

A cross-sectional study of  
women at Auckland Sexual  
Health Service: *Mycoplasma  
genitalium* – prevalence and  
association with cervicitis

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ASHS

# Acknowledgements

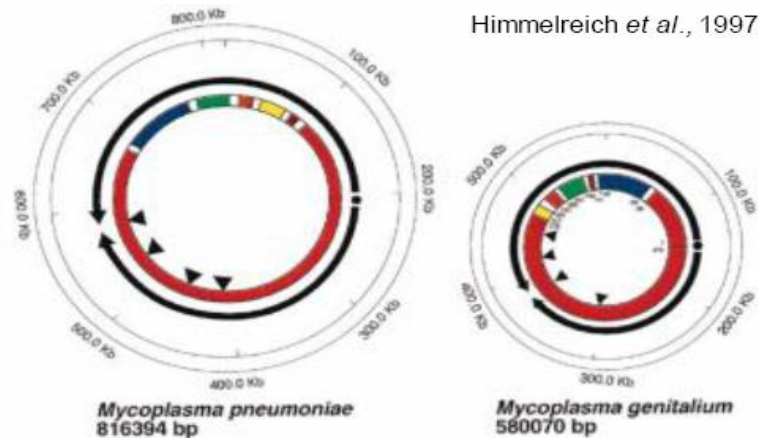
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# Introduction

- *Mycoplasma genitalium* discovered in 1981<sup>1</sup>
- Not visible on Gram stain (size 0.5 μm)
- Very long incubation period (>50 days)

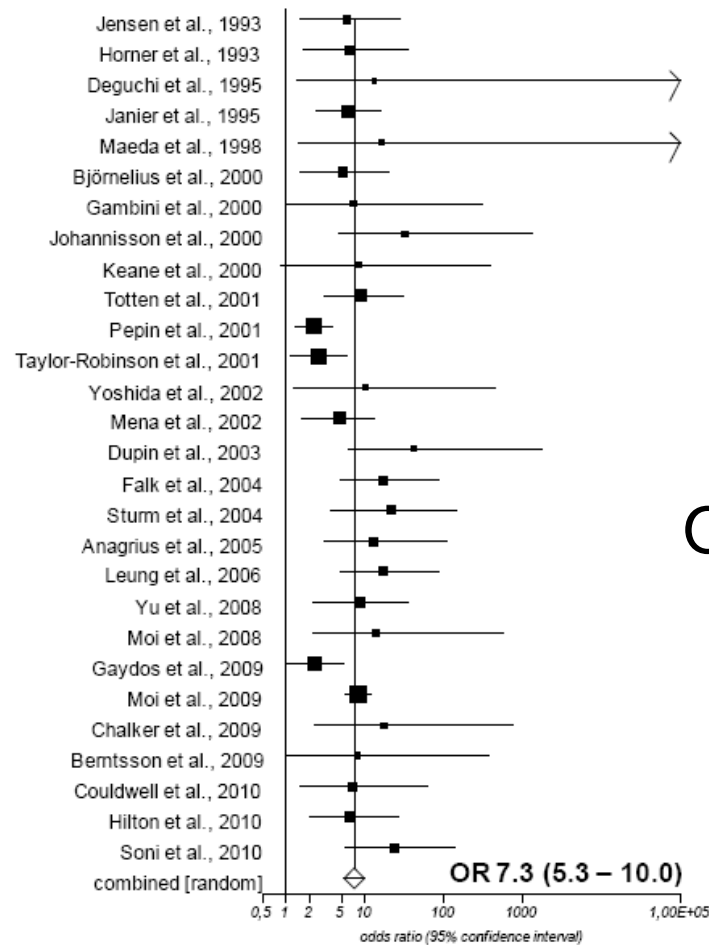


# Introduction

- Increasing evidence – pathogenicity and ability to be sexually transmitted
- Multiple studies- confirmed *M. genitalium* as an independent aetiologic agent for urethritis in men<sup>2</sup>



# Introduction



OR 7.3 (5.3-10.0)

