

A TRICHY SITUATION

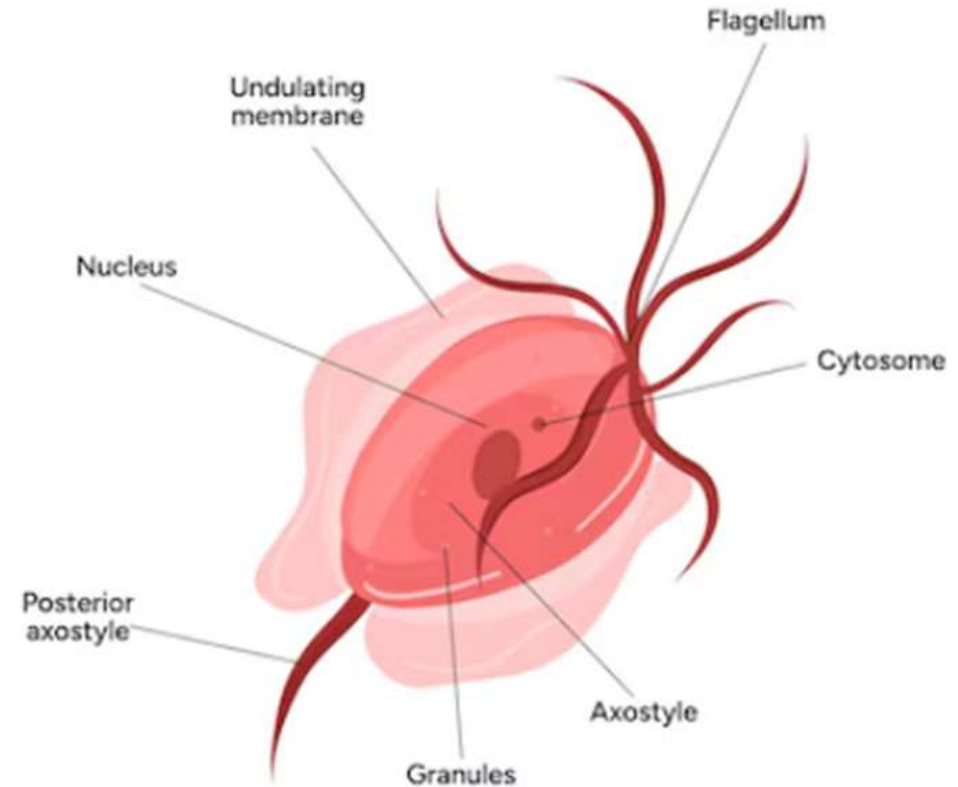
Megan Davis

Survey Link



OVERVIEW

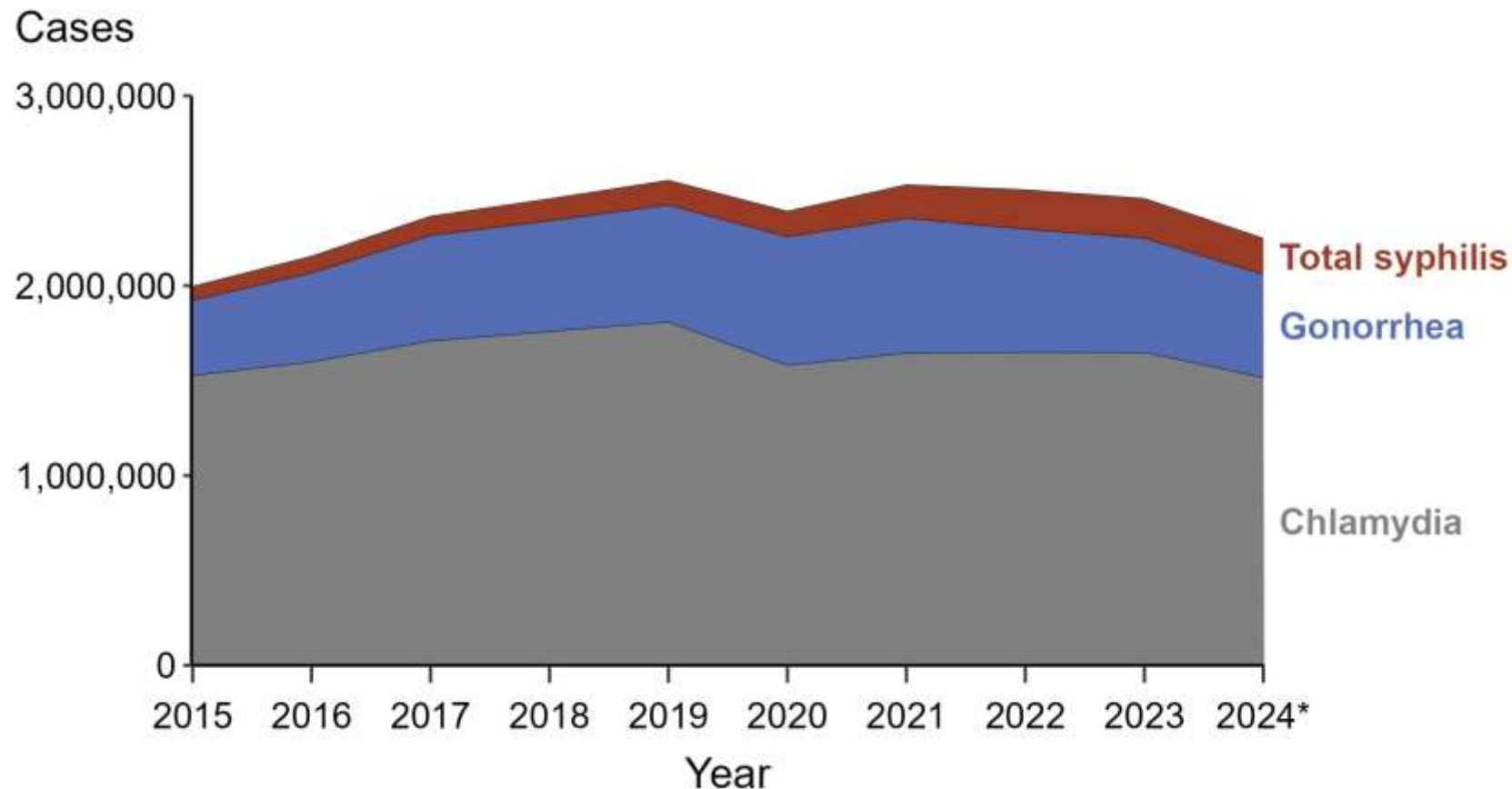
- Background
- Biology
- Transmission
- Diagnosis
- Treatment
- Evidence



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SEXUALLY TRANSMITTED INFECTIONS (STIS) — REPORTED CASES BY STI AND YEAR, UNITED STATES, 2015–2024



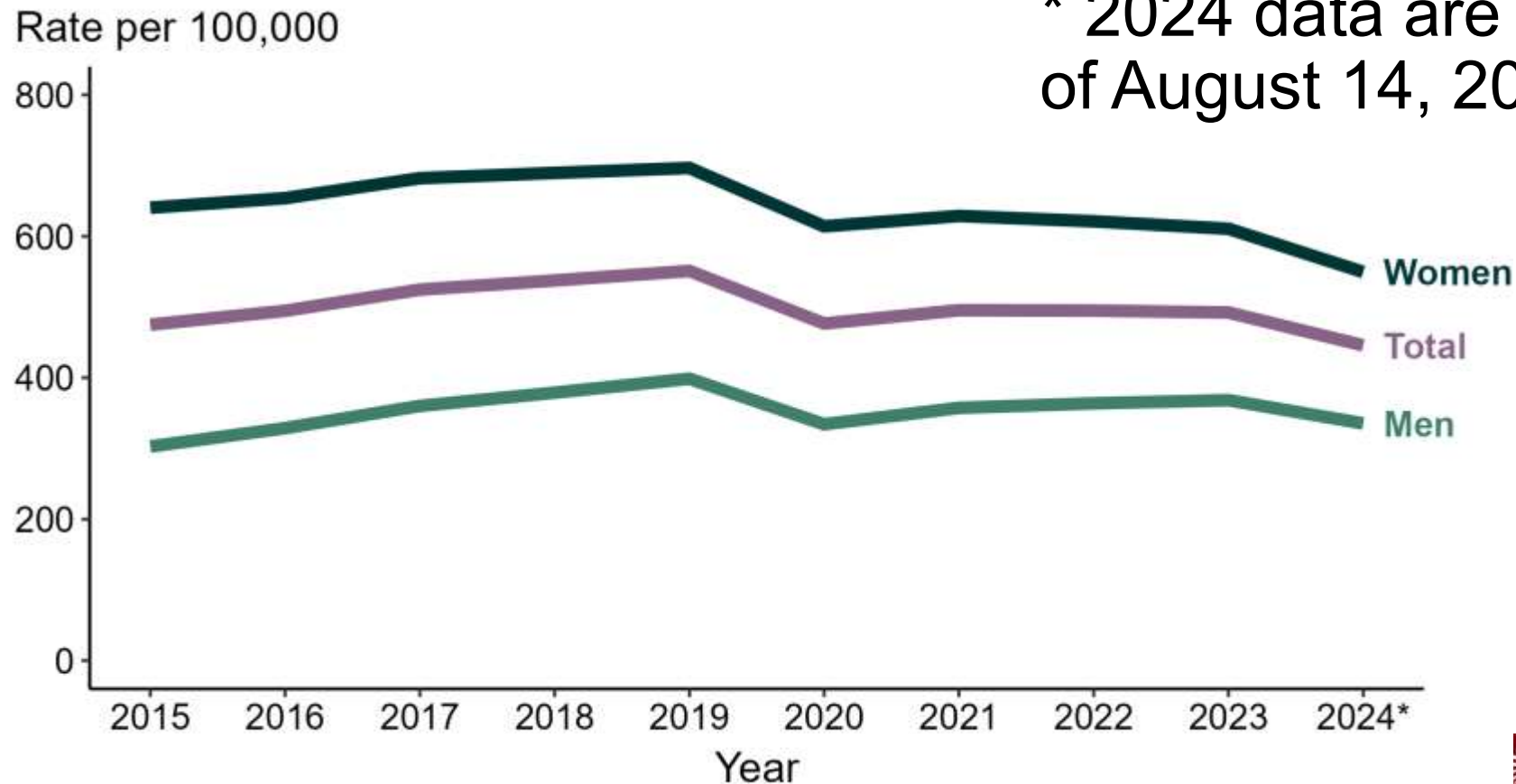
* 2024 data are provisional as of August 14, 2025.

