World Health Organization

GUIDELINES FOR THE MANAGEMENT OF SYMPTOMATIC SEXUALLY TRANSMITTED INFECTIONS

WEB ANNEX C. SYSTEMATIC REVIEW OF RISK FACTORS FOR CERVICAL INFECTIONS IN SYMPTOMATIC OR ASYMPTOMATIC WOMEN

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Guidelines for the management of symptomatic sexually transmitted infections: Web Annex C. Systematic review of risk factors for cervical infections in symptomatic or asymptomatic women

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Design and layout by 400 Communications.

CONTENTS

1. METHODS

We performed a systematic review of prevalence of or association of risk factors with gonococcal and chlamydial infections in women who are symptomatic or asymptomatic.

Electronic searches

We searched OVID Medline and Embase from 2000 to early December 2019 for relevant studies.

Eligibility criteria of included studies

Population	Female participants who are: • Symptomatic: – women presenting with or self-reporting symptoms related to vaginal discharge; including itching, odour, burning, lower abdominal pain with another vaginal symptom – women with confirmed symptoms related to vaginal discharge, based on physical examination by health care provider • Asymptomatic: – women without symptoms related to vaginal discharge.
Exposures	Risk factors of interest: • Age or age group • Contraceptive use, condom use • Sex work • Partner who travels • Other cervical infection; i.e., co-infection with NT and CT • Vaginal infections: – *trichomonas vaginalis* (TV) – *bacterial vaginosis* (BV) • Signs and symptoms, including: – vaginal discharge – vaginal itching (pruritus) – vaginal burning – lower abdominal pain – pain during sex (dyspareunia) – dysuria (painful urination).
Outcomes	Cervical infections, confirmed by laboratory testing: • *Neisseria gonorrhoeae* (NG) • *Chlamydia trachomatis* (CT) • NG and/or CT.
Study design	Primary comparative studies in any setting

Exclusions

We excluded the following:

- Case-control studies
- Case reports, letters to editor, reviews
- Conference abstracts.

We excluded studies that:

- reported less than 10 women had NG and/or CT
- used self-report for the presence/absence of genital NG and/or CT
- did not specify whether the population was symptomatic or asymptomatic
- included both men and women, but did not report findings separately for women
- included both symptomatic and asymptomatic, but did not report findings separately for each group, and one group included <=12%.

Studies that are "on hold"

For this report, we excluded non-English publications and studies in which *only* participants with the following specific risk factors were included:

- Female sex workers only
- HIV-positive women only
- Women infected with NG and/or CT only
- Women whose partners are infected with NG and/or CT.

The studies have been identified based on title and abstract screening, and are considered "on hold"; that is, full-text screening and analyses will be completed at a later date.

Data collection

We extracted the following data: study characteristics (country, setting, sample size, and risk factors), population characteristics (age, inclusion criteria), and outcome measures (type of infection, diagnostic test used). If a study used more than one diagnostic test, we extracted data for polymerase chain reaction (PCR) testing.

We extracted odds ratios (OR) or data from which an estimate could be calculated. We extracted adjusted OR when provided. If adjusted data was not provided, we extracted crude data. We extracted risk data separately for each infection when studies reported data for NG and CT separately. We extracted data for NG and/or CT when studies only reported risk data for combined cervical infections.

Statistical analysis

A random effects model was used to pool the effect estimates. Heterogeneity across pooled studies was expressed using the I^2 statistic. Each risk factor was analysed using subgroups for symptomatic women and asymptomatic women. Pooled effect measures were presented using forest plots.

2. RESULTS

Search strategy

Electronic databases searched:

- Embase 1974 to 2019 December 10
- Ovid MEDLINE(R) 1996 to December 04, 2019
- Ovid MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations and Daily 2015 to December 10, 2019

Search date:

- 2019 December 10

Search results:

1 (gonoc* or gonorr* or chlamydia* or trachomatis).mp. (98239)

2 (cervix or cervical or women or woman or female*).tw. (5093707)

3 1 and 2 (26710)

4 (questionnaire* or survey*).mp. (3187593)

5 (associat* or correlat* or odds or risk or risks).ti,ab. (16612250)

6 risk factor*.sh. (1996675)

7 or/4-6 (18639759)

8 (contracepti* or condom* or birth control*).tw. (163311)

9 (sex worker or FSW*).mp. (7051)

