STIs 101: GC, CT and Common STI Syndromes

Natalie Neu, MD, MPH
Professor of Pediatrics
Medical Director, NYC STI/HIV Prevention Training Center

PTC Disclaimer

Some terms in this presentation may have been modified to align with executive order requirements that this CDC-funded grant has received.

STIs Are Not Benign

- Pelvic inflammatory disease
- Chronic pelvic pain
- Infertility
- Adverse pregnancy outcomes
  - Prematurity
  - Stillbirth
- Urethral strictures
- Gastrointestinal fistulas
- Peri-rectal abscesses
- Severe complications of syphilis
  - Permanent hearing or vision impairment

What do we do when we see patients? Jack….

- 16-year-old
- Presents to clinic as a walk-in
- Feels like he just wants to get tested for STIs
- No specific complaints

Jack's History

- Partners
  - 6 male partners in the past 2 months
    - Meets partners on an app
  - 1 regular female partner
- Practices
  - Oral (gives and receives), vaginal and anal intercourse (insertive and receptive)
- Protection from STIs
  - Condoms "sometimes", doesn't like the sensation
- Past history of STIs
  - Chlamydia in the past
- Pregnancy intention
  - Doesn't want kids but does not know what his female partner uses

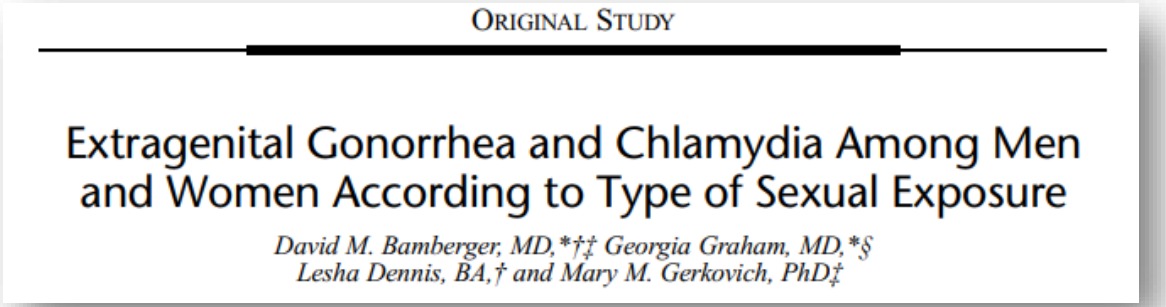
General STI Screening Recommendations

Population	Recommendations
Men who have sex with men	At least annually, **test at each site of exposure** (urethra, rectum) for sexually active MSM regardless of condom use or every 3-6 months if at increased risk.
Patients taking PrEP	**All patients** starting and taking oral PrEP should have genitourinary and extra-genital testing performed at baseline and **every 3 months**.
Persons living with HIV	For sexually active individuals, screen at first HIV evaluation and at least annually thereafter. **More frequent screening** might be appropriate depending on individual risk behaviors and local epidemiology
Non-pregnant Women	**Test at least annually** for sexually active women under 25 years of age and those aged 25 years and older if at increased risk Rectal chlamydial testing can be considered in females **based on sexual behaviors and exposure** through shared clinical decision making.
Men who have sex with women***	Consider screening young men in high prevalence clinical settings (adolescent and STI clinics and correctional facilities)
Pregnant Women	All pregnant women under 25 years of age and those aged 25 years and older if at increased risk. **retest during 3rd trimester** if under 25 years of age or at risk.

Why an Emphasis on Extragenital Testing

Missed Diagnosis

Change in Management



ORIGINAL STUDY

Extragenital Gonorrhea and Chlamydia Among Men and Women According to Type of Sexual Exposure

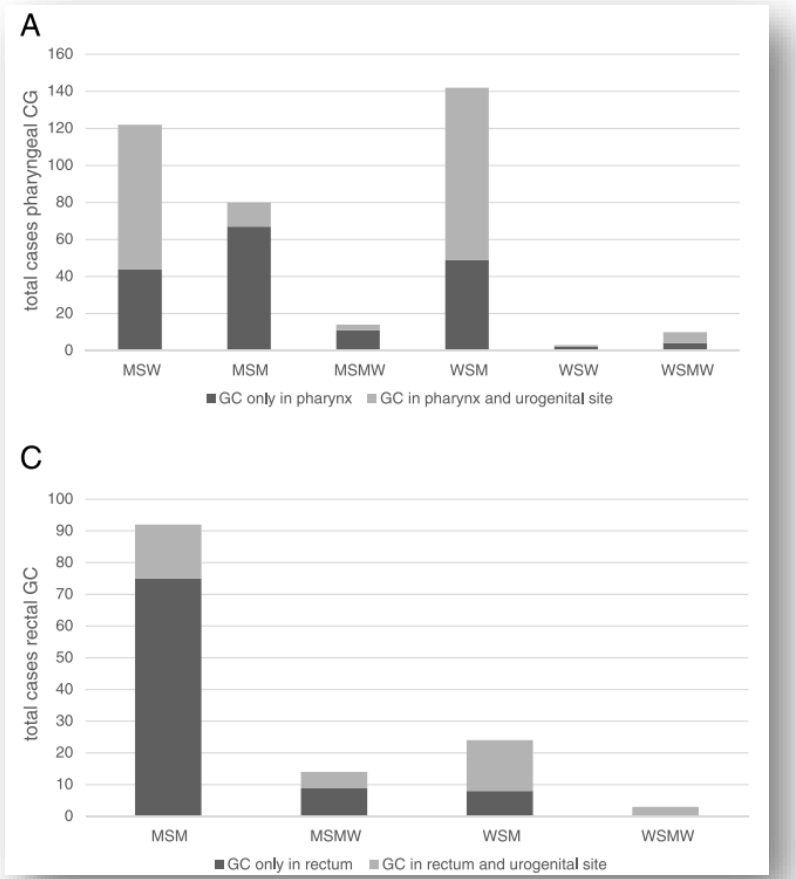
David M. Bamberger, MD,†‡ Georgia Graham, MD,*§*
Lesha Dennis, BA,† and Mary M. Gerkovich, PhD‡

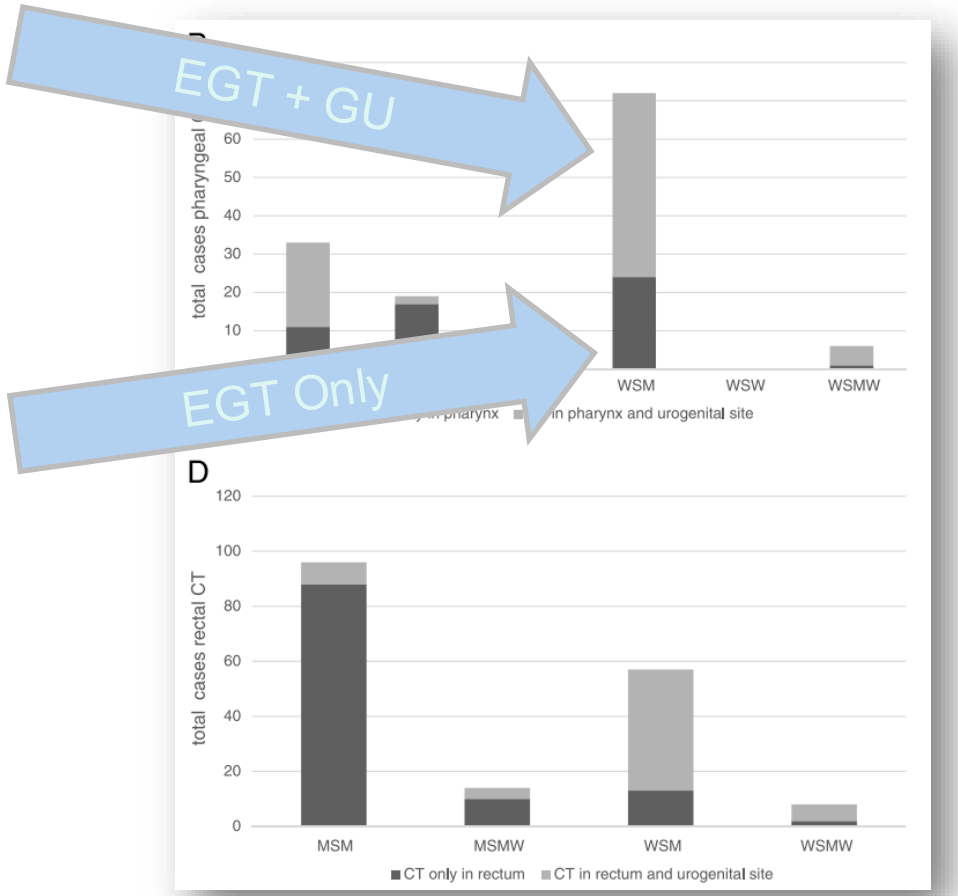
- Kansas City Department of Health STD Clinics - 9,646 clinical encounters

Emphasis on Extra-Genital Testing

Pharyngeal

Rectal



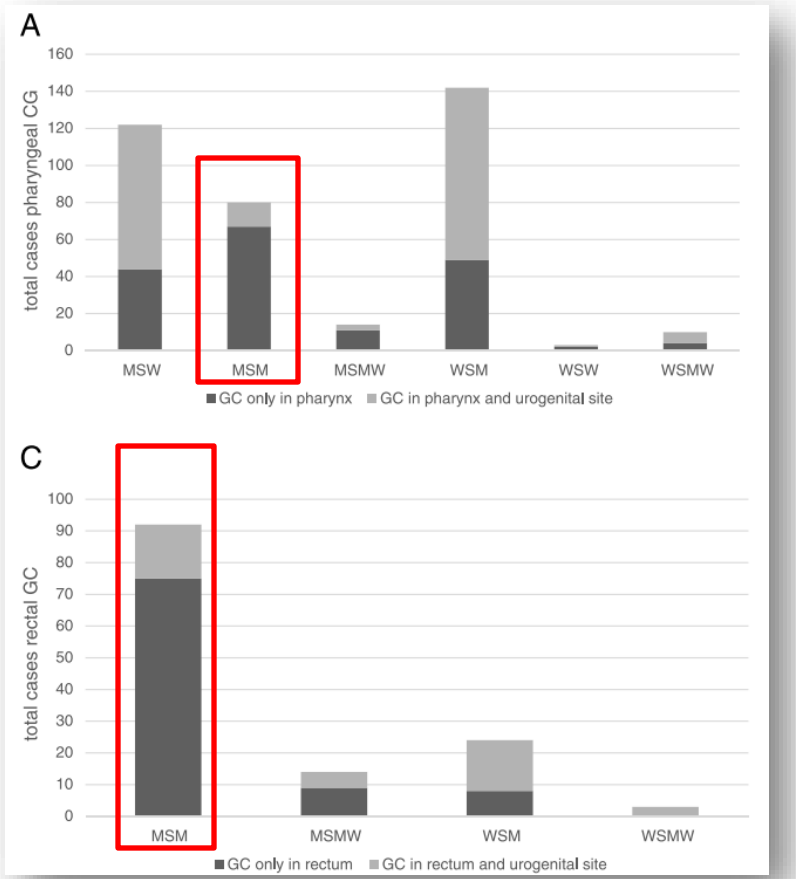


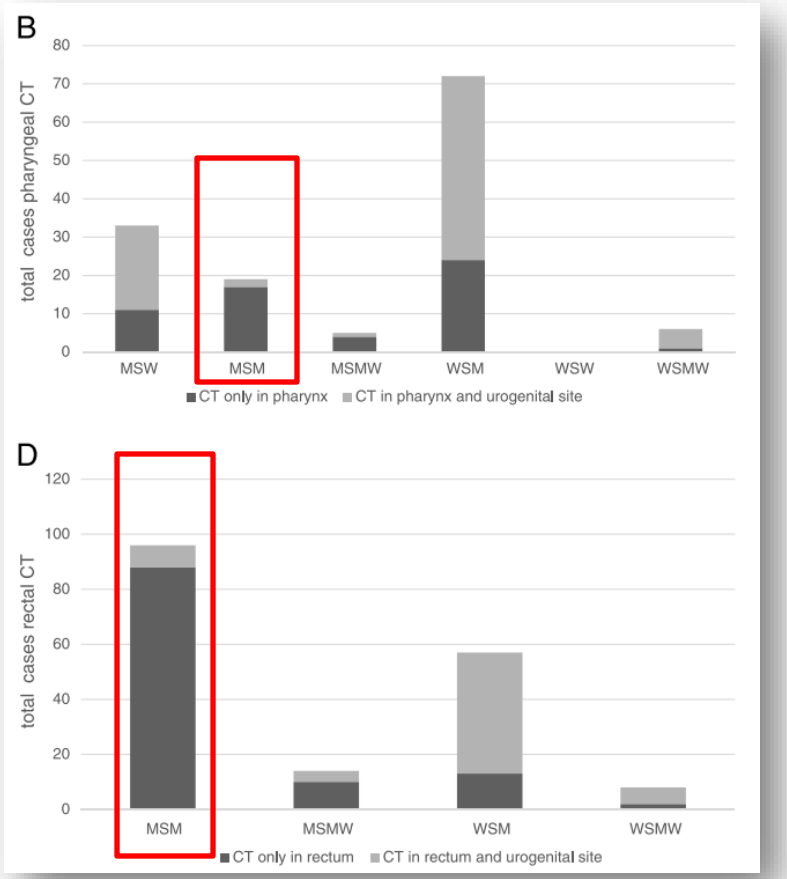
- Bamberger DM, Graham G, Dennis L, Gerkovich MM. Extragenital Gonorrhea and Chlamydia Among Men and Women According to Type of Sexual Exposure. Sex Transm Dis. 2019 May;46(5):329-334. doi: 10.1097/OLQ.0000000000000967. PMID: 30676485.

