TRICHOMONAS VAGINALIS
A TRICH-Y PROBLEM

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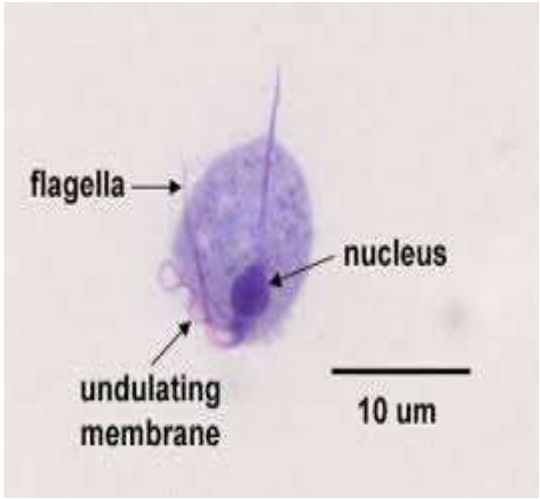
Fun Facts about *T. vaginalis*

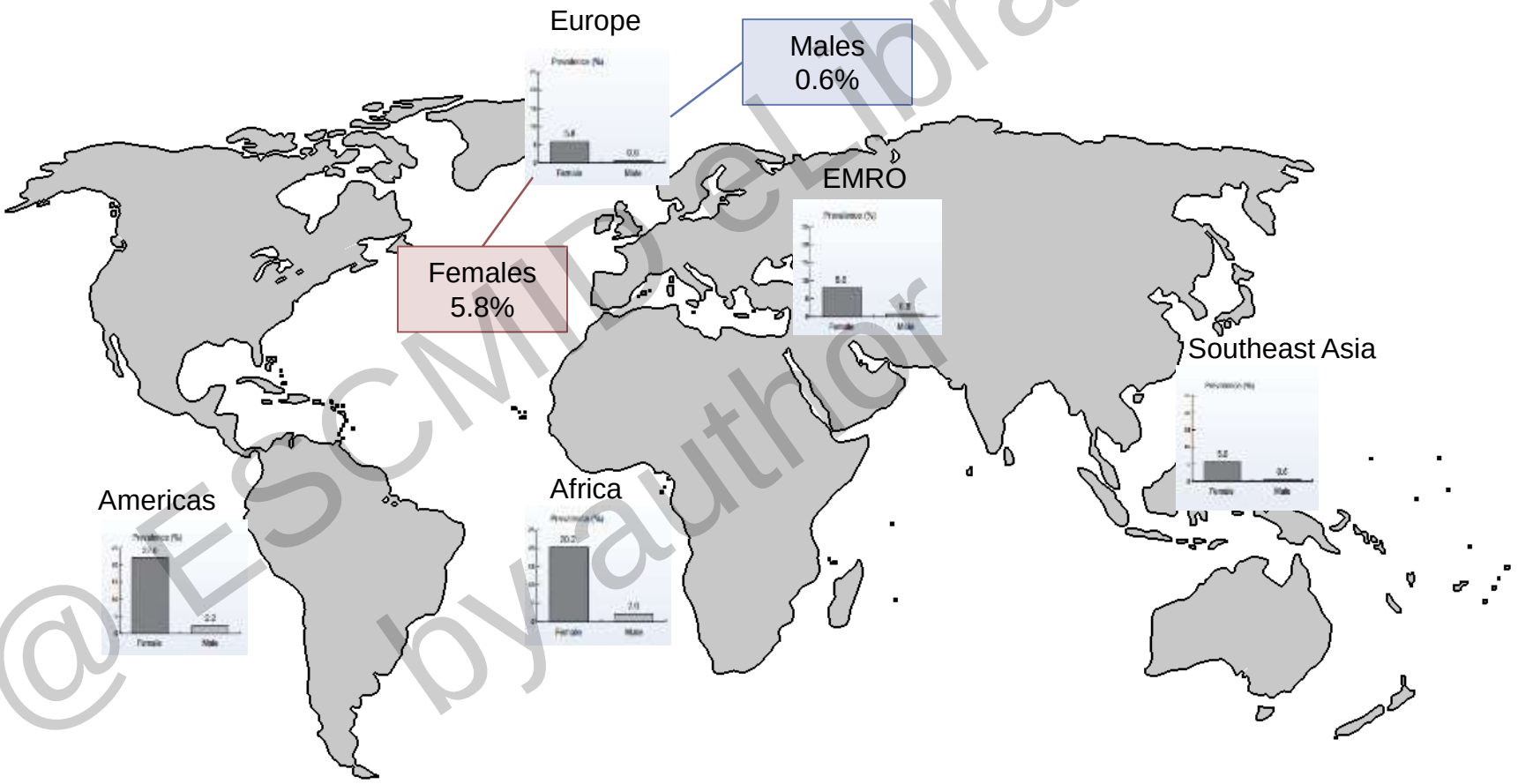
- Protozoan first described in 1836 by Alfred Donné[1]
- 1940's – established as an etiologic agent of vaginitis[2, 3]
- Roughly the size of a leukocyte[4]
- 4 anterior flagella responsible for motility
- Some strains infected with *T. vaginalis* viruses (TVVs)[5]
- Capable of phagocytosis – can engulf other reproductive tract pathogens[6-7]



