

# What's New in STDs? An Update for Clinicians

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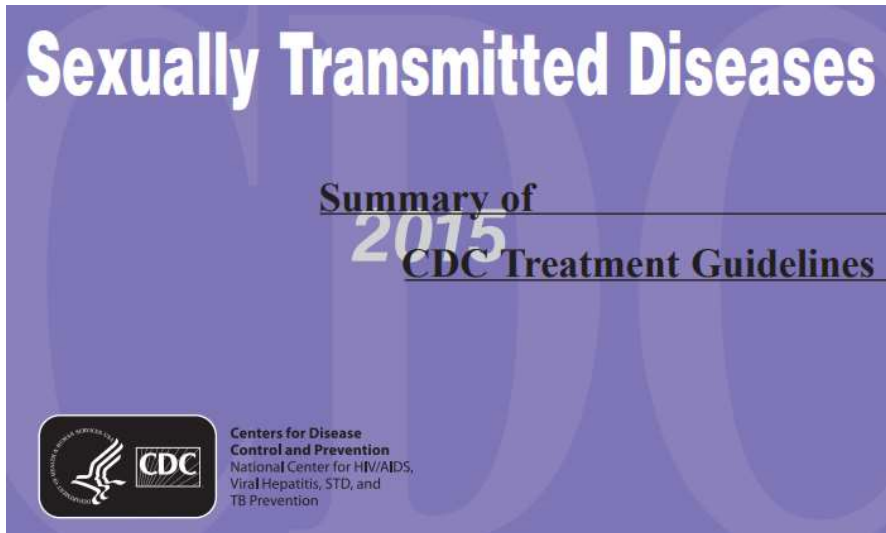
Last Updated: October 19, 2020

# Disclosures

Participated in research funded by Hologic

CDC STD Treatment Guidelines Committee Member

# Today's Talk



Poll, quiz & trivia breaks

# CDC 2018 STD Surveillance Summary

## The State of STDs in the United States



**STDS SURGE FOR THE FIFTH  
STRAIGHT YEAR, REACHING  
AN ALL-TIME HIGH.**



**1.8 million**  
CASES OF CHLAMYDIA  
19% rate increase since 2014



**583,405**  
CASES OF GONORRHEA  
63% rate increase since 2014



**115,045**  
CASES OF SYPHILIS  
71% rate increase of infectious  
syphilis since 2014



**1,306**  
CASES OF SYPHILIS  
AMONG NEWBORNS  
185% rate increase since 2014



# Quiz

In the 2019 CDC report, *Antibiotic Resistance in the United States*, *N. gonorrhoeae* was ranked at which threat level?

- Urgent
- Serious
- Concerning
- Watch List



Like the 2013 report, the 2019 report assesses threats according to seven factors:

- Clinical impact
- Economic impact (when available)
- Incidence
- 10-year projection of incidence (new infections over the next 10 years)
- Transmissibility (how easily a germ spreads or causes infections)
- Availability of effective antibiotics
- Barriers to prevention



# DRUG-RESISTANT *NEISSERIA GONORRHOEAE*

THREAT LEVEL **URGENT**



**550,000**  
Estimated drug-resistant infections each year



**1.14M**  
Total new infections each year



**\$133.4M**  
Annual discounted lifetime direct medical costs

## Urgent Threats

- Carbapenem-resistant *Acinetobacter*
- *Candida auris* (*C. auris*)
- *Clostridioides difficile* (*C. difficile*)
- Carbapenem-resistant Enterobacteriaceae (CRE)
- Drug-resistant *Neisseria gonorrhoeae* (*N. gonorrhoeae*)

## Serious Threats

- Drug-resistant *Campylobacter*
- Drug-resistant *Candida*
- Extended-spectrum beta-lactamase (ESBL)-producing Enterobacteriaceae
- Vancomycin-resistant *Enterococci* (VRE)
- Multidrug-resistant *Pseudomonas aeruginosa* (*P. aeruginosa*)
- Drug-resistant nontyphoidal *Salmonella*
- Drug-resistant *Salmonella* serotype Typhi
- Drug-resistant *Shigella*
- Methicillin-resistant *Staphylococcus aureus* (MRSA)
- Drug-resistant *Streptococcus pneumoniae* (*S. pneumoniae*)
- Drug-resistant Tuberculosis (TB)

## Concerning Threats

- Erythromycin-resistant group A *Streptococcus*
- Clindamycin-resistant group B *Streptococcus*

## Watch List

- Azole-resistant *Aspergillus fumigatus* (*A. fumigatus*)
- Drug-resistant *Mycoplasma genitalium* (*M. genitalium*)
- Drug-resistant *Bordetella pertussis* (*B. pertussis*)

# Gonorrhea Treatment

## 2015 CDC Treatment Guidelines

Ceftriaxone 250mg IM x 1

Plus

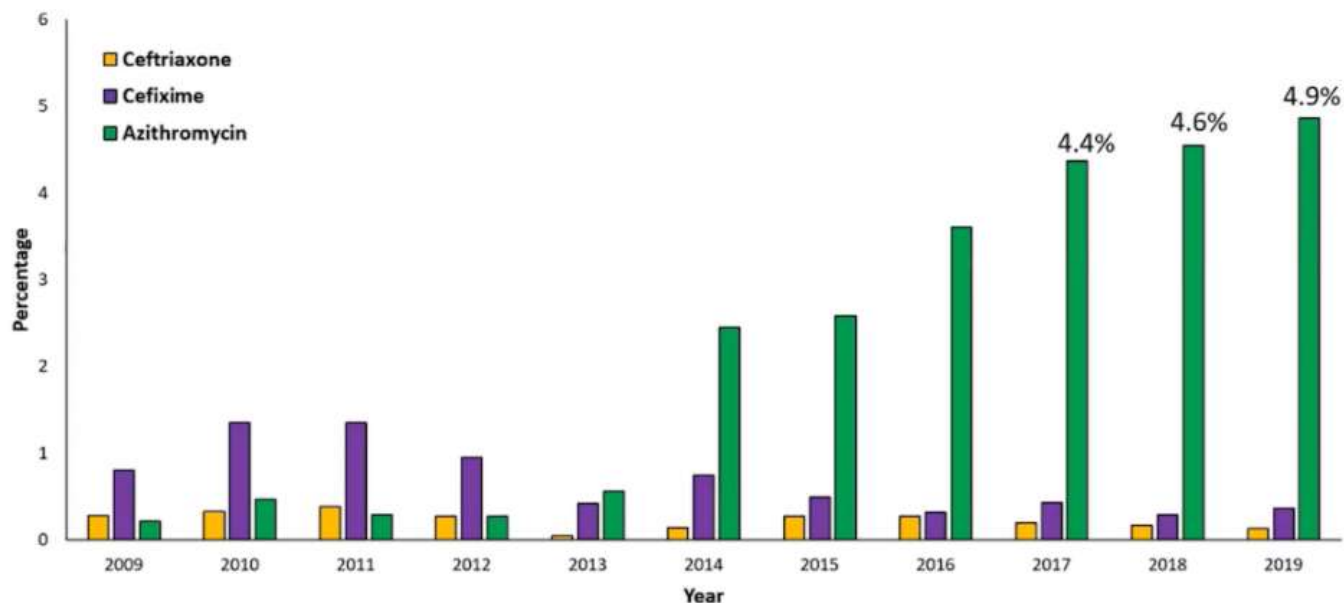
Azithromycin 1g orally x 1

Antimicrobial  
Stewardship

PK/PD  
properties of  
ceftriaxone

# Azithromycin Resistance

Prevalence of Isolates with Decreased Susceptibility to Ceftriaxone ( $\geq 0.1 \mu\text{g/ml}$ )  
Cefixime ( $\geq 0.25 \mu\text{g/ml}$ ) and Azithromycin ( $\geq 2.00 \mu\text{g/ml}$ ), GISP, 2009-2019\*



\* 2019 data are preliminary

Local SURRG  
Data: 10% of  
MSM with GC  
have AZM  
resistance

Increases in *Neisseria gonorrhoeae* With Reduced Susceptibility to Azithromycin Among Men Who Have Sex With Men in Seattle, King County, Washington, 2012–2016

Lindley A. Barbee,<sup>1,2</sup> Olusegun O. Soge,<sup>3,4</sup> David A. Katz,<sup>1,2</sup> Julia C. Dombrowski,<sup>1,2,5</sup> King K. Holmes,<sup>1,2,3,5</sup> and Matthew R. Golden<sup>1,2,5</sup>



# Ceftriaxone PK/PD properties

## Calculated ceftriaxone doses for various human weights extrapolated from the Murine Model

Weight	3 mg/kg	5 mg/kg <sup>^</sup>	10 mg/kg	15 mg/kg	30 mg/kg	120 mg/kg
50 kg	150 mg	<b>250 mg</b>	500 mg	750 mg	1500 mg	6000 mg
<u>80 kg*</u>	240 mg	400 mg	800 mg	1200 mg	2400 mg	9600 mg
100 kg	300 mg	500 mg	1000mg	1500 mg	3000 mg	12,000 mg
150 kg	450 mg	750 mg	1500mg	2250 mg	4500 mg	18,000 mg

\*Average U.S. Adult is 80kg (176lb)

<sup>^</sup> Connolly et al murine model required 5 mg/kg for MIC of 0.008 (GISP MIC50)

# Gonorrhea Treatment

## 2015 CDC Treatment Guidelines

Ceftriaxone 250mg IM x 1

Plus

Azithromycin 1g orally x 1

## 2021 CDC Treatment Guidelines

?

# *Chlamydia trachomatis* & *Mycoplasma genitalium*



# Case

- 42 yo man with well-controlled HIV (VL undetectable, CD4>500) who completed routine STI screening at his last medical visit, test results shown below. How would you treat him?

Site	GC	CT
Pharynx	-	-
Rectum	-	+
Urethra (urine)	-	-

- Azithromycin 1g po x 1
- Doxycycline 100mg po BID x 7 days
- Doxycycline 100mg po BID x 21 days
- Needs additional assessment before treatment

# Chlamydia Treatment

## 2015 CDC Treatment Guidelines

Azithromycin 1g po x 1

Or

Doxycycline 100mg po BID x 7 days

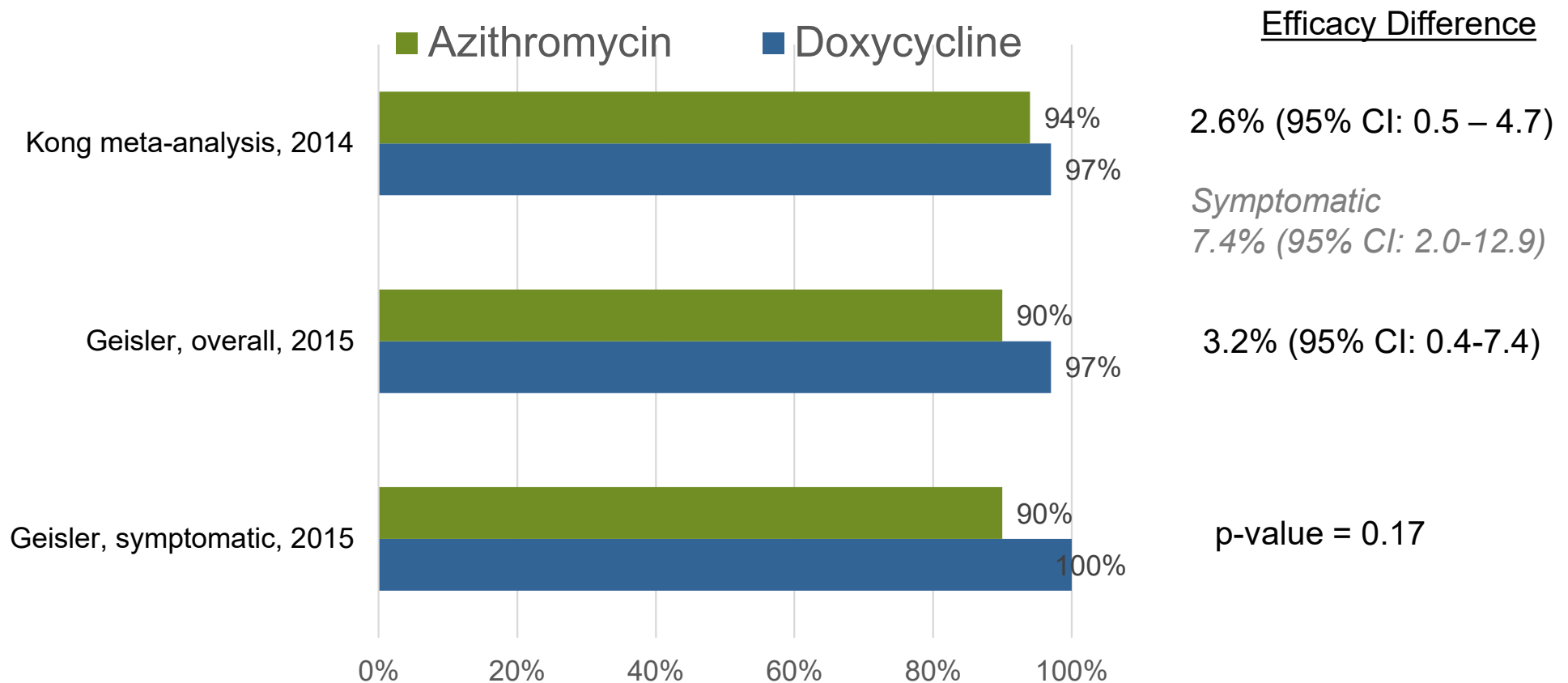
### Doxycycline

- May be more effective for symptomatic infections
- More effective for rectal infections