Emphasis on Extra-Genital Testing

Pharyngeal

Rectal



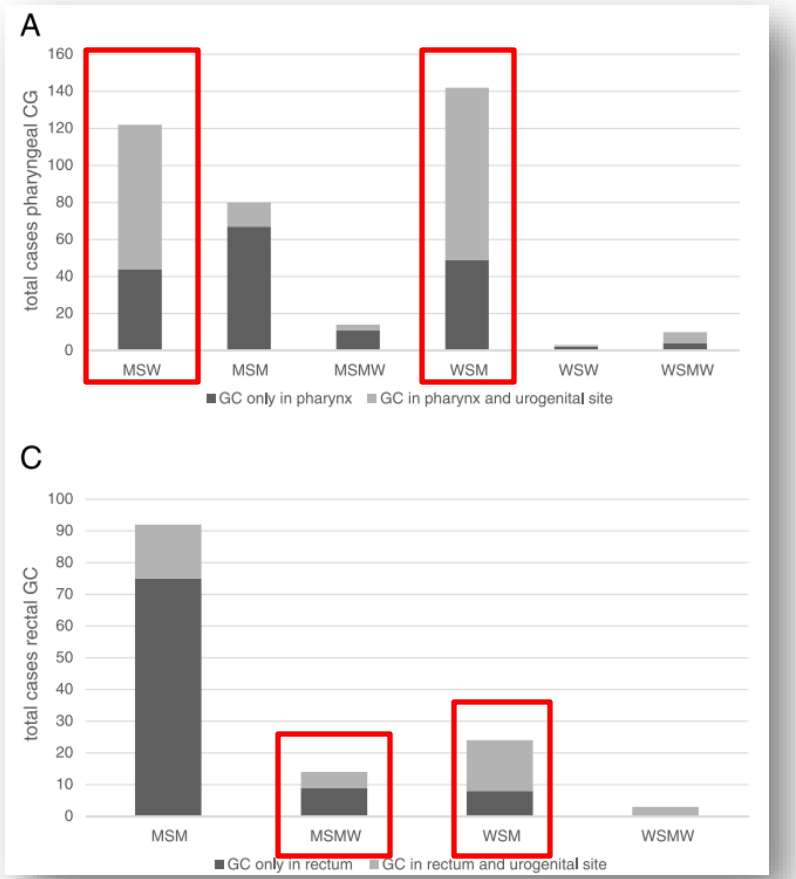


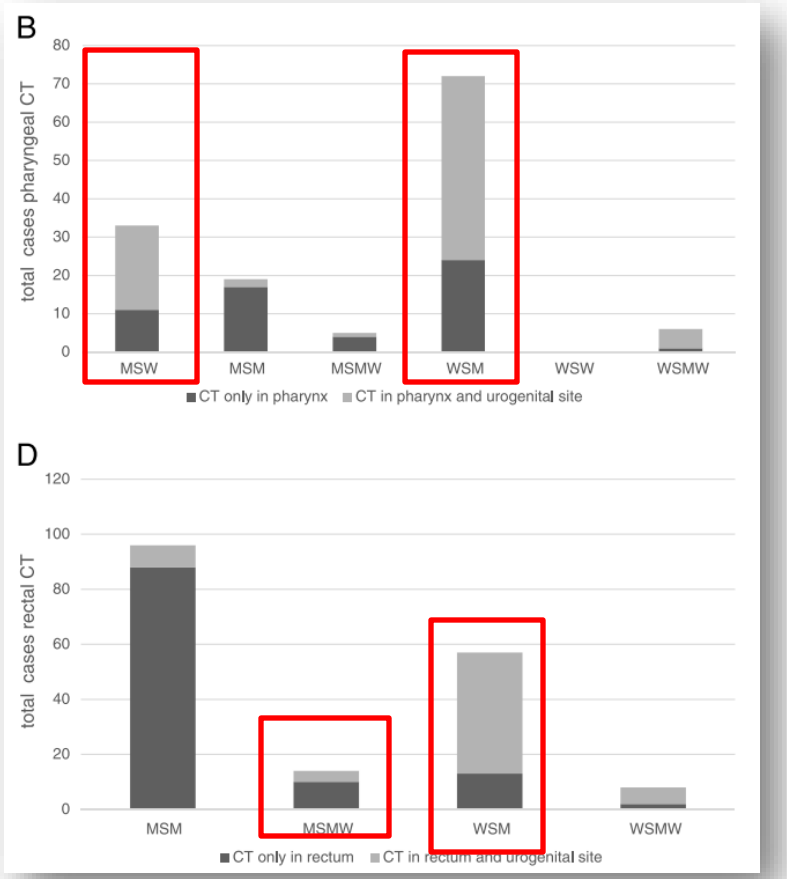
- Bamberger DM, Graham G, Dennis L, Gerkovich MM. Extragenital Gonorrhea and Chlamydia Among Men and Women According to Type of Sexual Exposure. Sex Transm Dis. 2019 May;46(5):329-334. doi: 10.1097/OLQ.0000000000000967. PMID: 30676485.

Emphasis on Extra-Genital Testing

Pharyngeal

Rectal





- Bamberger DM, Graham G, Dennis L, Gerkovich MM. Extragenital Gonorrhea and Chlamydia Among Men and Women According to Type of Sexual Exposure. Sex Transm Dis. 2019 May;46(5):329-334. doi: 10.1097/OLQ.0000000000000967. PMID: 30676485.

Emphasis on Extragenital Testing

Missed Diagnosis

Change in Management

- **Most cases** of GC and CT in MSM would have been **missed** had extragenital testing not been performed
- A **third of cases** of extragenital GC and CT in **MSW and WSM** would have been missed had only urogenital testing been performed

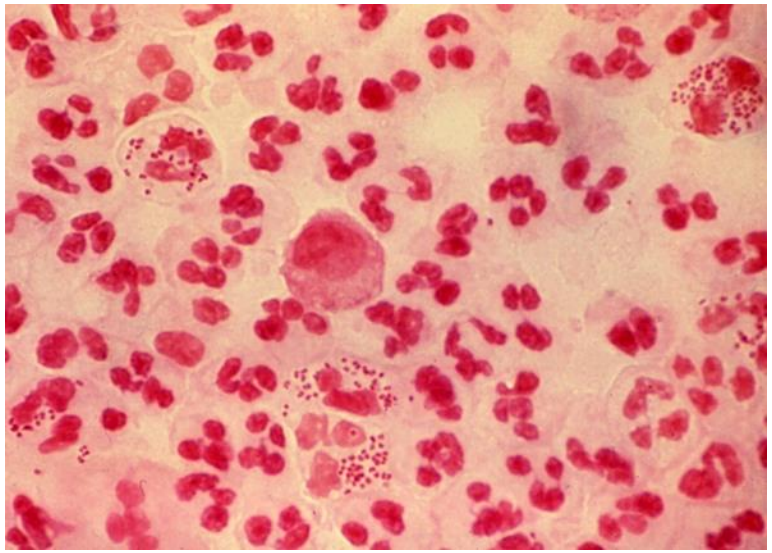
Jack's Work-Up

- Well, he does have some discharge
- Its mild and comes and goes
- Let's do a gram stain then…

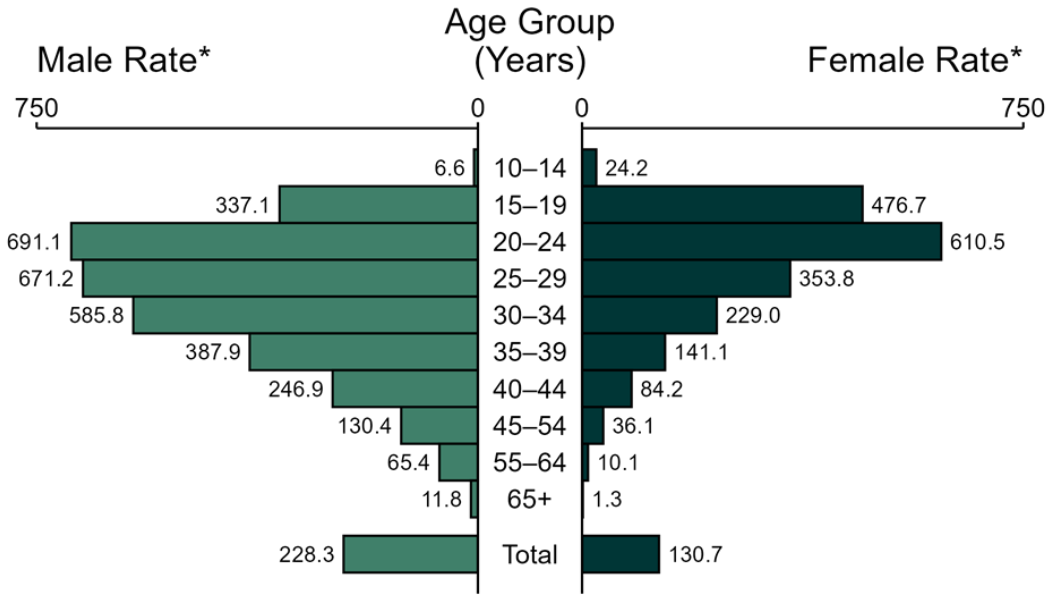
Gonorrhea (*Neisseria gonorrhea*)

Gram stain from urethral discharge

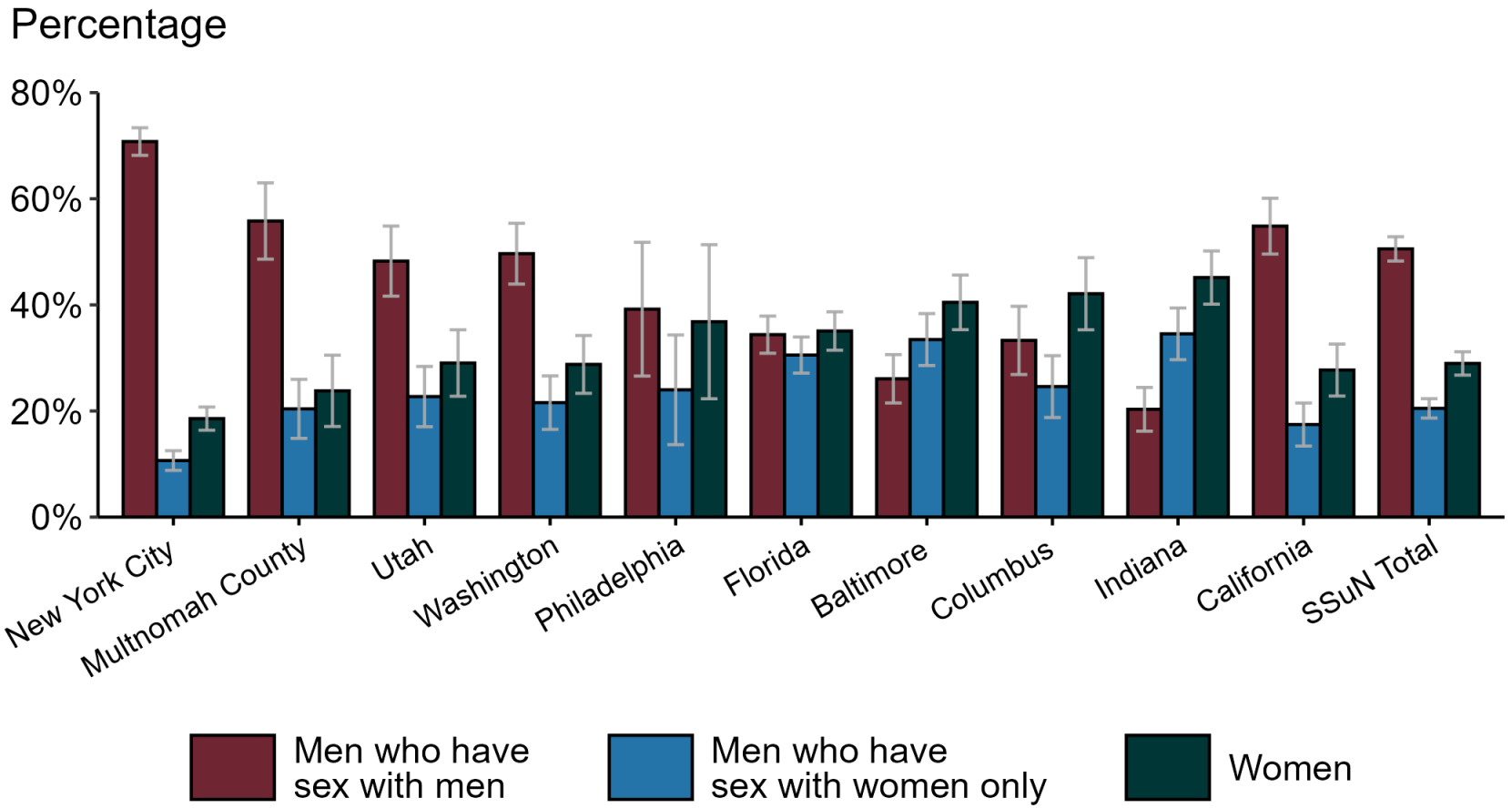
Gram-negative intracellular diplococci



Rates of Reported Cases by Age Group and Sex, United States, 2023



Gonorrhea — Estimated Proportion of Cases by Sex and Sex of Sex Partners and Jurisdiction, STI Surveillance Network (SSuN), 2023



NOTE: Estimate based on weighted analysis of data on sex of sex partners obtained from interviews (n=5,705) conducted among a random sample of gonorrhea cases reported to participating SSuN jurisdictions during January to December 2023. Includes ten SSuN sites reporting completed case investigations in 2023 for at least 1% of all reported cases.