10 travel*.tw. (141198)

11 ((sale or sell or selling or traffi*) adj2 sex*).tw. (1389)

12 (vagina* adj2 (itch* or pain* or muco* or pus* or discharge* or secretion* or fluid*)).tw. (19238)

13 (pain* or dysuria or urinat*).tw. (1679475)

14 adolescen*.tw. (629887)

15 or/8-14 (2574044)

16 3 and 7 and 15 (5539)

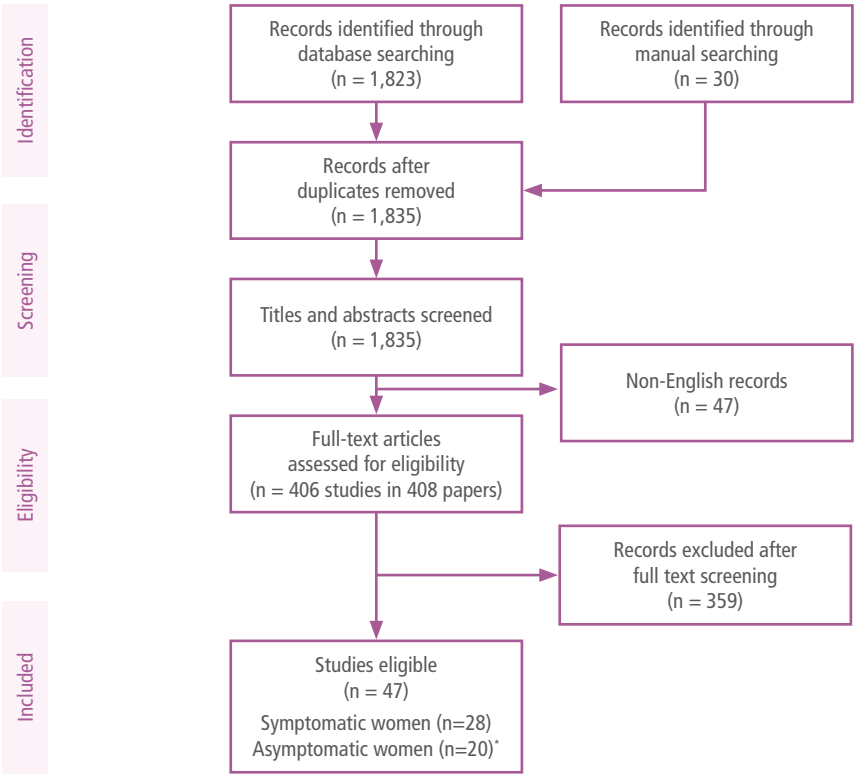
17 limit 16 to yr="2000 -Current" (4435)

18 limit 17 to (books or chapter or conference abstract or conference paper or "conference review" or editorial or erratum or letter or note or autobiography or bibliography or biography or case reports or comment or congress or consensus development conference or consensus development conference, nih or dictionary or directory or interview or legal case or legislation or news or newspaper article or patient education handout or portrait or webcasts) (818)

19 17 not 18 (3617)

20 remove duplicates from 19 (1857)

PRISMA Flow Diagram



*One study (Mania-Pramanik 2008) reported data separately for symptomatic and asymptomatic.

Pooled adjusted and crude odds ratios (ORs) for each risk factor in SYMPTOMATIC women

Risk factor	No. studies	No. participants	Pooled adjusted OR [95% CI]	Pooled crude OR [95% CI]
Younger age: <25 vs =>25 years old				
Risk of NG	1	549		1.21 [0.74, 1.97]
Risk of CT	3	1357		2.24 [1.38, 3.63]
Hormonal contraceptive use				
Risk of CT	1	100		0.78 [0.16, 3.85]
Risk of NG and/or CT	1	249		0.37 [0.12, 1.12]
Intrauterine device (IUD) use				
Risk of CT	1	100		0.54 [0.03, 10.56]
Type of hormonal contraceptive: injectable vs non-injectable				
Risk of CT	1	72		1.50 [0.34, 6.54]
No condom use				
Risk of NG	2	1,223		1.48 [0.95, 2.31]
Risk of CT – unadjusted	5	1827		1.36 [0.86, 2.14]
Risk of NG and/or CT	1	621		1.26 [0.80, 2.00]
Inconsistent condom use				
Risk of NG	2	484		0.56 [0.02, 16.08]
Risk of CT – unadjusted	3	959		1.57 [0.62, 3.95]
Withdrawal method (for contraception)				
Risk of CT	1	110		1.94 [0.62, 6.01]
Female sex worker				
Risk of NG	1	1165		6.01 [3.08, 11.71]
Risk of CT	2	1,315		3.14 [1.94, 5.07]
Infected with CT				
Risk of NG	6	3311		7.70 [3.23, 18.33]
Infected with NG				
Risk of CT	10	3895		5.47 [2.63, 11.39]
Infected with TV				
Risk of NG	5	4,019		2.41 [0.87, 6.70]
Risk of CT	8	4,449		3.43 [1.65, 7.10]