NOTE: “Total syphilis” includes all stages of syphilis and congenital syphilis.



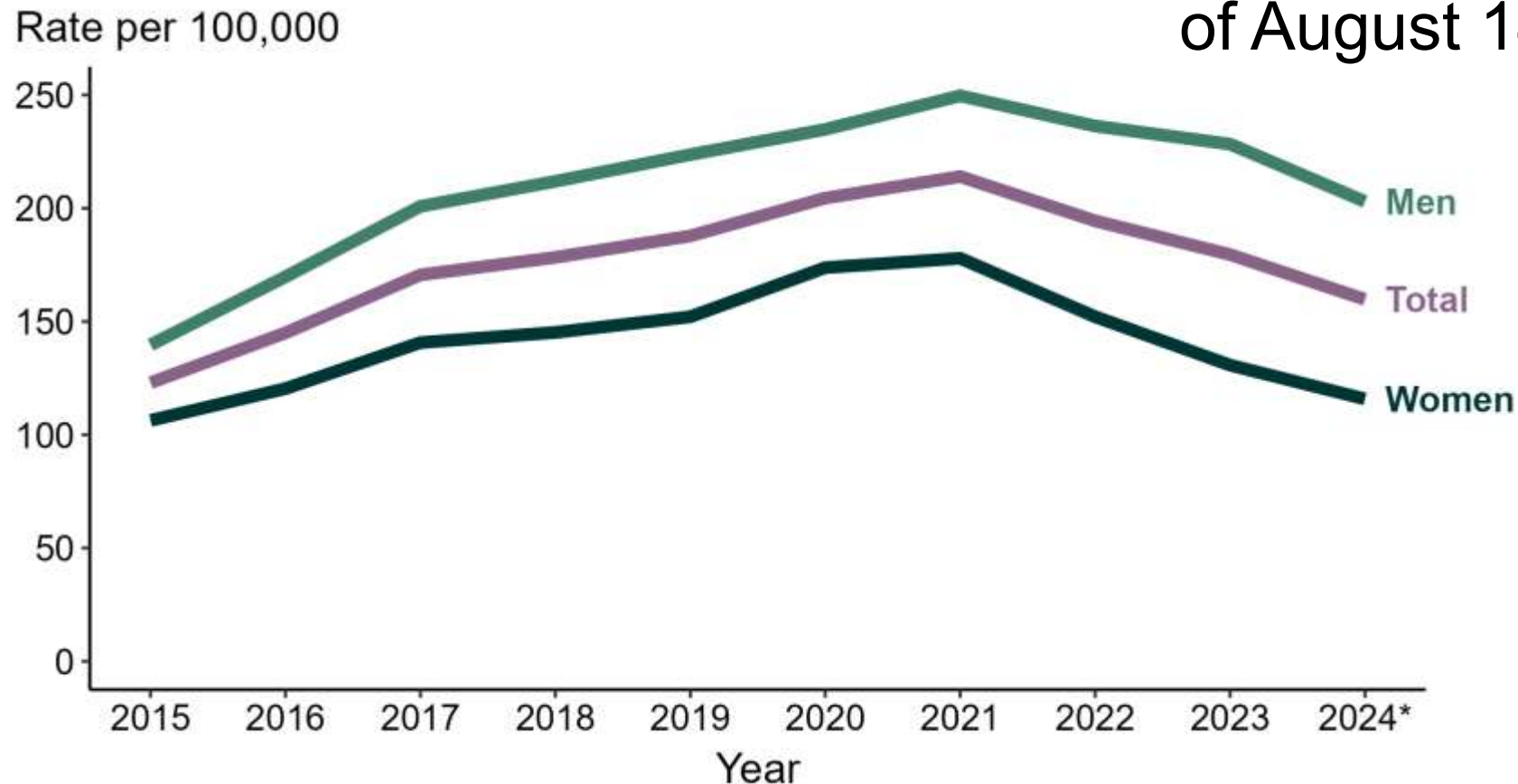
CHLAMYDIA — RATES OF REPORTED CASES BY SEX AND YEAR, UNITED STATES, 2015–2024

* 2024 data are provisional as of August 14, 2025.