### Azithromycin

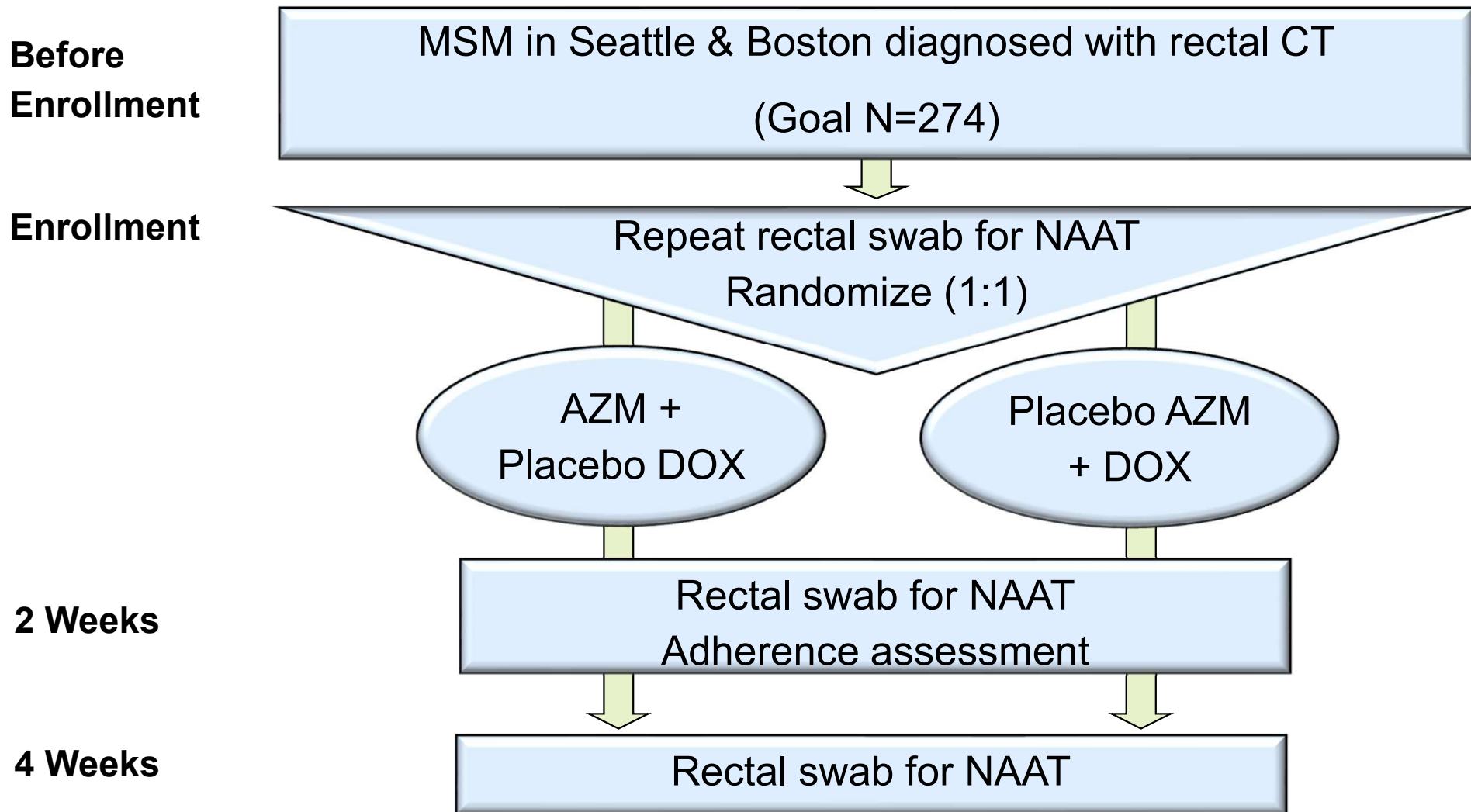
- Single dose that can be directly observed
- Evidence of equivalence for GU tract infections
- Safe in pregnancy

# RCTs of Doxycycline vs. Azithromycin, Urogenital Chlamydia



**Are treatment outcomes different for  
rectal chlamydia?**

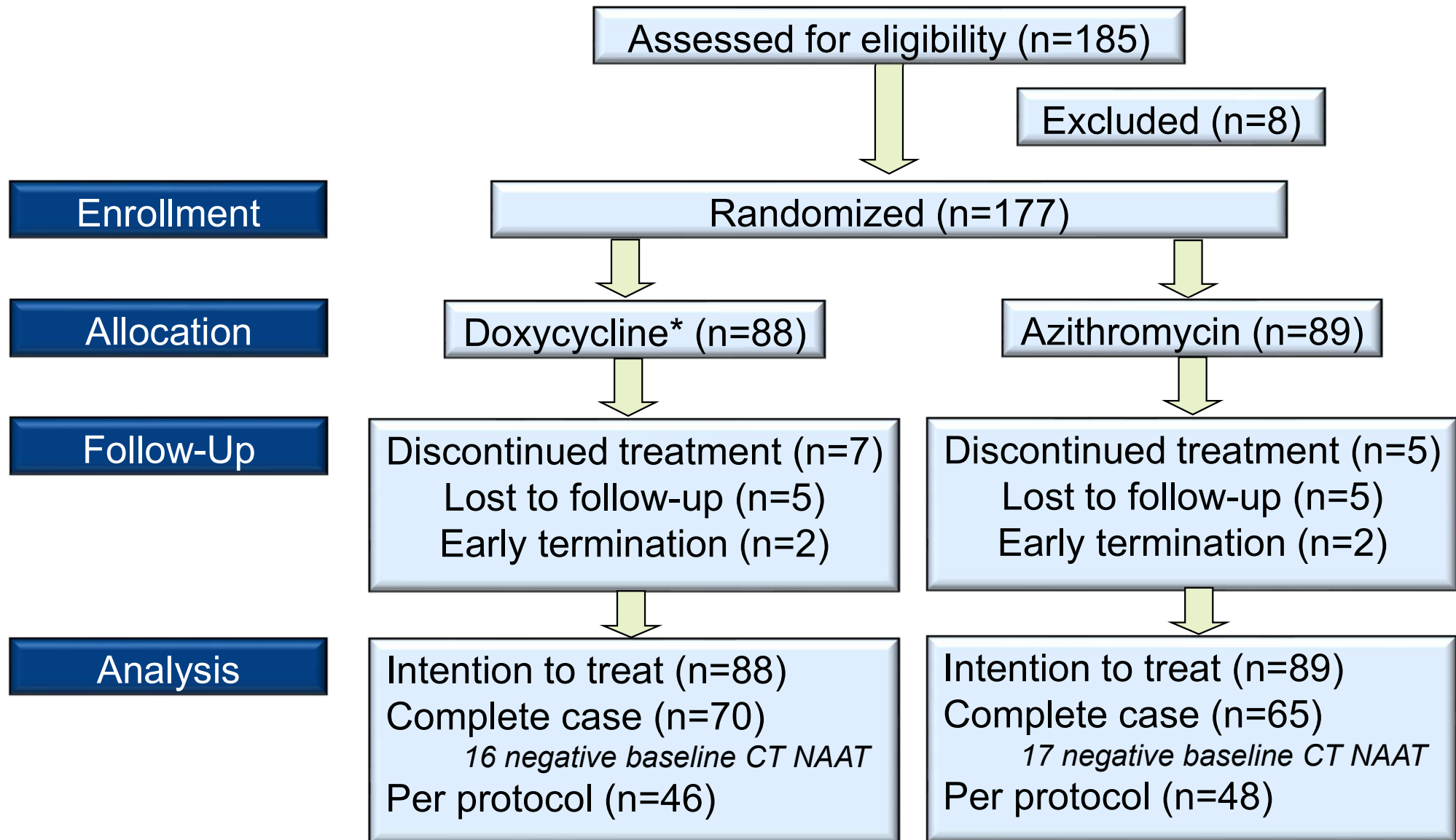
# Randomized, double-blinded, placebo-controlled trial of AZM vs. DOX for treatment of rectal CT in MSM



Safety monitoring: serious adverse events only

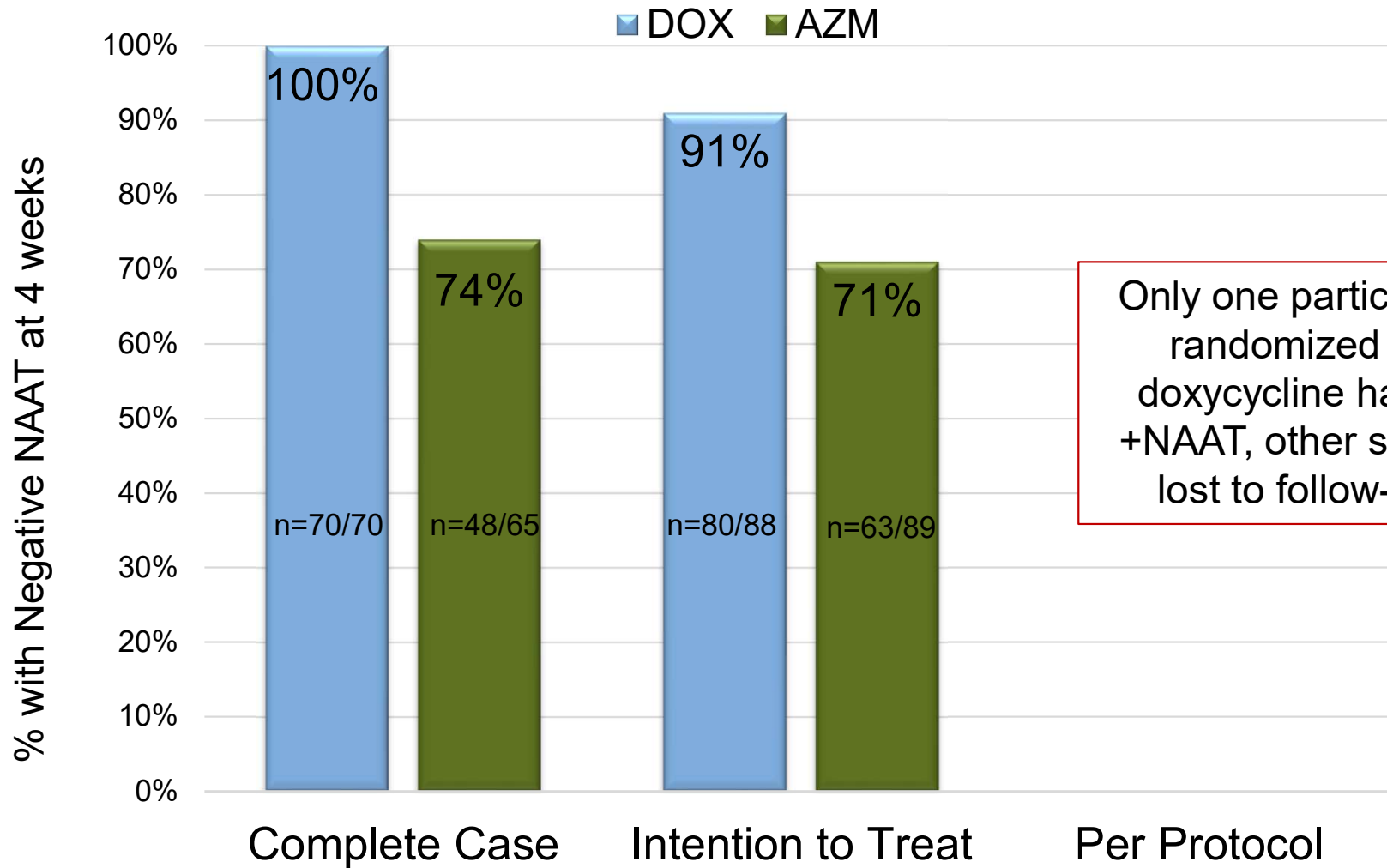


# Rectal Chlamydia Treatment Study Flow Chart



\*1 participant did not receive allocated intervention

# Microbiologic Cure at Four Weeks, by Treatment Group



Only one participant randomized to doxycycline had a +NAAT, other seven lost to follow-up

