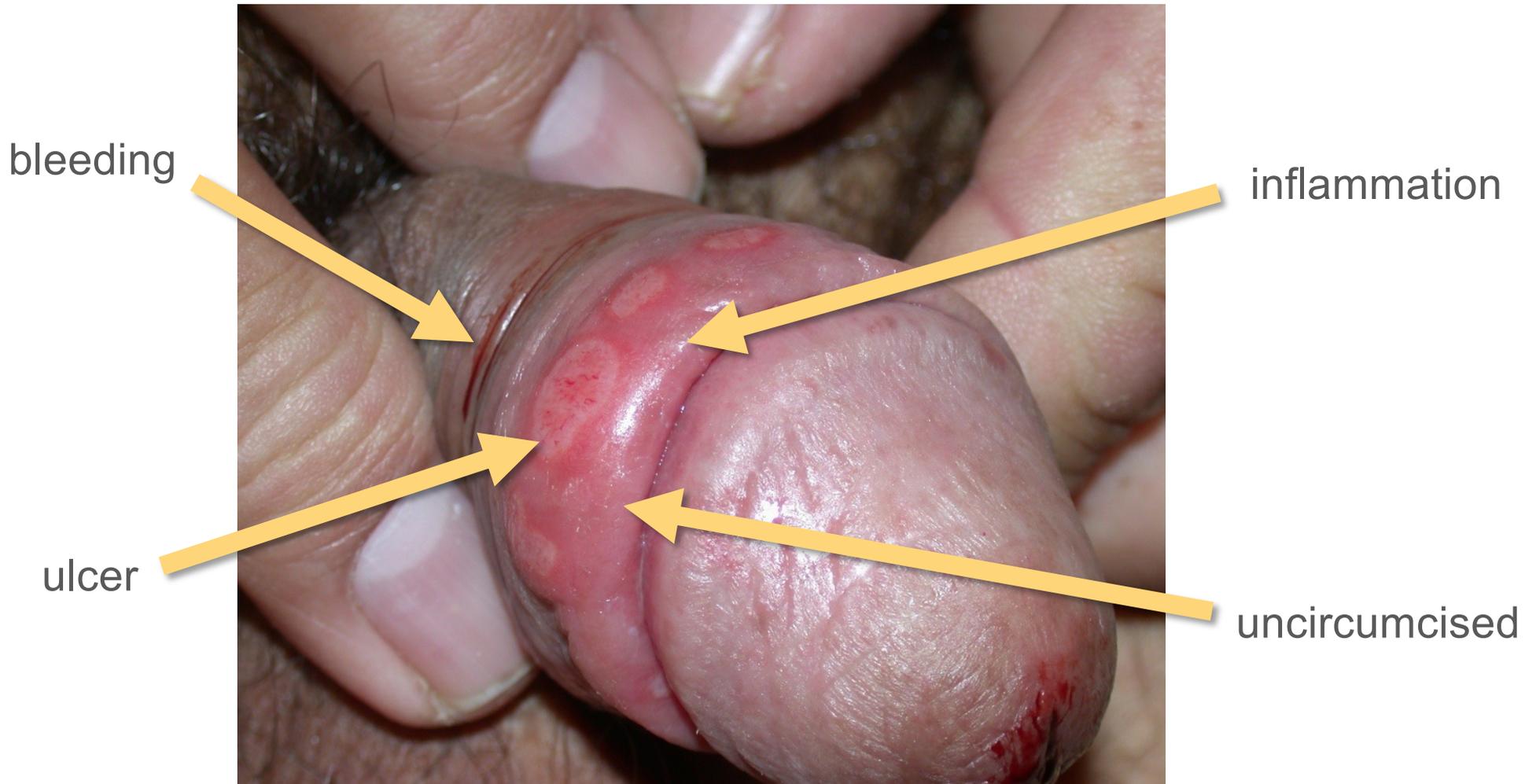
Figure by Christopher Hurt

Data from Table 1 → <https://www.cdc.gov/std/statistics/2021/tables/1.htm>

Estimated Incidence of STIs in the US, 2018



STIs facilitate HIV transmission



Fleming DT and Wasserheit JN. *Sex Transm Inf* 1999;75:3-17.

Image from AL/NC STD/HIV Prevention Training Center, via "STD 101 in a Box" toolkit, <https://www.cdc.gov/std/training/std101/home.htm>

If not already done in prior 12 months*

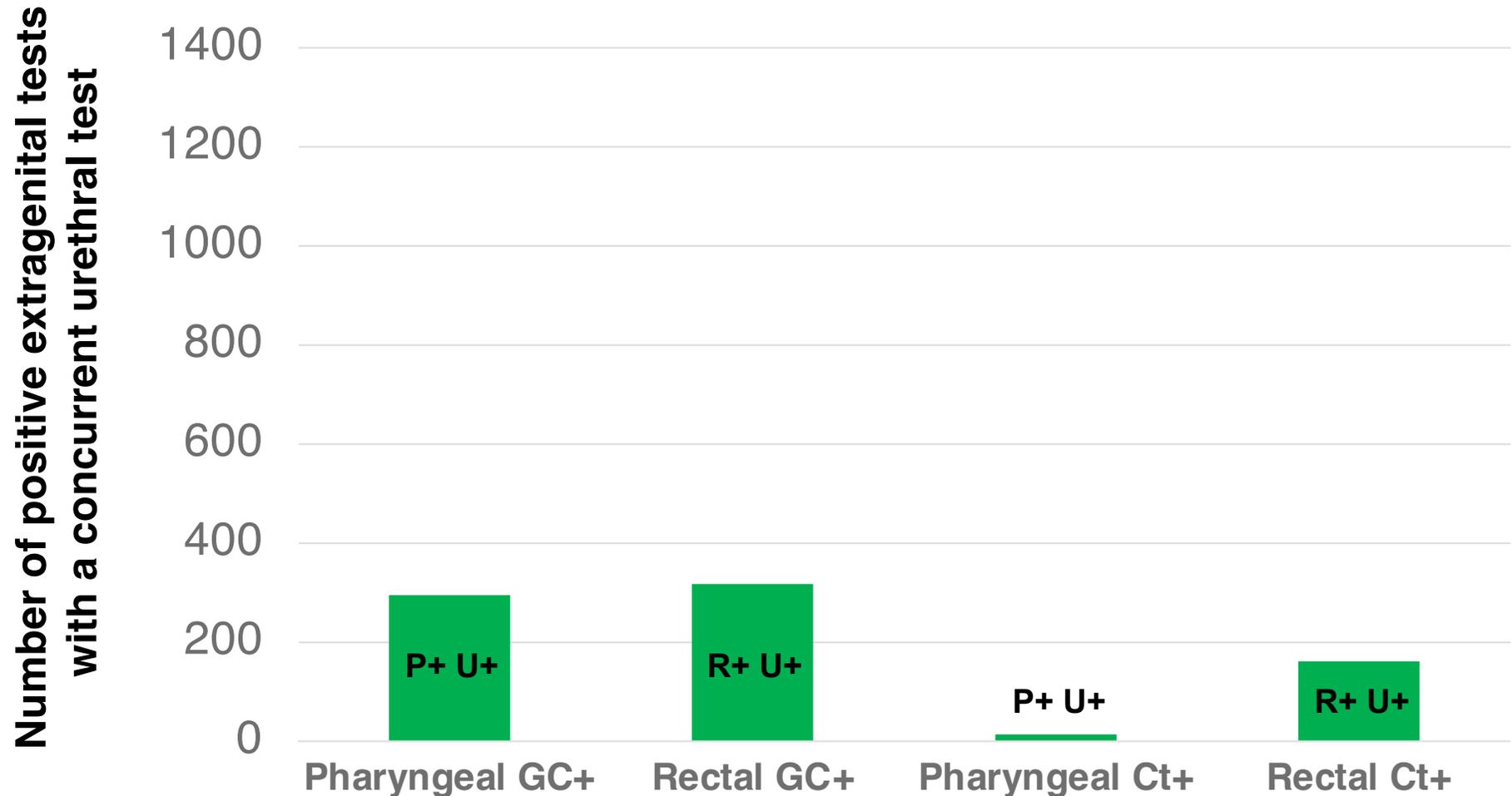
- ✓ RPR for syphilis
- ✓ Gonorrhea and chlamydia
 - Nucleic acid tests preferred
 - **Extragenital sites too!**