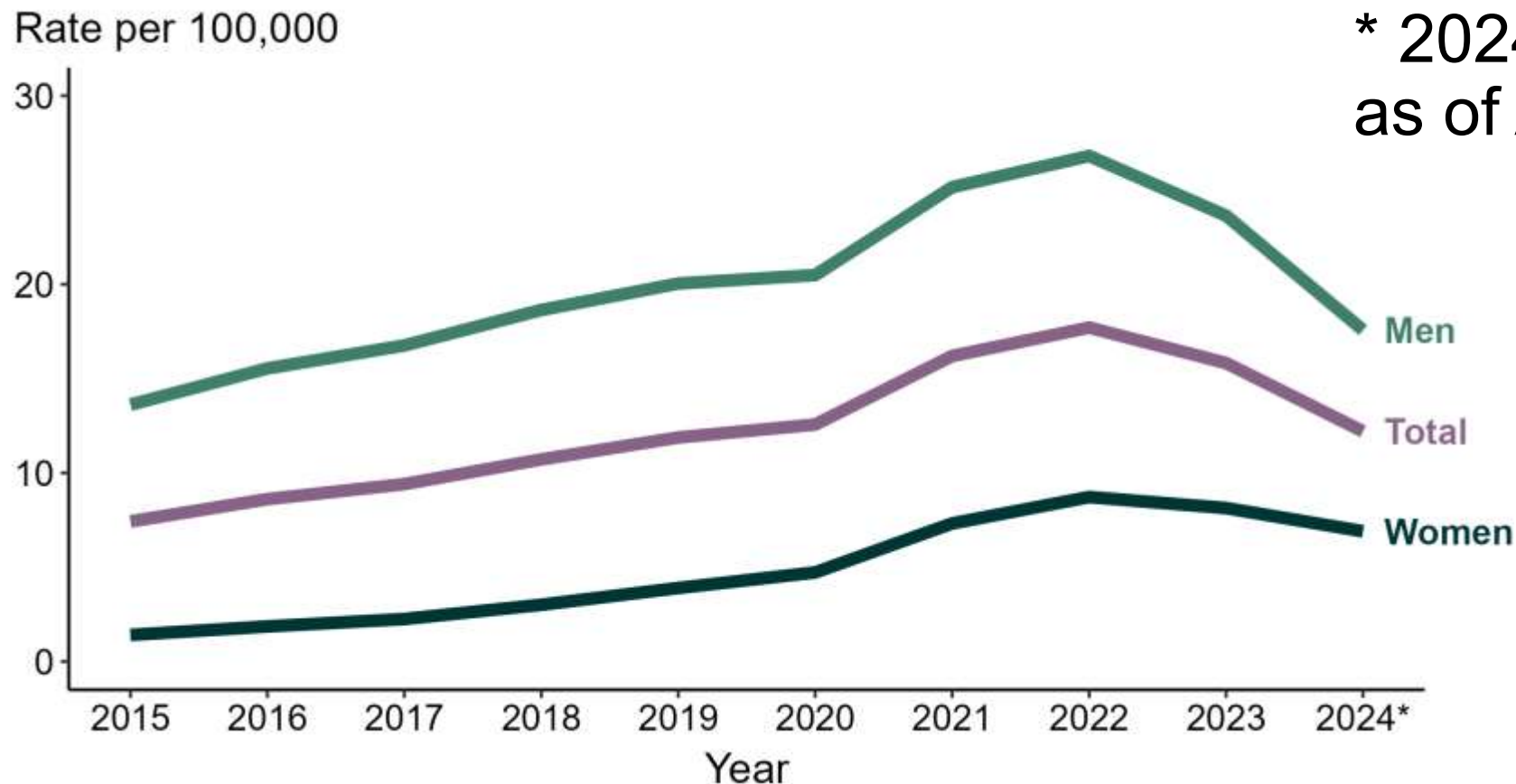


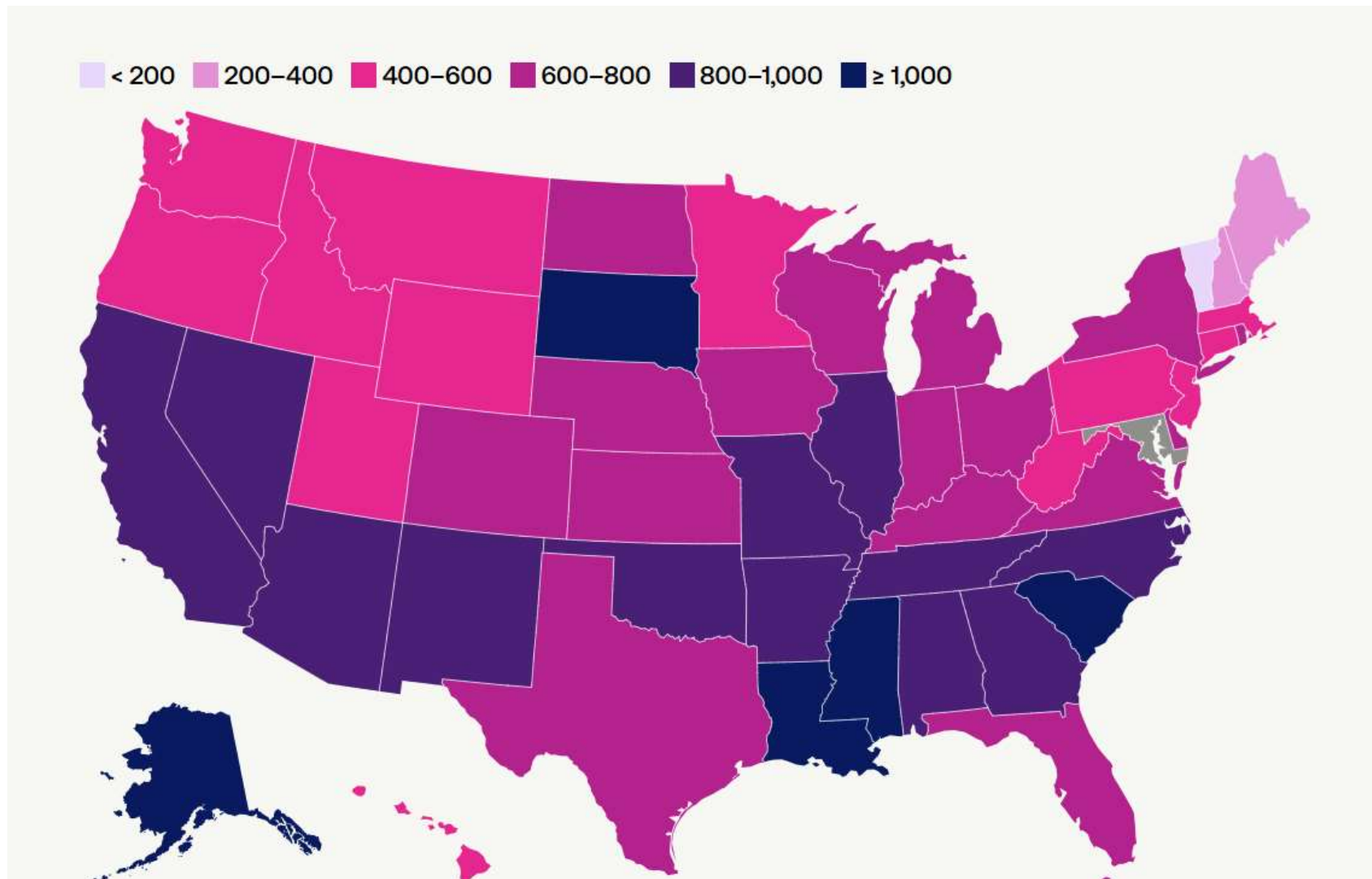
GONORRHEA — RATES OF REPORTED CASES BY SEX AND YEAR, UNITED STATES, 2015–2024

* 2024 data are provisional as of August 14, 2025.



PRIMARY AND SECONDARY SYPHILIS — RATES OF REPORTED CASES BY SEX AND YEAR, UNITED STATES, 2015–2024





<https://usafacts.org/articles/how-common-are-stds-in-the-us/>



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Chlamydia-Reported Cases and Rates of Reported Cases by State, Ranked by Rates, United States, 2023

Rank*	State	Cases	Rate per 100,000 Population
1	Louisiana	36,242	792.4
2	Mississippi	20,603	700.9
3	Alaska	5,117	697.7
4	Alabama	33,261	651.1
5	Georgia	71,294	646.4
6	South Carolina	32,889	612.1
7	North Carolina	65,867	607.9
8	Maryland	35,836	579.8

Gonorrhea- Reported Cases and Rates of Reported Cases by State, Ranked by Rates, United States, 2023

Rank*	State	Cases	Rate per 100,000 Population
1	Alaska	2,280	310.9
2	Louisiana	13,192	288.4
3	Georgia	30,307	274.8
4	South Dakota	2,329	253.3
5	Mississippi	7,382	251.1
6	North Carolina	26,353	243.2
7	New York	46,102	235.6
8	Alabama	11,592	226.9
9	South Carolina	11,950	222.4
10	Maryland	12,802	207.1

**Syphilis- Reported Cases and Rates of Reported Cases by State, Ranked by Rates,
United States, 2023**

12	Missouri	1,332	21.5
13	Washington	1,665	21.3
14	Georgia	2,210	20.0
15	North Carolina	2,159	19.9
16	Florida	4,366	19.3
17	Oregon	811	19.2
18	Delaware	180	17.4
19	South Carolina	927	17.3
20	Ohio	1,925	16.3



South Carolina 2025 List of Reportable Conditions

REPORT UPON RECOGNITION OF A SUSPECTED CASE, OUTBREAK, DIAGNOSIS, OR POSITIVE LABORATORY EVIDENCE
(SEE "HOW TO REPORT" ON BACK)

Suspected means clinical suspicion and/or initial laboratory detection, isolation, identification, or presence of supportive laboratory results.

! Immediately reportable by phone call to a live person at the regional public health office, 24/7

* Urgently reportable within 24 hours by electronic notification or by phone if electronic notification not possible. Email SCIONHelp@dph.sc.gov for details. The SCIONHelp email address may not be used for case reporting.

All other conditions except lead are reportable within 3 business days. By mail: <https://dph.sc.gov/sites/scdph/files/2024-04/D-1129.pdf>

! Any case that may be caused by chemical, biological, or radiological threat, novel infectious agent, or any cluster of cases, or outbreak of a disease or condition that might pose a substantial risk of human morbidity or mortality (1) (2)

Anaplasmosis (*Anaplasma phagocytophilum*)

* Animal (mammal) bites

! Anthrax (*Bacillus anthracis*) (2)

Babesiosis (*Babesia* spp.)

! Botulism (*Clostridium botulinum* or Botulinum toxin)

* Brucellosis (*Brucella* spp.) (2)

Campylobacteriosis (2)

* Candida auris or suspected (2) (3)

Carbapenem-resistant *Enterobacteriales* (CRE) and *Acinetobacter* species (2) (4) (5)

Carbapenem-resistant *Pseudomonas* spp. (CRPA) (2) (4) (6)

Chancroid (*Haemophilus ducreyi*)

* Chikungunya (2)

Chlamydia trachomatis

* Ciguatera

Coronavirus Disease 2019 (COVID-19), (SARS CoV-2) (7)

Cryptosporidiosis (*Cryptosporidium* spp.)

Cyclosporiasis (*Cyclospora cayentensis*) (2)

* Dengue (2)

* Diphtheria (*Corynebacterium diphtheriae*) (2)

* Eastern Equine Encephalitis (EEE) (2)

Ehrlichiosis (*Ehrlichia*)

* *Escherichia coli*, Shiga toxin – producing (STEC) (2)

Giardiasis (*Giardia* spp.)