[1]Donné, Comptes rendus de l'Académie des Sciences 1836; [2]Trussel & Plass Am J Obstet Gyn 1940; [3]Hesseltine JID 1942; [4]Hobbs et al, STD 2008; 5Wang & Wang J Biol Chem 1985; [6]Street et al Br J Vener Dis 1984; [7]Francioli JID 1983

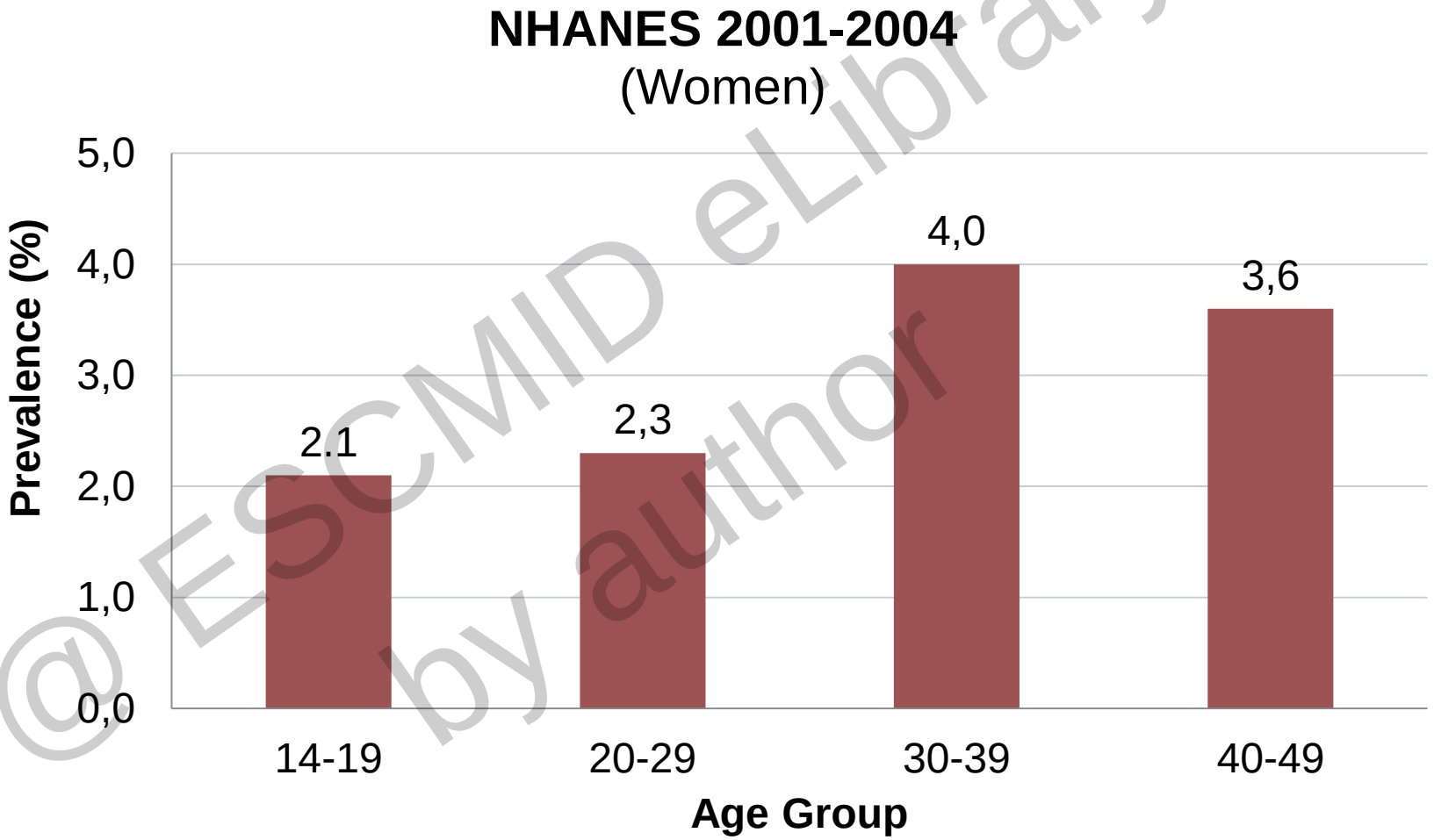
Trichomonas vaginalis

Global Prevalence = **187.0 million adults**



WHO 2013. Global incidence and prevalence of selected curable sexually transmitted infections – 2008

Age Specfic Prevalence – *T. vaginalis*



Sutton et al. Clin Infect Dis 2007

Who is Most Likely to Be Infected?

Characteristic	Adjusted Odds Ratio (95% CI)
Black Race	**6.9** (3.0 – 15.9)
Low Educational Attainment	**2.2** (1.3 – 3.5)
Lifetime Number Sex Partners	
1	0.7 (0.2 – 2.5)
2	1.2 (0.4 – 3.4)
3-5	**2.7** (1.1 – 6.4)
≥6	**3.2** (1.3 – 8.3)
Douching	**2.0** (1.2 – 3.5)

Sutton et al. Clin Infect Dis 2007

Clinical Spectrum in Women

- ~50% asymptomatic
- Vaginitis
  - Vaginal discharge
    (Profuse & frothy is pathognomonic)
  - Vulvar irritation
- Dysuria
  - ~33% of TV-infected women
- Cervicitis
  - Characteristic “strawberry cervix”
  - Uncommon but highly specific
  - May include post-coital bleeding & cervical friability