Absolute Difference

**26%**  
(95% CI: 16-36%)  
p<0.001

**20%**  
(95% CI: 9-31%)  
p<0.001

**What about adherence to doxycycline  
and lymphogranuloma venereum (LGV)?**

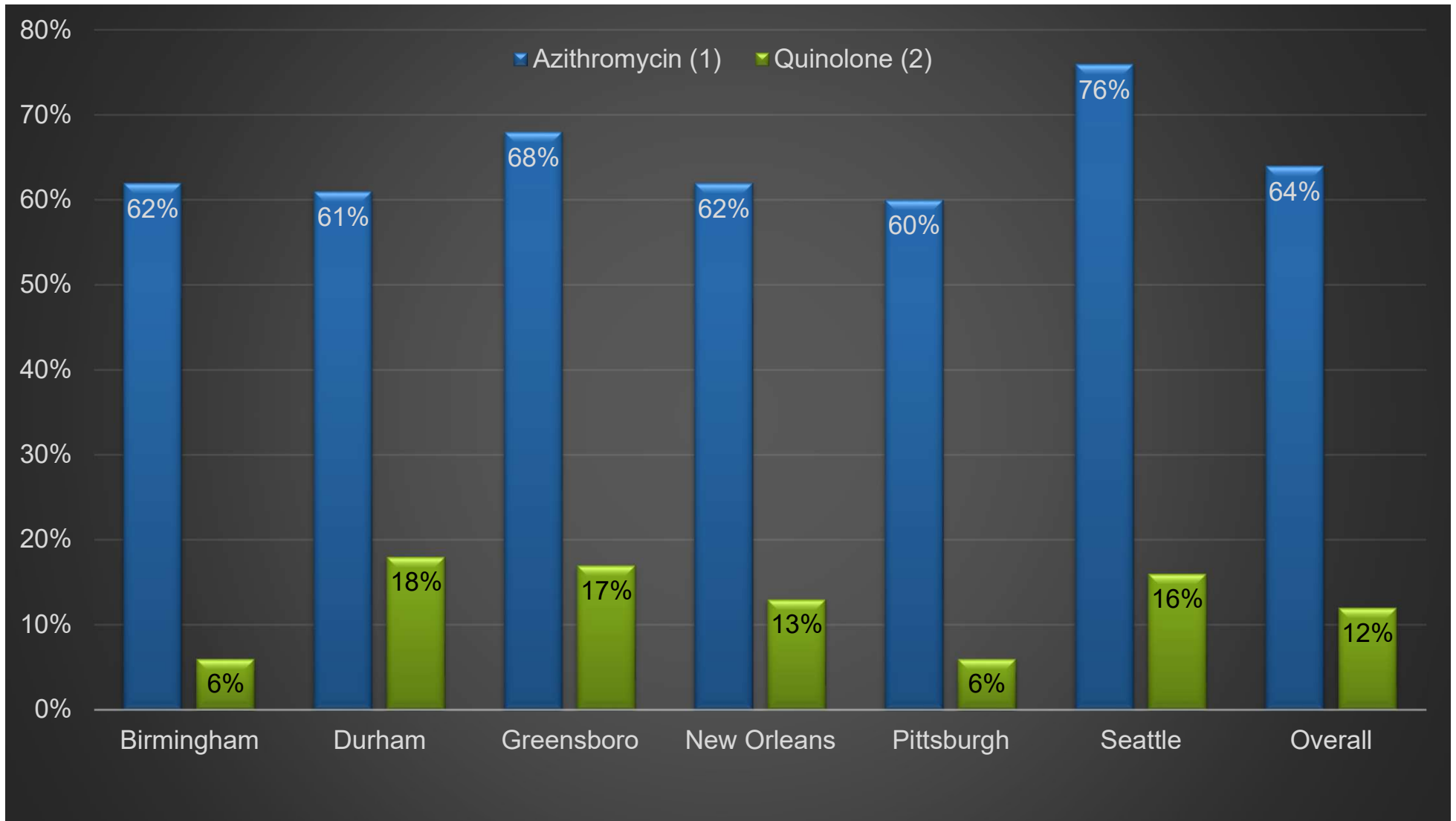
# *Mycoplasma genitalium*

- Causes urethritis in men
- No consensus on causal role in cervicitis, PID
- Population prevalence (2001-2002 data):
  - CT: 4.0%
  - M. gen: 1.0%
  - GC: 0.4%
- FDA approved test now available
- No recommendation for screening (yet?)
- Recently updated clinical epidemiology data

# Prevalence of Key Pathogens among Men with Urethritis (MAGNUM study)

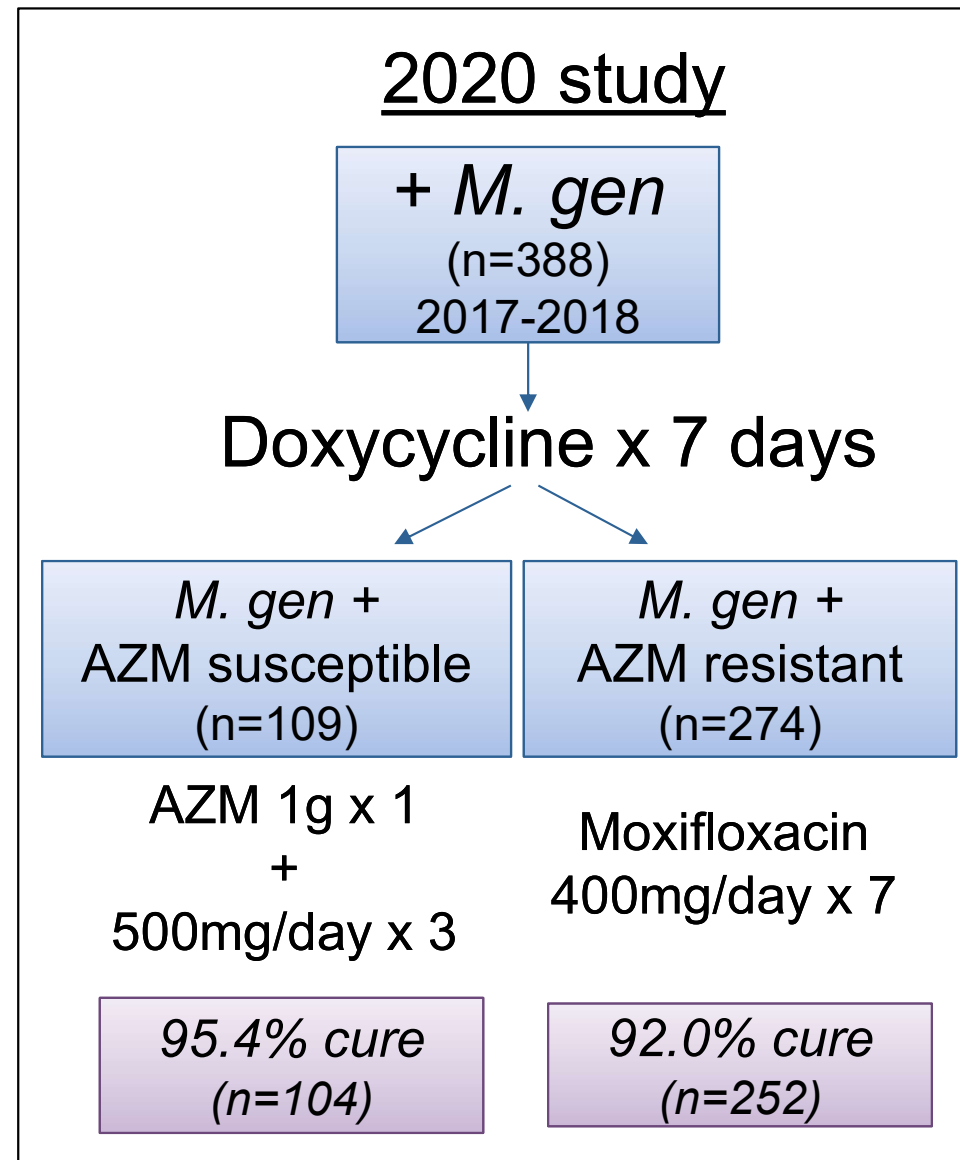
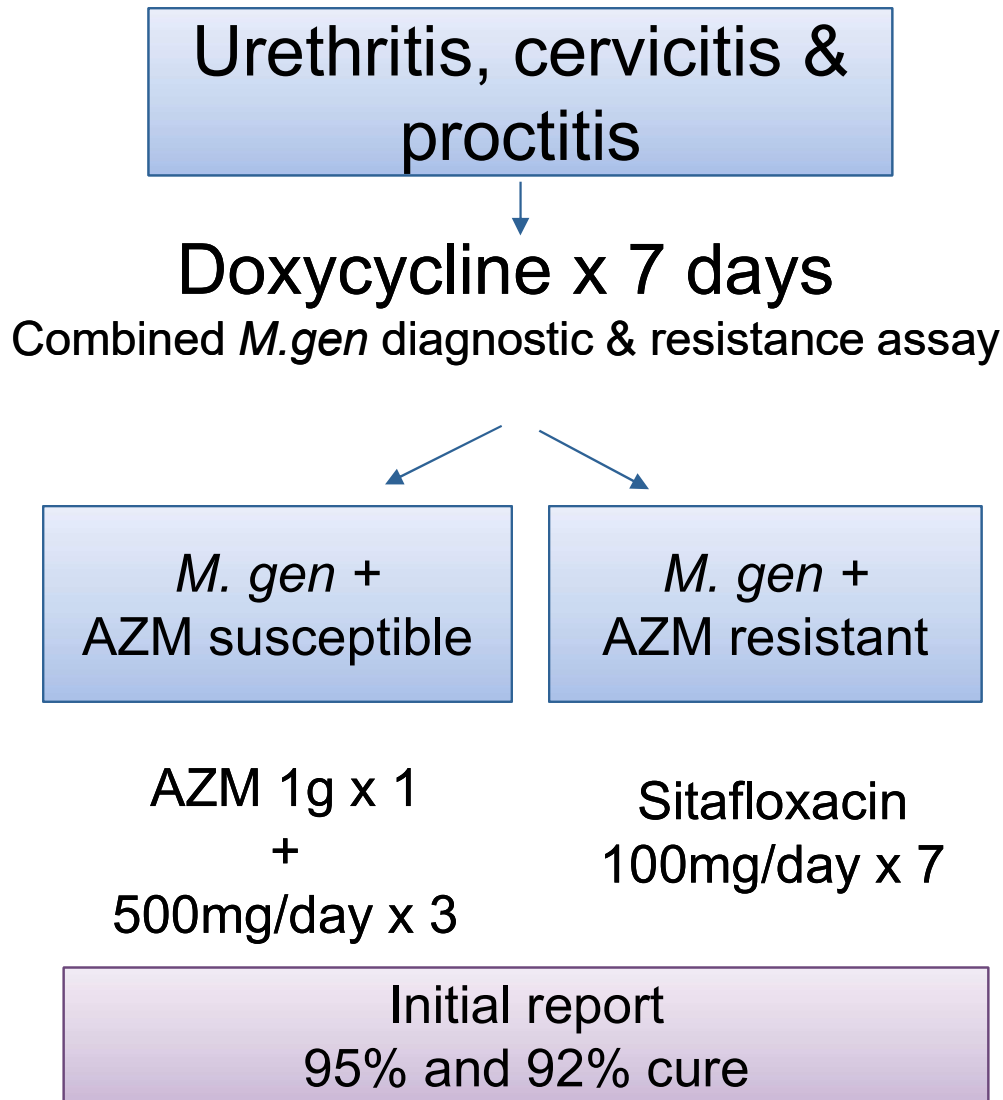
Study Site (n)	<i>N.g.</i>	<i>C.t.</i>	<i>M.g.</i>	<i>T.v.</i>
Birmingham, AL (n=235)	33%	23%	30%	7%
Durham, NC (n=93)	42%	32%	25%	8%
Greensboro, NC (n=152)	43%	29%	39%	10%
New Orleans, LA (n=103)	37%	25%	29%	2%
Pittsburgh, PA (n=174)	26%	27%	28%	12%
Seattle, WA (n=157)	35%	25%	29%	2%
<b>Overall</b>	<b>35%</b>	<b>25%</b>	<b>29%</b>	<b>7%</b>