Gonorrhea (*Neisseria gonorrhoeae*) (4)

* *Haemophilus influenzae*, all types, invasive disease (H flu) (2) (4) (8)

* Hantavirus (2)

* Hemolytic uremic syndrome (HUS), post-diarrheal

* Hepatitis (acute) A, B, C, D, & E (9)

Hepatitis (chronic) B, C, & D (9)

Hepatitis B surface antigen + with each pregnancy

HIV CD4 count/percentage for HIV+ people (L)

HIV exposed infants (all results, positive and negative)

HIV subtype and genotype (L)

HIV 1/2 Antibody and Antigen (rapid)

HIV 1/2 AB/AG (confirmatory, all positive and negative) (L)

HIV 1/2 AB/AG+ and/or detectable viral load with each pregnancy

HIV viral load (all results, detectable and undetectable) (L)

! Influenza, zoonotic or novel strain (2)

* Influenza associated deaths (all ages)

Influenza (7)

* La Crosse Encephalitis (LACV) (2)

Lead tests, all results - indicate venous or capillary specimen (10)

Legionellosis

Leprosy (*Mycobacterium leprae*) (Hansen's Disease)

Leptospirosis

Listeriosis (2)

Lyme disease (*Borrelia burgdorferi*)

Lymphogranuloma venereum

* Malaria (*Plasmodium* spp.)

! Measles (Rubeola)

! Meningococcal disease (*Neisseria meningitidis*) (2) (4) (8) (11)

* Mpox (positive, negative, and all other results)

* Mumps

* Pertussis (*Bordetella pertussis*)

! Plague (*Yersinia pestis*) (2)

! Poliovirus (Polio myelitis and Non-paralytic poliovirus infection)

! Psittacosis (*Chlamydia psittaci*)

! Q fever (*Coxiella burnetii*)

! Rabies (human)

* Rubella (includes congenital)

Salmonellosis (2) (4)

* Shiga toxin positive (2)

Shigellosis (2) (4)

! Smallpox (*Variola*)

Spotted Fever Rickettsiosis (*Rickettsia* spp.)

* *Staphylococcus aureus*, vancomycin-resistant or intermediate with a VA $\geq$ 8 MIC (VRSA/VISA) (2) (4) (12)

Streptococcus group A, invasive disease (4) (8) (13)

Streptococcus pneumoniae, invasive (pneumococcal) (4) (8) (14)

* St. Louis Encephalitis (SLEV) (2)

* Syphilis: congenital (15), syphilitic stillbirth (16)

Syphilis: All serological tests (treponemal & nontreponemal) if at least one test is positive, CSF-VDRL, or darkfield positive

Tetanus (*Clostridium tetani*)

Toxic Shock (specify staphylococcal or streptococcal)

* Tuberculosis (*Mycobacterium tuberculosis*) (2) (17)

Tuberculosis test - Positive Interferon Gamma Release Assays (IGRAs): QuantiFERON-TB Gold Plus (QFT-Plus) and T-SPOT.

TB (17) (L)

! Tularemia (*Francisella tularensis*) (2)

* Typhoid fever (*Salmonella typhi*) (2) (4)

! Typhus, epidemic (*Rickettsia prowazekii*)

* Varicella

* Vibriosis (any species of the family *Vibrionaceae*) to include toxigenic *Vibrio cholerae* O1 or O139 (2)

! Viral Hemorrhagic Fevers (e.g. Ebola, Lassa, Marburg viruses)

* West Nile Virus (2)

* Yellow Fever

Yersiniosis (*Yersinia*, not *pestis*)

* Zika (2)

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WHAT DO THEY HAVE THAT TRICHOMONAS DOES NOT

Criteria	Chlamydia	Gonorrhea	Syphilis	Trichomonas
Indices of frequency	✗	✗	✗	✗
Indices of Severity	✗	✗	✗	✗
Disparities or inequality associated with the disease	✗	✗	✗	✗
Health related costs	✗	✗	✗	✗
Preventability	✗	✗	✗	✗
Communicability	✗	✗	✗	✗
Public Interest	✗	✗	✗	✗



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THE *TRICHOMONAS VAGINALIS* DISPARITIES GAP

Clinical Infectious Diseases

[Clin Infect Dis](#). 2018 Jul 15; 67(2): 218–220.

Published online 2018 Mar 15. doi: [10.1093/cid/ciy085](https://doi.org/10.1093/cid/ciy085)

PMCID: PMC6030825

PMID: [29554227](https://pubmed.ncbi.nlm.nih.gov/29554227/)

Why Does *Trichomonas vaginalis* Continue to be a Problem in the United States?

[Christina A Muzny](#)

► [Author information](#) ► [Article notes](#) ► [Copyright and License](#)



Journal of the National Medical Association

Volume 114, Issue 1, February 2022, Pages 78–89

Short Review

Trichomoniasis, a new look at a common but neglected STI in African descent population

in the United States and the Black Diaspora. A call for prioritization, and action

Lee



The American Journal of Tropical Medicine and Hygiene

Print ISSN: 0002-9637

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Volume 90: Issue 5

Neglected Parasitic Infections in the United States: Trichomoniasis

W. Evan Secor, Elissa Meites, Michelle C. Starr, and Kimberly A. Workowski

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DOI: <https://doi.org/10.4269/ajtmh.13-0723>

Page(s): 800–804

Volume/Issue: Volume 90: Issue 5

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Editorial

Neglected Parasitic Infections in the United States: Needs and Opportunities

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Division of Parasitic Diseases and Malaria, Center for Global Health, Division of Parasitic Diseases and Malaria, Centers for Disease Control and Prevention, Atlanta, Georgia; National School of Tropical Medicine, Baylor College of Medicine, Houston, Texas

This issue of the American Journal of Tropical Medicine and Hygiene features brief reviews of five parasitic infections that remain a significant health problem in the United States: Chagas disease, cysticercosis, toxocariasis, toxoplasmosis, and trichomoniasis.^{2–6} These five diseases, which are among those that Centers for Disease Control and Prevention (CDC) refers to as neglected parasitic infections (NPIs) in the United States, have different epidemiologic profiles and modes of transmission and require tailored prevention and control strategies. However, in the United States these NPIs share key characteristics, including 1) the surprisingly large number of persons infected or at risk, especially those living in poverty; 2) the potential for underreporting and missed diagnoses, largely because of lack of clinician awareness and poor availability of optimal diagnostic tests; and 3) the dearth of interventions that can prevent or cure illness. As a result of these issues, these diseases have not received needed attention or resources in the United States.

TABLE 1

Estimates of burden and impact of neglected parasitic infections

- More than 300,000 persons living in the United States are infected with *Trypanosoma cruzi*, the cause of Chagas disease, and more than 300 infected babies are born every year in the United States
- At least 1,000 incident hospitalizations for symptomatic neurocysticercosis per year in the United States
- At least 14% of the U.S. population has been exposed to *Toxocara*, and each year at least 70 people, most of them children, are blinded by ocular toxocariasis
- More than 60 million persons in the United States are chronically infected with *Toxoplasma gondii*; new infections in pregnant women can lead to birth defects and infections in immunocompromised persons can be fatal
- Trichomoniasis is a major cause of infertility and preterm labor and low birthweight, and each year 1.1 million people are newly infected with *Trichomonas* in the United States



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TRICHOMONAS VAGINALIS- NEGLECTED

- Limits public health funding
 - Community education
 - Public health level diagnosis
 - Patient level treatment
 - Research
 - Interventions



<https://www.womenshealthmag.com/uk/health/sexual-health/a43641639/trichomoniasis/>

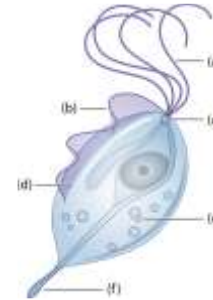


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CONSEQUENCES OF UNDIAGNOSED TRICHOMONIASIS

- Untreated infection can last months to years
- Two-fold increased risk of HIV acquisition
 - Inflammatory cytokine cascade → alteration of innate immune response → weakening of the vaginal-mucosal barrier
- Four-fold increase in HIV shedding
 - *53% of HIV infected Americans have concurrent TV infection*
- Increased risk for pregnant women to have preterm birth, low birthrate, and miscarriage/stillbirth
- Increased risk for pelvic inflammatory disease and infertility



www.cdc.gov/std/tg2015/trichomoniasis
Mavedzenge et al 2010 Sex trans dis
Thurman & Doncel 2011 Amer J Repro Immuno

The Associations Between Pelvic Inflammatory Disease, *Trichomonas vaginalis* Infection, and Positive Herpes Simplex Virus Type 2 Serology

Cherpes, Thomas L. MD^{*†}; Wiesenfeld, Harold C. MD, CM^{*†}; Melan, Melissa A. PhD[†]; Kant, Jeffrey A. MD[†]; Cosentino, Lisa A. BS[†]; Meyn, Leslie A. MS[†]; Hillier, Sharon L. PhD^{*†}

[Author Information](#) 

Sexually Transmitted Diseases 33(12):p 747-75
10.1097/01.olq.0000218869.52753.c7

Trichomonas vaginalis infection is associated with increased risk of cervical carcinogenesis: A systematic review and meta-analysis of 470 000 patients

Balázs Hamar^{1 2}, Brigitta Teutsch^{1 3}, Eszter Hoffmann^{1 2}, Péter Hegyi^{1 3 4}, Alex Váradi¹,
intner^{1 2},

Article | [Open access](#) | Published: 13 September 2022

Association between trichomoniasis and prostate and bladder diseases: a population-based case-control study