* **As often as every 3 months, in certain populations**

Extragenital sites may harbor “silent” STIs

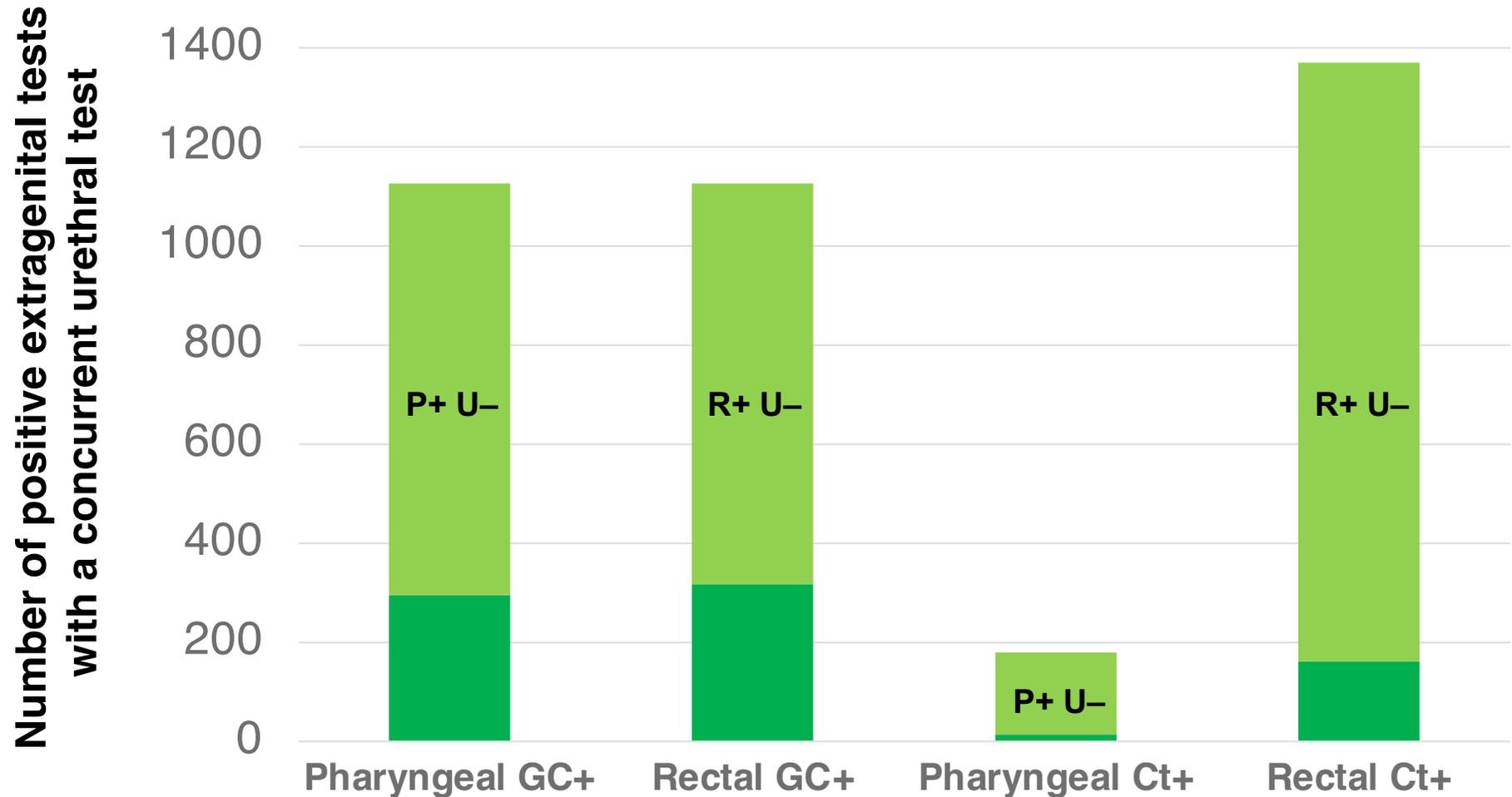
21,994 MSM seen @ 42 STD Surveillance Network clinics, 2011-12



Positive concurrent urethral test

Extragenital sites may harbor “silent” STIs

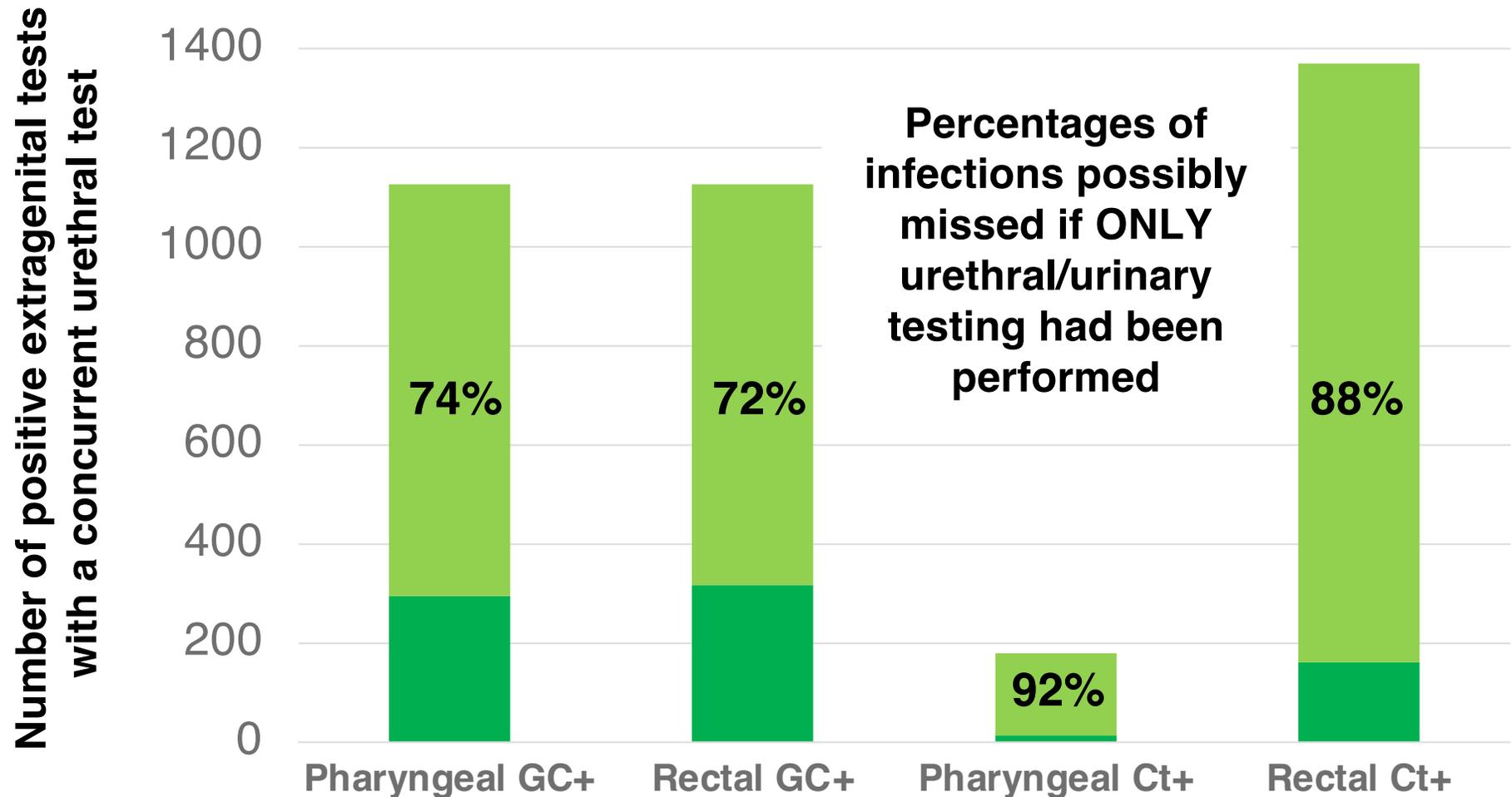
21,994 MSM seen @ 42 STD Surveillance Network clinics, 2011-12