What is the best treatment for his positive gonorrhea test?

- Ceftriaxone 250 mg IM once
- Ceftriaxone 500 mg IM once
- Ceftriaxone 250 mg IM once with azithromycin 1 gram by mouth once
- Ceftriaxone 500 mg IM once with doxycycline 100 mg by mouth twice daily for 7 days

Gonorrhea Treatment Guidelines

Ceftriaxone **500** mg IM x 1
for persons weighing <150kg*

*For persons weighing ≥ 150kg, 1 g of IM ceftriaxone should be administered

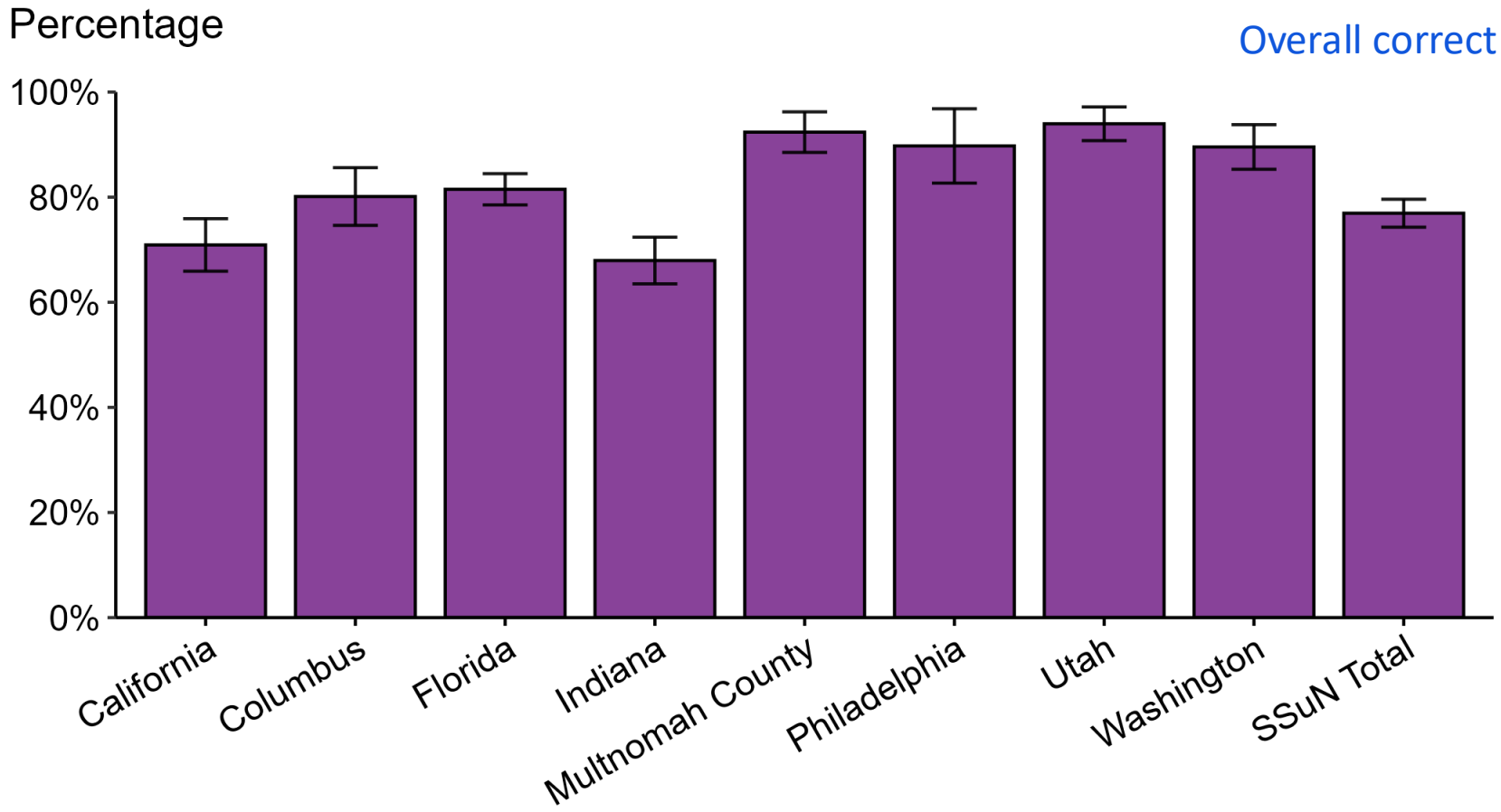
If chlamydia has **not** been excluded, treat for chlamydia with:

Doxycycline 100 mg PO twice daily x 7 days

*For pregnancy, allergy, or concern for non-adherence 1g PO Azithromycin can be used

No longer recommending dual therapy with azithromycin

Gonorrhea — Estimated Proportion of Cases Treated with Recommended Regimen by Jurisdiction, STI Surveillance Network (SSuN), 2023



NOTE: Includes SSuN jurisdictions with treatment and dosage data ascertained for at least 80% of sampled, investigated cases. In 2023, the recommended treatment for uncomplicated gonorrhea was ceftriaxone 500 mg, intramuscular.

Alternative Gonorrhea Treatment

Uncomplicated infections of the cervix, urethra, and rectum if ceftriaxone is not available.:

Cefixime **800** mg PO x 1

IF chlamydia has not been excluded, treat for chlamydia with:

Doxycycline 100 mg PO BID x 7 days

For pregnancy, allergy, or concern for non-adherence, 1g PO azithromycin x 1 can be used

Cephalosporin allergy: Gentamicin 240 mg IM + azithromycin 2 g PO

No reliable alternative treatments are available for **pharyngeal** gonorrhea

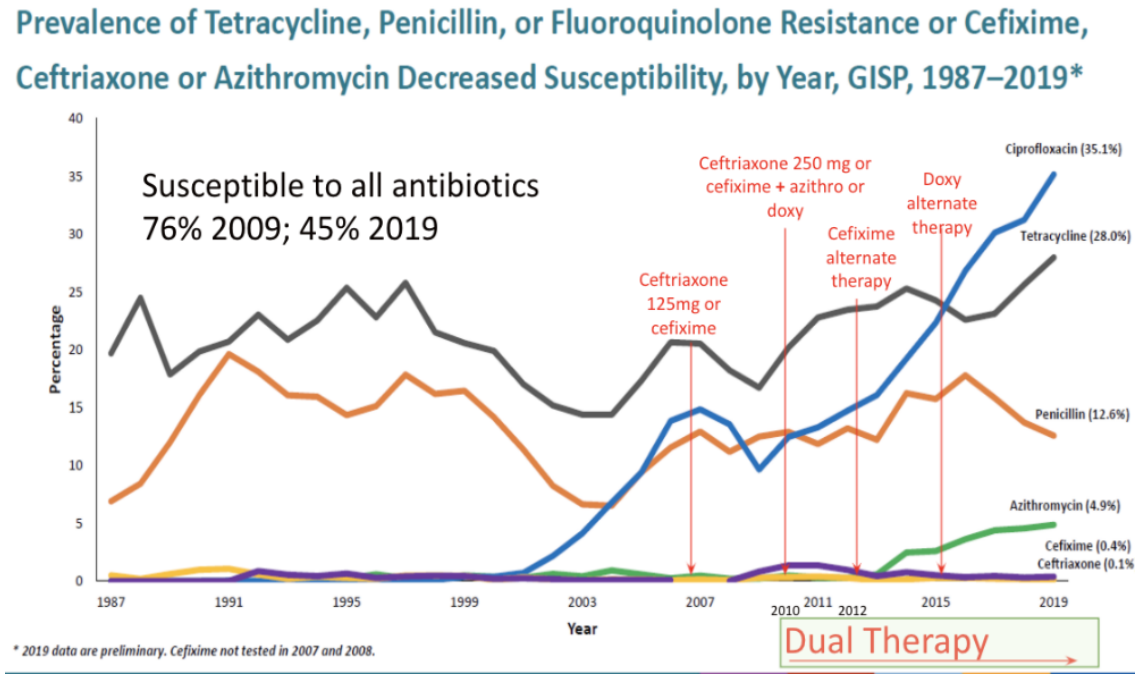
Source: Update to CDC's Treatment Guidelines for Gonococcal infection, MMWR 202

Why Make This Change for Gonorrhea

1. Antimicrobial stewardship
   a) *N. gonorrhoeae* resistance
   b) Rising resistance in other pathogens
   c) Selection for non-macrolide resistance
2. Pharmacokinetics and pharmacodynamics
   a) Rising MICs = Increase Dose Needed
   b) Pharynx

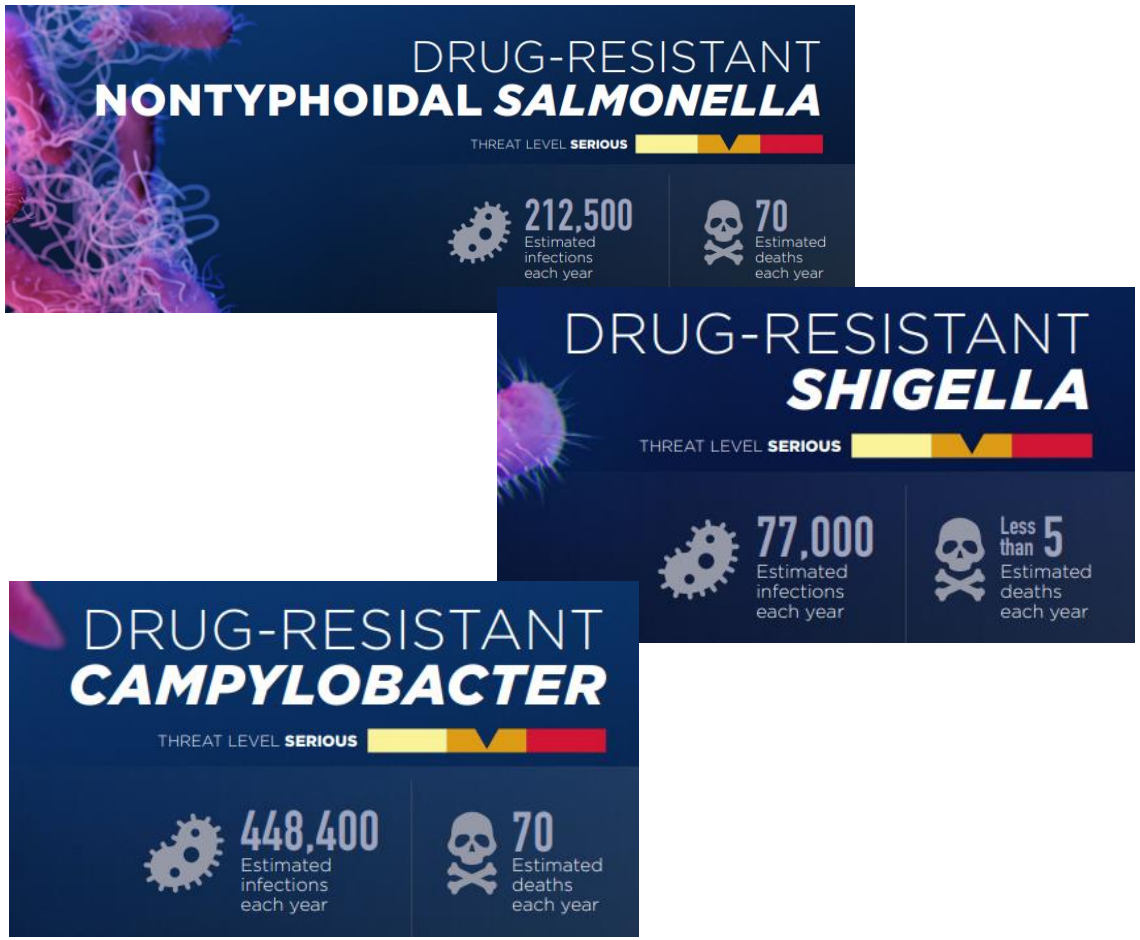
Antimicrobial Stewardship

1. Antimicrobial stewardship
   - ***a) N. gonorrhoeae* resistance**
   - b) Rising resistance in other pathogens
   - c) Selection for non-macrolide resistance
2. Pharmacokinetics and pharmacodynamics
   - a) Rising MICs = Increase Dose Needed
   - b) Pharynx



Antimicrobial Stewardship

1. Antimicrobial stewardship
   a) *N. gonorrhoeae* resistance
   b) Rising resistance in other pathogens
   c) Selection for non-macrolide resistance
2. Pharmacokinetics and pharmacodynamics
   a) Rising MICs = Increase Dose Needed
   b) Pharynx



• Purpura L, Zucker J, LaSota E, et al. Prevalence of Gastrointestinal Pathogens Detected by Multiplex Polymerase Chain Reaction in a Prospective Cohort of Men Who Have Sex With Men Taking Human Immunodeficiency Virus Preexposure Prophylaxis-New York City, 2019-2020. Open Forum Infect Dis. 2021;8(8):ofab411. Published 2021 Aug 3. doi:10.1093/ofid/ofab411