[Hung-Yi Yang](#), [Ruei-Yu Su](#), [Chi-Hsiang Chung](#), [Kuo-Yang Huang](#), [Hsin-An Lin](#), [Jui-Yang Wang](#), [Chien-Chou Chen](#), [Wu-Chien Chien](#)  & [Hsin-Chung Lin](#) 

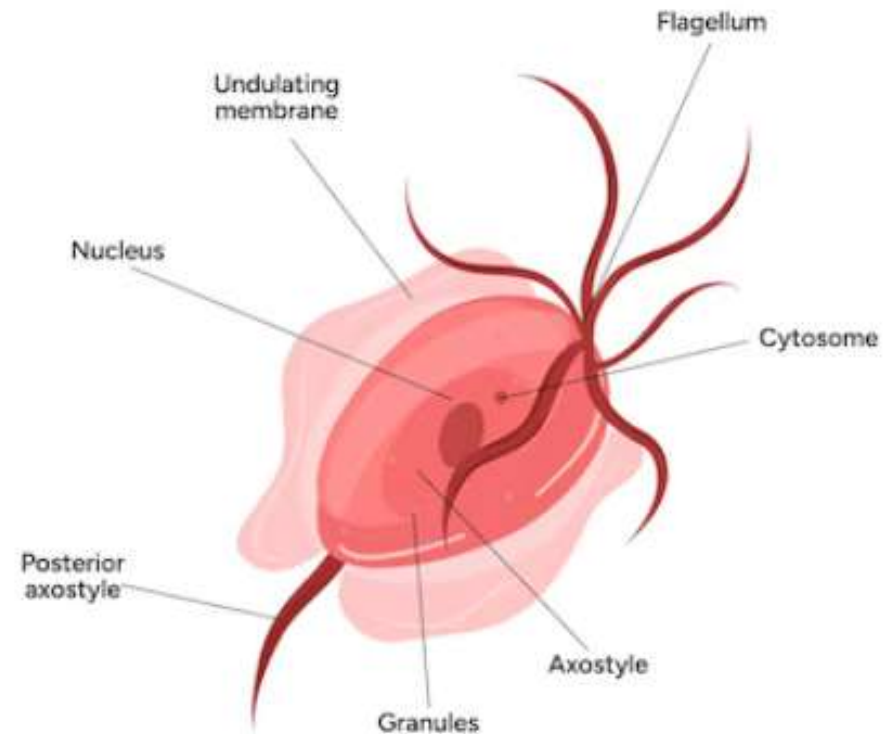
[Scientific Reports](#) 12, Article number: 15358 (2022) | [Cite this article](#)



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TRICHOMONAS VAGINALIS

- Flagellate protozoan parasite
- Various shapes
- Microaerotolerant
- Quivering motility
- Trophozoite with no true cystic stage



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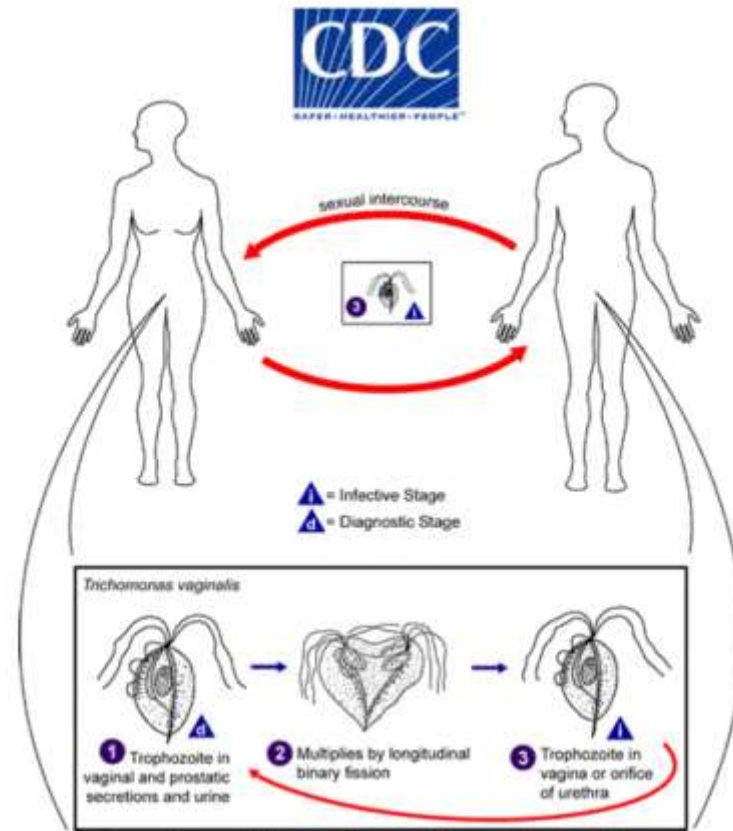
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QUIVERING MOTILITY