Hobbs et al, STD 2008

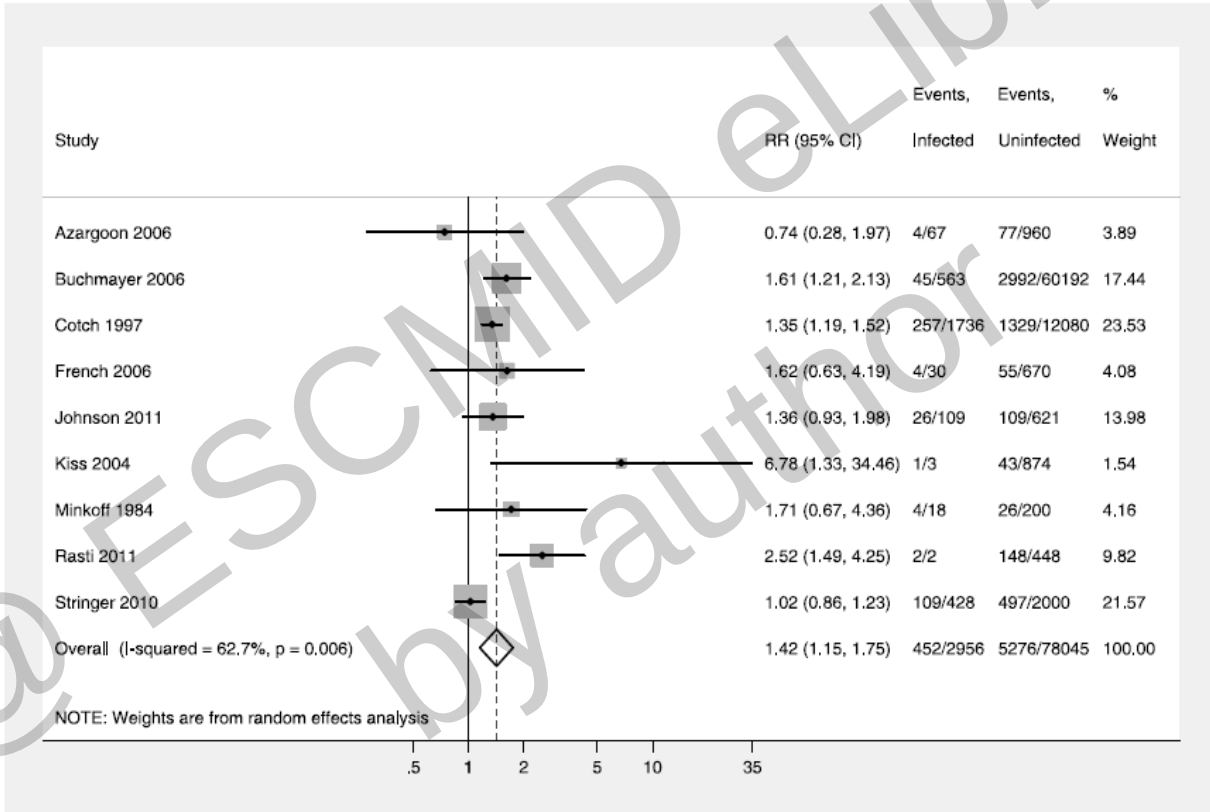
Clinical Spectrum in Men

- Up to 77% asymptomatic
- 2 – 18% of nongonococcal urethritis (NGU) cases
- Dysuria most common complaint
- > 2/3 of men spontaneously clear infection within 2 weeks

Sena et al, Clin Infect Dis 2007; Hobbs et al, STD 2008; Martin STD 2008

An Underappreciated Pathogen

- *T. vaginalis* and **Preterm Birth**



Summary OR

=

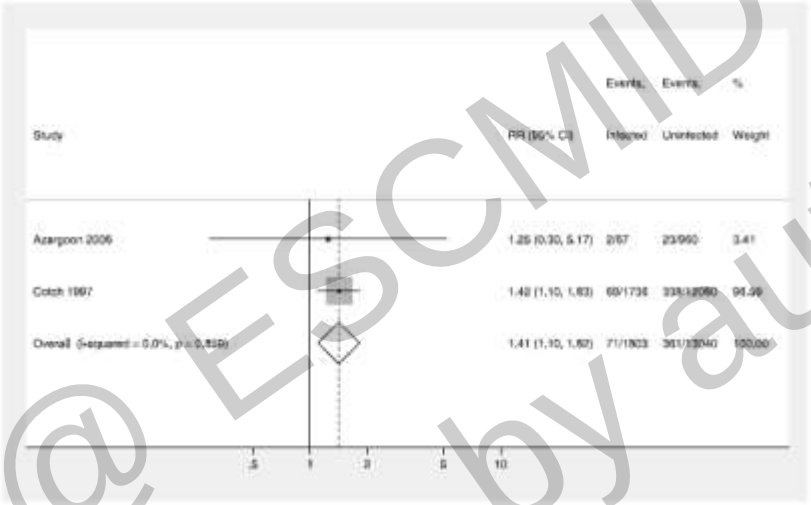
1.4 (1.2 – 1.8)