Association between *M. genitalium* and male NCNGU<sup>2</sup>

# Introduction

- Evidence for a pathogenic role for *M. genitalium* in women - slower to emerge
- Multiple studies – strong associations between other STI's and cervicitis<sup>3,4</sup>
- *M. genitalium* and cervicitis – some associations but variable<sup>3,4</sup>

# Introduction

- Prevalence of *M. genitalium* in men at ASHS (2010): with urethritis is 10%  
asymptomatic is 2%<sup>5</sup>
- Prevalence in women at ASHS – ?
- Prevalence in women attending for a TOP – 8.7% (2008, Wellington)<sup>6</sup>

# Aims

- Estimate the prevalence of *M. genitalium* in women attending ASHS for sexual health screens
- Investigate for the presence of any association between *M. genitalium* and the finding of cervicitis

Approval granted by the Northern Y Regional Ethics Committee NTY/19/12/122



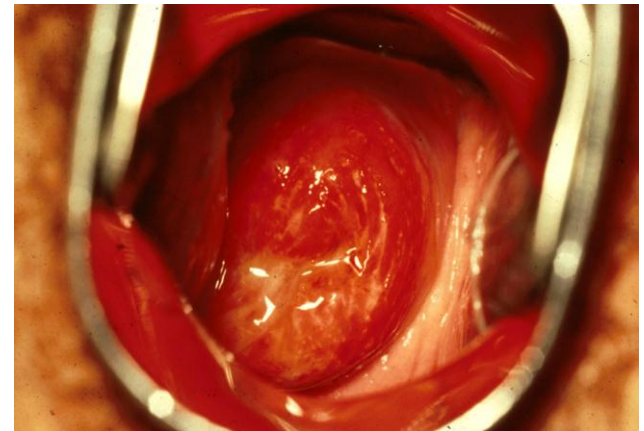
# Methods

- Recruitment: consecutively attending women at ASHS in April/May 2011
- Exclusion criteria:
  - < 16 years
  - recent antibiotics (2/52)
  - pregnant
  - menstruating
  - hysterectomy or recent cervical procedure (1/12)
  - declined speculum examination or cx not located

# Methods

- History: symptomatic = vaginal discharge, dysuria, abdominal pain.
- Routine speculum examination of the cervix

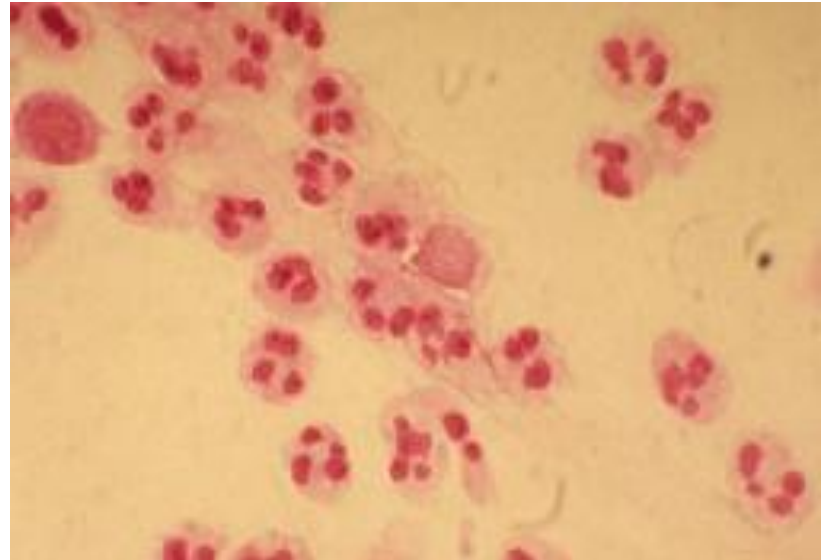
Clinical cervicitis: mucopus and/or contact bleeding



# Methods

- Routine swabs including endocervical swab for Gram stain

Microscopic cervicitis:  $\geq 30$  PMNLs on cervical Gram stain



# Methods

- Infection screen:

*C. trachomatis* – SDA (BD Probe Tec™)

*N. gonorrhoeae* - culture on New York media

*T. vaginalis* – culture in Diamond TYM broth

- Extra endocervical swab - *M. genitalium*

- *M. genitalium* testing at Melbourne Women's Hospital (qPCR assay)