Risk factor	No. studies	No. participants	Pooled adjusted OR [95% CI]	Pooled crude OR [95% CI]
Infected with BV				
Risk of NG	2	589		0.24 [0.00, 28.79]
Risk of CT	4	916		0.54 [0.22, 1.30]
Risk of NG and/or CT	1	598		1.32 [0.78, 2.23]
Vaginal discharge				
Risk of NG	2	825		1.05 [0.59, 1.86]
Risk of CT – unadjusted	5	1750		1.04 [0.44, 2.43
Risk of NG /CT – adjusted	1	4,690	2.00 [1.10, 3.64]	
Risk of NG/CT – unadjusted	1			0.38 [0.22, 0.64]
Itching				
Risk of NG	1	549		0.78 [0.45, 1.37]
Risk of CT	2	649		1.62 [0.44, 6.01]
Risk of NG and/or CT	2	1,219		0.70 [0.33, 1.48]
Burning				
Risk of CT	1	100		1.15 [0.40, 3.36]
Risk of NG and/or CT	1	598		2.65 [1.51, 4.67]
Lower abdominal pain				
Risk of CT	2	406		1.10 [0.52, 2.36]
Risk of NG and/or CT	1	621		1.25 [0.81, 1.92]
Dysuria				
Risk of NG	2	1,284		1.72 [0.57, 5.19]
Risk of CT	4	1661		0.93 [0.62, 1.41]
Risk of NG and/or CT	1	598		4.23 [2.32, 7.72]
Pain at sexual intercourse				
Risk of NG	2	1274		1.40 [0.84, 2.34]
Risk of CT	3	1570		1.58 [0.75, 3.34]
Risk of NG and/or CT	1	621		0.67 [0.40, 1.13]
Any symptoms				
Risk of CT – unadjusted	2	686		1.10 [0.28, 4.38]
Partner who travels				NO DATA

Pooled adjusted and crude odds ratios (ORs) for each risk factor in ASYMPTOMATIC women

Risk factor	No. studies	No. participants	Pooled adjusted OR [95% CI]	Pooled crude OR [95% CI]
Younger age: <25 vs =>25 years old				
Risk of NG	1	7,596		3.44 [2.27, 5.22]
Risk of CT	1	6,313	1.46 [1.19, 1.90]	
	5	8,578		2.35 [1.06, 5.19]
Hormonal contraceptive use				
Risk of CT	2	1,276		0.91 [0.69, 1.20]
Type of hormonal contraceptive: injectable vs non-injectable				
Risk of CT	1	72		1.50 [0.34, 6.54]
No condom use				
Risk of CT – adjusted	1	1,355	2.60 [1.20, 5.63]	
Risk of CT – unadjusted	4	5,867		1.56 [1.00, 2.42]
Inconsistent condom use				
Risk of NG	2	484		0.56 [0.02, 16.08]
Risk of CT – adjusted	3	11,651	2.16 [1.73, 2.70]	
Risk of CT – unadjusted	5	3,952		1.10 [0.80, 1.50]
Withdrawal method (for contraception)				
Risk of CT	2	1,181		0.93 [0.55, 1.58]
Female sex worker				
Risk of NG	1	258		1.14 [0.46, 2.81]
Infected with TV				NO DATA
Infected with CT				
Risk of NG	1	8,539		5.93 [3.27, 10.75]
Infected with NG				
Risk of CT	4	9664		3.68 [2.20, 6.16]
Infected with BV				
Risk of CT	2	245		1.49 [0.52, 4.25]
Vaginal discharge				
Risk of CT – adjusted	1	4,690	1.90 [1.00, 3.63]	
Risk of CT – unadjusted	2	966		1.47 [0.40, 5.44]
Risk of NG/CT – unadjusted	1	427		2.23 [1.05, 4.74]
Itching				NO DATA
Burning				NO DATA
Lower abdominal pain				
Risk of CT	1	389		1.00 [0.22, 4.55]
Dysuria				
Risk of CT	1	389		3.76 [1.13, 12.46]
Pain at sexual intercourse				
Risk of CT	1	998		1.55 [1.08, 2.24]
Any symptoms				
Risk of CT – adjusted	1	450	2.50 [1.00, 6.25]	
Risk of CT – unadjusted	1	375		6.36 [0.67, 60.64]
Partner who travels				NO DATA