Antimicrobial Stewardship

1. Antimicrobial stewardship
   a) *N. gonorrhoeae* resistance
   b) Rising resistance in other pathogens
   c) Selection for macrolide and non-macrolide resistance
2. Pharmacokinetics and pharmacodynamics
   a) Rising MICs = Increase Dose Needed
   b) Pharynx

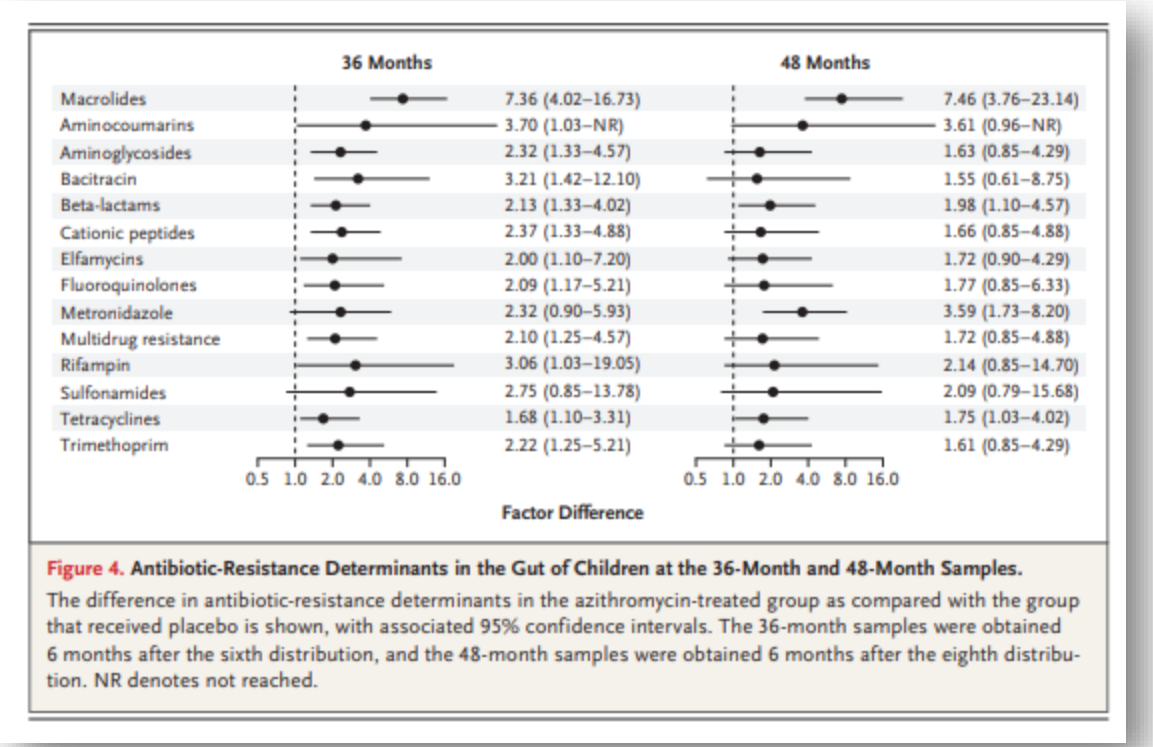


Figure 4. Antibiotic-Resistance Determinants in the Gut of Children at the 36-Month and 48-Month Samples.
The difference in antibiotic-resistance determinants in the azithromycin-treated group as compared with the group that received placebo is shown, with associated 95% confidence intervals. The 36-month samples were obtained 6 months after the sixth distribution, and the 48-month samples were obtained 6 months after the eighth distribution. NR denotes not reached.

Doan Et al. NEJM 2020

Pharmacokinetics and Pharmacodynamics

1. Antimicrobial stewardship
   a) *N. gonorrhoeae* resistance
   b) Rising resistance in other pathogens
   c) Selection for non-macrolide resistance
2. Pharmacokinetics and pharmacodynamics
   a) Rising MICs = Increase Dose Needed
   b) Pharynx

- Ceftriaxone levels need to be > GC strain MIC for ~24 hours
- Increasing MIC means increasing dosage needed

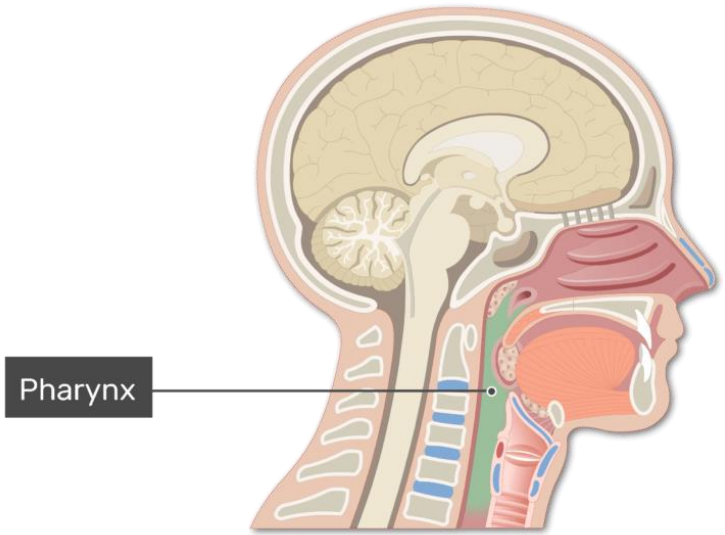
Pharmacokinetics and Pharmacodynamics

1. Antimicrobial stewardship
   a) *N. gonorrhoeae* resistance
   b) Rising resistance in other pathogens
   c) Selection for non-macrolide resistance
2. Pharmacokinetics and pharmacodynamics
   a) Rising MICs = Increase Dose Needed
   b) Pharynx

– Screened less

– Ceftriaxone concentrations more variable

  • *N. gonorrhoeae* likely requires longer times above the strain's MIC



When should the patient follow-up for re-testing?

- 1-2 weeks
- 4 weeks
- 8 weeks
- 12 weeks
- 24 weeks

Gonorrhea Follow-up

- Abstain from sex until 7 days after completing treatment
- Assess for treatment failure if persistent symptoms at 3-5 days with culture (with AST) and NAAT
- **Test of cure recommended for all pharyngeal infections at 7-14 days**
- Test of cure at 4 weeks if pregnant
- Rescreen everyone at 3 months for re-infection

Test of Cure for Pharyngeal Infections

- Persistent nonviable organisms may cause a false positive NAAT
- Reinfection from re-exposure is a common cause of persistent positive GC tests

RNA NAAT

TOC Pharynx*	N	Persistent RNA NAAT N (%)	OR (95% CI)
0-7 days	309	27 (8.7)	1 -----
8-14 days	367	8 (2.2)	0.23 (0.1-0.52)
15-28 days	105	1 (1.0)	0.10 (0.01-0.75)

DNA NAAT

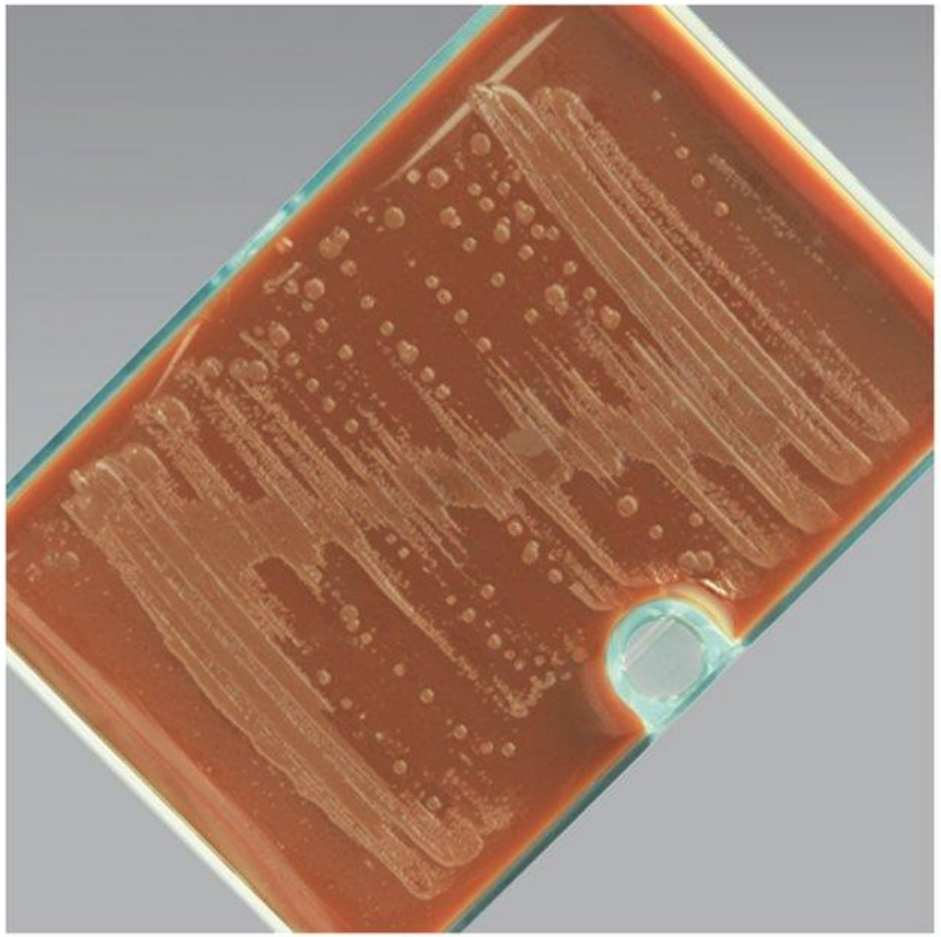
Pharyngeal GC persistence--DNA NAAT	% (95% CI)
7 days	13 (6.4-19.6)
14 days	8 (2.7-13.3)
All cultures negative	

- Hananta IPY, De Vries HJC, van Dam AP, van Rooijen MS, Soebono H, Schim van der Loeff MF. Persistence after treatment of pharyngeal gonococcal infections in patients of the STI clinic, Amsterdam, the Netherlands, 2012-2015: a retrospective cohort study. Sex Transm Infect. 2017 Nov;93(7):467-471. doi: 10.1136/sextrans-2017-053147. Epub 2017 Aug 19. PMID: 28822976; PMCID: PMC5739854..
- Bissessor M, Whiley DM, Fairley CK, Bradshaw CS, Lee DM, Snow AS, Lahra MM, Hocking JS, Chen MY. Persistence of Neisseria gonorrhoeae DNA following treatment for pharyngeal and rectal gonorrhea is influenced by antibiotic susceptibility and reinfection. Clin Infect Dis. 2015 Feb 15;60(4):557-63. doi: 10.1093/cid/ciu873. Epub 2014 Nov 3. PMID: 25371490.

What if this patient's test of cure were positive?

- Most suspected treatment failures are reinfections

- If re-infection is unlikely:
  - Obtain simultaneous NAAT and gonorrhea culture
  - Alert public health authorities
  - Treat with either ceftriaxone or gentamicin/azithromycin



Case 2: Jill

- A 18-year-old female in New York City
- She is sexually active with several male partners
  - One of them was recently diagnosed with chlamydia

What Do You Ask Jill?

5Ps

- Partners
- Practices
- Protection from STIs
- Past history of STIs
- Pregnancy intention

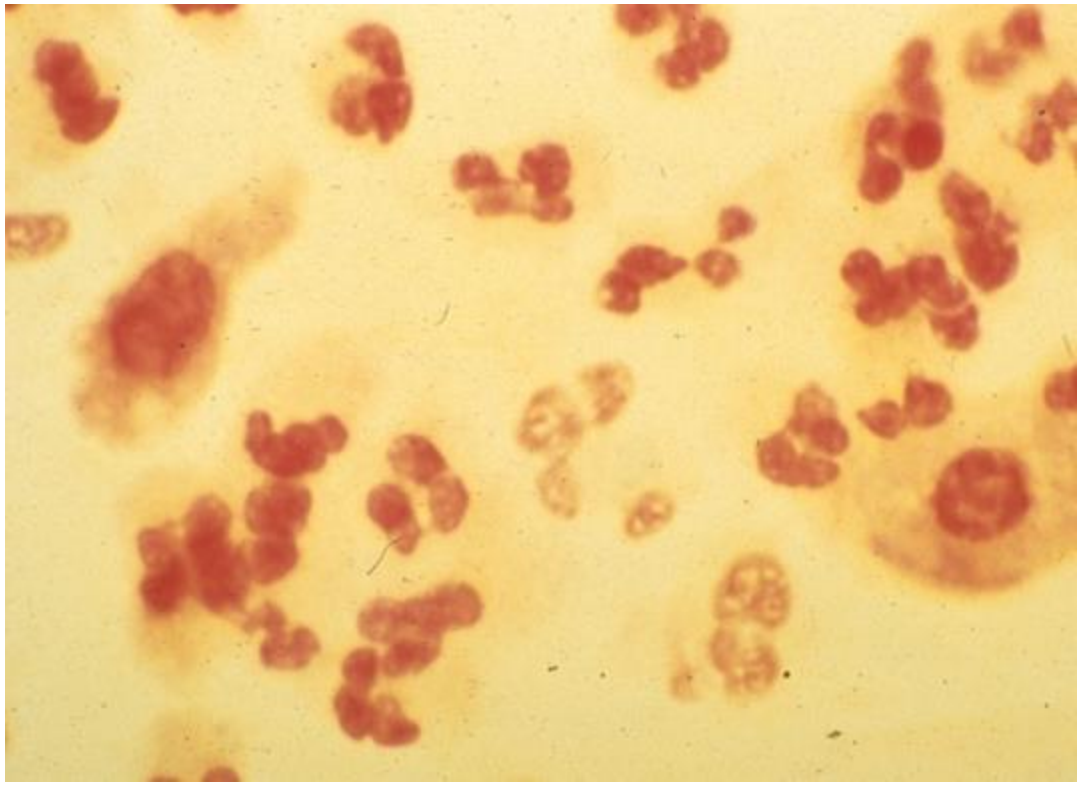
Jill's History

- Partners
  - 6 male partners in the past 2 months
  - 1 female partner
- Practices
  - Oral (gives and receives), vaginal and anal intercourse "a few times"
- Protection from STIs
  - Condoms 50% of the time, never for oral sex
- Past history of STIs
  - Chlamydia x 2 in the past
- Pregnancy intention
  - Does not want kids
  - Uses oral contraceptives (when she remembers to take them)