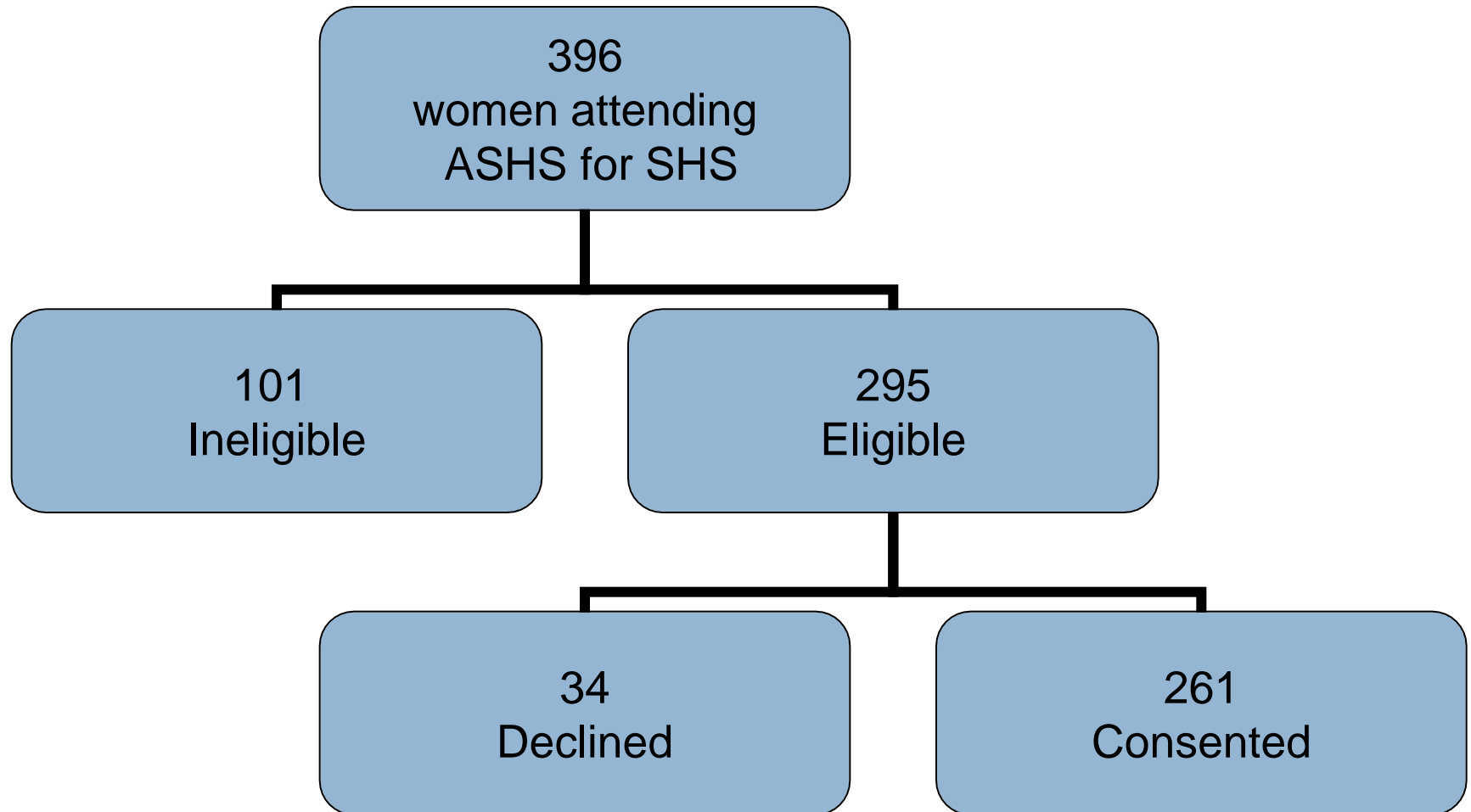
# Methods

- Statistical Analysis:

A generalized logistic regression was run with a nominal outcome of three categories;

*M. genitalium* infection, no infection, other infection with *M. genitalium* infection as the reference group, to investigate the associations between characteristics and the presence of infection.