Study characteristics of all included studies

1a. Symptomatic women (n=24):

women presenting for symptoms related to vaginal discharge, itching, odour, burning, lower abdominal pain with another vaginal symptom; but excluding genital ulcers

Study	Study Design	Country/Territory	Setting	Population (age range)	Symptomatic / asymptomatic	N	Prevalence (%)	Diagnostic test
Barry 2008	Prospective cross-sectional	Senegal	Hospitals, primary health facilities	Non-pregnant women (15-49 years)	Symptomatic vaginal discharge or itch (with or without burning, dyspareunia or bleeding between menstrual cycles / during sexual intercourse)	276	CT: 4.7 NG/CT: 35.9	NG/CT: NAAT
Bhatla 2013	Cross-sectional	India	Outpatient OB/ GYN clinics	Sexually active women (30-74 years)	Symptomatic (persistent vaginal discharge for over 6 months, intermenstrual or postcoital bleeding; or detected to have an unhealthy cervix on examination)	600	CT: 4.8	CT: DNA
Bristow 2014	Cross-sectional	Haiti	Rural outpatient clinic	General population women (>18 years, mean 31.9)	Symptomatic (complaints of vaginal itching, discharge, pain, or lesions or associated urinary symptoms)	206	CT: 5.4	CT: PCR
Chirenje 2018	Cross-sectional	Zimbabwe	STI clinics	General population women (18-53 years)	Symptomatic vaginal discharge	200	NG: 24.0 CT: 14.0	NG/CT: PCR
Dela 2019	Surveillance	Ghana	Military clinics, civilian STI clinic	General population women (>18 years)	Symptomatic vaginal discharge (89% with clinical symptoms/clinical presentation of vaginal discharge)	549	NG: 16.4 CT: 8.2	NG/CT: NAAT
Fonck 2000	Cross-sectional	Kenya	Peripheral health centres, major STD referral clinic	Pregnant (54%) and non-pregnant women (>14 years)	Symptomatic vaginal discharge (spontaneous or prompted complaints of vaginal discharge with or without other symptoms)	621	NG: 7.1 CT: 9.3 NG and/or CT: 15.6	NG/CT: PCR
Garcia 2007	Epidemiologic	Peru	Pharmacies	Adult women (>18 years)	Symptomatic vaginal discharge	122	CT: 9.1	CT: PCR

Study	Study Design	Country/Territory	Setting	Population (age range)	Symptomatic / asymptomatic	N	Prevalence (%)	Diagnostic test
Goyal 2011	Prospective	United States	Pediatric emergency department	Adolescent females (14-19 years)	Symptomatic (chief complaint suggestive of an STI, including lower abdominal, pelvic, flank pain; and/or genitourinary symptoms, e.g., dysuria, vaginal pain, discharge, lesions, itching, or bleeding)	236	CT: 19.7	CT: NAAT
Hoque 2013	Prevalence study	Bangladesh	Hospital OB/GYN department, non-government health organization	Sexually active women of reproductive age and brothel-based female sex workers (FSW) (<45 years)	Symptomatic (complaints of chlamydial infection-like clinical symptoms)	150	CT: 33.3	CT: PCR
Huppert 2003	Retrospective chart review	United States	Teen health centre (July 2000 to June 2001)	Adolescent females (15-21 years)	Symptomatic (91% with chief complaint of urinary symptoms such as dysuria, urgency, and frequency; or vaginal symptoms such as vaginal discharge, odor, and itching)	81	CT: 22.2	CT: Ligase chain reaction (LCR)
Huppert 2008	Cross-sectional study	United States	Teen health centre (July 2004 to May 2006)	Adolescent females (14-21 years)	Symptomatic (89% with any genitourinary symptoms)	326	NG: 10.7 CT: 24.4	NG: Culture or strand displacement assay CT: Strand displacement assay
Kufa 2018	Cross-sectional	South Africa	Primary healthcare centres	Adult women (median 27 years)	Symptomatic vaginal discharge (presenting with vaginal discharge syndrome)	757	NG: 18.5 CT: 17.7	NG/CT: PCR
Landers 2004	Prospective	United States	Health care sites	Non-pregnant women (18-45 years)	Symptomatic (presenting with >= one untreated genital complaints related to vaginal discharge: significant change in the character of vaginal discharge, abnormal vaginal odor, vaginal itching, or lower genital tract burning)	598	NG/CT: 10.5	NG: Culture CT: PCR