# Prevalence of Resistance Mutations in *M. gen* among Men with Urethritis (MAGNUM study)

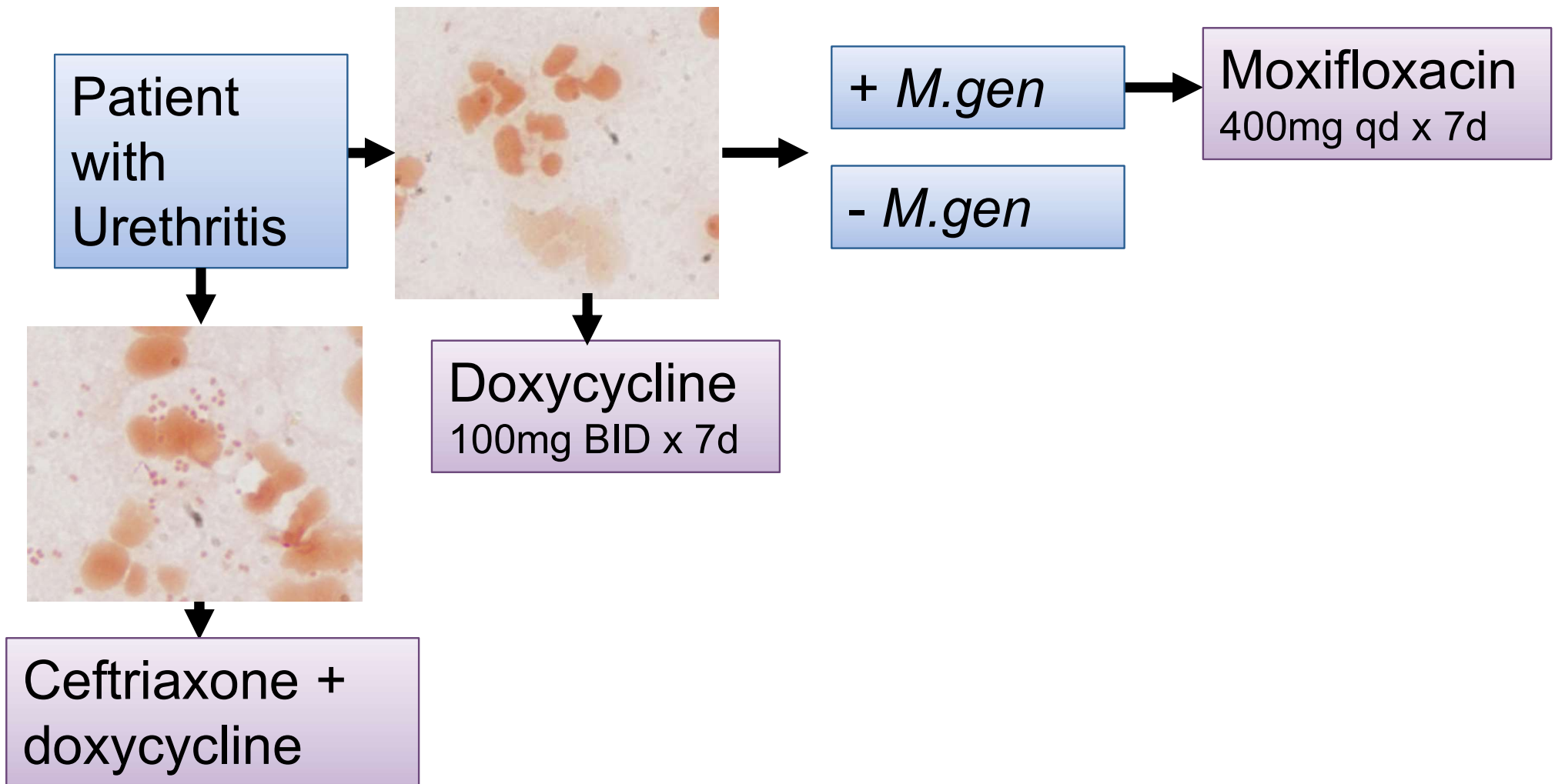


1. 23S rRNA mutation, among those with evaluable results
2. *parC* mutation, among those with evaluable results

# Resistance-Guided Treatment Algorithm Melbourne Sexual Health Centre



# A Proposed Approach to Urethritis Treatment\*



- \* Not currently recommended in CDC guidelines.
- \* This is the approach used in Public Health – Seattle & King County Sexual Health Clinic



# Trivia

- This sexually transmitted pathogen is itself frequently infected with a virus:
  - *Chlamydia trachomatis*
  - *Neisseria gonorrhoeae*
  - *Mycoplasma genitalium*
  - *Trichomonas vaginalis*
  - *Shigella* spp.
  - *Treponema pallidum*

# Trivia

Review article

INTERNATIONAL JOURNAL OF  
**STD & AIDS**

## ***Trichomonas vaginalis* virus: a review of the literature**

International Journal of STD & AIDS  
2019, Vol. 30(5) 496–504  
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sagepub.com/journals-permissions  
DOI: 10.1177/0956462418809767  
journals.sagepub.com/home/std



**KJ Graves<sup>1</sup> , AP Ghosh<sup>1</sup>, PJ Kissinger<sup>2</sup> and CA Muzny<sup>1</sup>**

### **Abstract**


*Trichomonas vaginalis* (TV) is a parasitic protozoan responsible for the sexually transmitted infection trichomoniasis. *Trichomonas vaginalis* virus (TVV) is a nonsegmented, 4.5–5 kbp, double-stranded RNA virus, from the Totiviridae family, which inhabits TV. A capsid protein consisting of 120 subunits is covered in channels aiding in RNA release. TVV is closely associated with the Golgi complex and is transmitted vertically. TVV has four subspecies, TVV1, TVV2, TVV3, and TVV4. The clinical significance of TVV and its effect on the pathogenicity of TV is not well known. We performed a systematic review of the literature on TVV to better understand its clinical significance and its role in the pathogenesis of TV.

*Clinical Infectious Diseases*

**MAJOR ARTICLE**



## ***Trichomonas vaginalis* Virus Among Women With Trichomoniasis and Associations With Demographics, Clinical Outcomes, and Metronidazole Resistance**

**Keonte J. Graves,<sup>1</sup> , Arindam P. Ghosh,<sup>1</sup> Norine Schmidt,<sup>2</sup> Peter Augostini,<sup>3</sup> W. Evan Secor,<sup>3</sup> Jane R. Schwebke,<sup>1</sup> David H. Martin,<sup>2,4</sup> Patricia J. Kissinger,<sup>2</sup> and Christina A. Muzny<sup>1</sup>**

<sup>1</sup>Division of Infectious Diseases, University of Alabama at Birmingham; <sup>2</sup>Department of Epidemiology, Tulane University School of Public Health and Tropical Medicine, New Orleans, Louisiana; <sup>3</sup>Centers for Disease Control and Prevention, Division of Parasitic Diseases and Malaria, Atlanta, Georgia; and <sup>4</sup>Section of Infectious Diseases, Louisiana State University Health Sciences Center, New Orleans

# *Trichomonas vaginalis* Treatment

## 2015 CDC Treatment Guidelines

Metronidazole 2g orally single dose

Or

Tinidazole 2g orally single dose

## 2020 ACOG Guidelines

Metronidazole 500mg BID x 7 days

RCTs show superiority of 7d course vs. single dose in both HIV+ women (92% vs. 83%) & HIV- women (89% vs. 81%)

~~Disulfuram-like reaction with alcohol~~  
(let go of this)

# Alternative Treatments for *T. vaginalis*

## First Line

*Recommended*

### Nitroimidazole resistance

Higher dose & longer course

- MTZ or TIN 2g po daily x 5-7 days
- TIN 2-3g po daily + intravaginal TIN 500mg BID x 14 days (\$\$\$)

### Nitroimidazole allergy

Oral desensitization

## Alternatives

*Supporting evidence generally poor quality*  
*Avoid intravaginal treatments in pregnancy*

Table 1 Alternative treatment options for *Trichomonas vaginalis* in the setting of nitroimidazole drug resistance or severe allergy

Agent and regimen	Cure rates
Intravaginal boric acid (applied in a gelatin capsule containing 600 mg boric acid) twice daily x 2 months <sup>27</sup>	1/1 cured (100%)
Intravaginal paromomycin cream (5 g of a 5% cream administered nightly) and high-dose oral tinidazole (1 g orally three times a day) x 14 days <sup>24</sup>	2/2 cured (100%)
Intravaginal furazolidone (100 mg per 5-g applicator of 3% nonoxynol-9) twice daily x 12 days <sup>28</sup>	1/1 cured (100%)
Intravaginal boric acid (applied in a gelatin capsule containing 600 mg boric acid) alternating nightly with intravaginal clotrimazole cream x 1–5 months <sup>25</sup>	2/2 cured (100%)
Intravaginal 6.25% paromomycin cream (250 mg per 4-g applicator, one applicator used nightly) x 2–3 weeks <sup>23</sup>	6/9 cured (66.6%)
Intravaginal povidone-iodine (Betadine) douches, 20 ml of a 10% solution twice daily for 2 days per week x 2 weeks (left in the vagina for 10 min) <sup>30</sup>	1/1 cured (100%)
Nonoxynol-9, 100-mg intravaginal suppository <sup>29</sup>	1/1 cured (100%)



# Case

- January 13, 2021
- King County back to Phase 1 of COVID re-opening plan (facility-based and in-person contact is limited)
- Your patient calls triage about notification of gonorrhea diagnosis from partner, last sex with this partner 2 wk ago, no symptoms
- What do you recommend?
  - Defer treatment, call if symptoms develop, screen when safe to come in
  - Ceftriaxone 250mg IM x1 + azithromycin 1g po x1
  - Cefixime 800mg PO x1 + azithromycin 1g po x1
  - Cefpodoxime 400mg q12h x 2 + azithromycin 1g po x 1

# Recommended Oral Therapies for Gonorrhea, Chlamydia, and Syphilis

Infection	Type or Site of Infection	First Oral Option	Alternative Oral Option
Syphilis	Contact or early latent	Doxycycline 100 mg PO BID × 14 d	None
	Late latent	Doxycycline 100 mg PO BID × 28 d	
	In pregnancy	No oral options Must be seen for benzathine penicillin	
Gonorrhea	Contact or nonpharyngeal	Cefixime 800 mg PO × 1 plus azithromycin 1 g PO × 1	Cefpodoxime 400 mg q12h × 2 doses, plus azithromycin 1 g × 1
	Pharyngeal*	Cefixime 800 mg PO q12h × 2, plus azithromycin 2 g PO × 1	Cefopodoxime 400 mg q12h × 4 doses, plus azithromycin 2 g † PO × 1
	Cephalosporin allergy	Azithromycin 2 g PO × 1	Ciprofloxacin ‡ 500 mg PO × 1 with test of cure
Chlamydia	Contact or nonrectal	Azithromycin 1 g or doxycycline 100 mg PO BID × 7 d	Levofloxacin 500 mg PO daily × 7 d
	Rectal chlamydia	Doxycycline 100 mg PO BID × 7 d	or Erythromycin base 500 mg q6h × 7 d

\*We recommend home self-collected test of cure using nucleic-acid amplification test at 14 days after treatment.

†May separate the 2-g dose into two 1-g doses given with the first 2 doses of the cephalosporin.

‡Current ciprofloxacin resistance levels vary by jurisdiction.<sup>12</sup> In areas where ciprofloxacin resistance is >30%, use caution.

BID indicates twice a day; PO, per os; q6h, every 6 hours; q12h, every 12 hours.