# Results



88.5% of eligible women consented to be part of the study

# Results – ineligible

## □ Ineligible: n=101

5	< 16 years
15	recent antibiotics
17	pregnant
24	menstruating
1	recent cervical procedure
1	hysterectomy
37	declined speculum examination
3	cervix not located

# Results - declined

- No difference in the mean age of women between the two groups.
- Some difference between the two groups in the ethnicity of women - higher % of Māori women consented and a higher % of Asian women declined.

	NZ Euro (%)	Māori (%)	Pacific Peoples	Other (%)	Asian (%)
Consented N=261	123 (47.1)	55 (21.1)	30 (11.5)	31 (11.9)	22 (8.4)
Declined N=34	17(50.0)	4 (11.8)	4 (11.8)	3 (8.8)	6 (17.6)



# Results -demographics

- 261 women in final analysis:

Mean age 28 (16 – 57 years)

Clinics – North 11.9%

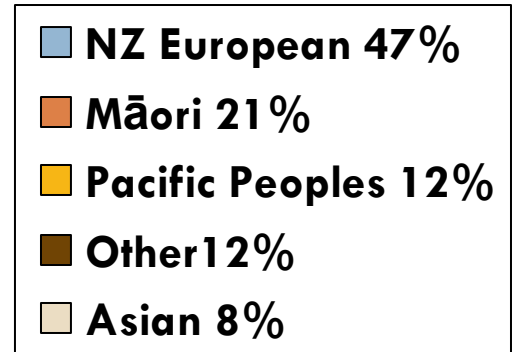
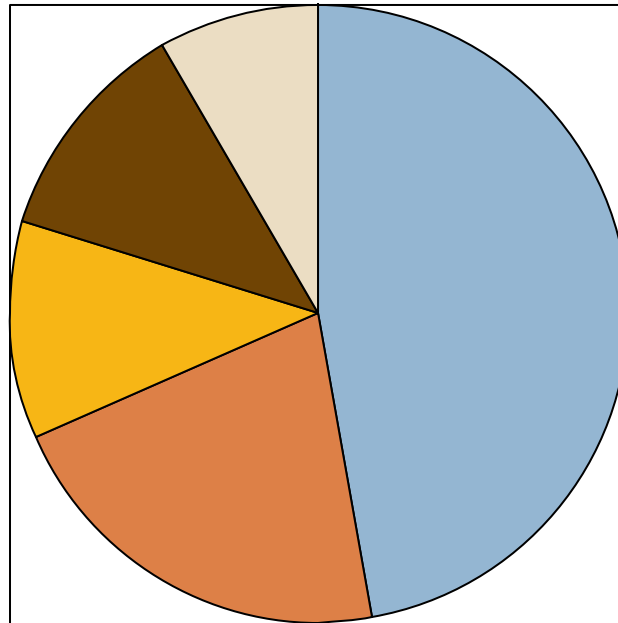
Central 36%

West 25.3%

South 26.8%

# Results - ethnicity

Ethnicity of women in the study group:



# Results - contraception

## □ Contraception

Nil	Condoms	Pills	Depo	IUCD	Implant	T/L
98	46	65	14	29	3	6

Of all women 214 (82%) reported UPSI in the past 3/12.

UPSI = unprotected sexual intercourse

# Results - prevalence

□ Prevalence of infections in study group: 24.5%

*M. genitalium* - 22 positive results

- 8.4% (95%CI 5.4-12.5)

<i>Mycoplasma genitalium</i>	<i>Chlamydia trachomatis</i>	<i>Neisseria gonorrhoeae</i>	<i>Trichomonas vaginalis</i>
22 (8.4%)	28 (10.7%)	5 (1.9%)	9 (3.5%)

➤ Most *M. genitalium* infections were diagnosed in isolation (77.3%) but 5 women had co-infections, 4 with *C. trachomatis*, 1 with *N. gonorrhoeae* and 1 with *T. vaginalis*.