Study	Study Design	Country/Territory	Setting	Population (age range)	Symptomatic / asymptomatic	N	Prevalence (%)	Diagnostic test
Lewis 2003	Annual STI aetiological surveys	South Arica	Public health care clinics	General population women (mean 29 years)	Symptomatic vaginal discharge (vaginal discharge syndrome on physical exam, nurse-confirmed)	1,232	NG: 12.7 CT: 16.0	NG/CT: PCR
Lubbad 2007	Prevalence study	Occupied Palestinian Territory, including East Jerusalem	Child and mother health centre	Pregnant women (>16 years)	Symptomatic (complaints of vaginal discharge, cervicitis, and other clinic signs)	423	CT: 8.3	CT: not reported
Molaei 2017	Cross-sectional	Iran (Islamic Republic of)	Hospital gynaecological outpatient department	Married women of reproductive age (18-49 years)	Symptomatic vaginal discharge (with or without other symptoms)	100	CT: 16.0	NG: Gram stain CT: ELISA
Ngandijio 2003	Prevalence study	Cameroon	Not reported	Sexually active students (mean 25.6 years)	Symptomatic (89% reported urogenital symptoms: vaginal discharge, vaginal itching, lower abdominal pains)	605	CT: 4.0	CT: PCR
Pepin 2004	Prevalence study	Benin, Burkina Faso, Ghana, Guinea, Mali	Health centres	Non-pregnant women who denied being sex workers (>12 years)	Symptomatic vaginal discharge (presenting with vaginal discharge without lower abdominal pain)	726	NG: 1.9 CT: 3.2	NG/CT: PCR
Pepin 2006	Clinical trial	Ghana, Guinea, Mali, Togo	Health facilities	Sex workers and non-sex workers (>11 years)	Symptomatic vagina discharge (presenting with vaginal discharge)	1,165	NG: 5.0 CT: 3.4	NG/CT: PCR
Reed 2007	Cross-sectional	United States	Hospital pediatric emergency department	Adolescent females (13-18 years)	Symptomatic (seeking care because of genitourinary or abdominal symptoms that may be explained by STIs, including abdominal pain, vaginal bleeding, vaginal discharge)	250	NG: 8.8 CT: 16.8	NG: Culture CT: Wet mount, gram stain
Sonkar 2016	Cross-sectional	India	Hospital OB/GYN department	Non-pregnant women (>18 years)	Symptomatic (seeking diagnosis and treatment of vaginal discharge syndrome)	634	NG: 7.9 CT: 10.0	NG/CT: PCR

Study	Study Design	Country/Territory	Setting	Population (age range)	Symptomatic / asymptomatic	N	Prevalence (%)	Diagnostic test
Sonkar 2017	Cross-sectional	India	Hospital OB/GYN departments	Married non-pregnant women (18-56 years)	Symptomatic (vaginal discharge, green to brown color frothy discharge, foul odor of discharge, vaginal itching, edema or erythema pruritus or genital ulcers, colpitis mascularis by punctate hemorrhages, dysuria, pain during intercourse, urinary tract infection, soreness, vaginitis, lower abdominal pain, elevated pH greater than 4.5, presence of amines, vaginal leucocytosis, vulvar erythema, purulent with white blood cells, cervicitis, or frequency of micturation, burning and pain on micturition)	1,797	NG: 6.6 CT: 8.2	NG/CT: PCR
Thomas 2019	Prospective	India	Hospital gynecology outpatient department	General population women (18-72 years)	Symptomatic (92.9% vaginal discharge with or without other vaginal symptoms)	296	CT: 7.4	CT: IgG ELISA
Zimba 2011	Cross-sectional	Mozambique	Health centre	General population women (mean 35.5 years)	Symptomatic vaginal discharge (presenting with symptoms and signs of vaginal discharge syndrome)	154	NG: 12.3 CT: 11.0	NG/CT: NAAT