Barbee L et al, STD 2020

CDC Dear Colleague letter available at:

<https://www.cdc.gov/std/prevention/disruptionGuidance.htm>



# Recommendations for Syndromic Management of STI Syndromes Over the Phone

Symptoms	Syndromic Management	Other Considerations
Urethral discharge	Cefixime* 800 mg PO × 1 plus doxycycline 100 mg PO BID × 7 d	Can substitute azithromycin 1 g PO for the doxycycline For persistent symptoms†, consider adding moxifloxacin 400 mg daily × 10 d to cover <i>Mycoplasma genitalium</i> and/or metronidazole 2 g PO × 1 for <i>Trichomonas</i>
Vaginal discharge‡	Frothy or malodorous discharge: metronidazole 500 mg BID × 7 d Cottage cheese like discharge: fluconazole 150 mg PO × 1, may repeat q3d for 3 doses Yellow/pus-like discharge: cefixime§ 800 mg PO × 1 plus azithromycin 1 g PO × 1	Ask women with vaginal discharge about symptoms of pelvic inflammatory disease (abdominal or pelvic pain and fever). If present, treat with cefixime 800 × 1, doxycycline × 14 d plus metronidazole 500 BID × 14 d.
Genital ulcer disease	Doxycycline 100 mg PO BID × 14 d With§ or without Acyclovir 400 mg every 8 h × 7–10 d	All persons with suspect syphilis should be screened for symptoms of neurosyphilis.
Anorectal symptoms‡	Discharge: Cefixime§ 800 mg PO × 1 plus doxycycline 100 mg PO BID × 7 d Pain: add acyclovir 400 mg PO q8h × 7–10 d	
Body rash	Doxycycline 100 mg PO BID × 14 d	All persons with suspect syphilis should be screened for symptoms of neurosyphilis. Whenever possible, arrange to see the rash using videoconferencing or a picture¶

\*If cefixime is unavailable, cefpodoxime 400 mg every 12 hours × 2 doses can be substituted.

†Local epidemiology of urethritis etiologies can assist second-line therapies for persistent urethritis.

‡Use symptomatology to guide treatment.

§Consider treatment for genital herpes particularly if painful or blisters.

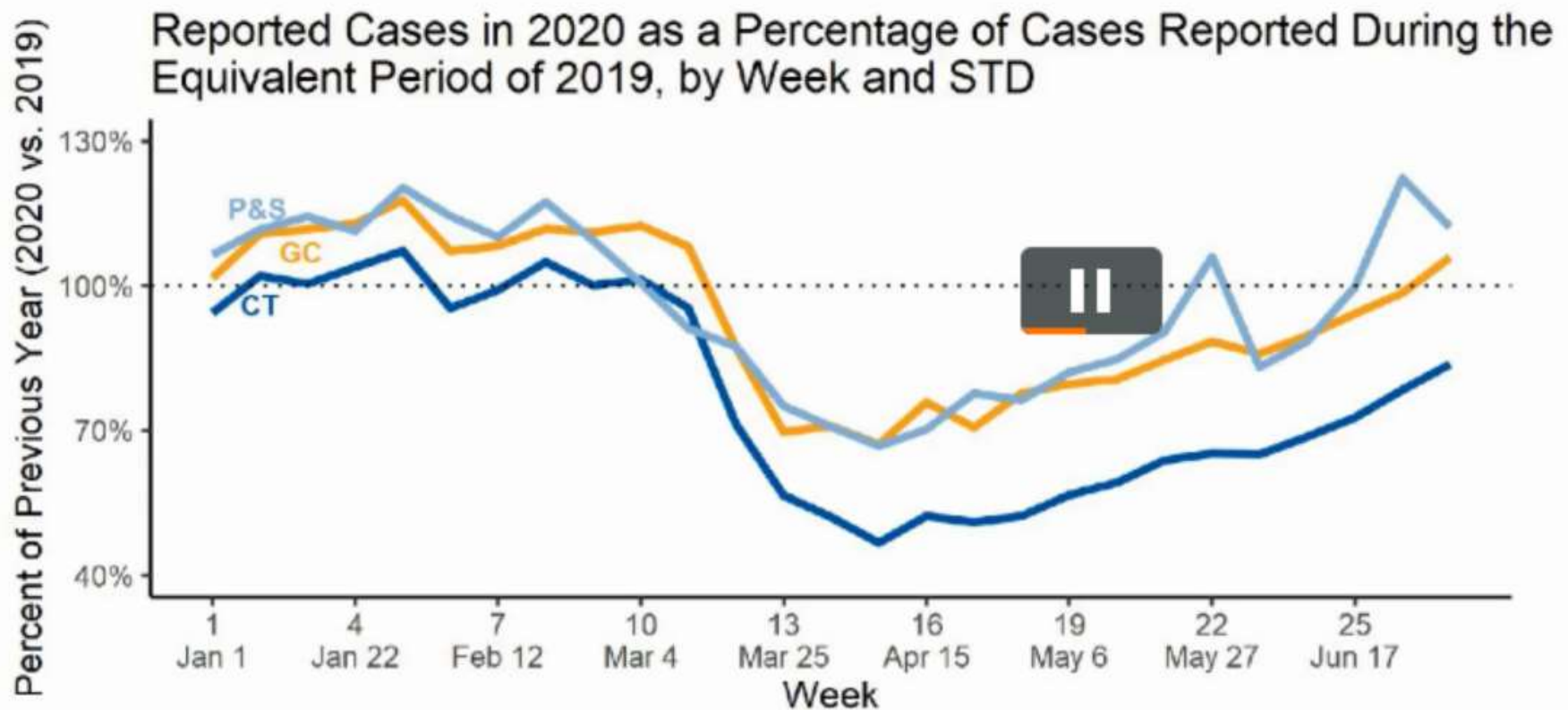
¶Exchange of information needs to comply with federal privacy laws.

BID indicates twice a day; PO, per os; STI, sexually transmitted infection; q3d, every 3 days; q6h, every 6 hours; q8h, every 8 hours; q12, every 12 hours.



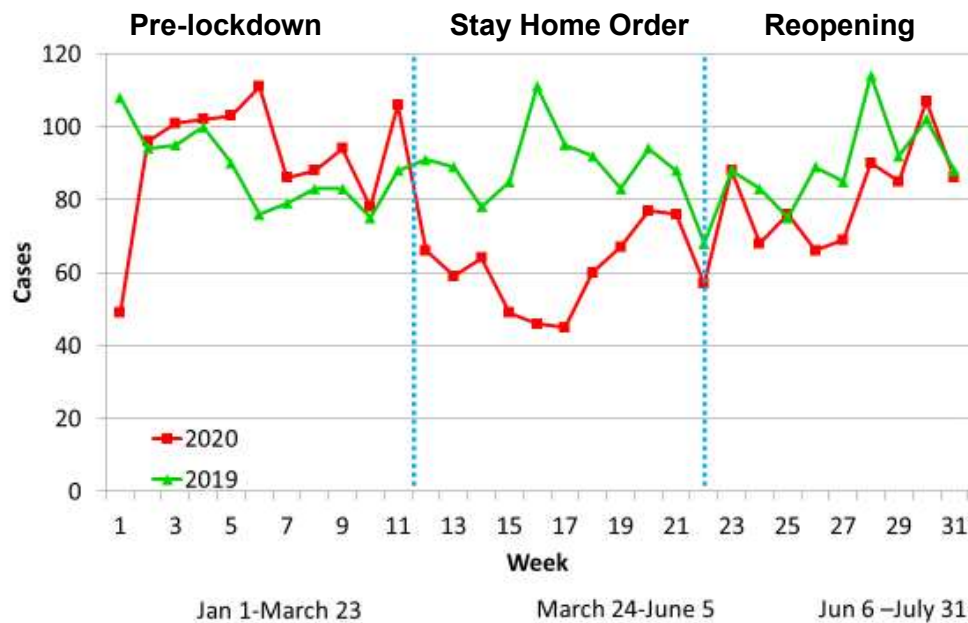
# STD Case Reports Down Nationally in 2020

## Reporting Overview: 2020 cases as percent of 2019 cases



# Case Reports in King County, 2020 vs. 2019

- Weekly gonorrhea cases:  
**13% decrease**



- Weekly syphilis cases:  
**11% decrease**



# Reported partner change since COVID-19 arrived in the U.S.

- Online surveys among MSM in U.S., April 2020 (n=1,051)

	N (%)
Number of sex partners	
Decreased	539 (51)
No change	500 (48)
Increased	9 (1)
Opportunities to have sex	
Decreased	715 (68)
No change	282 (27)
Increased	45 (4)
Use of dating/hook-up apps to meet in-person	
Decreased	513 (49)
No change	472 (45)
Increased	61 (6)

# Sex and COVID-19

## Temporary Recommendations for Men Who Have Sex with Men (MSM)

In addition to your current HIV/STI prevention activities, such as using condoms, taking HIV pre-exposure prophylaxis (PrEP), having an undetectable HIV viral load, and getting tested and treated for STIs regularly, COVID-19 prevention should be included into your safer sex plans and activities.

### Key Messages

- Stay home as much as possible and minimize contact with others
- If you have symptoms, or had contact with someone that has COVID-19, [get tested](#) and isolate
- If you or your partners have symptoms, take a pause from having sex for 10 days after symptoms started
- Take precautions interacting with people at risk for severe COVID-19 illness (people over 65yrs, or those with serious medical conditions)
- Have as few sex partners as possible
- Consider the safety of those you live with, coworkers, elderly parents, and the public

### Safest Sex

- Solo sex (masturbation)
- Virtual sex (phone chat, sexting, web chat, video dates)
- Wash (hands, body, sex toys, keyboards, touchscreens, etc.) before and after sex
- Select partners you live with, and only have sex with them

### Safer Sex

- Limit sexual contact with people you don't live with
- Select a small group of people (0-4) and only have sex with each other
- Discuss COVID-19 risk, symptoms, testing, and prevention before having sex
- Use condoms or dental dams to reduce contact with saliva, semen, or feces
- Wash (hands, body, sex toys, keyboards, touchscreens, etc.) before and after sex
- If you are hooking up, check for symptoms, get tested, wash up, wear a mask, and take precautions with those most at risk for severe illness
- Use physical barriers, like walls, that will allow sexual contact but prevent face to face contact.
- Get partners' contact info in case you need to get in touch about COVID-19

### Avoid

- Kissing & exchange of saliva
- Rimming (mouth to anus)
- Using saliva as lubricant
- Close contact without a mask
- Close contact with multiple people at parties, gatherings, and public/private sex environments
- Having sex if you or your partners have symptoms.



### COVID-19 Facts

- You can get COVID-19 from someone who may, or may not, have symptoms.
- It spreads when respiratory droplets from coughing, sneezing, or breathing, gets into your mouth, nose, or eyes.
- Staying 6 feet away from others, and wearing a mask over your nose and mouth, can help to prevent the spread.
- It also spreads through direct contact with saliva or mucus, and has been found in many other body fluids, including semen, and in feces (poop).

#### Symptoms include:

- fever/chills
- cough
- sore throat
- difficulty breathing
- fatigue
- muscle or body aches
- headache
- new loss of taste or smell
- congestion or runny nose
- nausea or vomiting
- diarrhea

[Get tested](#) for COVID-19 if you have symptoms.

Public Health  
Seattle & King County

Adapted for the NYC Health Safer Sex and COVID-19 guidance

7/20

Available at <https://www.kingcounty.gov/depts/health/communicable-diseases/hiv-std/~media/depts/health/communicable-diseases/documents/hivstd/sex-and-covid-19.ashx> (or just search "King County COVID sex")



# NAAT Swab Shortage



DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Centers for Disease Control  
and Prevention

September 8, 2020

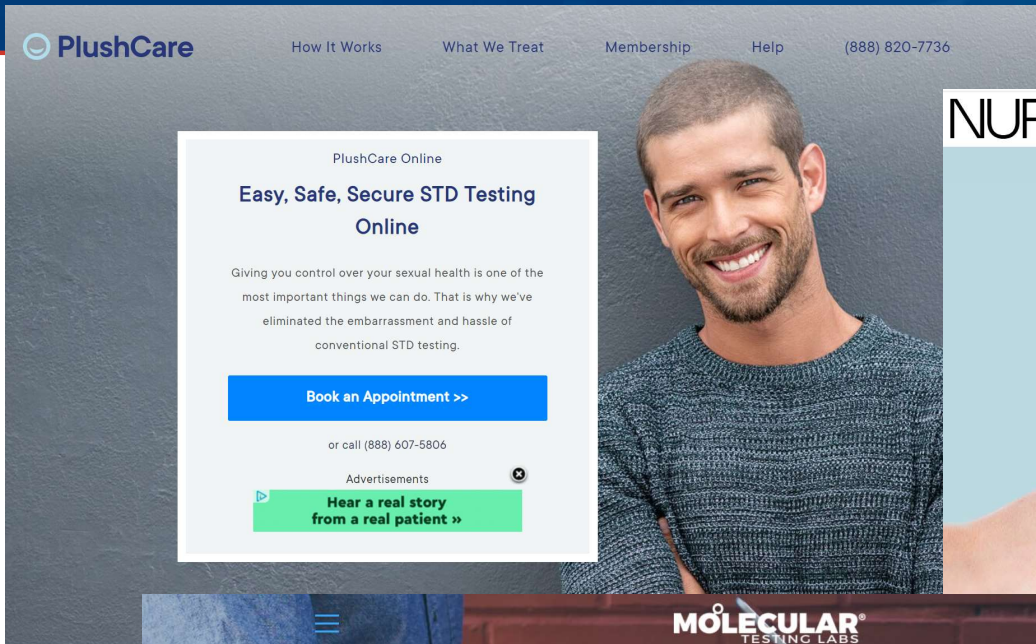
Dear Colleagues,

There is a current shortage of STI test kits and laboratory supplies, most notably for chlamydia and gonorrhea nucleic acid amplification tests (CT/GC NAAT). The shortages affect multiple diagnostic companies, public health and commercial laboratories, and impact several components of the specimen collection and testing process. CDC is working with state, local and

## Key recommendations:

- Prioritize women <25 years of age (or at risk) & asymptomatic MSM
- In MSM
  - Rectal > pharyngeal > urethral/urine
  - Extend screening intervals beyond q3 months
- Empiric treatment of patients with STI syndromes
- Forgo testing of contacts (but still treat empirically)

# HIV/STI Home Self-Testing\*




PlushCare Online

## Easy, Safe, Secure STD Testing Online

Giving you control over your sexual health is one of the most important things we can do. That is why we've eliminated the embarrassment and hassle of conventional STD testing.