# Results – multivariable analysis

Characteristic	<i>M. Genitalium</i> n=22 (%)	No Infection n=207 (%)	Other Infection n=37 (%)	p value
Age < 25 yrs	10 (45.5)	89 (43.0)	24 (64.9)	
≥ 25 yrs	12 (54.5)	118 (57.0)	13 (35.1)	p = 0.09
NZ European	9 (40.9)	105 (50.7)	11 (29.8)	
Māori	7 (31.8)	37 (17.9)	14 (37.8)	
Pacific Peoples	2 (9.1)	19 (9.2)	9 (24.3)	
Asian	2 (9.1)	18 (8.7)	2 (5.4)	
Other	2 (9.1)	28 (13.5)	1 (2.7)	p = 0.32

Generalized logistic regression with a nominal outcome and categories: no infection, other infection or *M. genitalium* (reference group).

# Results – multivariable analysis

Characteristic	<i>M. Genitalium</i> n=22 (%)	No Infection n=207 (%)	Other Infection n=37 (%)	p value
No symptoms	7 (31.8)	93 (44.9)	8 (21.6)	
Symptoms	15 (68.2)	114 (55.1)	29 (78.4)	$p = 0.76$
No new sexual partner (SP)	8 (36.4)	93 (44.9)	16 (43.2)	
New SP	14 (63.6)	114 (55.1)	21 (56.8)	$p = 0.76$
No bacterial vaginosis	7 (31.8)	111 (53.6)	9 (24.3)	
Bacterial vaginosis	15 (68.2)	96 (46.4)	28 (75.7)	$p = 0.08$

Generalized logistic regression with a nominal outcome and categories: no infection, other infection or *M. genitalium* (reference group).

# Results – summary

- Presence of *M. genitalium*:
  - no difference with: age, ethnicity, symptoms, sexual behaviours, presence/absence of bacterial vaginosis

# Results – clinical findings

- Microscopic cervicitis: 51.3% (134/261)
- Clinical cervicitis: 28.0% (73/261)
- Cervical mucopus: 13.4% (35/261)
- Cervical contact bleeding: 17.2% (45/261)



# Results – multivariable analysis

Characteristic	<i>M. genitalium</i> n=22 (%)	No Infection n=207 (%)	Other Infection n=37 (%)	p value
PMNLs < 30	7 (31.8)	108 (52.2)	13 (35.1)	
PMNLs ≥ 30	15 (68.2)	99 (47.8)	24 (64.9)	p = 0.13
No Cx mucopus	19 (86.4)	182 (87.9)	28 (75.7)	
Cx mucopus	3 (13.6)	25 (12.1)	9 (24.3)	p = 0.86
No Cx bleeding	13 (59.1)	176 (85.0)	9 (24.3)	
Cx bleeding	9 (40.9)	31 (15.0)	28 (75.7)	p = 0.006

Generalized logistic regression with a nominal outcome and categories: no infection, other infection or *M. genitalium* (reference group).

# Results – clinical findings

Cervicitis risk factors for *M. genitalium* compared to no sexually transmitted infections on multivariable analysis

	<i>M. genitalium</i> n=22 (%)	No infections n=207 (%)	Odds Ratio (95% CI)	<i>p</i> value
PMNLs				
≥ 30	15 (68.2%)	99 (47.8%)	2.64	0.06
< 30	7 (31.8%)	108 (52.2%)	(0.95-7.34)	

#Significant association on univariate testing between OTHER infection (CT/NG/TV) and microscopic cervicitis,  $p=0.04$

# Results – clinical findings

Cervicitis risk factors for *M. genitalium* compared to no sexually transmitted infections on multivariable analysis

	<i>M. genitalium</i> n=22 (%)	No infections n=207 (%)	Odds Ratio (95% CI)	p value
PMNLs				
≥ 30	15 (68.2%)	99 (47.8%)	2.64	0.06
< 30	7 (31.8%)	108 (52.2%)	(0.95-7.34)	
Mucopus				
Yes	3 (13.6%)	25 (12.1%)	0.72	0.65
No	19 (86.4%)	182 (87.9%)	(0.17-3.02)	
Contact Bleeding				
Yes	9 (40.9%)	31 (15.0%)	5.45	0.001
No	13 (59.1%)	176 (85.0%)	(1.93-15.42)	