1b. Women with confirmed symptoms (n=4)

Study	Study Design	Country/Territory	Setting	Population (age range)	Symptomatic / asymptomatic	N	Prevalence (%)	Diagnostic test
Abbai 2016	Secondary analysis of trial	South Africa	Family planning, well-baby and general health clinics	Sexually active, HIV-negative women (18-49 years)	Confirmed symptomatic based on physical examination (abnormal vaginal discharge, abnormal vaginal epithelium, abnormal perineum / perianal area, abnormal cervical mucus, abnormal cervical epithelium)	435	NG: 2.8 CT: 10.2	NG/CT: PCR
De Jongh 2010	Prevalence study	South Africa	Tertiary teaching hospital serving semi-rural population	Termination of pregnancy patients (13-41 years)	Confirmed symptomatic based on speculum examination (vaginal discharge)	146	CT: 15.7	CT: Culture / PCR
Mania-Pramanik 2008	Labaratory-based	India	Hospital gynecology outpatient department	General population women (18–44 years)	Confirmed symptomatic based on pelvic examination (clinical signs and symptoms of lower genital tract infections; such as vaginal discharge, cervicitis, and vaginitis with one or more children)	185	CT: 10.8	CT: PCR
Marconi 2012	Cross-sectional	Brazil	Women's health outpatient clinic	General population women; 89% sexually active (mean 31.2 years)	Confirmed symptomatic based on medical examination (dyspareunia, pain during bimanual exam, excessive cervical mucus, cervical ectopy, or 3 or more episodes of altered vaginal flora in previous year)	142	CT: 23.9	CT: PCR

2. Asymptomatic women (n=20):

women screened for NG and/or CT for reasons other than symptoms (e.g. routine screening, other risk factors, part of study protocol)

Study	Study Design	Country/Territory	Setting	Population (age range)	Symptomatic / asymptomatic	N	Prevalence (%)	Diagnostic test
Al-Sweih 2011	Prevalence study	Kuwait	Primary health care centres	Married women (not reported)	Asymptomatic	8,539	NG: 1.5 CT: 2.1	NG/CT: Amplified DNA-assay
Balle 2018	Cross-sectional	South Africa	High risk communities	Adolescent females using hormonal contraceptives (16-22 years)	Asymptomatic	72	CT: 41.7	CT: PCR
Cai 2011	Cross-sectional	Italy	STD centres	Sexually active women (18-43 years)	Asymptomatic (no genitourinary symptoms; and no medical history of vulvar itching, fissures, abnormal discharge, and persistent pain at intercourse)	998	CT: 29.2	CT: IgA
Corbeto 2010	Cross-sectional	Spain	Sexual and reproductive health centres	Sexually active women (16-35 years)	Asymptomatic (>94%)	397	CT: 4.5	CT: PCR
de Lima 2014	Cross-sectional	Brazil	Public health program	Sexually active, non-pregnant women (15-24 years)	Asymptomatic	574	CT: 9.6	CT: PCR
Geisler 2007	Cross-sectional	United States	Gynecology clinic, STD clinic	Non-pregnant women (17-25 years)	Asymptomatic (excluded women reporting genital symptoms or symptomatic partners)	577	CT: 11.8	CT: NAAT
Goldzier Thomas 2001	Cross-sectional	United States	Navy bases: shore-based command; ship-based submarine tender	Navy-enlisted, healthy women (18-45 years)	Asymptomatic	277	CT: 4.7	CT: LCR