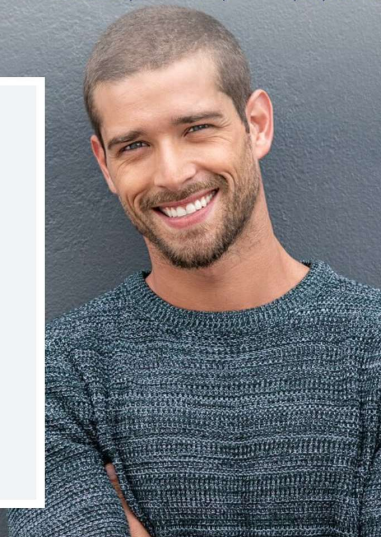
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STI TESTING

# TAKE CONTROL

Testing yourself for sexually transmitted infections offers priceless peace of mind. With our STI Home Test Kits you can get a status check on common infections conveniently and confidentially, with or without insurance.

[GET STARTED](#)

Image of a hand holding a clear plastic test kit.



MOLECULAR TESTING LABS

## Diagnostics Delivered

Image showing a person in a blue shirt handing a cardboard box to a person in a dark hoodie. A test kit is visible in the foreground.

\*Informational only – no endorsement implied



# HIV/STI Home Testing Under Investigation

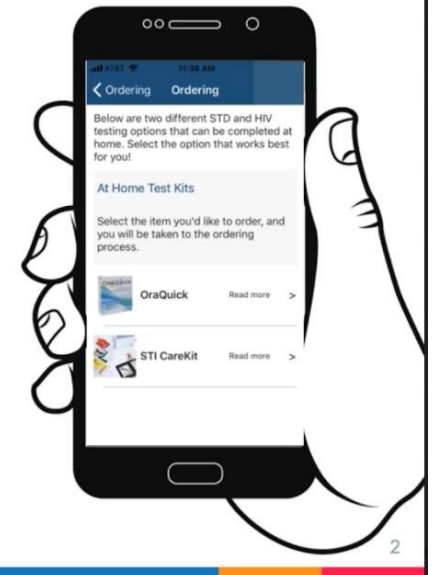
- Upcoming study in Public Health – Seattle & King County Sexual Health Clinic
  - Established patients on PrEP
  - PI: Chase Cannon

- Emory Experience (research context)

## Background

- ▷ Provided STI & HIV home testing kits through the mobile app
- ▷ Sexual health intervention for men who have sex with men (MSM)
- ▷ Many people ordered but did not return the kits

**25%**  
Return rate



*Norelli J et al, National STD Prevention Conference 2020*

# Epidemiology Quiz

Nationwide, the *relative* increase in incidence rates from 2014-18 was greatest for which of the following infections?

- Chlamydia
- Gonorrhea
- Syphilis, primary & secondary
- Syphilis, congenital



# CDC 2018 STD Surveillance Summary

## The State of STDs in the United States



**STDS SURGE FOR THE FIFTH  
STRAIGHT YEAR, REACHING  
AN ALL-TIME HIGH.**



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19% rate increase since 2014



**583,405**  
CASES OF GONORRHEA  
63% rate increase since 2014



**115,045**  
CASES OF SYPHILIS  
71% rate increase of infectious  
syphilis since 2014



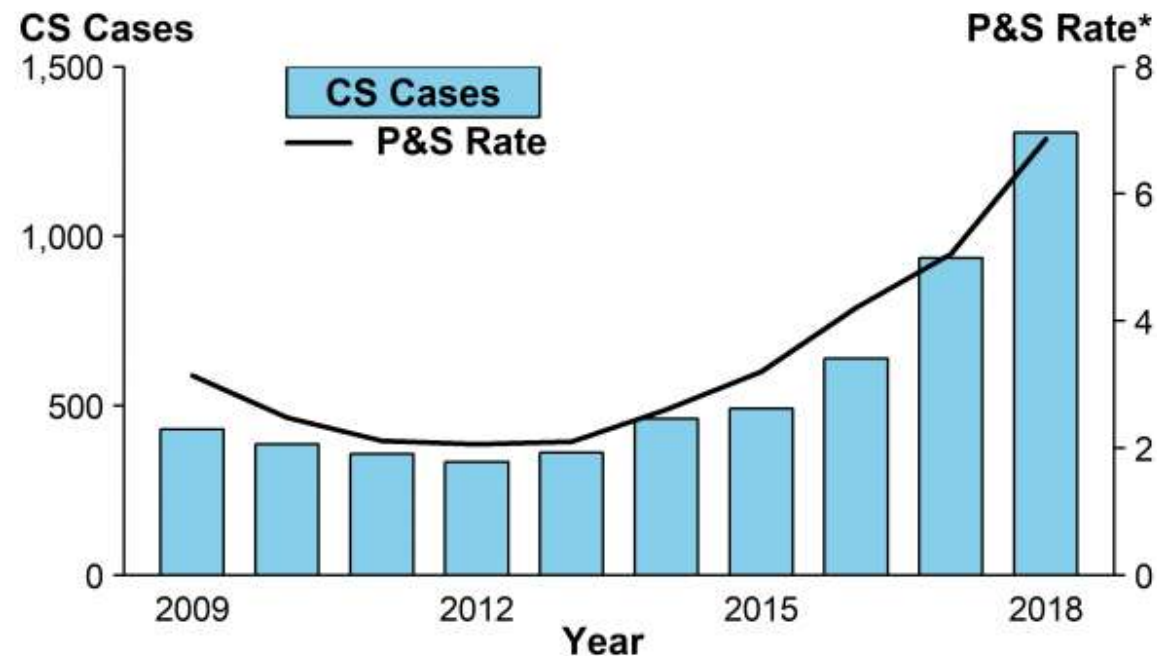
**1,306**  
CASES OF SYPHILIS  
AMONG NEWBORNS  
185% rate increase since 2014





# Congenital Syphilis, United States

**Figure 49. Congenital Syphilis — Reported Cases by Year of Birth and Rates of Reported Cases of Primary and Secondary Syphilis Among Females Aged 15–44 Years, United States, 2009–2018**

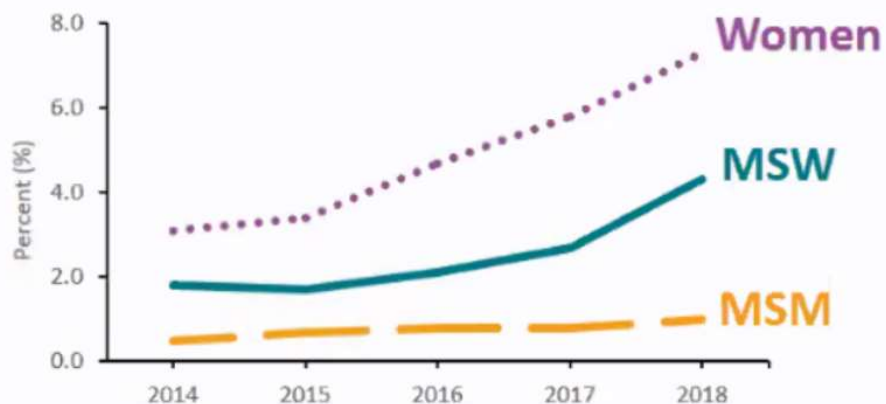


\* Per 100,000.