# Results – clinical findings

Cervicitis risk factors for *M. genitalium* compared to other sexually transmitted infection (*C. trachomatis*, *N. gonorrhoeae*, *T. vaginalis*) on multivariable analysis

	<i>M. genitalium</i> n=22 (%)	Other infection n=54 (%)	Odds Ratio (95% CI)	p value
PMNLs				
≥ 30	15 (68.2%)	35 (64.8%)	1.75	0.38
< 30	7 (31.8%)	19 (35.2%)	(0.51-6.00)	
Mucopus				
Yes	3 (13.6%)	10 (18.5%)	0.63	0.58
No	19 (86.4%)	44 (81.5%)	(0.13-3.19)	
Contact Bleeding				
Yes	9 (40.9%)	14 (25.9%)	4.3	0.04
No	13 (59.1%)	40 (74.1%)	(1.10-17.2)	

# Results – clinical findings

Predicting the presence of *M. genitalium*:

	Sensitivity	Specificity	PPV
Microscopic cervicitis	68%	52%	11%
Clinical cervicitis: contact bleeding	41%	85%	20%

# Summary of findings

- Prevalence of *M. genitalum* in women attending ASHS 8.4%
- Strong association between *M. genitalium* and the finding of contact bleeding (OR 5.45,  $p=0.001$ )
- No statistically significant association between *M. genitalium* and other clinical findings

# International comparison

- Estimates of prevalence for women - vary widely for *M. genitalium* depending on pop<sup>n</sup> (0.8% -26.3%)  
For women attending sexual health services:
  - NZ            8.4
  - Australia 1.3 – 10%
  - UK            4.5 - 6%
  - USA         7.0 - 19.2%
- Meta analysis of women attending SHS - prevalence 7.3%<sup>7</sup>

# International comparison

## Microscopic cervicitis $\geq 30$ PMNLs

Anagrus 2005*	9/84 vs 6/227 $p = 0.006$
Hogdahl 2007	63/109 vs 46/109 $p = 0.33$
Manhart 2008	OR 1.6 (95%CI 0.7-3.8%)
Moi 2009	OR 1.3 (95%CI 1.0-1.6%)
Lusk 2011*	PR* 1.24 (95%CI 1.04-1.48%)

\* Denotes statistically significant \* PR = Prevalence Ratio



# International comparison

## Cervical mucopus

Casin 2002	OR 0.77 (95%CI 0.32-1.88)
Manhart 2003 *	21 / 50 vs 146 / 669 $p = 0.005$
Pepin 2005 *	OR 2.5 (95%CI 1.5-4.3%)
Korte 2006	OR 0.65 (95%CI 0.15-2.9)
Cohen 2007	HR* 0.59 (95%CI 0.18 – 1.91)
Huppert 2008	7 / 74 vs 40 / 257 $p = 0.18$
Manhart 2008 *	15 / 26 vs 67 / 251 $p = 0.001$

\* Denotes statistically significant \* HR = Hazard Ratio

# International comparison

## Cervical contact bleeding

Manhart 2003	26/50 vs 235/669 $p = 0.06$
Pepin 2005 *	OR 1.8 (95%CI 1.0-3.1%)
Cohen 2007	HR* 0.74 (95%CI 0.32-1.73%)
Huppert 2008	11/74 vs 41/257 $p = 0.82$
Manhart 2008	6/26 vs 43/251 $p = 0.43$

\* Denotes statistically significant \* HR = Hazard Ratio

# Conclusion

- High prevalence of *M. genitalium* in women attending ASHS for sexual health screens

However universal screening for women should not be advocated until clearer evidence emerges regarding risks

# Conclusion

- Strong association between cervical contact bleeding and *M. genitalium*.

However poor PPV for the finding of cervicitis in the presence of *M. genitalium*, in conjunction with the lack of agreement in the international literature, suggest that cervicitis in the sexual health setting has poor clinical utility as an indicator for the presence of *M. genitalium* infection.

# References

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# Whole cell model – 525 genes