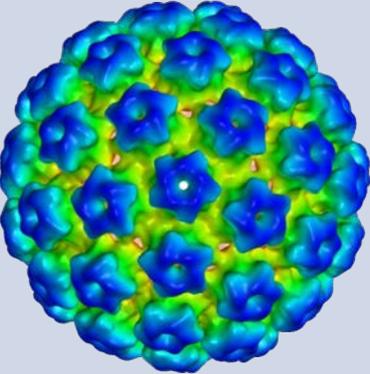
- Light green square: Negative concurrent urethral test
- Dark green square: Positive concurrent urethral test

Extragenital sites may harbor “silent” STIs

21,994 MSM seen @ 42 STD Surveillance Network clinics, 2011-12



- Negative concurrent urethral test
- Positive concurrent urethral test

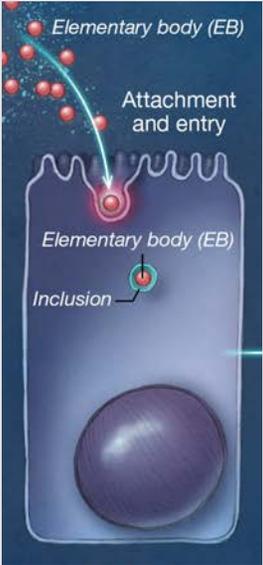
| Caused by | Can infect | Burden | Curable? |
|-------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| <p>A virus</p> <p>Human papillomavirus (HPV)</p>  | <p>Any lining of the body (skin or mucosa)</p> | <p>In 2018</p> <p>13M</p> <p>cases in US</p> <p>Equates to</p> <p>3,978</p> <p>cases for every 100,000 Americans (in 2018)</p> | <p>Sort of...</p> |



Cauliflower-like,
raised, fleshy
warts from **HPV**



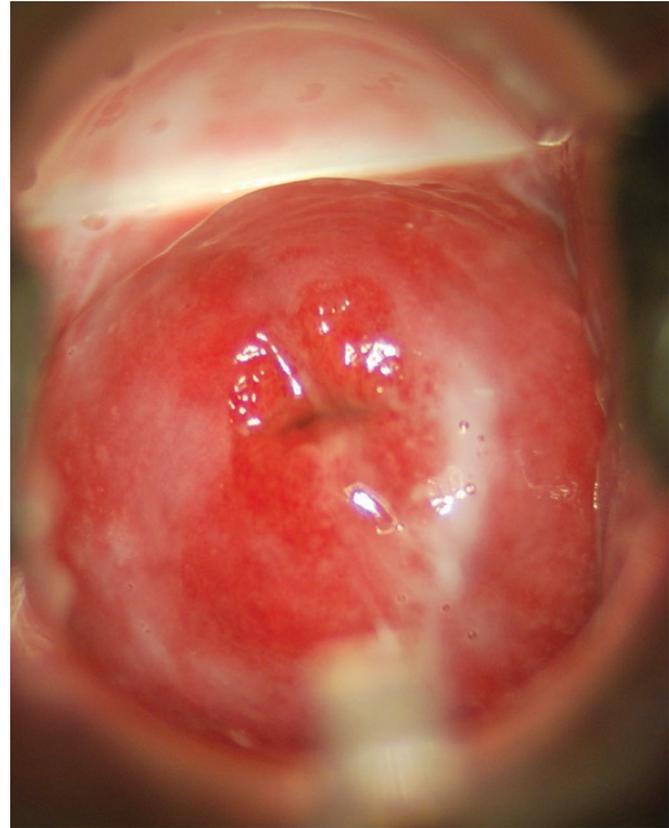
Top Left: <https://www.ncbi.nlm.nih.gov/books/NBK441884/>
Top Right: <https://www.sehersirin.com/wp-content/uploads/2018/07/makat-sgili-768x525.jpg>
Bottom Right: <https://stiatlas.org/Index.aspx> "Cervical wart 3"

| Caused by | Can infect | Burden | Curable? |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| <p>A bacteria</p> <p><i>Chlamydia trachomatis</i> (abbreviated CT)</p>  | <p>Cervix (cervicitis)</p> <p>Urethra (urethritis)</p> <p>Throat (pharyngitis)</p> <p>Rectum (proctitis)</p> | <p>In 2018</p> <p>4M cases in US</p> <p>Equates to</p> <p>1223 cases for every 100,000 Americans</p> | <p>Yes</p> <p>Doxycycline 100mg PO BID for 7 days</p> |

Prevalence statistics from: <https://www.cdc.gov/std/statistics/prevalence-2020-at-a-glance.htm>

Treatment recommendations from: <https://www.cdc.gov/std/treatment-guidelines/toc.htm>

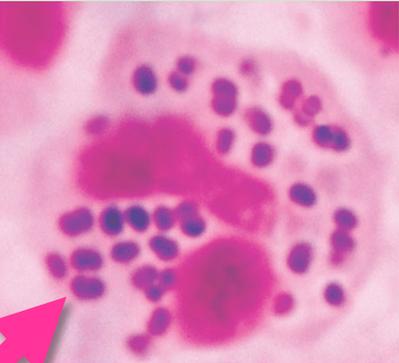
Image from: <https://cdn.std.uw.edu/doc/316-5/life-cycle-chlamydia.jpg>



Clear-to-cloudy discharge from **chlamydia**

Penis: Harryman L & Horner P. *Medicine (UK)*. 2010. 38(5), 249-254

Cervix: <https://accessmedicine.mhmedical.com/content.aspx?bookid=2547§ionid=206784522>

| Caused by | Can infect | Burden | Curable? |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| <p>A bacteria</p> <p><i>Neisseria gonorrhoeae</i> (also called GC)</p>  | <p>Cervix (cervicitis)</p> <p>Urethra (urethritis)</p> <p>Throat (pharyngitis)</p> <p>Rectum (proctitis)</p> <p>Joints (arthritis)</p> <p>Tendons (tenosynovitis)</p> | <p>In 2018</p> <p>1.6M cases in US</p> <p>Equates to</p> <p>489 cases for every 100,000 Americans</p> | <p>Yes</p> <p>Ceftriaxone 500mg IM once</p> |

Prevalence statistics from: <https://www.cdc.gov/std/statistics/prevalence-2020-at-a-glance.htm>

Treatment recommendations from: <https://www.cdc.gov/std/treatment-guidelines/toc.htm>

Image from: <http://www.medical-labs.net/wp-content/uploads/2014/11/Detail-of-structure-of-Neisseria-Gonorrhoeae.jpg>



Yellow-green (purulent) discharge from **gonorrhea**

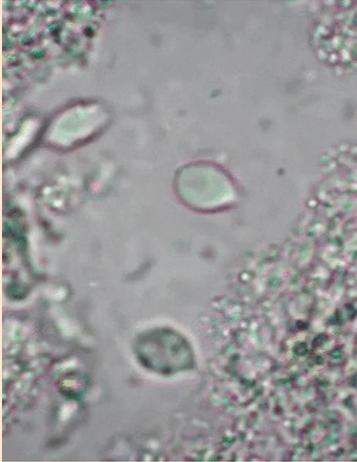
Left: [https://stiatlas.org/images/full/Gonococcal_urethritis_\(02\).jpg](https://stiatlas.org/images/full/Gonococcal_urethritis_(02).jpg)

Right: <https://doctorlib.info/gynecology/hacker-moore-essentials-obstetrics-gynecology/hacker-moore-essentials-obstetrics-gynecology.files/image166.jpg>

GENERALLY...