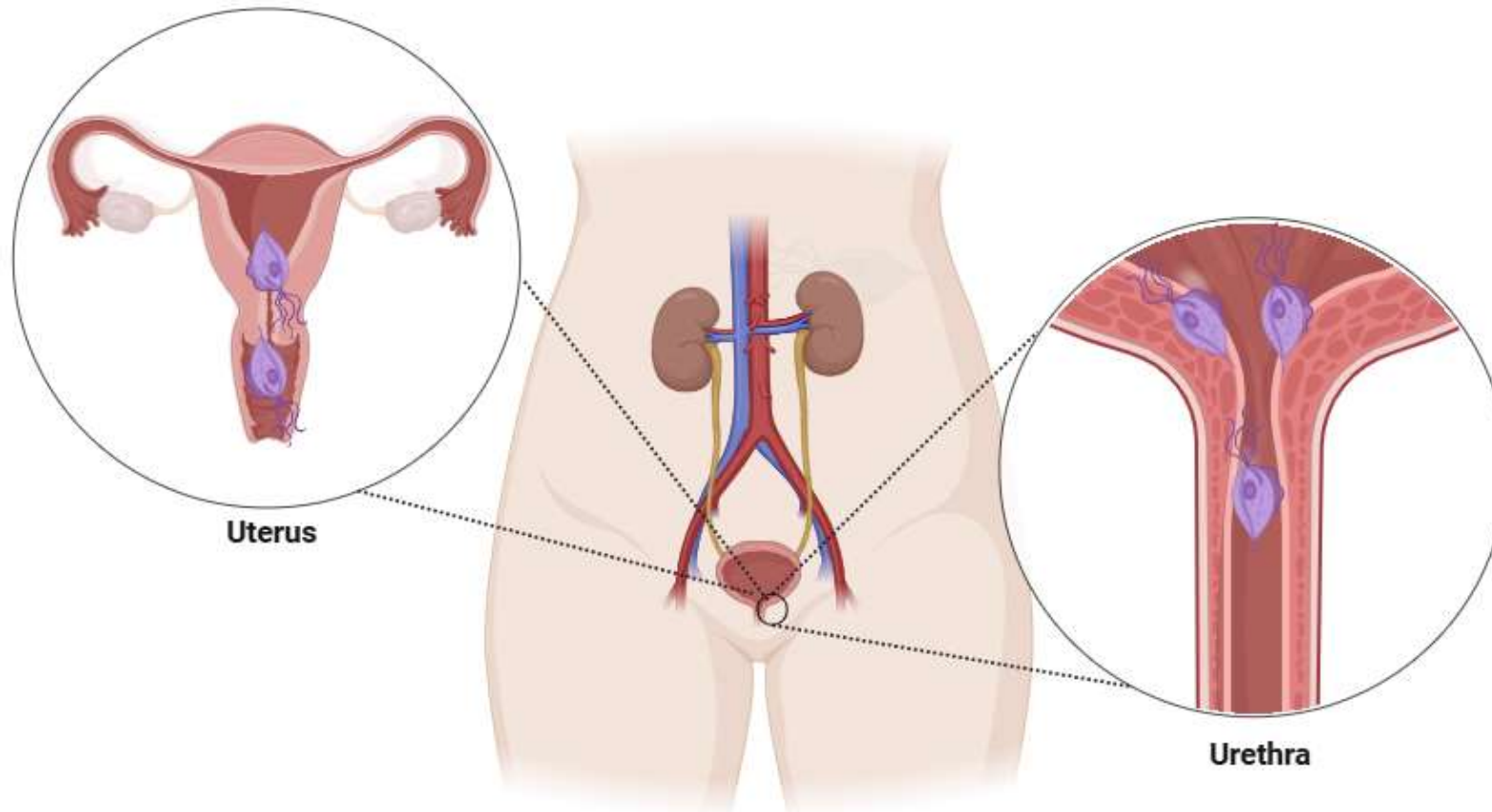


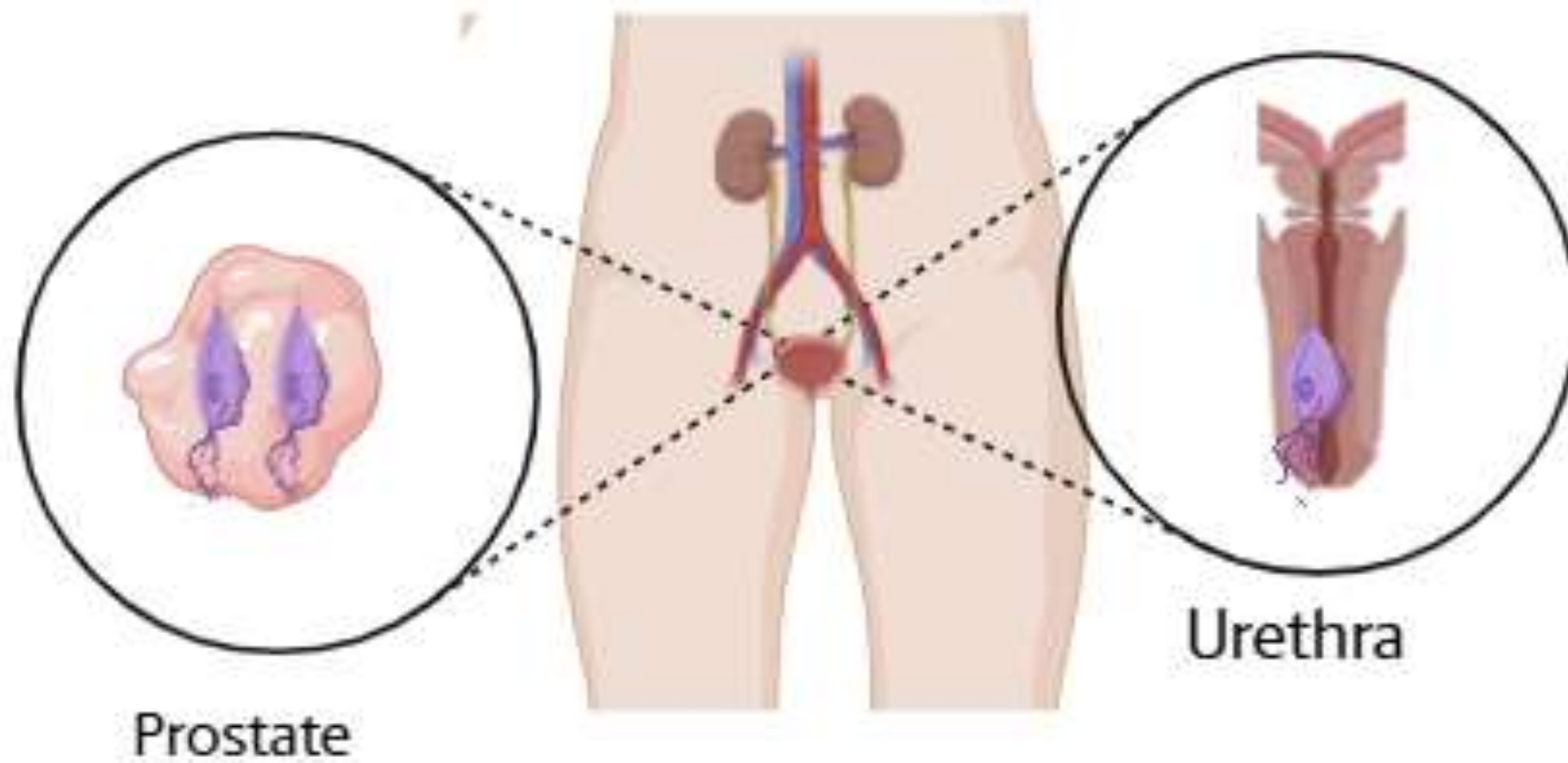
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TRANSMISSION



TRICHOMONAS VAGINALIS





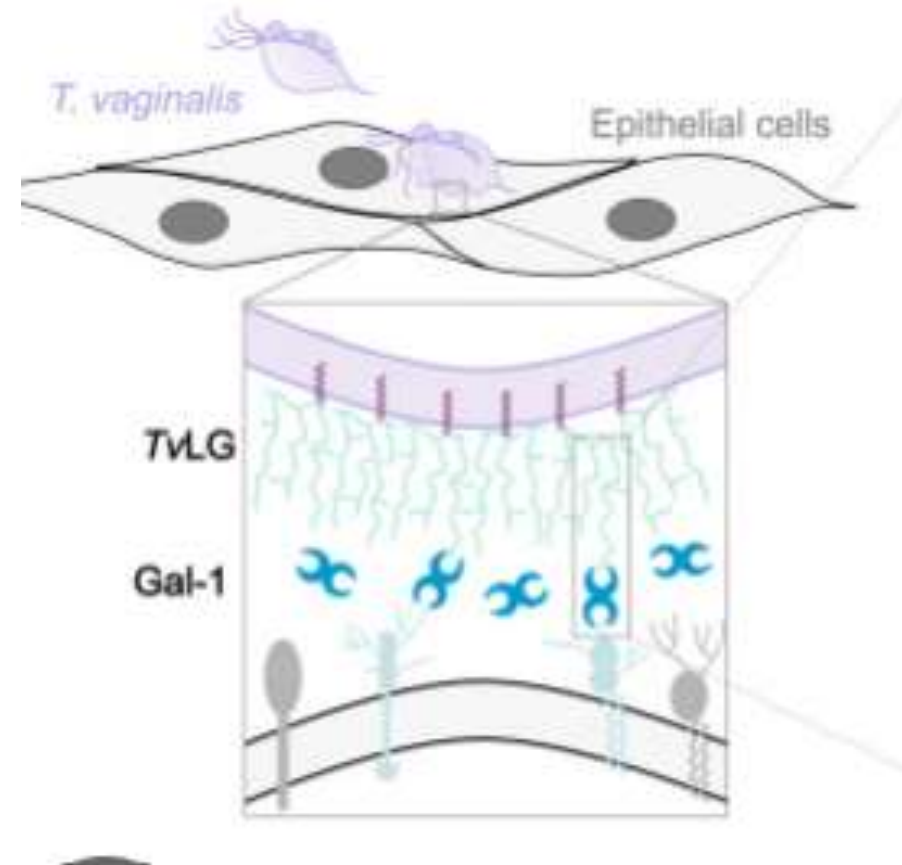
VIRULENCE FACTORS

- Hydrogenosomes



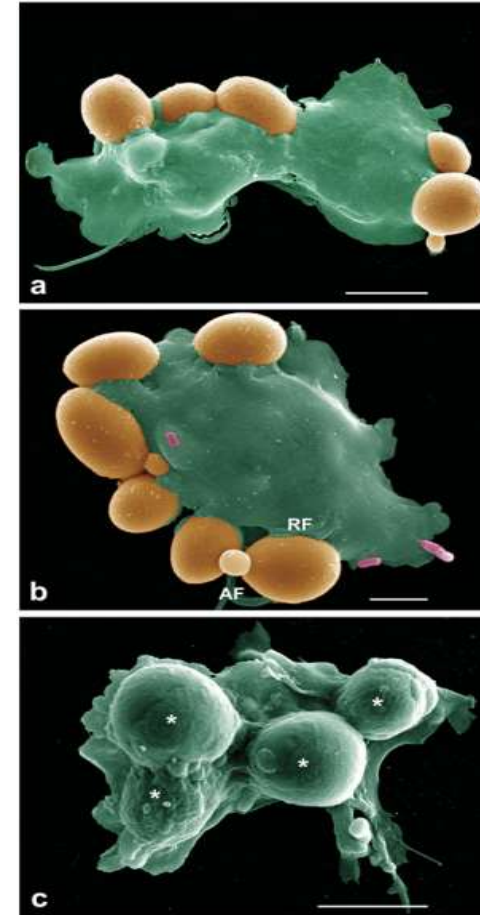
VIRULENCE FACTORS

- Hydrogenosomes
- TV lioglycans



VIRULENCE FACTORS

- Hydrogenosomes
- TV lioglycans
- Phagocytosis
 - Lateral gene transfer
 - Microbiota disruption