Jill's Work-up

- HIV Testing (HIV Ab/Ag test)
- Hepatitis C testing
- Gonorrhea and chlamydia testing
  - **3 site GC/CT NAAT**
  - Gram stain (if able)
- Trichomonas testing
- Syphilis testing (RPR)
- Pregnancy test
- Offer of HIV biomedical HIV prevention services (PrEP +/- PEP)

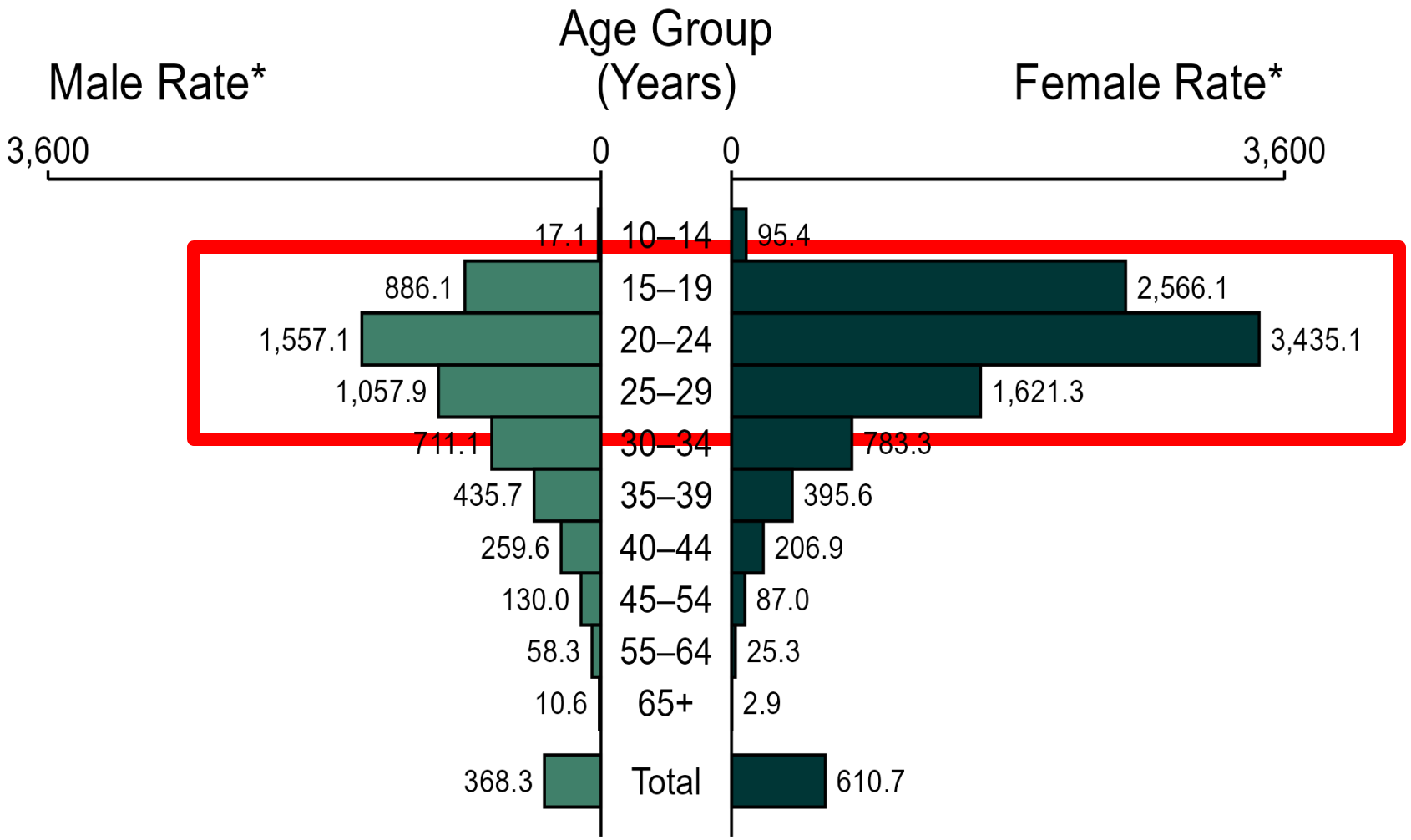
Non-Gonococcal Urethritis



Etiology

- *C. trachomatis* (15-40%)
- ***M. genitalium*** **(15-25%)**
- *T. vaginalis* (1-8%)
- HSV (3%)
- ***N. meningitidis***
- Other bacteria (i.e. *H. influenzae*)
- Other viruses (i.e. adenovirus, EBV)
- UNKNOWN (~50%)!

Chlamydia — Rates of Cases by Age and Sex, 2023



Highest rates:
Youth 15-30

https://www.cdc.gov/sti-statistics/media/files/2024/11/2023-STI-Surveillance-Report

Testing for STIs in Women

- **New:** Consider extragenital testing for GC/CT rectal and GC in the pharynx
- **Data: 2016, review of 33 studies included women**
  - Rectal GC 0.6- 35.8% (median 1.9%)
  - Pharyngeal GC 0-29.6% (median 2.1%)
  - Rectal CT 3-77.3% (median 8.7%)
  - Pharyngeal CT 0.2-3.2% (median 1.7%)
- **Conclusions:**
  - Extragenital screening can increase detection of GC/CT from 6-50% compared with urine alone
  - High impact sexual health intervention!

Sexual history taking

Shared decision making

Chan, Philip A., Robinette, Ashley, Montgomery, Madeline, Almonte, Alexi, Cu-Uvin, Susan, Lonks, John R., Chapin, Kimberle C., Kojic, Erna M., Hardy, Erica J., Extragenital Infections Caused by *Chlamydia trachomatis* and *Neisseria gonorrhoeae*: A Review of the Literature, *Infectious Diseases in Obstetrics and Gynecology*, 2016, 5758387, 17 pages, 2016. https://doi.org/10.1155/2016/5758387

Treatment Guidelines - Chlamydia

Preferred

Doxycycline 100 mg PO twice daily x 7 days

Alternative

Azithromycin 1g orally once*

*Preferred during pregnancy
**Pregnancy alternative: Amoxicillin 500mg orally 3 times per day for 7 days

OR

Levofloxacin 500mg orally x 7 days

Why Make This Change for Chlamydia

Genitourinary infection

- Microbiologic failure higher among men

Rectal infection

- Doxycycline superior to azithromycin (20%-26%)
- Rectal infection not uncommon among women with genitourinary infection (33%-83%)

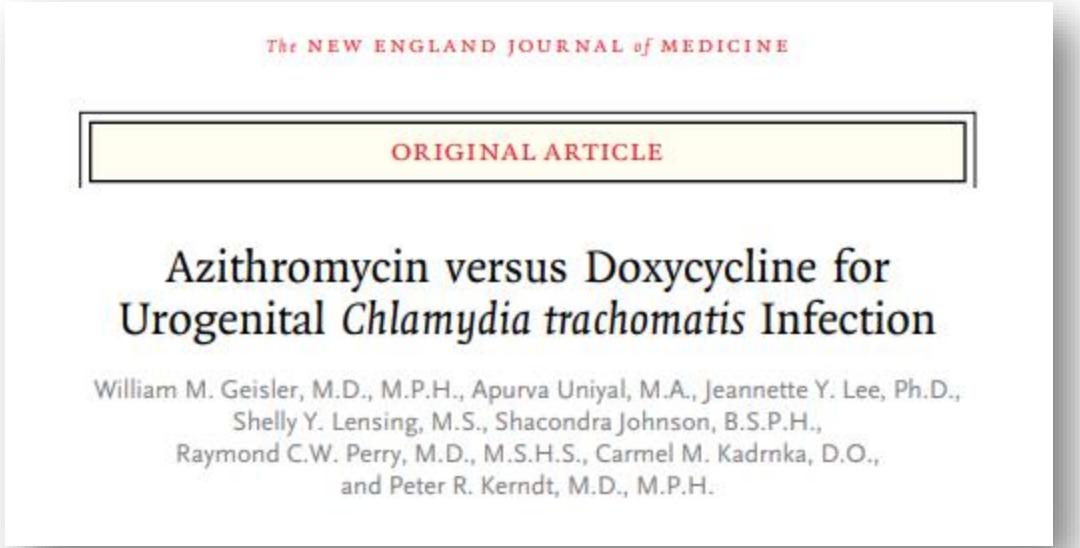
Why Make This Change for Chlamydia

Genitourinary infection

- **Microbiologic failure higher among men**

Rectal infection

- Doxycycline superior to azithromycin (20%-26%)
- Rectal infection not uncommon among women with genitourinary infection (33%-83%)



- Efficacy of azithromycin was 97%
- Efficacy of doxycycline was 100%

- **Non-inferiority of azithromycin was not established**

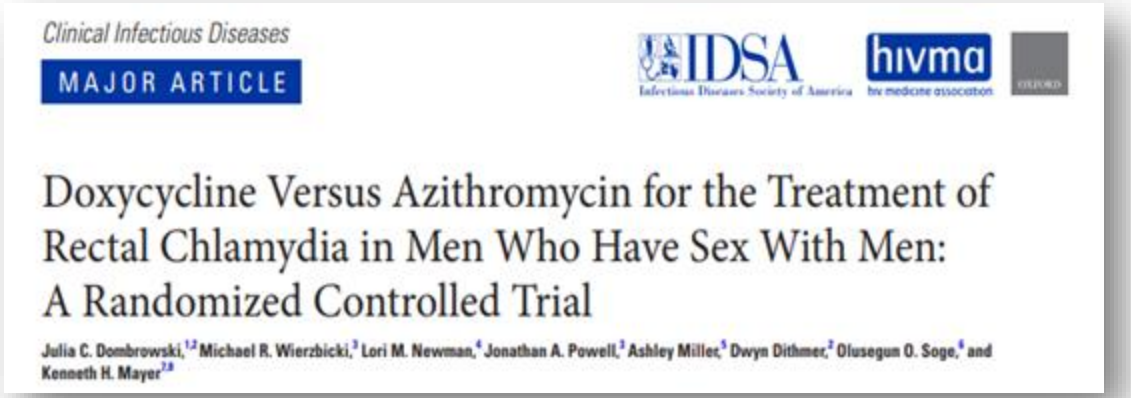
Why Make This Change for Chlamydia

Genitourinary infection

- Microbiologic failure higher among men

Rectal infection

- **Doxycycline superior to azithromycin (20%-26%)**
- Rectal infection not uncommon among women with genitourinary infection (33%-83%)

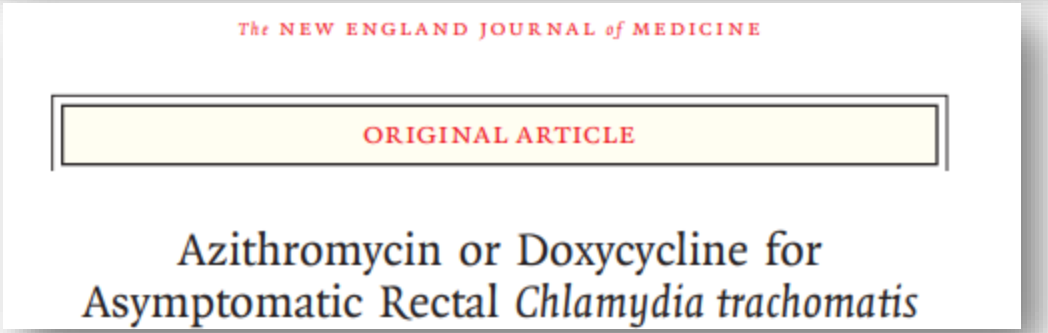

Clinical Infectious Diseases

MAJOR ARTICLE

IDSA Infectious Diseases Society of America | hivma hiv medicine association

Doxycycline Versus Azithromycin for the Treatment of Rectal Chlamydia in Men Who Have Sex With Men: A Randomized Controlled Trial

Julia C. Dombrowski,[1,2] Michael R. Wierzbicki,[3] Lori M. Newman,[4] Jonathan A. Powell,[3] Ashley Miller,[5] Dwyn Dithmer,[2] Olusegun O. Soge,[6] and Kenneth H. Mayer[7,8]


The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Azithromycin or Doxycycline for Asymptomatic Rectal *Chlamydia trachomatis*

7-day course of doxycycline was significantly more effective than a single dose of azithromycin