Gonorrhoea is green

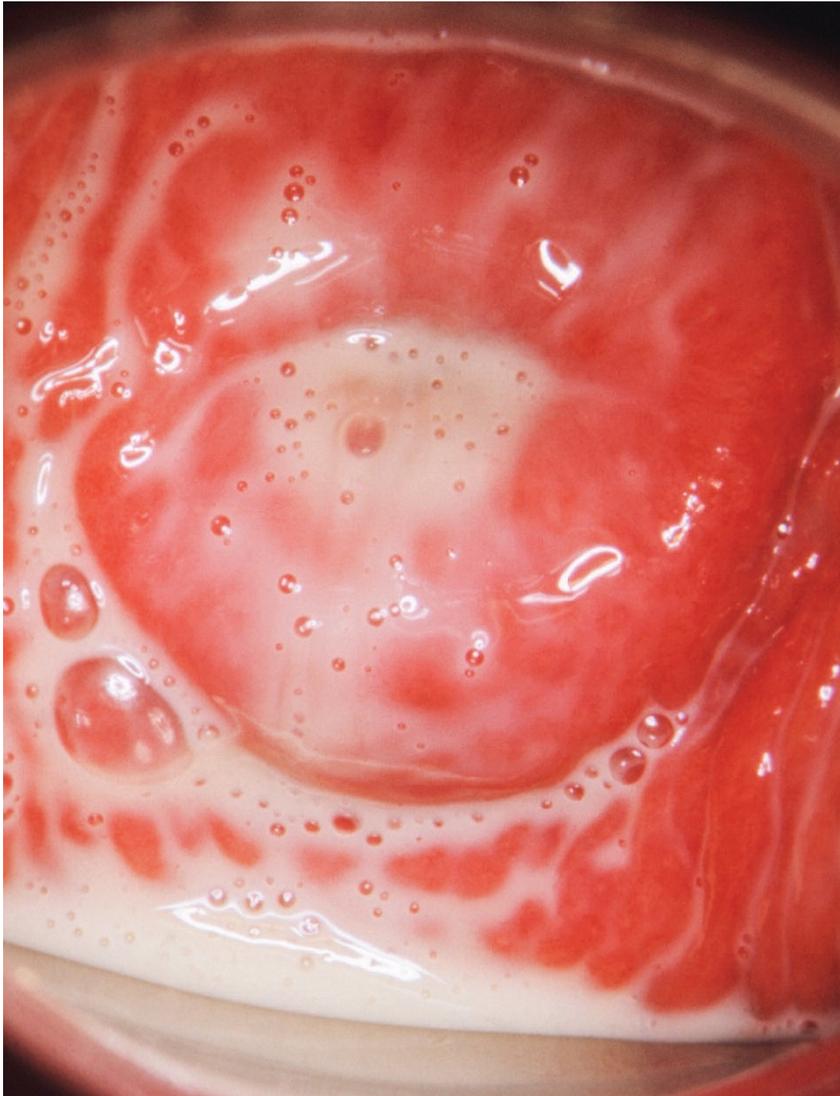
Chlamydia is clear

| Caused by | Can infect | Burden | Curable? |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>A free-living parasite</p> <p><i>Trichomonas vaginalis</i> ("trick")</p>  | <p>Cervix (cervicitis)</p> <p>Urethra (urethritis)</p> | <p>In 2018</p> <p>6.9M</p> <p>cases in US</p> <p>Equates to</p> <p>2,111</p> <p>cases for every 100,000 Americans (in 2018)</p> | <p>Yes</p> <p>Metronidazole 500mg PO BID for 7 days</p> <p>– OR –</p> <p>Tinidazole 2000mg PO once</p> |

Prevalence statistics from: <https://www.cdc.gov/std/statistics/prevalence-2020-at-a-glance.htm>

Treatment recommendations from: <https://www.cdc.gov/std/treatment-guidelines/toc.htm>

GIF from: <https://gifs.com/gif/trichomonas-v1QaRA>



Yellow-green, frothy,
fishy-smelling discharge of
trichomoniasis

Vaginal discharge isn't always an STI

<https://www.stepwards.com/wp-content/uploads/2015/12/b2.jpg>



Bacterial vaginosis (BV) is an overgrowth of normal bacteria from sexual activity OR using douches

- gray-white, thin, fishy-smelling
- vulvar / vaginal itching

Curable with metronidazole 500mg
PO BID for 7 days

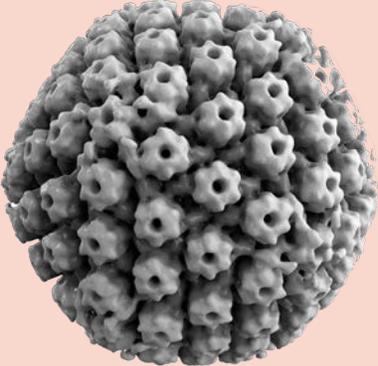


<https://www.davinciclinic.be/app/uploads/2017/09/vaginalecandida.jpg>

Yeast infection (candidiasis) is caused by disruption of normal bacteria, usually from antibiotics

- white, thick, curd-like – no odor
- vulvar / vaginal itching

Curable with fluconazole 150mg
PO once

| Caused by | Can infect | Burden | Curable? |
|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>A virus</p> <p>Herpes simplex virus, type 2 (HSV-2)</p>  | <p>Any lining of the body (skin or mucosa)</p> <p>Outer lining of the brain (meningitis)</p> | <p>In 2018</p> <p>572,000 cases in US</p> <p>Equates to</p> <p>175 cases for every 100,000 Americans (in 2018)</p> | <p>No</p> <p>Outbreaks can be treated with EITHER</p> <p>Acyclovir 400mg PO 3x per day for 7-10 days</p> <p>– OR –</p> <p>Valacyclovir 1000mg BID for 7-10 days</p> |

Prevalence statistics from: <https://www.cdc.gov/std/statistics/prevalence-2020-at-a-glance.htm>

Treatment recommendations from: <https://www.cdc.gov/std/treatment-guidelines/toc.htm>

Image from: <https://commons.wikimedia.org/wiki/File:HSV-1-EM.png>



https://www.clinicaladvisor.com/wp-content/uploads/sites/11/2018/12/hsv_genitals_0413-slideshow_362841.jpg