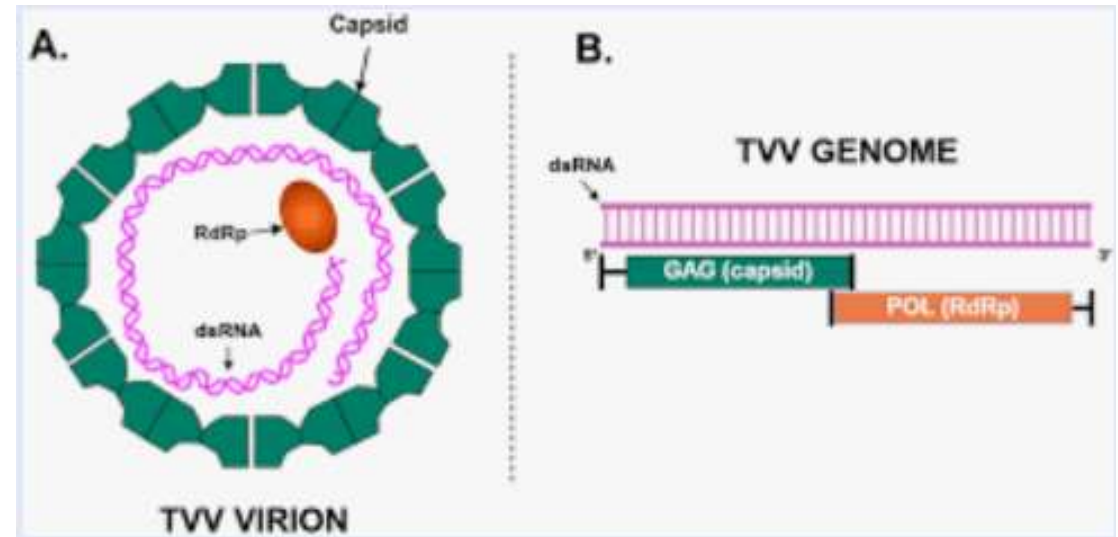


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VIRULENCE FACTORS

- Hydrogenosomes
- TV lioglycans
- Phagocytosis
 - Lateral gene transfer
 - Microbiota disruption
- TV viruses



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- Grey or yellow vaginal discharge
- Vaginal bleeding
- Genital burning
- Genital swelling
- Frequent urge to urinate
- Pain during sex
- Strawberry cervix



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- Discharge from urethra
- Burning during urination or after ejaculation
- Urge to urinate frequently



STI	Symptoms				
	Vaginal Discharge	Burning with Urination	Discharge from Penis	Itching inside of Penis	Genital Irritation
 <i>Chlamydia trachomatis</i>	Yes	Yes	Yes	Yes	Yes
 <i>Neisseria gonorrhea</i>	Yes	Yes	Yes	Yes	Yes
 <i>Trichomonas vaginalis</i>	Yes	Yes	Yes	Yes	Yes



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GOLD STANDARD-CULTURE

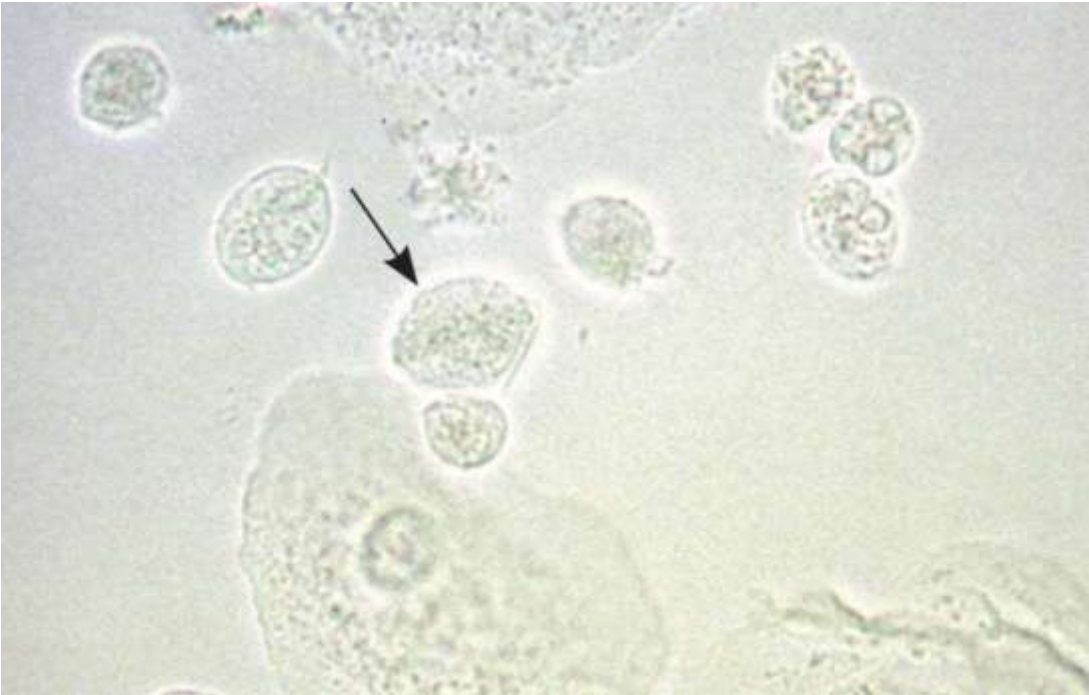
- Sensitivity 75-96%
- Specificity 100%
- Cumbersome, several days to results
- Less sensitive in men
- Specimen type
- Needed in cases of drug resistance



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TRADITIONAL DIAGNOSIS-WET PREP



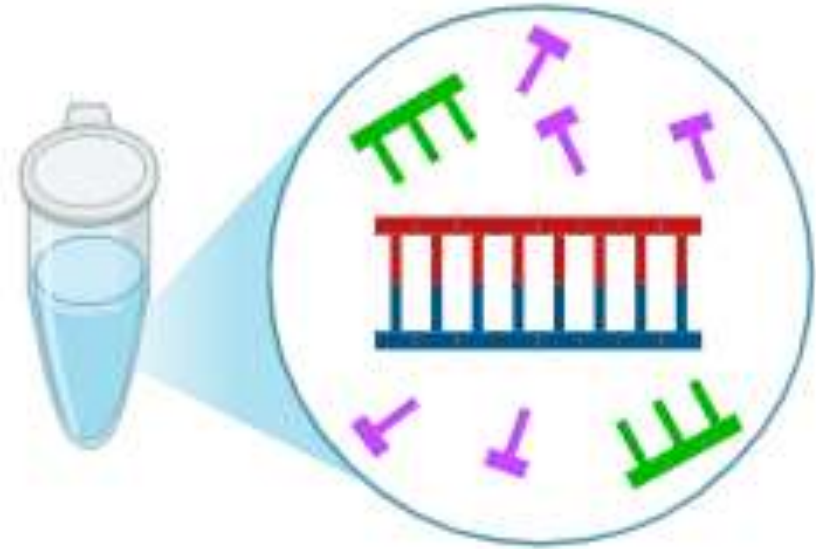
<https://www.aafp.org/pubs/afp/issues/2011/0401/p807>

- Sensitivity 44-81%
- Specificity 51-65%
- Rapid results



NEW-NUCLEIC ACID AMPLIFICATION TESTS (NAAT)

- Sensitivity 95-100%
- Specificity 100%
- Results in 24-48 hours
- Specimen type



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A TALE OF TWO TESTS

Wet Prep

- Pro's
 - High specificity
 - Rapid diagnosis
- Con's
 - Low sensitivity
 - Temperature dependent
 - Technician dependent

NAAT

- Pro's
 - High specificity
 - High sensitivity
 - Multi-STI's
 - Stable specimen
- Con's
 - Time to result



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TREATMENT

Metronidazole Molecule



- 5- nitroimidazole is the only class of drug with invitro ant-trichomonascidal activity
- Causes cell death by binding nitrogen radicals to the DNA, disrupting DNA and propagating cell death



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Single-dose compared to multi-dose metronidazole for the treatment of trichomoniasis in women: A meta-analysis

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Patricia Kissinger, PhD

Abstract

Background—*Trichomonas Vaginalis* is the most common non-viral sexually transmitted infection worldwide. While the Centers for Disease Control and Prevention recommend a single 2-gram dose of metronidazole for the treatment of *T. vaginalis* among HIV negative women, high-quality evidence is limited. The purpose of this meta-analysis was to compare treatment outcomes between single-dose and multi-dose metronidazole for the treatment of *T. vaginalis* in women.

Treatment

Treatment reduces symptoms and signs of *T. vaginalis* infection and might reduce transmission. Treatment recommendations for women are based on a meta-analysis (1104) and a multicenter, randomized trial of mostly symptomatic women without HIV infection (1105). The study demonstrated that multidose metronidazole (500 mg orally 2 times/day for 7 days) reduced the proportion of women retesting positive at a 1-month test of cure visit by half, compared with women who received the 2-g single dose. No published randomized trials are available that compare these doses among men.