- Dombrowski JC, Wierzbicki MR, Newman LM, et al. Doxycycline Versus Azithromycin for the Treatment of Rectal Chlamydia in Men Who Have Sex With Men: A Randomized Controlled Trial. *Clin Infect Dis*. 2021;73(5):824-831. doi:10.1093/cid/ciab153
- Lau A, Kong FYS, Fairley CK, et al. Azithromycin or Doxycycline for Asymptomatic Rectal *Chlamydia trachomatis*. *N Engl J Med*. 2021;384(25):2418-2427. doi:10.1056/NEJMoa2031631

Why Make This Change for Chlamydia

Genitourinary infection

- Microbiologic failure higher among men

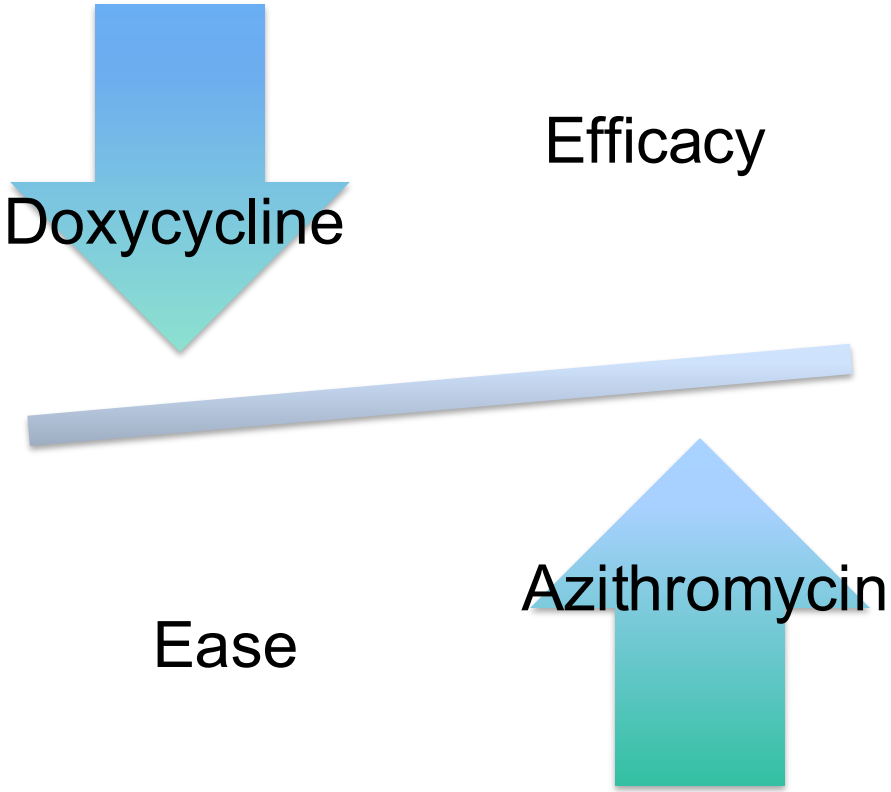
Rectal infection

- Doxycycline superior to azithromycin (20%-26%)
- **Rectal infection not uncommon among women with genitourinary infection (33%-83%)**

Doxycycline versus azithromycin for the treatment of anorectal *Chlamydia trachomatis* infection in women concurrent with vaginal infection (CHLAZIDOXY study): a multicentre, open-label, randomised, controlled, superiority trial

Olivia Peuchant, Edouard Lhomme, Pervenche Martinet, Anne Grab, Dounia Baita, Claire Bernier, Sophie Anne Gibaud, Isabelle Le Hen, Erwan Le Naour, Nathalie Trignol-Viguier, Philippe Lanotte, Philippe Lefebvre, Anne Vachée, Thomas Girard, Julien Loubinoux, Cécile Bébéar, Bellabes Ghezzoul, Caroline Roussillon, Marion Kret, Bertille de Barbeyrac, and the CHLAZIDOXY Study Group*

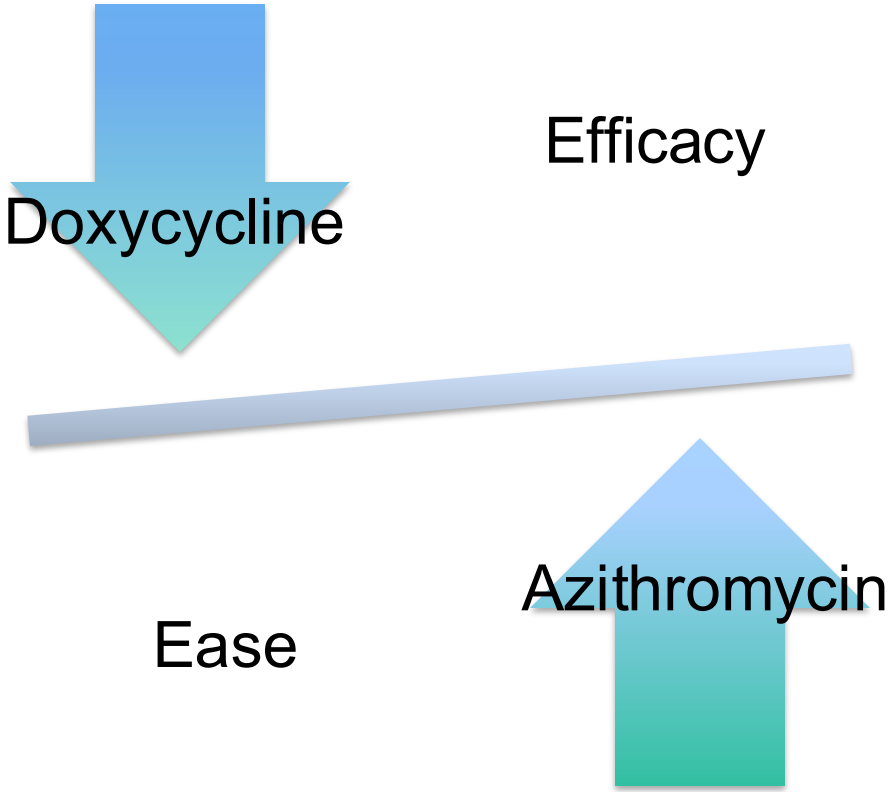
Azithromycin vs Doxycycline



Ease

- **Access**
  - **Only 57.7% (95%CI, 50.9-64.5) of adolescents with STI diagnosis in an ED filled their prescription**
- **Adherence**
  - Studies suggest doxycycline self-reported adherence 60%-90%
- **Confidentiality**
- **Side Effect Profile**

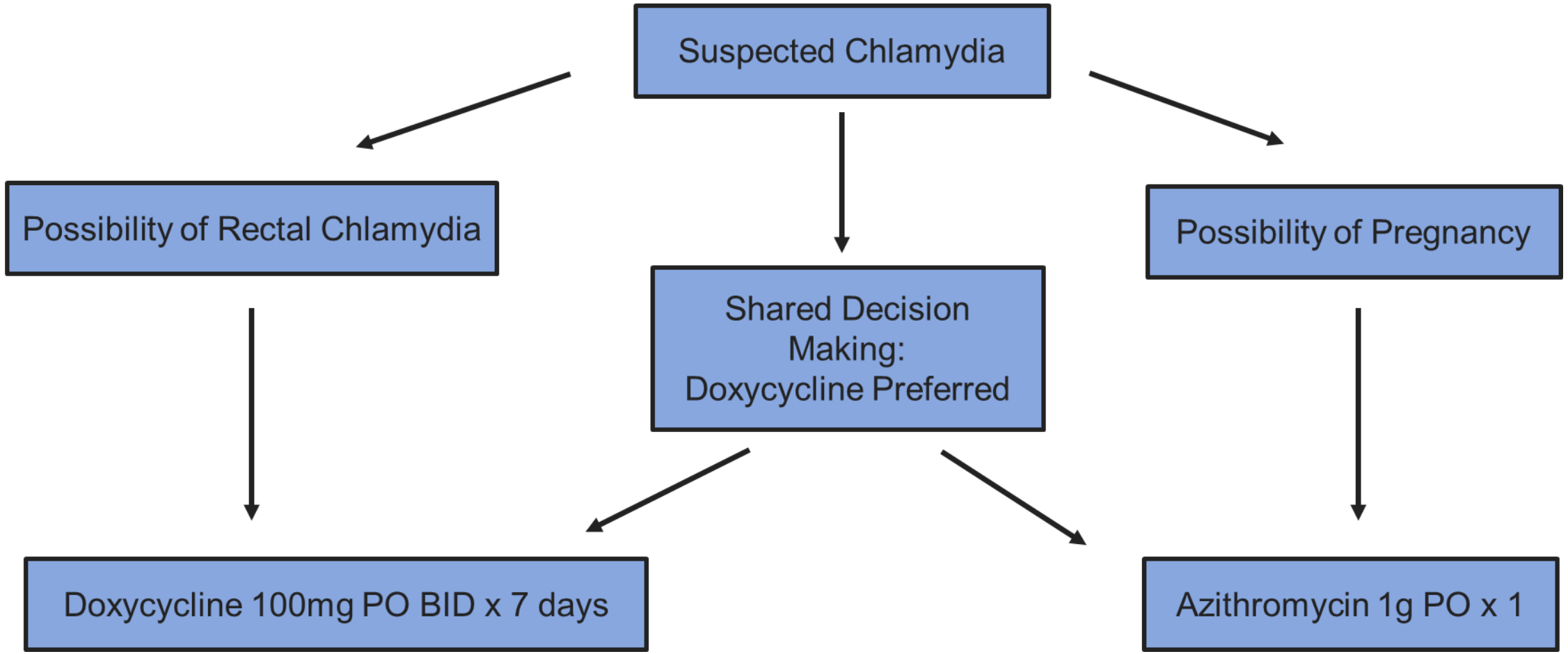
Azithromycin vs Doxycycline



Indications for Azithromycin

- Pregnant or may be pregnant
- History of allergy or intolerance to doxycycline
- Unlikely to be adherent
- Unlikely to be able to obtain doxycycline and azithromycin is available at point of care

Chlamydia Shared Decision Making



Chlamydia Follow-up

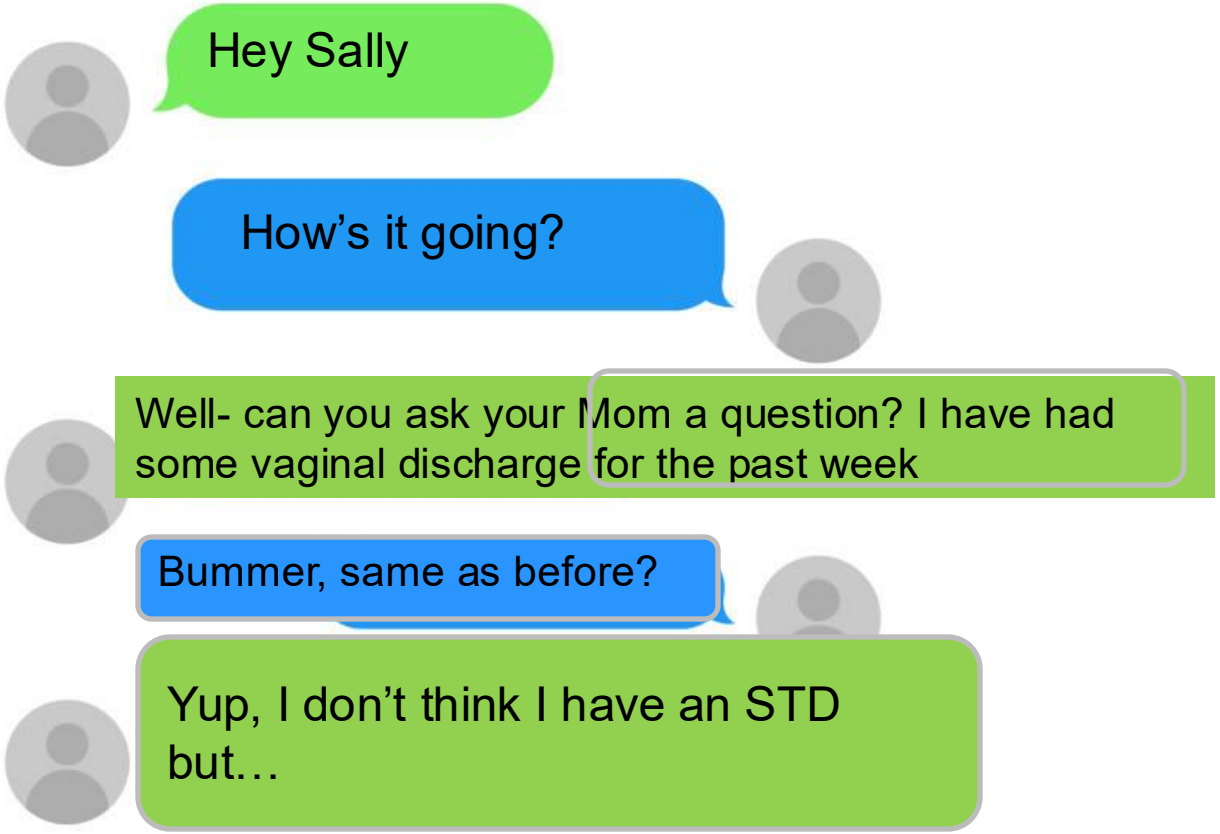
- Abstain from sex until partners have completed treatment or 7 days after single dose therapy
- **Consider repeat testing at 4 weeks for rectal CT treated with Azithromycin due to lower efficacy**
- Test of cure at 4 weeks if pregnant
- Rescreen at 3 months for re-infection

What Did We Do For Jill?