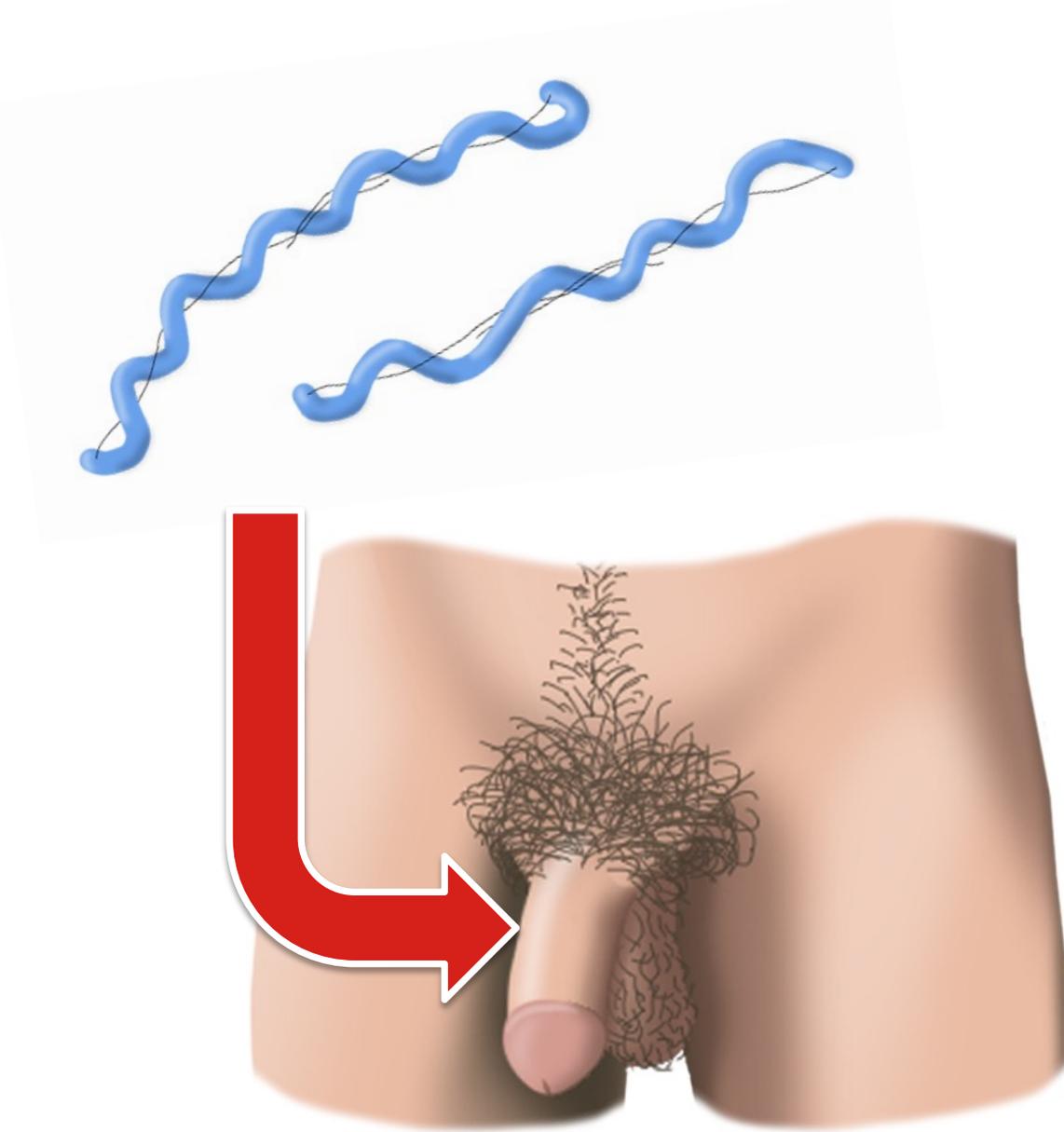


<http://4.bp.blogspot.com/-Lu5NexMT0QV/Ag5YmrKRal/AAAAAAAAAM8/wZxH4hEasv1600/Knowing%2Ba%2BComplete%2BFact%2Bor%2BGenital%2BHerpes%2BSores.jpg>

Vesicles or pustules in **clusters** that progress to **painful ulcers** in **genital herpes (principally HSV-2)**

| Caused by | Can infect | Burden | Curable? |
|---------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| <p>A bacteria</p> <p><i>Treponema pallidum</i></p>  | <p>Any lining of the body (skin or mucosa)</p> <p>Aorta Brain (& lining) Eye Kidney Liver</p> | <p>In 2018</p> <p>146,000 cases in US</p> <p>Equates to</p> <p>45 cases for every 100,000 Americans</p> | <p>Yes</p> <p>Penicillin 2.4MU IM for 1-3 weeks</p> <p>– OR –</p> <p>Doxycycline 100mg PO BID for 14-28 days</p> |

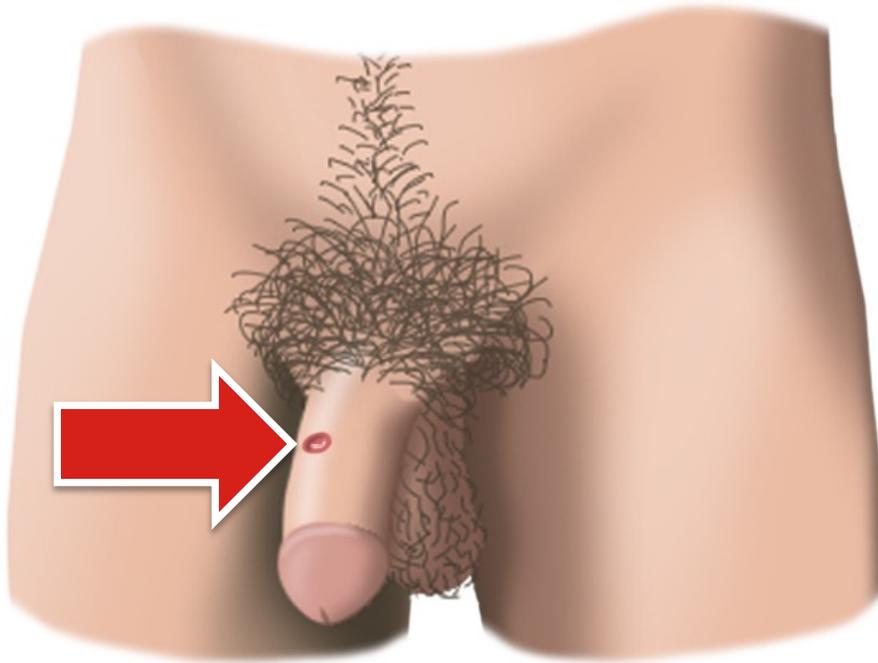
Syphilis is acquired from direct inoculation



A chancre will form at the inoculation site



- Clean-based, firm, rolled-edge, nontender
- Develops around 21 days after inoculation (3-90d)
- **Spontaneously** resolves in 3-6 weeks

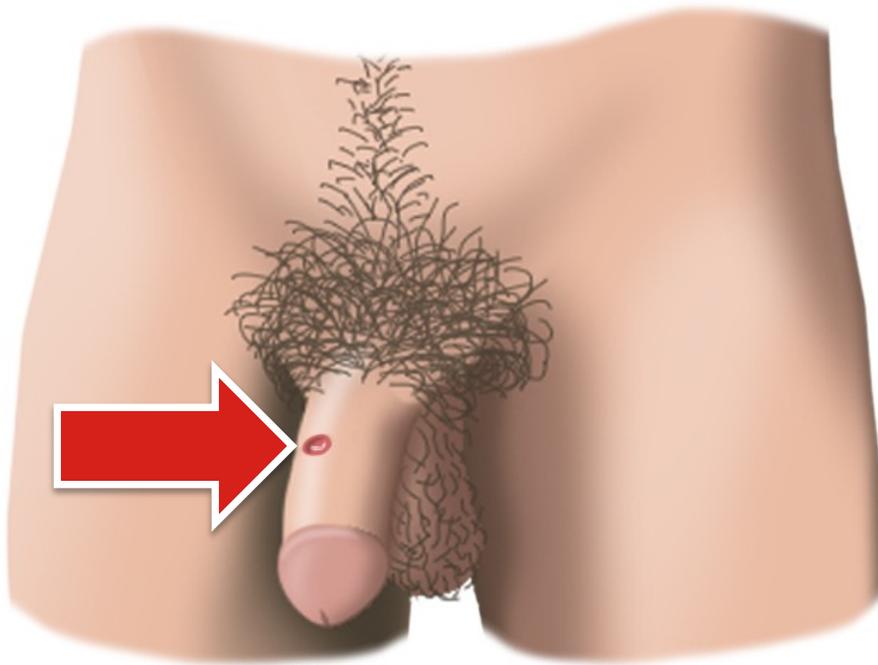


Left: "Syphilis." Kang S, et al. Fitzpatrick's Dermatology, 9e; 2019.
Right: <https://stiatlas.org/> "Vulvar chancre"