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



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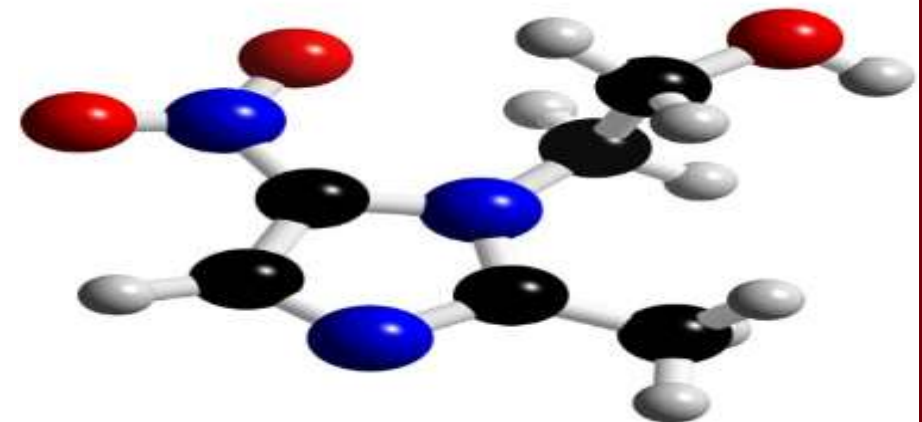
TREATMENT

Women

- Metronidazole (Flagyl)
 - 500 mg, 2x day for 7 days
- Tinidazole
 - Single 2000 mg dose
- Secnidazole
 - Single 2000 mg dose

Men

- Metronidazole (Flagyl)
 - Single 2000 mg dose
- Tinidazole
 - Single 2000 mg dose



TREATMENT FAILURE

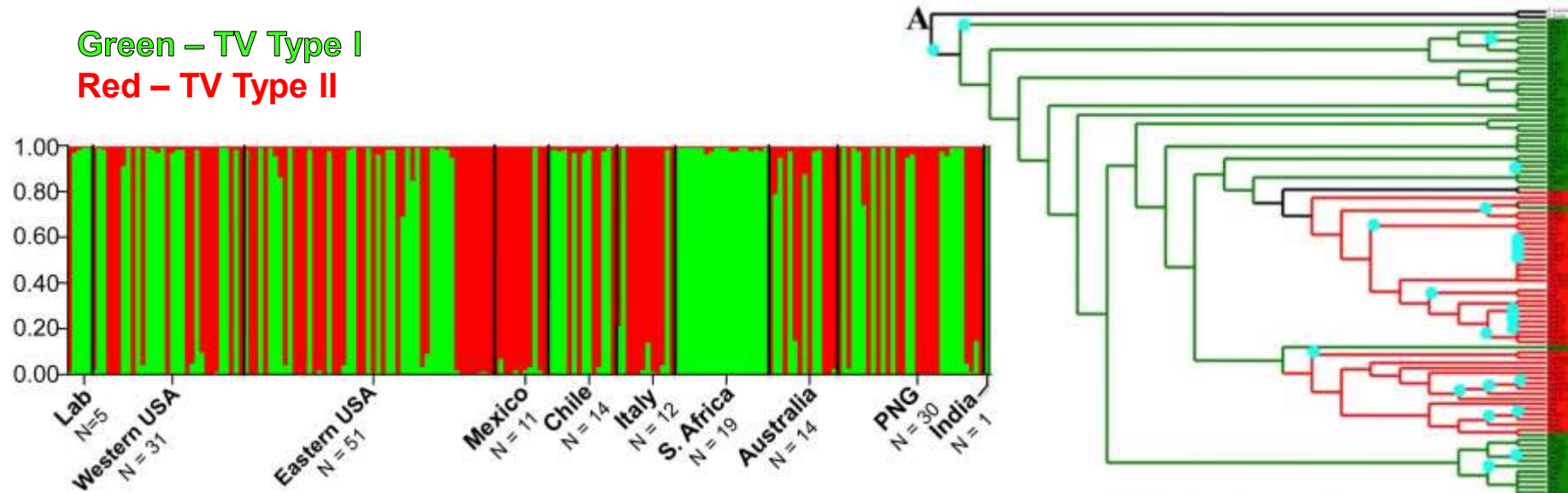
- Clinical treatment failure
- Repeat infections
 - 5-30%
- Drug resistance
- Partner treatment
- Loss to follow-up



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GENOTYPES INFLUENCE TREATMENT FAILURE



- **TV I**-More often seen with *Trichomonas Vaginalis virus* (TVV)
 - Trigger pro-inflammatory cascades/Th1
- **TV II**- More frequently associated with metronidazole resistance
 - Potentially reduced parasite load
 - More often seen with high-risk behavior



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A SILENT ASSASSIN

- Adverse pregnancy outcomes
- Increased susceptibility to other infections
- Augmentation of disease
- Populations at risk



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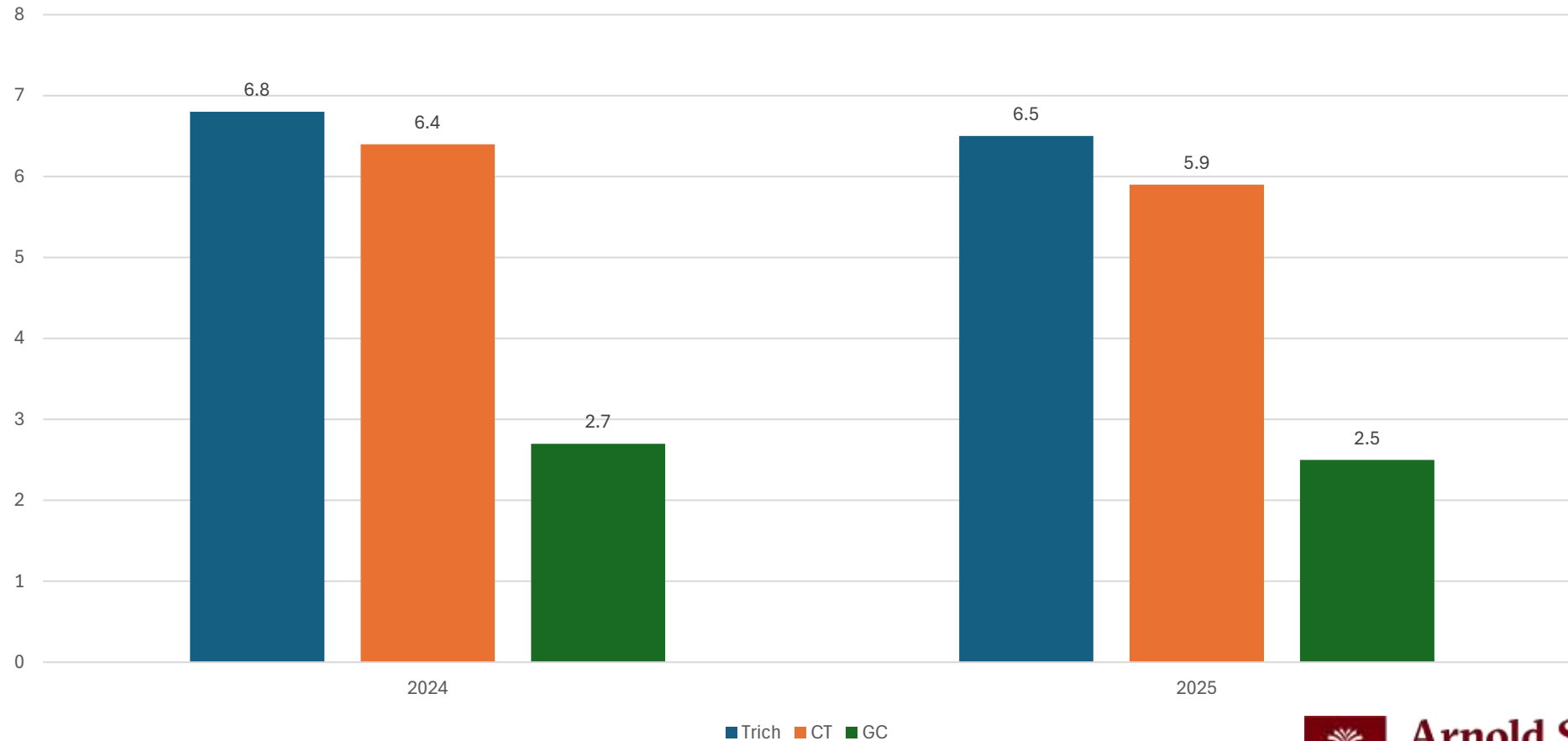
DISPARITIES IN RESEARCH

	T. vaginalis	Syphilis	Gonorrhea	Chlamydia	HPV	HIV
T. vaginalis		329	1,347	1,366	190	741
Syphilis	329		4,793	2,703	265	9,149
Gonorrhea	1,347	4,793		8,167	403	4,482
Chlamydia	1,366	2,703	8,167		814	4,093
HPV	190	265	403	814		4,433
HIV	741	9,149	4,482	4,093	4,433	
Totals	3,973	17,239	19,192	16,329	6,105	22,898



EVIDENCE

Percent of Sample Positive for *Trichomonas*, *Chlamydia*, and *Gonorrhea* - 2024-2025



EVIDENCE CONTINUED

- National Health and Nutrition Examination Survey-2016
- Prevalence
 - Females 1.8%
 - Males 0.5%
- Public Health Testing
 - 2024
 - Females 7.7%
 - Males 4.3%
 - 2025
 - Females 7.4%
 - Males 4.1%



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EVIDENCE CONTINUED CO-INFECTIONS

- 2024
 - 14.4% Co-infection rate
 - 10.5% Chlamydia
 - 2.6% Gonorrhoeae
 - 1.2% had all three
- 2025
 - 13.9% Co-infection rate
 - 10.8% Chlamydia
 - 1.8% Gonorrhoeae
 - 1.2% had all three



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ITS SILENCE IS ITS
GREATEST WEAPON BUT
AWARENESS, TESTING,
AND TREATMENT CAN
STOP ITS SPREAD