**ACRONYMS:** CS = Congenital syphilis; P&S = Primary and secondary syphilis.

# Nationally, syphilis among women associated with injection drug use

## Heroin Use



## Meth Use



## Injection Drug Use



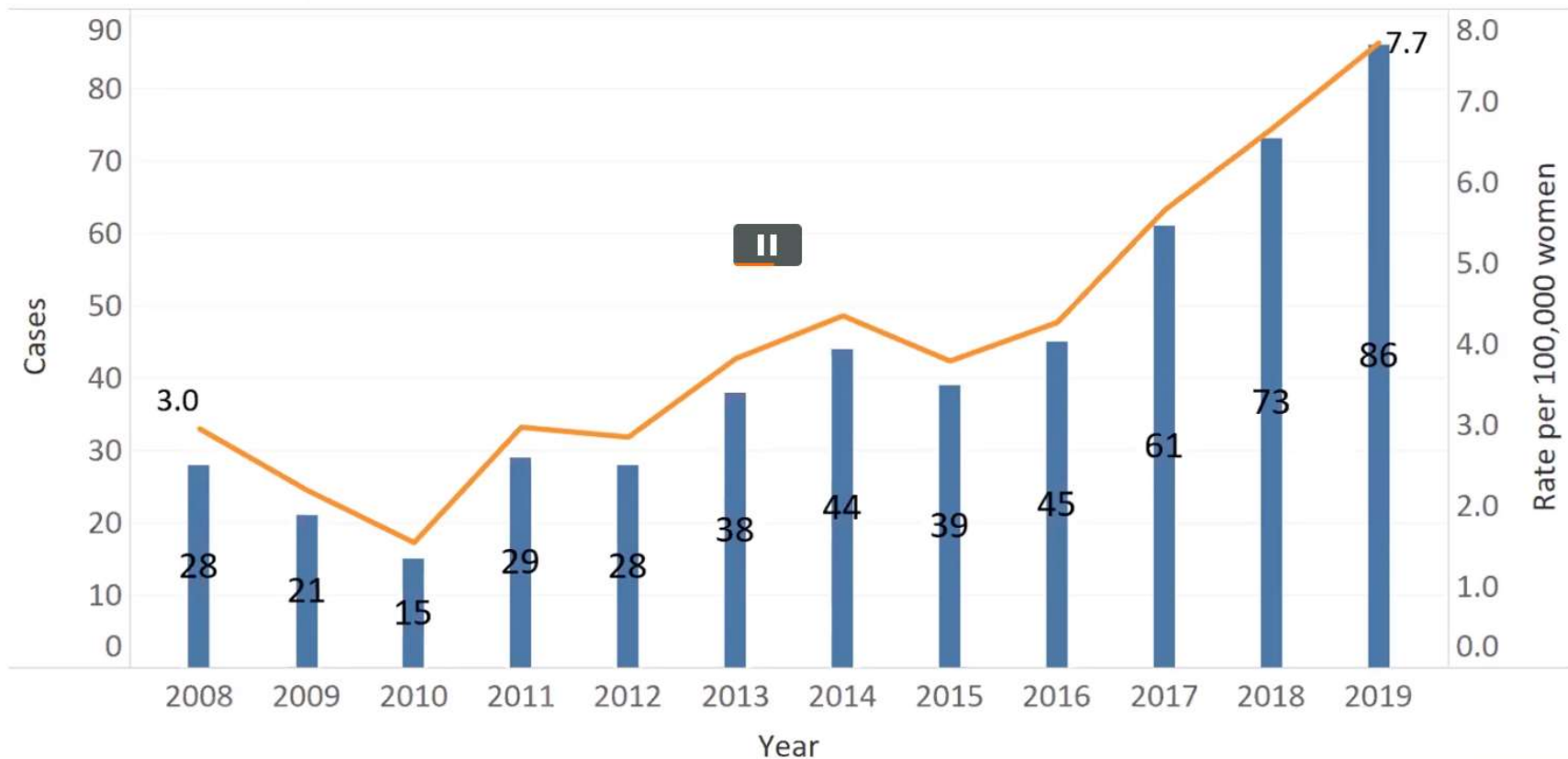
## Sex with a PWID



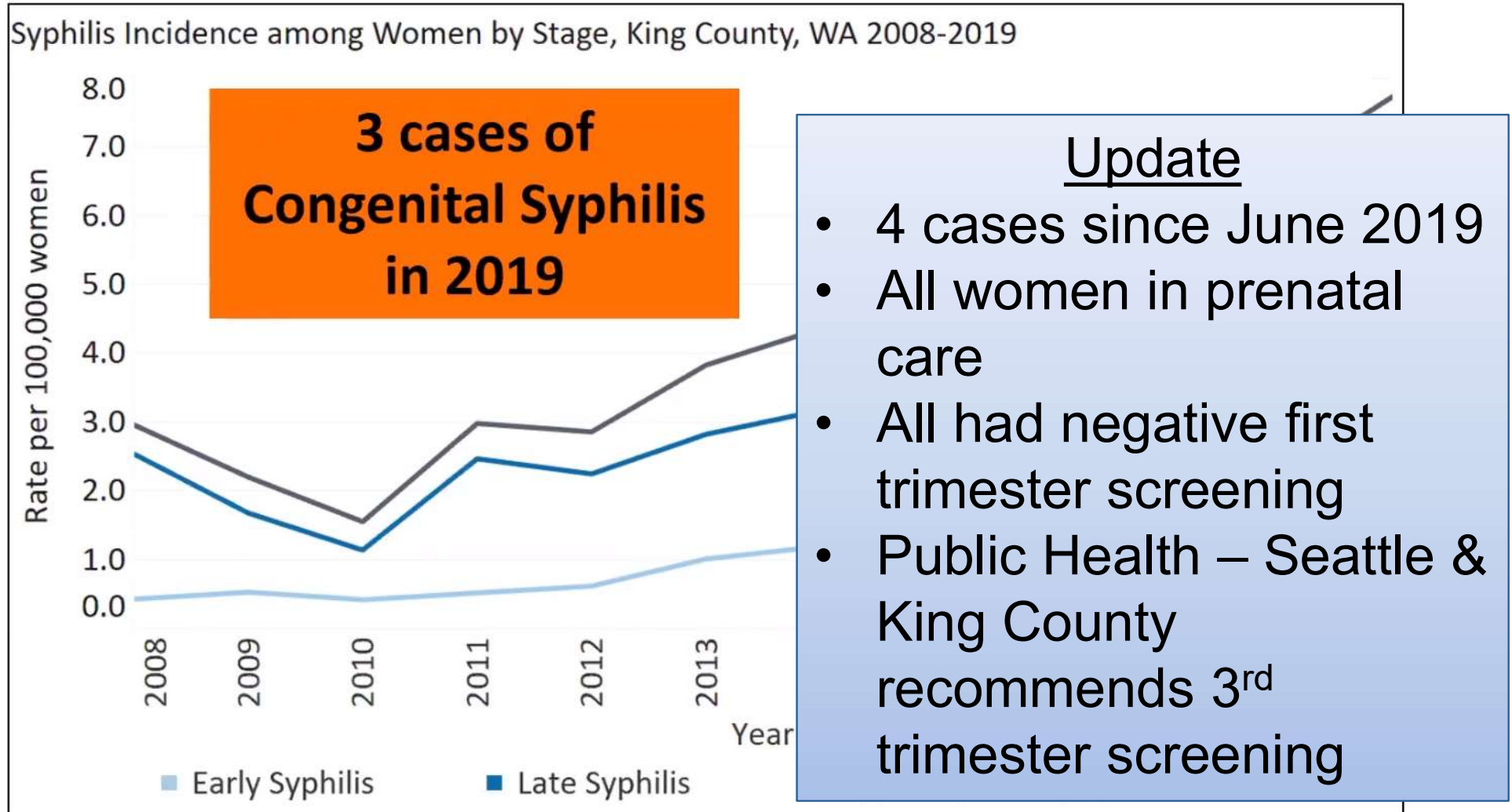
# Syphilis in Women, King County

Syphilis incidence among women **increased** from 2008 to 2019

Syphilis Incidence: Reported Cases and Rates among Women, King County, WA 2008-2019



# Congenital Syphilis, King County





- Doxycycline
- Mouthwash
- Men B vaccine

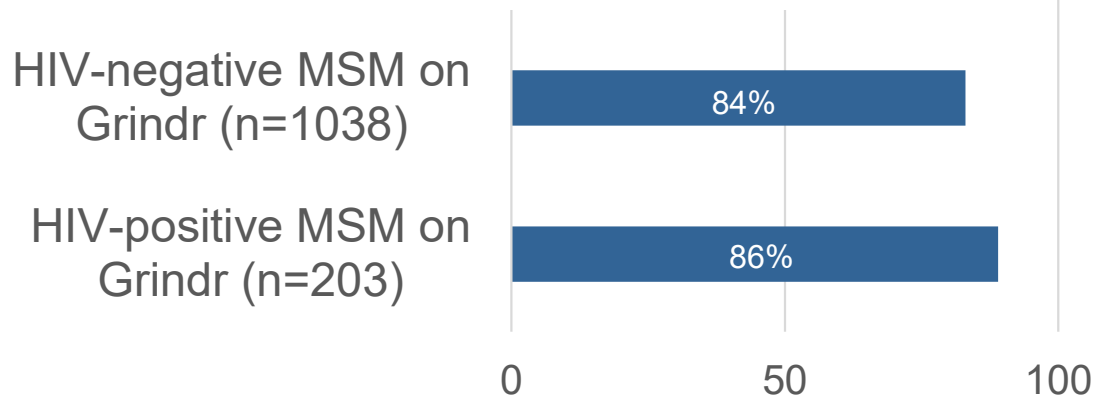
# Doxycycline Prophylaxis for STI Prevention: Evidence to Date

Reference	Population	Intervention	Results
Bolan RK, <i>Sex Transm Dis</i> , 2015	HIV+ MSM with history of syphilis, US (n=30)	Doxy 100mg daily vs. contingency management (No STI = \$)	<ul style="list-style-type: none"><li>• 73% ↓ in STI</li><li>• Driven by ↓ in syphilis</li><li>• No self-reported behavior change</li></ul>
Molina JM, <i>Lancet Infect Dis</i> , 2018	HIV-negative MSM on even-driven HIV PrEP in France	Doxy 200mg within 72 hrs after sex vs. no medication (open label)	<ul style="list-style-type: none"><li>• 47% ↓ in combined STI<ul style="list-style-type: none"><li>• 70% ↓ in CT</li><li>• 73% ↓ in syphilis</li><li>• No ↓ in GC</li></ul></li></ul>



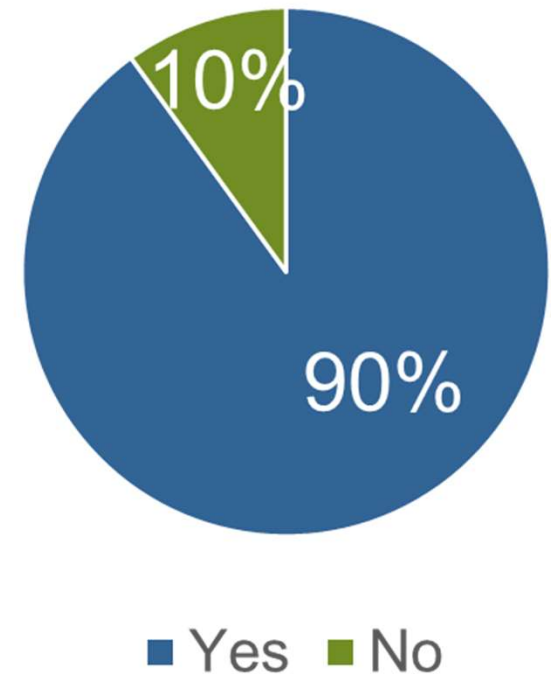
# Interest in Doxycycline PEP for STI among MSM

Atlanta, Birmingham, Chicago, NYC, SF, Seattle



African American & Latino MSM were *more* likely to report interest than non-Hispanic white MSM

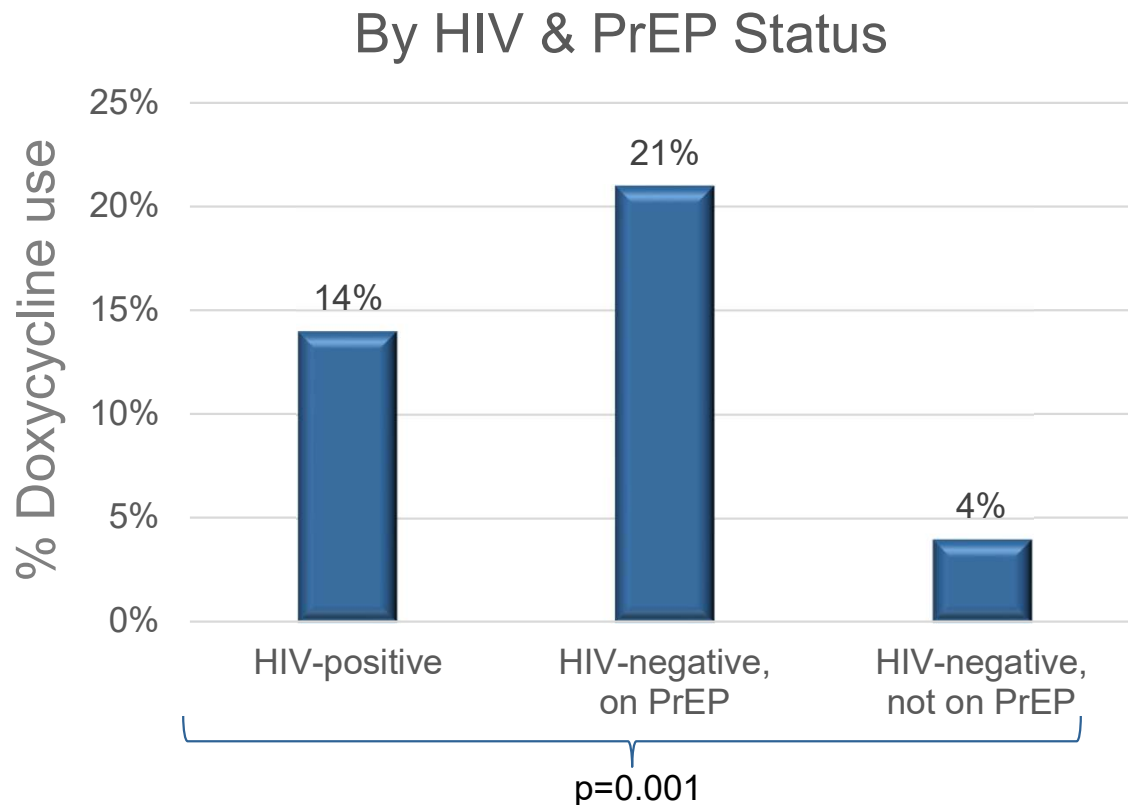
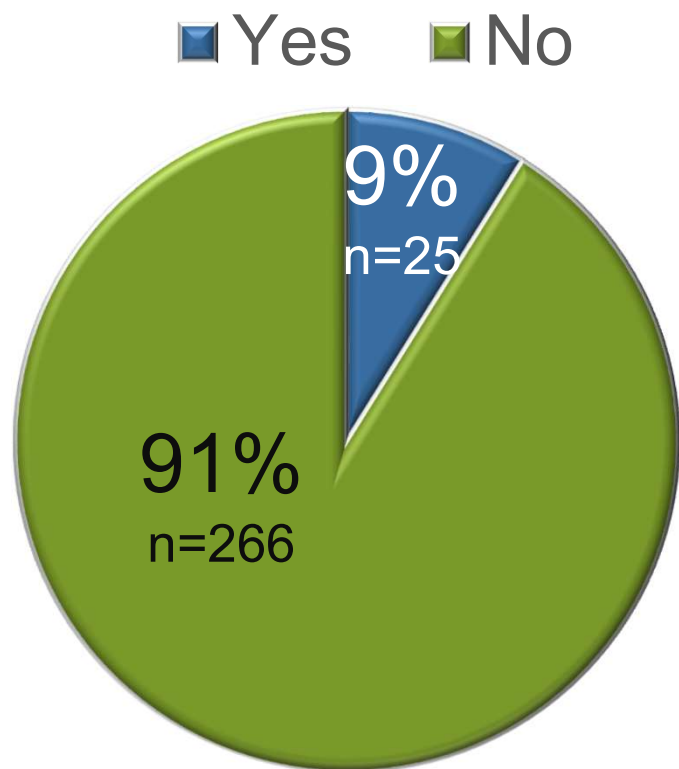
King County STD Clinic PrEP Program (N=35)