A chancre will form at the inoculation site



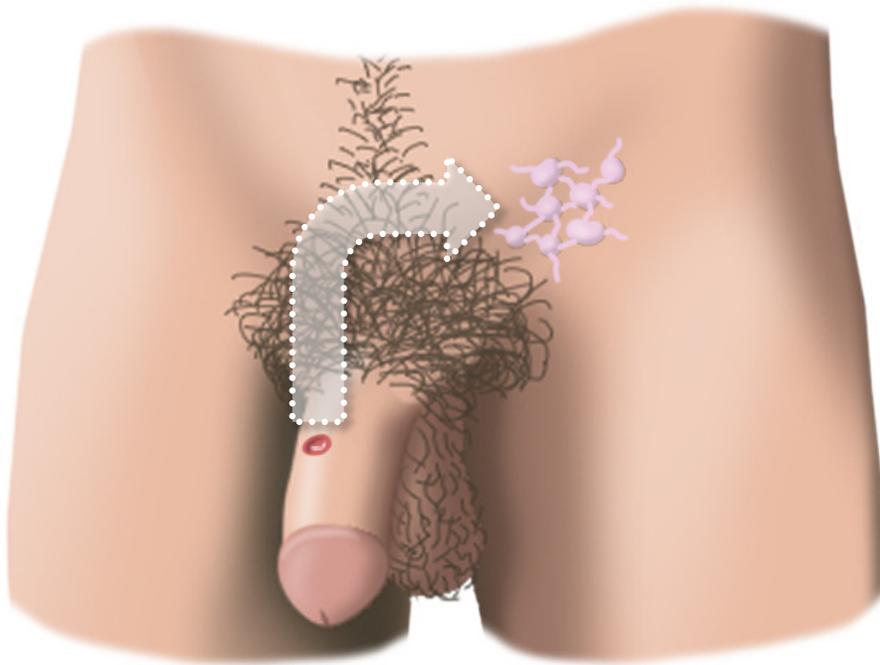
- Clean-based, firm, rolled-edge, nontender
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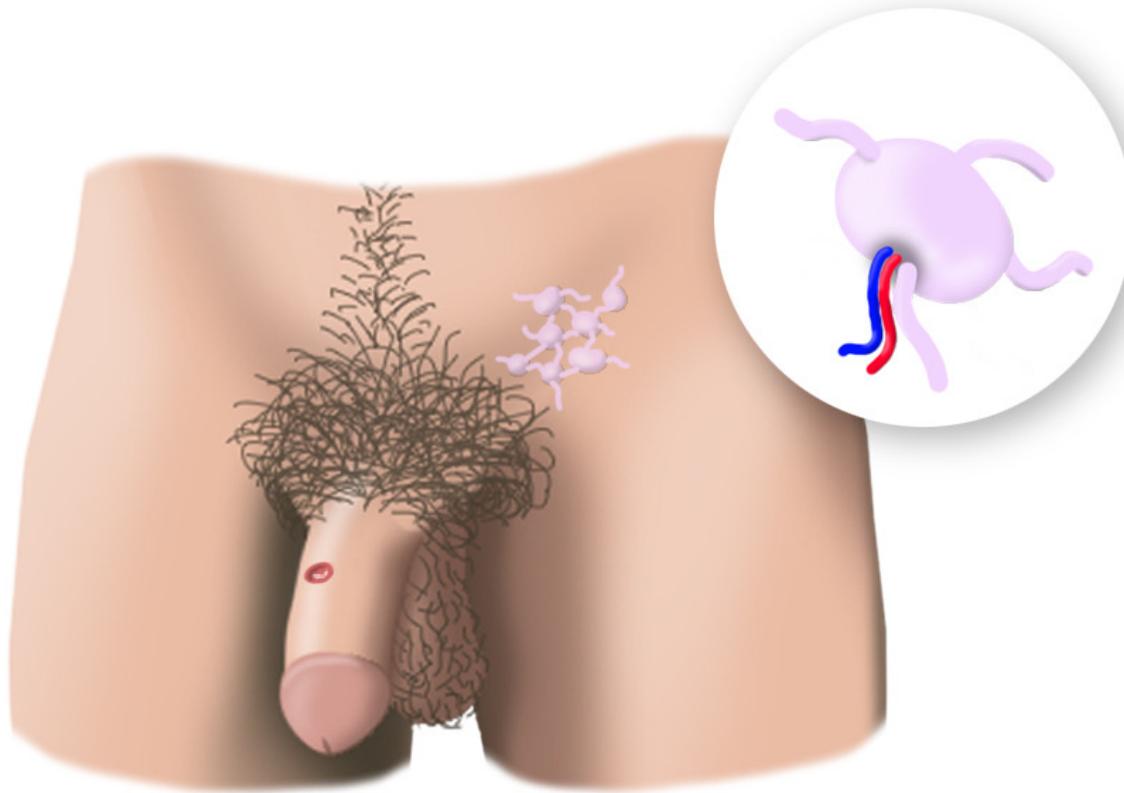
Left:
Right:

<http://acuclinic.com.au/pocit/SyphilisMucosalChancre.jpg>
Qiao J, Fang H. CMAJ. 2011 Nov 22;183(17):2015

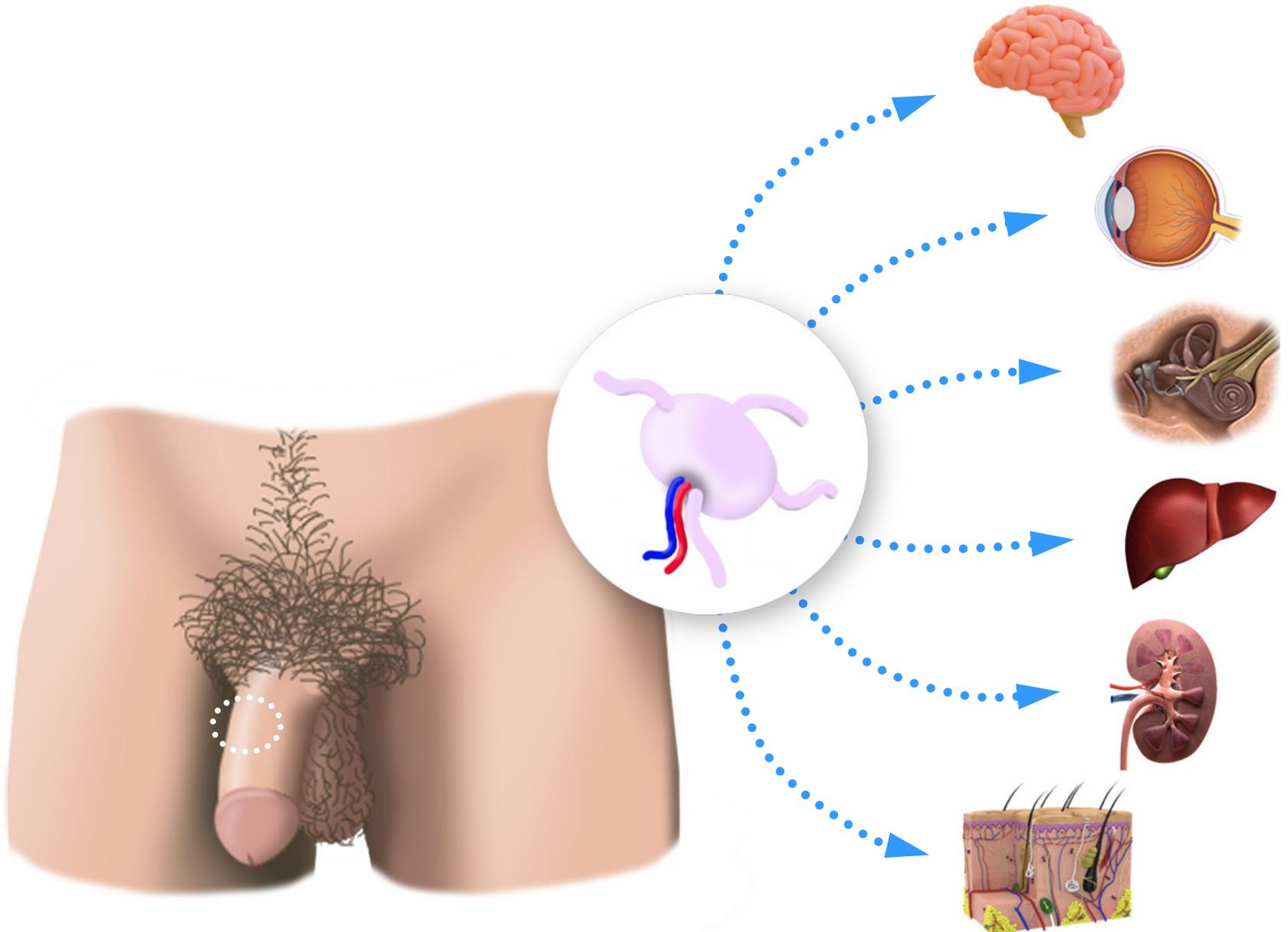
Infection spreads to draining lymph nodes



After *T.pallidum* reaches lymph nodes...