Prescription Pad Dr. Z Sexual Health Clinic
Doxycycline 100mg PO Q12 x 7 days
HIV testing
Hepatitis C Ab testing
3 Site GC/CT testing
Syphilis Testing
HIV prevention counseling and offer of services
Pregnancy testing, counseling and services

Sally has a discharge

The college roommate text… help….



Vaginitis: itching, burning, irritation, odor, and discharge

#1 Bacterial vaginosis:

May be considered an STI based on new study showing treatment of partners leads to less recurrences.*

Dysbiosis resulting from replacement of normal lactobacillus in the vagina with other anaerobic bacteria such as *Gardnerella vaginalis*, *prevotella, mobiluncus*

Asymptomatic pregnant women should not be screened -> no data on risk to fetus or pregnancy

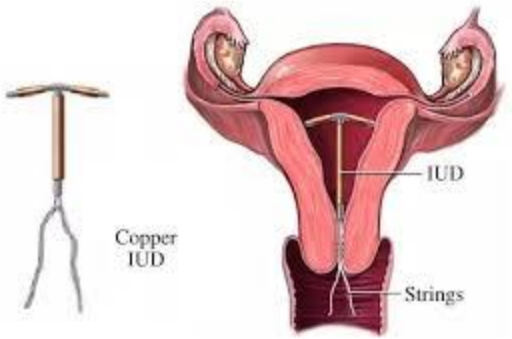
Risk factors:

multiple sex partners

female partners

douching

Copper IUD



*N Engl J Med 2025;392:1026-1027

Diagnosing Bacterial Vaginosis

BV Diagnostic Scores

- Nugent score (#) (from vaginal gram stain of the concentration of organisms (0-3 normal)
  - # > 4 consistent with Gardnerella; # >6= BV
- Amsel's Clinical criteria (3 out of 4 below)
  - Milk-like discharge, Clue cells (e.g., vaginal epithelial cells studded with adherent bacteria), pH of vaginal fluid >4.5, fishy odor of vaginal discharge before or after addition of 10% KOH (i.e., the whiff test)

Near and Point of Care Testing

- **Point of Care testing**
  - Osom BV Blue test (detects vaginal sialidase activity)
  - Affirm VP III- detects Gardnerella (most useful in those with symptoms)
  - FemExam Test Card- measures vaginal pH, and other aminopeptidases in Gardnerella
- **NAAT testing**- high sensitivity and specificity
  - Max Vaginal Panel, Aptima BV- FDA cleared
  - NuSwabVG, OneSwab BV panel PCR and SureSwab BV

Bacterial Vaginosis

Risks and Sequelae

- High likelihood of recurrence
- Can complicate GYN surgeries
- May increase risk of other STIs (MG, HSV2, and HPV)
- Certain BV associated bacteria may increase HIV susceptibility
  - Prevotella bivia, Leptotrichia/Sneathia, Parvimonas 1&2, M. hominis, Eggerthella spp.

Prevention and Protection

- male circumcision
- condom use
- lack of sexual activity
- hormonal contraception
- probiotics (Cohen, et al. NEJM 2020; 382: 1906-15) Lactin-V to prevent recurrence

Treatment of BV

Recommended Regimens for Bacterial Vaginosis

- Metronidazole 500 mg orally 2 times/day for 7 days
- OR
- Metronidazole gel 0.75% one full applicator (5 g) intravaginally, once a day for 5 days OR
- Clindamycin cream 2% one full applicator (5 g) intravaginally at bedtime for 7 days (preferred for allergy)

Alternative Regimens

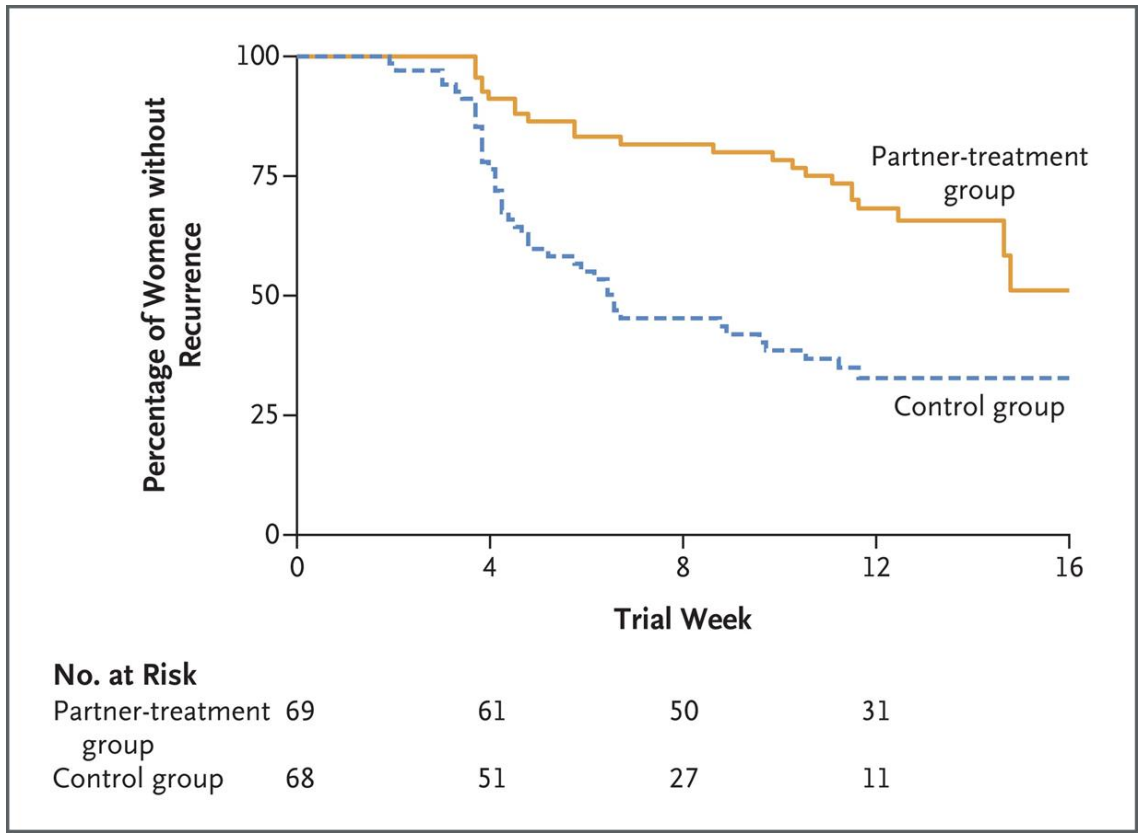
- **PO options:**
  - Clindamycin 300 mg orally 2 times/day for 7 days (preferred for allergy)
  - Secnidazole 2 g oral granules in a single dose (53% cure rate)
  - Tinidazole 2 g orally once daily for 2 days or Tinidazole 1 g orally once daily for 5 days
- **Suppository options:**
  - Clindamycin ovules 100 mg* intravaginally once at bedtime for 3 days (may weaken latex)
  - NEW: SINGLE DOSE: metronidazole 1.3% gel and Clindesee 2% vaginal cream (37% cure rate)

Bacterial Vaginitis

Vodstrcil, L. etal

N Engl J Med 2025;392:947-957

Kaplan-Meier Curves for Time to recurrence of BV (Mod ITT population)



- Prevalence: college students (5-25%) and 12-61% of STI patients
- Treatment response: 30-60%
- Diagnostics:
  - Wet mount: clue cells- Amsel criteria
  - CLIA waived POC testing – vaginal sialidase activity
  - BV NAAT
- Screening: symptomatic women, female partners of women with BV, women prior to surgical abortion
- Treatment:
  - Metronidazole 500 mg orally twice a day for 7 days, OR
  - Metronidazole gel 0.75%, one full applicator x 5 days OR
  - Clindamycin cream 2%, one full applicator x 7 days

  - Alternative treatment: clindamycin 300mg 2 times/day x 7 days, secnidazole 2 gm single dose, tinidazole 2 gm daily x 2 days or tinidazole 1 gm daily x 5 days or clindamycin 100mg ovules vaginally x 3 days

Treatment of male partners with metronidazole 400mg BID and clindamycin cream BID lead to fewer recurrences of BV within 12 weeks. The trial was stopped early.

More Vaginal Discharge: Trichomonas

- Why is it important:
  - Meta-analysis OB outcomes associated with trichomonas
  - PROM 1.4, preterm birth 1.4, endometritis 2.2, HIV acquisition 1.5
- Testing
  - Asymptomatic- many and screening only for women in correctional facility
  - Symptoms: Testing done
    - Men: urethritis, epididymitis, prostatitis; persistent symptoms (MSW)
    - Women: malodorous discharge; strawberry cervix
- Re-testing
  - Persistent infection (resistance testing + combination therapy)
  - Clearance by NAAT up to 3 weeks

Trichomoniasis: Diagnostic comparisons

Nucleic Acid Amplification Tests

- can order on same GC/CT specimen

Sens/Spec :88-100%, 97-99.9%

Saline Wet Mount

- Motile trichomonads
- pH >4.5
- Whiff test may be +

Sens/Spec: **36-70**%, ~100%

Point-of-care tests

- OSOM trichomonas rapid antigen test (Genzyme)
- Affirm VP III (BD)

OSOM **Sens**/Spec: **67-100%,** 92-100%
Affirm VP **Sens**/Spec: **~63 %**
Sens/Spec: **75-95%,** 100%

Culture

- Diamond's
- InPouch TV, BioMed Diagnostics

Diagnosis: NAAT

- vaginal discharge and women with HIV;
- Men
- consider testing (high prevalence settings, high risk of infection)

Miller & Nyirjesy, Curr Infect Dis Rep 2011
Schwebke, JCM 2011
APHL, Advances in Laboratory Detection of T. Vaginalis (Updated) 2016

Trichomonas Treatment

NEW Treatments

Preferred Regimen For Women

Metronidazole 500mg twice daily for 7 days

Preferred Regimen For Men

•Metronidazole 2g once

ALTERNATIVE Regimen

Tinidazole 2g x 1

Regimens for TV Persistence

- Metronidazole or tinidazole 2 g daily x 7 days
- Tinidazole 2 g daily + intravaginal tinidazole 500mg 2 times/day x 14 days
- Tinidazole 1 g 3 times/day + intravaginal paromomycin (4 g of 6.25% intravaginal paromomycin cream nightly) x 14 days

Trichomonas Treatment

NEW Treatments

Metronidazole 2 gm PO x 1 vs 500mg twice daily x 7 days

Single-dose versus 7-day-dose metronidazole for the treatment of trichomoniasis in women: an open-label, randomised controlled trial

Patricia Kissinger, Christina A Muzny, Leandro A Mena, Rebecca A Lillis, Jane R Schwebke, Laura Beauchamps, Stephanie N Taylor, Norine Schmidt, Leann Myers, Peter Augostini, William E Secor, Martina Bradic, Jane M Carlton, David H Martin

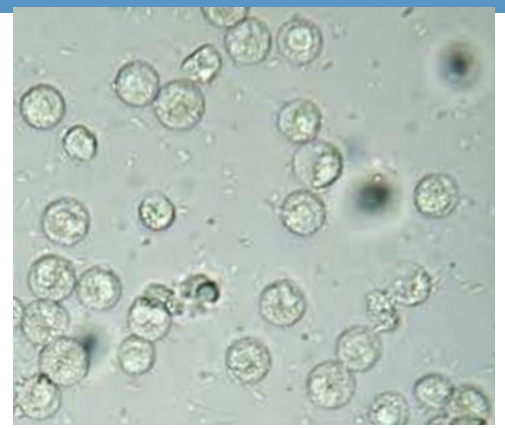
- Multicenter, open-label, randomized controlled trial (2014-2017 published 2018)
- Block randomization
- 632 women enrolled
- Primary outcome was infection at test-of-cure 4 weeks after completion of treatment
- Patients in the 7-day-dose group were less likely to be positive at test-of-cure than those in the single-dose group 11% vs 19%
  - Relative risk 0.55, 95% CI 0·34–0·70; p < 0.0001

Vulvovaginal Candidiasis (VVC)

- Non specific symptoms: dysuria, pruritis, dyspareunia, vaginal discharge
- 75% of women will have at least one episode

Uncomplicated	**Complicated**
Sporadic or infrequent	Recurrent (> 3 episodes per year)
Mild to moderate VVC	Severe
Likely candida albicans	Non- albicans
Non-immunocompromised women	Women with diabetes, immune compromise (HIV), immunodeficiency, or on steroids

Vulvovaginal Candidiasis



- Testing
  - Wet prep, saline, 10% KOH- to see budding yeast or hyphae on microscope
  - Culture remains standard (susceptibility testing)
    - *C. albicans* azole resistance more common
  - PCR testing for yeast- most not FDA cleared
- Recurrent VVC (≥3 episodes/year) large economic burden
  - Fluconazole (100-mg, 150-mg, 200-mg oral dose) weekly for 6 months

VVC Treatment: Uncomplicated Infection

- Over the counter agents (clotrimazole, miconazole, etc)
- Prescription intravaginal applications (oil based and weaken condoms)
  - Butoconazole 2% cream (single dose), 5 g
  - Terconazole 0.4% cream; 5 g daily x 7 days
  - Terconazole 80mg vaginal suppository daily x 3 days
- Prescription orals
  - Fluconazole 150 mg oral single dose

VVC Treatment: Complicated Infection

- 7-14 days of topical or every 3rd day for 3 doses (Day 1,4,7)
- Recurrent VVC (≥3 episodes/year) large economic burden- for prevention
  - Fluconazole (100-mg, 150-mg, 200-mg oral dose) weekly for 6 months
- Fluconazole use in pregnancy
  - Increase risk of congenital anomalies
  - Spontaneous abortion

Molgaard-Neilsen. JAMA 2016: 315: (1): 58-67.