# Doxy Prophylaxis Use among Men and Transgender Persons who Have Sex with Men, King County Pride Survey, 2019

*Taking the antibiotic doxycycline every day or after having condomless sex may reduce the risk of getting syphilis and chlamydia (by about 70%).*

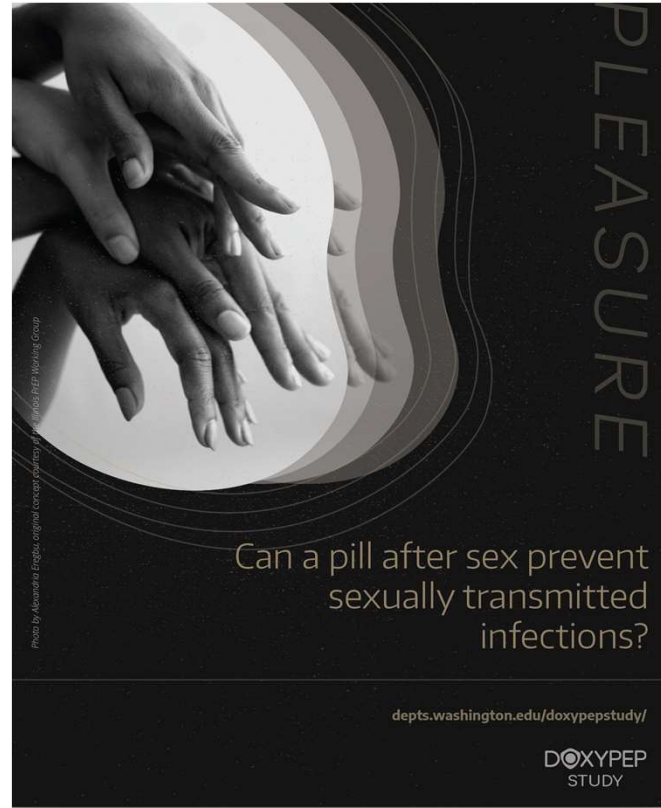
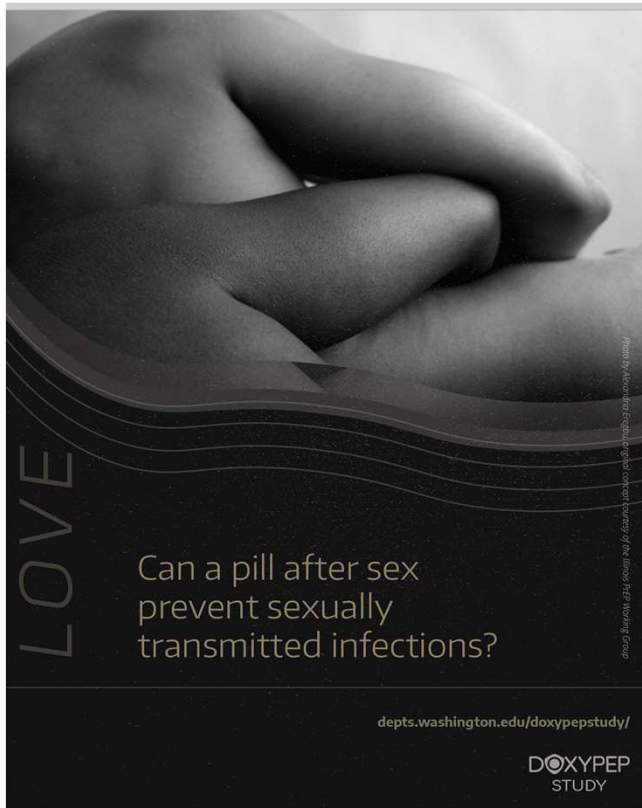
**Have you ever taken doxycycline to reduce the risk of getting an STD?**



# Ongoing Doxycycline Prophylaxis Studies

Study/investigators	Design	Population/N	Outcomes
<b>Doxycycline <u>PEP</u> studies</b>			
<b>DoxyPEP</b> (Luetkemeyer, Celum)	Open label, RCT doxy 200 mg after sex	MSM & TGW living with HIV or on PrEP (N=780)	STI incidence (GC, CT, TP), safety, AMR, acceptability
<b>Kenya dPEP</b> (Baeten, Bukusi)	Open label, RCT doxy 200 mg after sex	Kenyan young women on PrEP (N=446)	CT incidence, AMR, acceptability
<b>ANRS Prevenir PrEP</b> (Molina)	Open label, RCT doxy 200 mg after sex; factorial design with meningococcal B vaccine	MSM on PrEP, N=700	STI incidence (GC, CT, TP); AMR; microbiome
<b>Doxycycline <u>PrEP</u> studies</b>			
<b>Syphilaxis</b> (Kaldor)	Single arm study, doxy 100 mg daily	MSM & TGW living with HIV or HIV-, N=350	Use, acceptability, STI diagnosis, AMR in microbiome
<b>DuDHS &amp; DaDHS</b> (Grennan)	Immediate vs deferred doxy 100 mg daily	MSM living with HIV or on PrEP, N=102	Acceptability, adherence, tolerability, change in sexual activity, STI diagnosis

# Referrals to doxy PEP study in Seattle



## Eligibility:

MSM or TGW living with HIV or on PrEP *plus* GC, CT or early syphilis in past 12 months

## Referrals at Madison clinic:

-Rodney Perkins: 206 265-9153  
-Colleen Kimsey: 206 321-6984  
-Lindsay Legg: [lmlegg@uw.edu](mailto:lmlegg@uw.edu)  
-[doxypepstudy@uw.edu](mailto:doxypepstudy@uw.edu)

## Referrals at Sexual Health (formerly STD) Clinic:

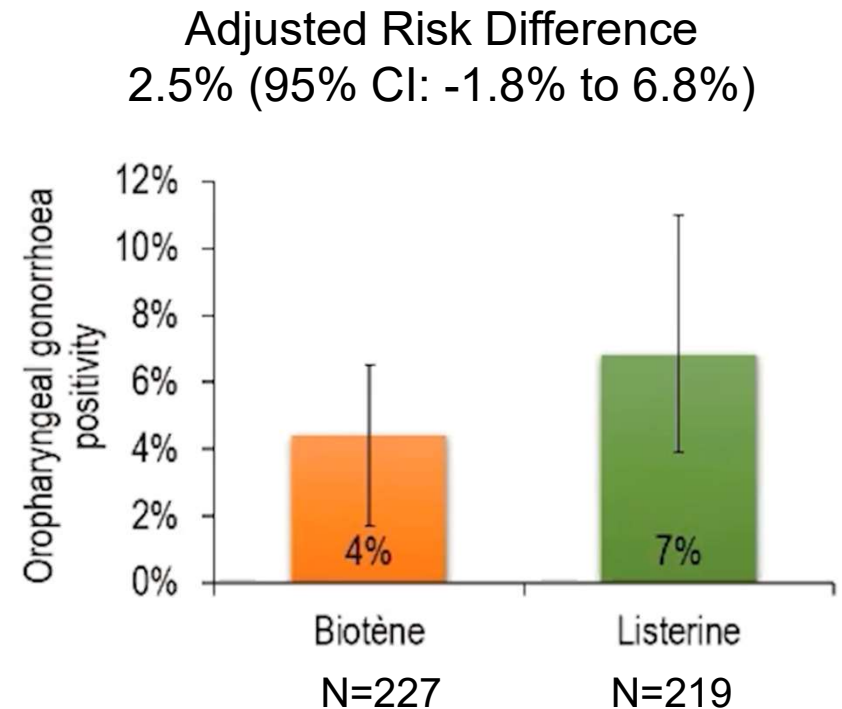
Cheryl Malinski  
[Cheryl.Malinski@kingcounty.gov](mailto:Cheryl.Malinski@kingcounty.gov)

**Any interventions for gonorrhoea prevention?**

# OMEGA Study

## Oral Mouthwash use to Eradicate Gonorrhoea

- Double-blind RCT
- 530 MSM
- Australia & New Zealand
- Primary outcome  
+Pharyngeal NAAT w/in 12 wk



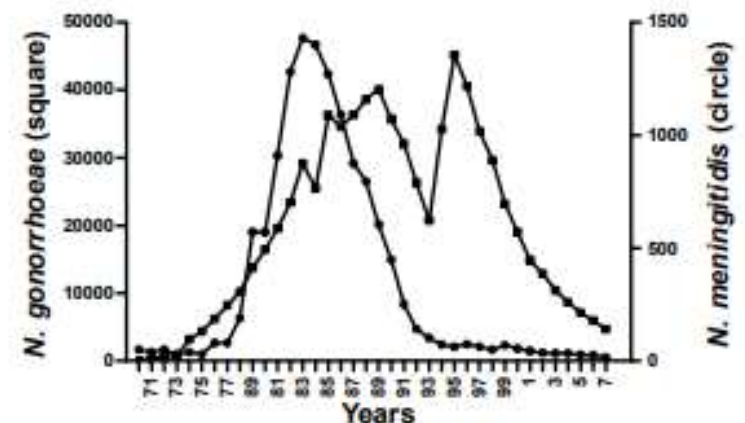
# Do we already have a partially effective gonococcal vaccine?



- Cross-reaction with serogroup B meningococcal vaccine containing *N. meningitidis*-derived outer membrane vesicles

- Ecological evidence of decrease in GC after update of meningococcal vaccination campaigns in Cuba & Norway

Fig. 1. Morbidity of *Neisseria* pathogenic species since 1970 in Cuba



# Case-Control Studies of Meningococcal Vaccine Effectiveness for GC Prevention

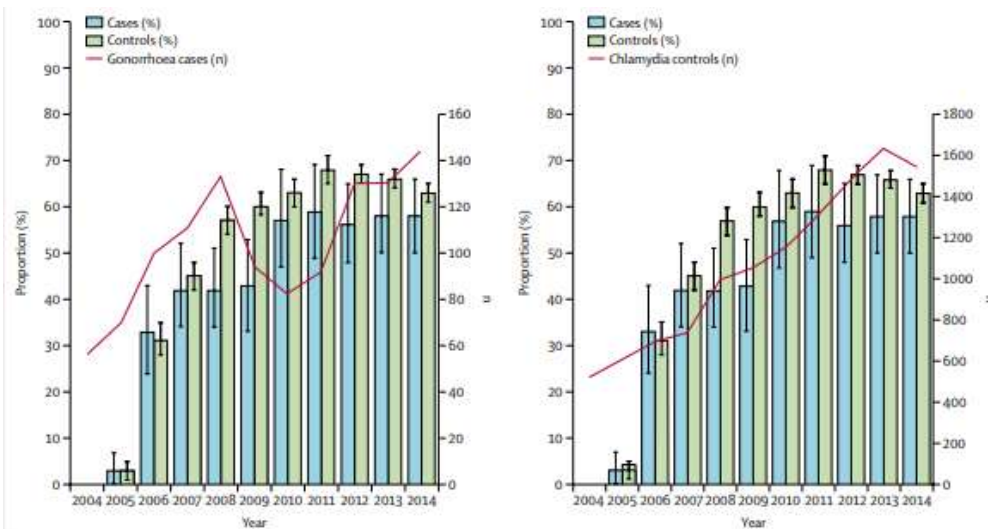
## New Zealand, 2004-14

Estimated effectiveness of MeNZB against gonorrhoea (adjusted):  
**31% (95% CI: 21-39)**

## NYC & Philadelphia, 2016-2018

Estimated effectiveness of Men4B against gonorrhoea (adjusted):  
**41% (95% CI: 25-53)**

Year-by-Year Difference in % of cases & controls vaccinated and Gonorrhoea & Chlamydia Cases



### Areas of Active Research

Efficacy?

Ongoing RCT in Alabama and North Carolina

Public health impact?

Depends on duration of immunity & uptake in population



# Synthesis – Learning Objectives

- Single dose azithromycin is falling out of favor for STD treatment
  - Fosters resistance in *N. gonorrhoeae*
  - Less effective than doxycycline for *C. trachomatis*
  - Most *M. genitalium* already resistant
- Treatment options in the context of the COVID pandemic
  - Local recommendations: “Sex in the time of COVID” article in *Sex Transm Dis* (Barbee LA, et al)
- Clinical significance of, appropriate treatment for *M. genitalium*
  - Available test, no screening recommendation, drug resistance
  - Consider 2-stage urethritis treatment: doxy -> moxi if *M. gen* positive

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Thank you

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