...infection becomes widely disseminated



Secondary syphilis



The rash of **secondary syphilis** is generally diffuse, doesn't blanch, and doesn't itch ("roseola syphilitica")

Develops 2-8 weeks after chancre appears

Spontaneously resolves, variable timing (days-weeks)

Secondary syphilis

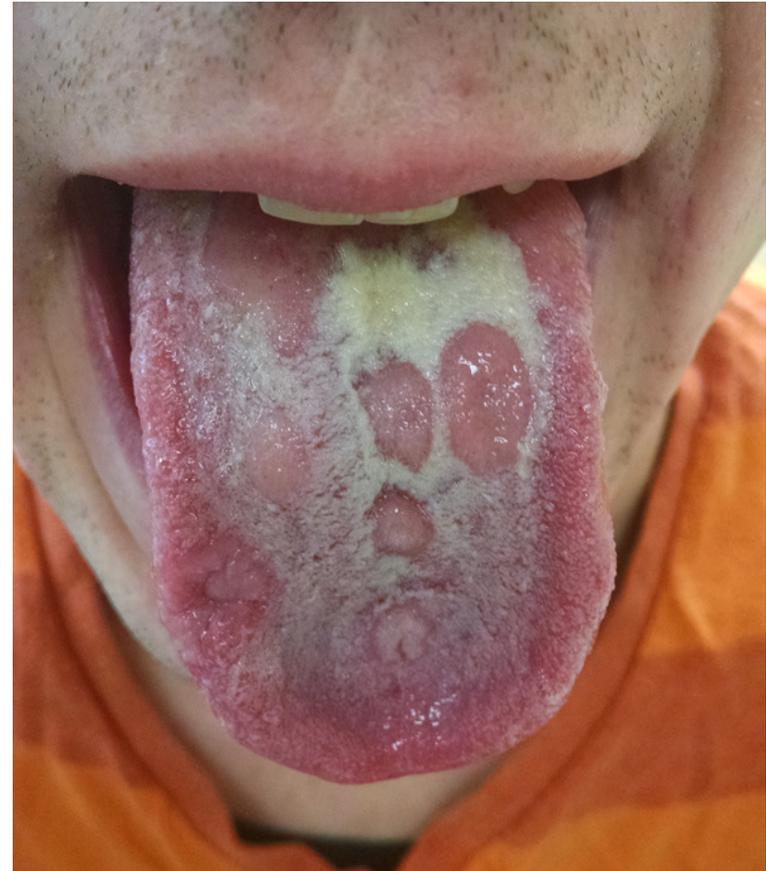
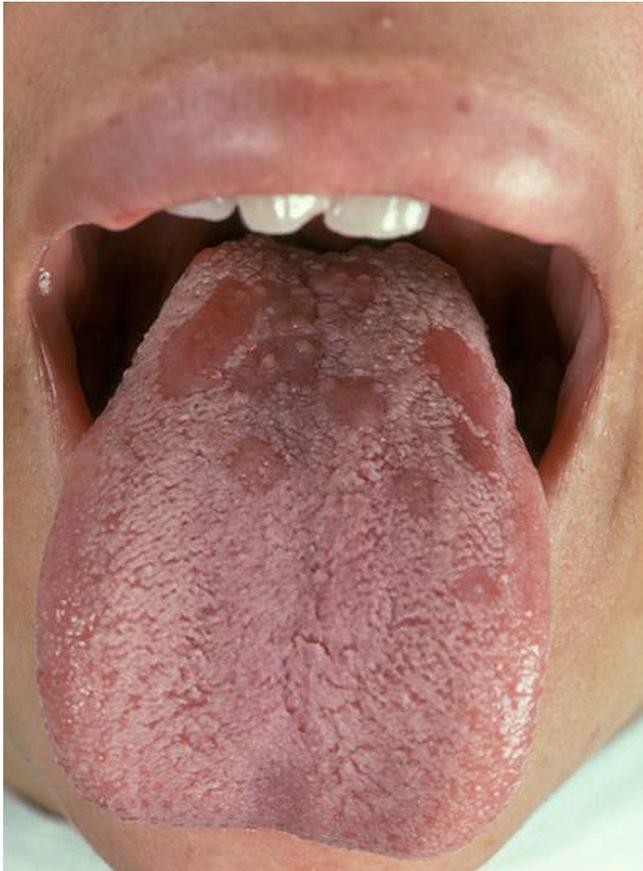


Painless, scaly, hyperpigmented palm and sole (“volar”) lesions of **secondary syphilis**

“Biett collarette” → (white ring of scale) may be a clue for secondary syphilis



Secondary syphilis



Gray-white “pseudomembrane” with painful loss of papillae (“mowed meadow” pattern) are **mucous patches of secondary syphilis**

Left: <https://cdn.hivguidelines.org/wp-content/uploads/20160817134702/Syphilis-Figure-10B.jpg>
Right: https://www.cdc.gov/std/syphilis/images/IMG_20150603_152037793.jpg
Reference: López-Sánchez C, Flores-Climente V. Sex Transm Dis. 2019 Dec;46(12):819

Secondary syphilis



Whitish, flat, warty or plaque-like lesions are **condyloma lata** of **secondary syphilis**

Top L: Courtesy of Brian Bramson, MD
Top R: <https://accessmedicine.mhmedical.com/MediaLibrary.aspx?termId=33927>
Bottom R: Carbone PN, et al. Head Neck Pathol. 2016 Jun;10(2):206-8