- Retrospective study, Denmark; nationwide registry 1997-2013
- 1,405,663 pregnancies; fluconazole exposed at weeks 7-22 in pregnancy
- 1:4 Oral fluc vs unexposed- match on propensity score, maternal age, year, gestational age
- Increased risk for spontaneous abortion in exposed group:
  - HR 1.48; 95% CI, 1.23-1.77
  - 147 out of 3315 women exposed vs 563 out of 13,246 unexposed women
- No impact on still births

Non- albicans candidiasis

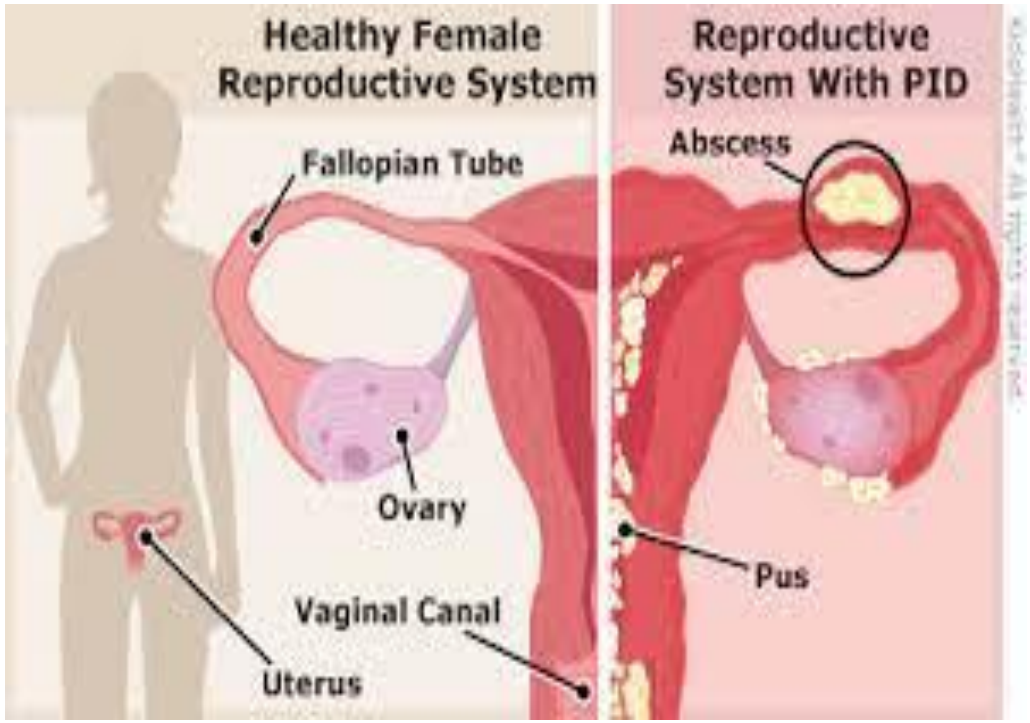
- 10% of symptomatic vulvo-candidiasis are due to non- albicans strains
- Strains
  - *C. glabrata (Nakaseomyces glabrata)*
    C. krusei (Pichia Kudriavzeveii)
    C. parapsilosis
    C. tropicalis
    Less common
    C. lusitaniae
    C. gulliermondi
    Also
    Saccharomyces cerevisiae
    *Trichosporon spp. (T. inkii)*ains:

- Treatment usually longer duration; often resistance to azole therapy
- Acute first line:
  - Boric acid vaginal suppositories 600mg daily x 14-21 days
  - Nystatin pessary 100,000 unites intravaginally x 12-14 days
- Alternative
  - Amphotericin B vag suppositories 50-100mg daily x 14-21 days
  - Flucytosine 5g cream 1g pessary (17%) daily x 14-21 days
  - Combination: ampho + flucyctosine
  - Voriconazole 200-400mg daily x 14 days
  - Itraconazole 200mg daily + topicals

Sobel, J. D. (2024). Treatment of vaginitis caused by non-albicans Candida species. Expert Review of Anti-Infective Therapy, 22(5), 289–296. https://doi.org/10.1080/14787210.2024.2347953

Case #3: BB has pain

- BB presents with dysuria and abdominal pain 2 months after having CT infection
- Exam with cervical motion tenderness consistent with mild PID



Cervicitis→ Concern for PID due to symptoms

- Mild to moderate pelvic inflammatory disease (PID). No new information on the definition of this condition.

- Clinical diagnostic criteria (minimum 3 criteria)
  - Temperature >38.3C
  - Abnormal mucopurulent cervical discharge
  - WBC in vaginal saline microscopy (wet prep)
  - Elevated ESR and CRP
  - + test for GC/CT

PID Treatment

- IM or ORAL

NEW Treatments

Ceftriaxone **500** mg IM x 1
for persons weighing <150kg*

Ceftriaxone 1g Q24 hours

Doxycycline 100 mg PO twice daily x 14 days

Doxycycline 100 mg PO twice daily x 14 days

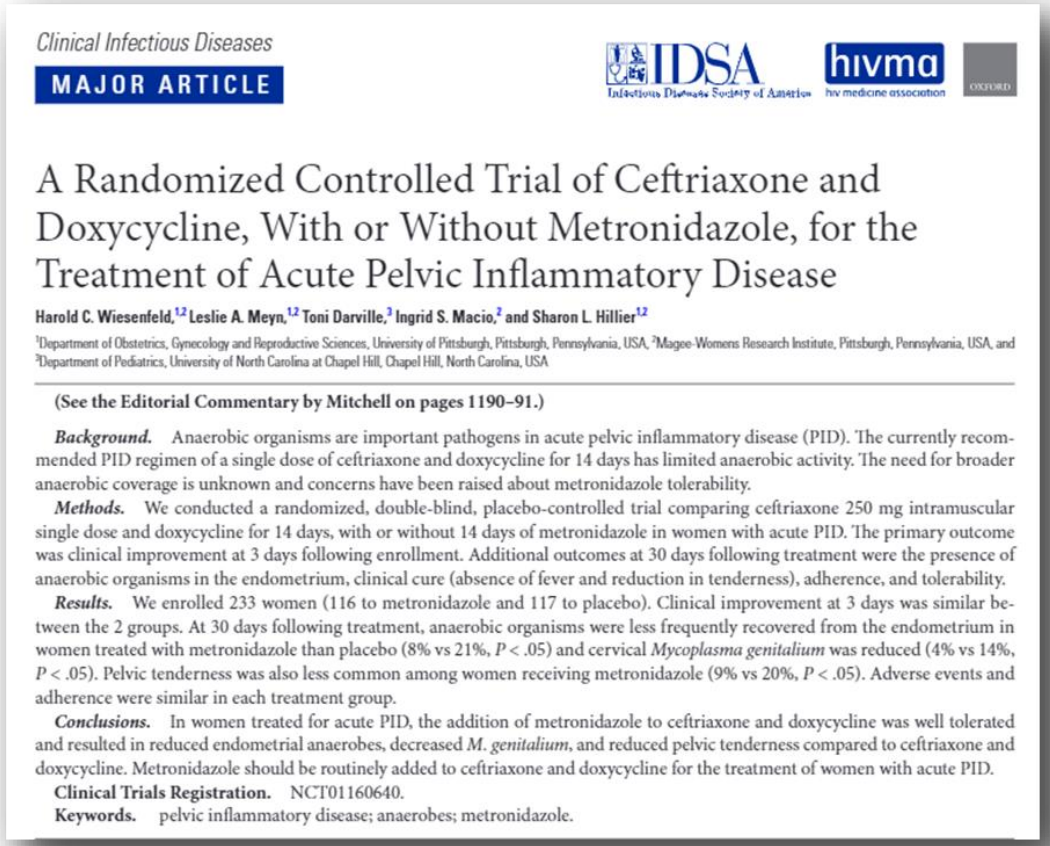
Metronidazole 500mg twice daily for 14 days

Metronidazole 500mg twice daily for 14 days

- Parenteral

PID Treatment

NEW Treatments



Clinical Infectious Diseases

MAJOR ARTICLE

IDSA Infectious Diseases Society of America | hivma hiv medicine association | OXFORD

A Randomized Controlled Trial of Ceftriaxone and Doxycycline, With or Without Metronidazole, for the Treatment of Acute Pelvic Inflammatory Disease

Harold C. Wiesenfeld,[1,2] Leslie A. Meyn,[1,2] Toni Darville,[3] Ingrid S. Macio,[2] and Sharon L. Hillier[1,2]

[1]Department of Obstetrics, Gynecology and Reproductive Sciences, University of Pittsburgh, Pittsburgh, Pennsylvania, USA, [2]Magee-Womens Research Institute, Pittsburgh, Pennsylvania, USA, and [3]Department of Pediatrics, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, USA

(See the Editorial Commentary by Mitchell on pages 1190–91.)

Background. Anaerobic organisms are important pathogens in acute pelvic inflammatory disease (PID). The currently recommended PID regimen of a single dose of ceftriaxone and doxycycline for 14 days has limited anaerobic activity. The need for broader anaerobic coverage is unknown and concerns have been raised about metronidazole tolerability.

Methods. We conducted a randomized, double-blind, placebo-controlled trial comparing ceftriaxone 250 mg intramuscular single dose and doxycycline for 14 days, with or without 14 days of metronidazole in women with acute PID. The primary outcome was clinical improvement at 3 days following enrollment. Additional outcomes at 30 days following treatment were the presence of anaerobic organisms in the endometrium, clinical cure (absence of fever and reduction in tenderness), adherence, and tolerability.

Results. We enrolled 233 women (116 to metronidazole and 117 to placebo). Clinical improvement at 3 days was similar between the 2 groups. At 30 days following treatment, anaerobic organisms were less frequently recovered from the endometrium in women treated with metronidazole than placebo (8% vs 21%, $P < .05$) and cervical *Mycoplasma genitalium* was reduced (4% vs 14%, $P < .05$). Pelvic tenderness was also less common among women receiving metronidazole (9% vs 20%, $P < .05$). Adverse events and adherence were similar in each treatment group.

Conclusions. In women treated for acute PID, the addition of metronidazole to ceftriaxone and doxycycline was well tolerated and resulted in reduced endometrial anaerobes, decreased *M. genitalium*, and reduced pelvic tenderness compared to ceftriaxone and doxycycline. Metronidazole should be routinely added to ceftriaxone and doxycycline for the treatment of women with acute PID.

Clinical Trials Registration. NCT01160640.

Keywords. pelvic inflammatory disease; anaerobes; metronidazole.

- Double-blind placebo-controlled trial
- 233 females
- Outcomes: Symptom improvement at 3 days and presence of anaerobic organisms in the endometrium
- Findings at Day 30 post treatment WITH metronidazole vs. placebo:
  - Endometrial anaerobes reduced (8% vs 21%, P < .05)
  - Pelvic tenderness less common (9% vs 20%, P < .05)
  - Decreased cervical *M. genitalium* (4% vs 14%, P < .05) ?
  - Similar adverse events

Wiesenfeld HC, Meyn LA, Darville T, Macio IS, Hillier SL. A Randomized Controlled Trial of Ceftriaxone and Doxycycline, With or Without Metronidazole, for the Treatment of Acute Pelvic Inflammatory Disease. Clin Infect Dis. 2021 Apr 8;72(7):1181-1189. doi: 10.1093/cid/ciaa101. PMID: 32052831; PMCID: PMC8028096.

Summary: what's new for vaginitis and PID

- Bacterial vaginosis:
  - Single dose regimens for non-pregnant women (secnidazole 2 g oral, metro gel & clindesse cream)
  - No data linking nitroimidazole and alcohol adverse effect
- Trichomonas:
  - Test out option for women in correctional facilities
  - Treatment for 7 days recommended (males still have single dose treatment option)
- Candida
  - Review PCR treatment options (may not be FDA cleared yet)
  - Review data on fluconazole and spontaneous abortions (first trimester data)
- PID:
  - No new data refining diagnosis
  - Treatment includes metronidazole and clindamycin/gent demoted to alternative regimen

NYC STI Prevention Training Center (PTC)

The CDC-funded NYC STD Prevention Training Center at Columbia University provides a continuum of education, resources, consultation and technical assistance to health care providers, and clinical sites.
https://www.publichealth.columbia.edu/nycptc

Didactic Presentations

Webinars, conferences, trainings and grand rounds presentations to enhance and build knowledge

Technical Assistance

Virtual and on-site technical assistance regarding quality improvement, clinic implementation and best practices around sexual health provision

For more information please contact:
nycptc@cumc.columbia.edu

Clinical Consultation Warmline

Clinical guidance regarding STD cases; no identifying patient data is submitted
www.stdccn.org

Resources

Clinical guidance tools regarding the STD treatment guidelines, screening algorithms and knowledge books, such as the **Syphilis Monograph**.
To download a copy:
https://www.publichealth.columbia.edu/file/15568/download?token=exDNYpJ-