Silver et al. Sex Transm Dis 2014

An Underappreciated Pathogen

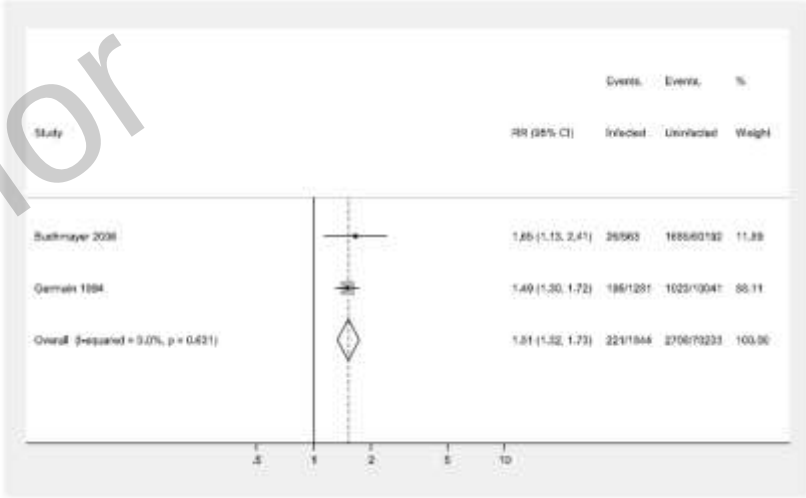
T. vaginalis & **Preterm PROM**

Summary OR = **1.4** (1.1 – 1.8)



T. vaginalis & **SGA***

Summary OR = **1.5** (1.3 – 1.7)

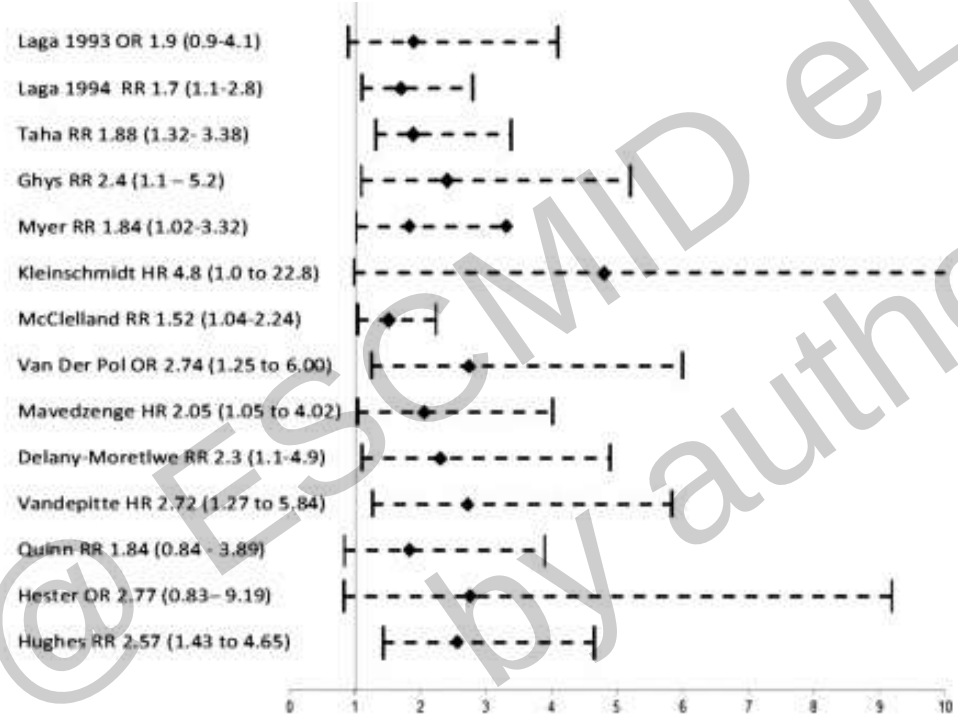


* Also associated with low birth weight

Silver et al. Sex Transm Dis 2014

T. vaginalis & HIV-infection in Women

HIV Acquisition



HIV Transmission

- HIV **shedding** elevated
- Synergy with bacterial vaginosis (BV):
  - **TV** alone: OR = **4.1** *(1.8-9.4)*
  - **BV** alone: OR = **5.7** *(2.6-12.0)*
  - **TV & BV:** OR = **18.6** *(6.7-51.7)*