Patchy loss of hair can be a sign of **secondary syphilis**

Diagnosing syphilis

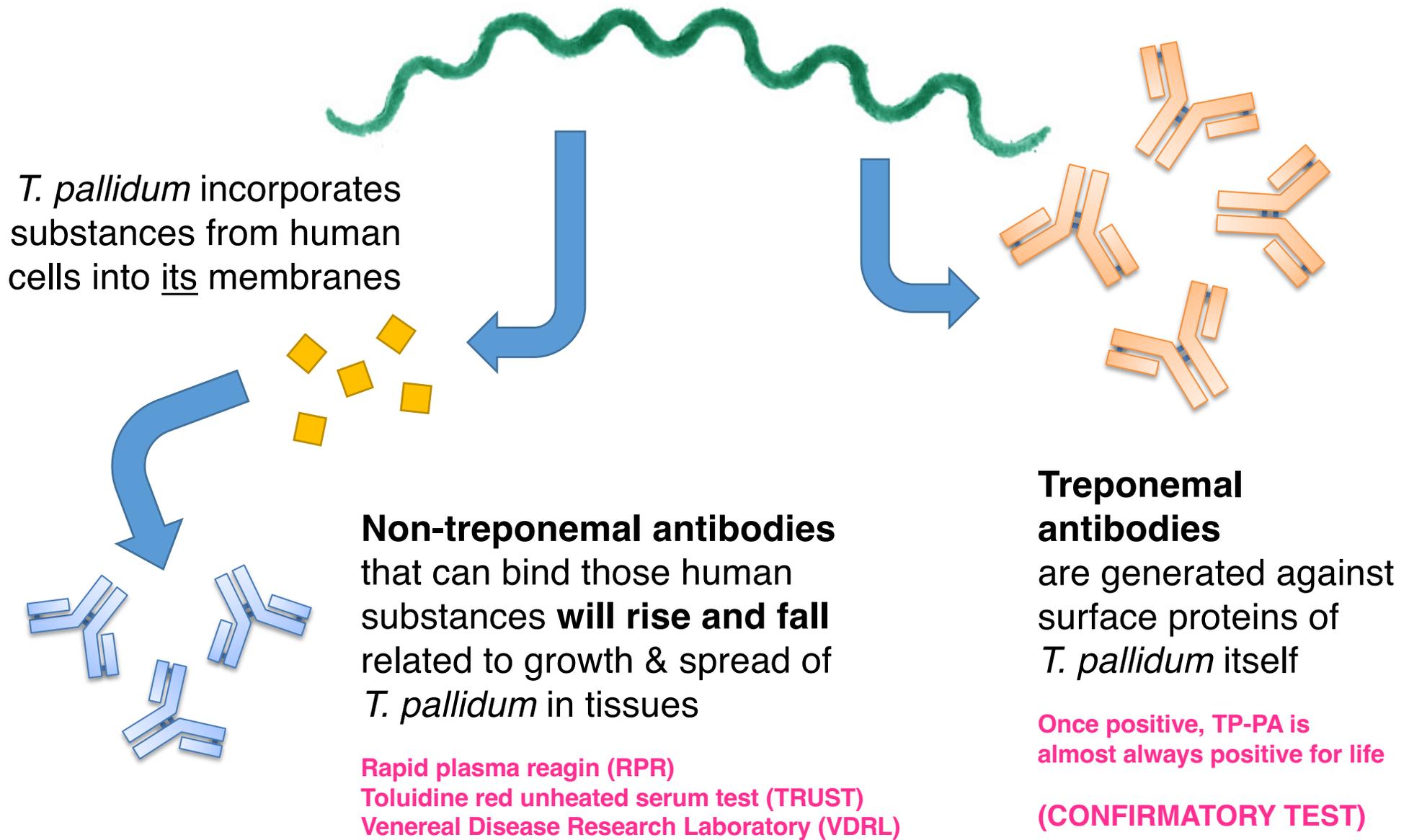


Figure by Christopher Hurt

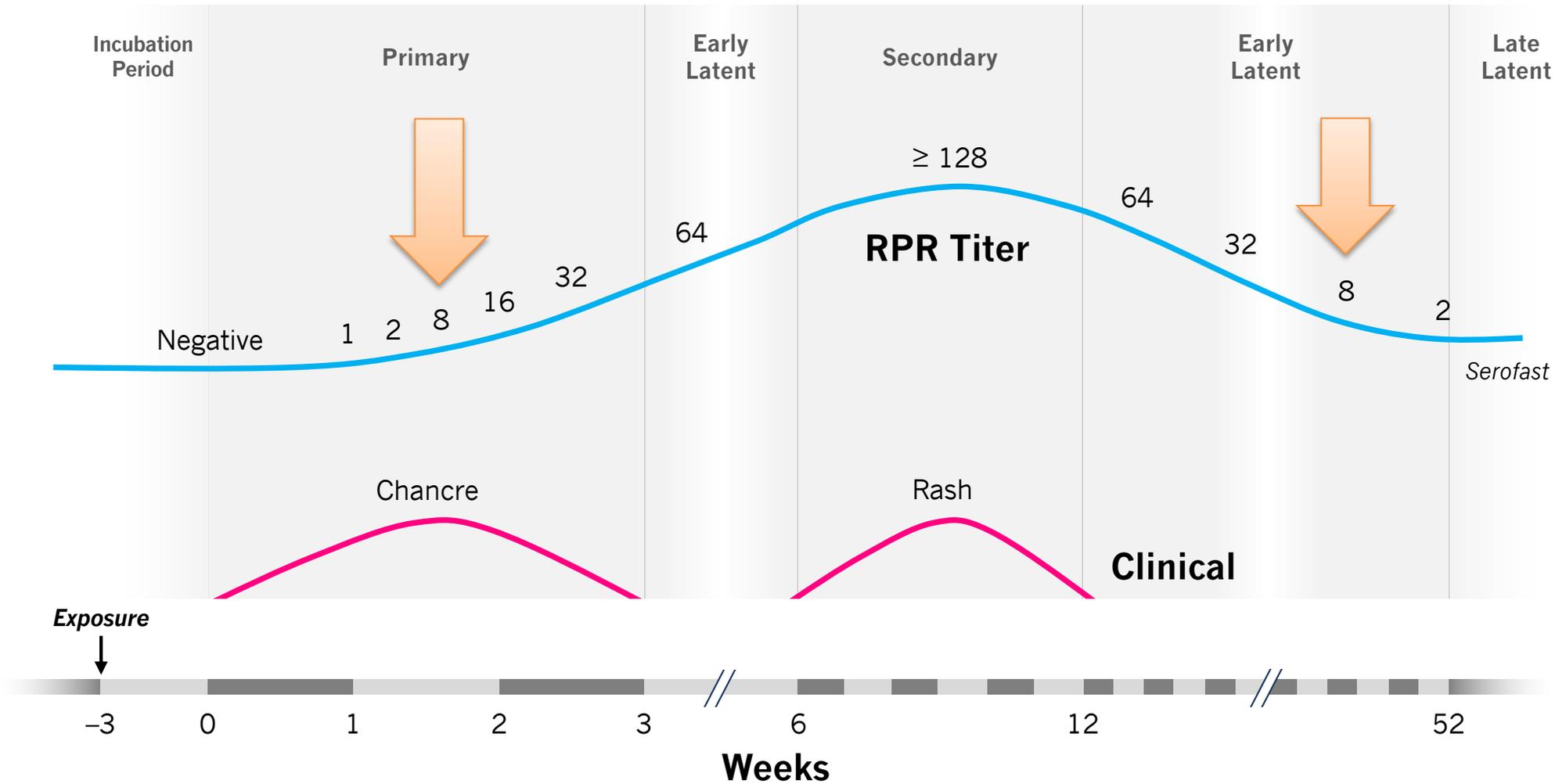
Think of *T.pallidum* like a teeny-tiny drill



RPR asks, “how much dust is there?” but by itself, it cannot tell you if the dust is from drilling or something else

Confirmatory tests (e.g., TP-PA) pretty reliably tell you if the dust is from drilling (*T. pallidum*) or not

Why do we do annual screening for syphilis?

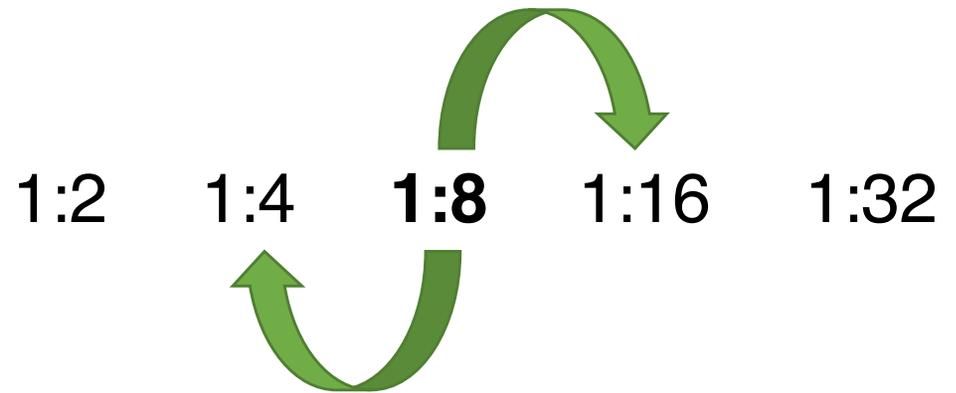


Adapted from: Gunn RA, Klausner JD. Sex Transm Dis. 2019 Oct;46(10):629-636

Using the RPR can be a pain in the butt

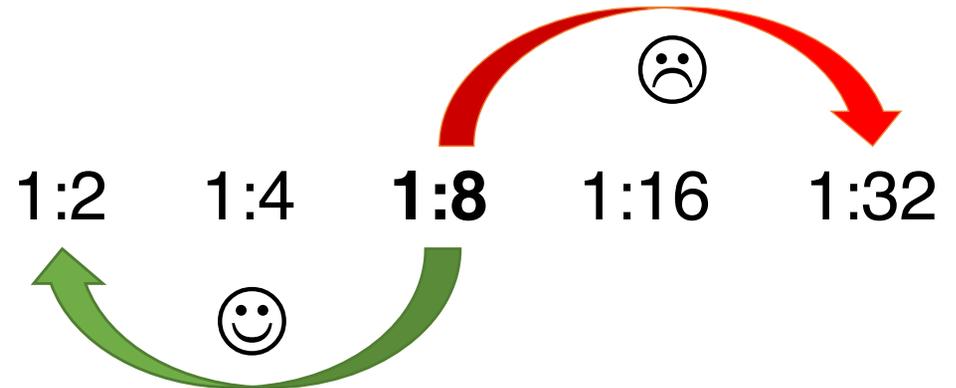
One dilution (two-fold) up or down is **within the margin of error**

Does **NOT** generally require intervention



More than one dilution (> two-fold) up or down is **meaningful**

MIGHT need add'l intervention, if it's moving the wrong direction



Response = at least 2 dilutions (four-fold) by one year after treatment

The test is positive! ☹️

Now what?

<https://www.cdc.gov/std/treatment-guidelines/>

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Sexually Transmitted Infections Treatment Guidelines, 2021

STI Treatment Guidelines

2021 RECOMMENDATIONS NOW AVAILABLE

STI Treatment Guidelines Update

CDC's Sexually Transmitted Infections (STI) Treatment Guidelines, 2021 provides current evidence-based prevention, diagnostic and treatment recommendations that replace the 2015 guidance. The recommendations are intended to be a source for clinical guidance. Healthcare providers should always assess patients based on their clinical circumstances and local burden.

2021 Mobile App in Development
Learn how to use the interim, mobile-friendly solution.

BROWSE GUIDELINES ONLINE

PROVIDER RESOURCES

NATIONAL NETWORK OF STD PREVENTION TRAINING CENTERS

RECOMMENDATIONS FOR PROVIDING QUALITY STD CLINICAL SERVICES

Screenshot taken 26 May 2022



<https://www.iStockphoto.com/Vector/vector-emoji-condom-with-poster-about-safe-love-cartoon-sticker-gm607618964-104161175>

Questions?

Please email me!

Christopher Hurt, MD
churt@med.unc.edu