Kissinger & Adamski, Sex Transm Inf 2013

Diagnosis of *T. vaginalis*

Clinical Diagnoses

Profuse, frothy vaginal discharge

pH > 4.5

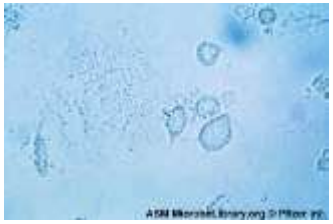
"Strawberry cervix"

Urethral discharge *(less purulent than GC)*

≥5 PMNs – Gram stain

BUT – Clinical diagnosis is fairly **unreliable** (majority are asymptomatic)

Detection of *T. Vaginalis*



Microscopy:

Wet-mount
(motile trichomonads)

Culture:

In-Pouch Assay

Antigen Detection:

- **OSOM**
- **Xenotope**

NAAT:

PCR
TMA

Diagnostic Test Performance - *T. vaginalis*

Adapted from Poole and McClelland, STI 2013

Assay	Manufacturer	Sensitivity %	Specificity %	Sensitivity %	Specificity %
		Women		Men	
Wet mount microscopy	-	36.4-82.0	99.1-100.0	-	-
Immuno-chromatic Ag detection	OSOM[1]	83.3-98.0	98.9-99.4	-	-
	XenoStrip-Tv[2]	66.7-90.0	92.5-100	-	-
Culture	Diamond's medium	95.7	100.0	56.0-100	99.0%-100.0
	In-Pouch TV[3]	69.7-73.3	100.0	-	-
NAAT	PCR (urine)	90.8-100.0	93.4-99.2	91.7-100	88.0-99.4
	PCR (swab)	97.8-98.6	97.4-97.8	81.6-98.6	94.9-95.5
	TMA: Aptima TV[4]	95.2-100.0	98.0-100.0	96.0	90.5-96.3

[1] Sekisui Diagnostics; [2] Xenotope Diagnostics; [3] Biomed Diagnostics; [4] Hologic (Gen-Probe)

2011 European (IUSTI/WHO) Guideline

T. vaginalis and Bacterial Vaginosis

Recommended Regimen
Metronidazole 400 - 500mg orally twice daily for 5 - 7 days *OR*
Metronidazole 2g orally in a single dose *OR*
Tinidazole 2g orally in a single dose

T. vaginalis – Treatment Considerations

GOOD NEWS

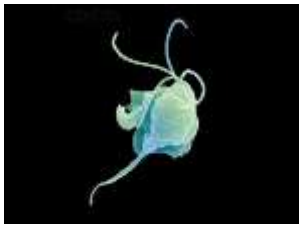
- Antimicrobial resistance generally low
  - Metronidazole: 4 – 10%
  - Tinidizole: ~1%
- Higher dosing often effective for treatment failures
- Alternative regimens (although evidence is limited):
  - Intravaginal paromomycin + high-dose tinidazole
  - Intravaginal boric acid
  - Nitazoxinide

BAD NEWS

- **Single dose** therapy with metronidazole **not recommended** for **HIV+** individuals or women with **BV**
  - 5-7 days of metronidazole instead
- Some evidence PTB can occur in pregnant women after treatment, but inconclusive

CDC STD Treatment Guidelines 2015

Summary – *T. vaginalis*



- An **underappreciated pathogen**, associated with
  - Vaginitis and NGU
  - Perinatal Morbidity: Preterm Birth, PROM, SGA, and LBW
  - HIV – increased risk of acquisition and transmission

- Individuals with *T. vaginalis* infections should
  - Abstain from sex until therapy for index & partners is completed
  - Refer partners for evaluation and treatment

- Limited global data on population estimates of *T. vaginalis*
  - Lack of surveillance activities limits our understanding of the burden of *T. vaginalis* infections

THANK YOU!

26th European Congress of Clinical Microbiology and Infectious Disease

Pr Cécile Bébéar – Université de Bordeaux

Pr Jorgen Jensen – Statens Serum Institut

Pr Marcia Hobbs – University of North Carolina

Hologic, Inc – San Diego, California

US National Institutes of Health / National Institute of Allergy & Infectious Diseases