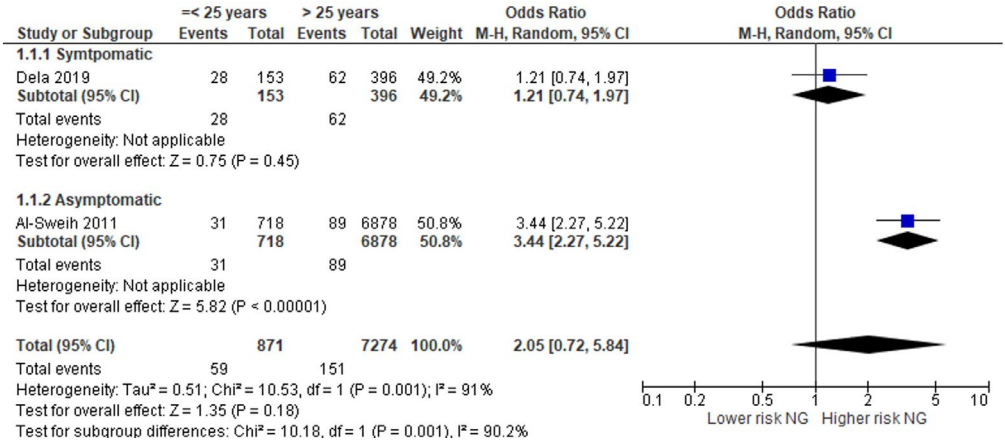
Study	Study Design	Country/Territory	Setting	Population (age range)	Symptomatic / asymptomatic	N	Prevalence (%)	Diagnostic test
Guimaraes 2009	Population-based cross-sectional	Brazil	Households	Sexually active adolescent females (15-19 years)	Confirmed asymptomatic (91% without mucopurulent discharge on gynecological examination)	427	CT: 14.5	CT: PCR
Ikeme 2011	Prospective	Nigeria	Teaching hospital gynecological clinic	Female undergraduates and general population women, 12.6% with secondary infertility (20-34 years)	Asymptomatic	286	CT: 29.4	CT: Cell culture, direct fluorescent antibody, enzyme immunoassay, NAAT
Imai 2004	Prevalence study	Japan	Universities, professional schools (October 2001 to February 2002)	Sexually active women (=>18 years)	Asymptomatic	451	CT: 9.1	CT: PCR
Imai 2010	Cross-sectional	Japan	Universities, junior colleges, major professional schools (January 2004 to March 2006)	Sexually active female students (18-36 years)	Asymptomatic	4,003	CT: 9.5	CT: PCR
Mania-Pramanik 2008	Laboratory-based	India	Hospital gynecology outpatient department	General population women (18–44 years)	Asymptomatic (no clinical signs and symptoms of lower genital tract infections; such as vaginal discharge, cervicitis, and vaginitis with one or more children)	173	CT: 9.2	CT: PCR
Mbizvo 2001	Cross-sectional	Zimbabwe	Primary health care clinics	Sexually active women; 46% pregnant (15-49 years)	Asymptomatic (not presenting for urogenital symptoms)	389	CT: 3.9	CT: LCR
Mossong 2009	Prospective	Luxembourg	Family planning centres	Sexually active women (15-25 years)	Asymptomatic	1,355	CT: 7.7	CT: CT assay

Study	Study Design	Country/Territory	Setting	Population (age range)	Symptomatic / asymptomatic	N	Prevalence (%)	Diagnostic test
O'Connell 2009	Prevalence study	Ireland	Higher education institutions	Sexually active female students (17-34 years)	Asymptomatic (excluded women presenting with symptoms suggestive of an STI or requesting assessment for STIs)	450	CT: 4.8	CT: PCR
Obasi 2001	RCT	United Republic of Tanzania	Household in rural communities	Female adolescents (15-19 year olds)	Asymptomatic (11.9% reported any current STD symptoms)	4,690	CT: 2.4	CT: PCR
Putu Yuda Hananta 2016	Prevalence study	Indonesia	STD clinics, outreach programs	Heterosexual women and female sex workers (=>16 years)	Asymptomatic	258	NG: 26.4	NG: Culture, DNA Hybridization method
Tibaldi 2009	Retrospective	Italy	Outpatient clinic for genital tract diseases	Non-pregnant females (not reported)	Asymptomatic (no report of genital symptoms)	12,357	CT: 0.09	CT: Transcription Mediated Amplification (TMA) with DNA probe
Wand 2011	Population attributable risk study	Australia	Urban sexual health clinic	Heterosexual, female international travellers and residents; backpackers and non-backpackers (<=30 years)	Asymptomatic (98.7% not presenting with genital symptoms)	6,313	CT: 3.9	CT: NAAT
Yeung 2014	Cross-sectional	Australia	Rural and metropolitan general practice clinics	General population women (16-29 years)	Asymptomatic (6% presenting with STI symptoms or contact)	3,027	CT: 4.4	CT: NAAT

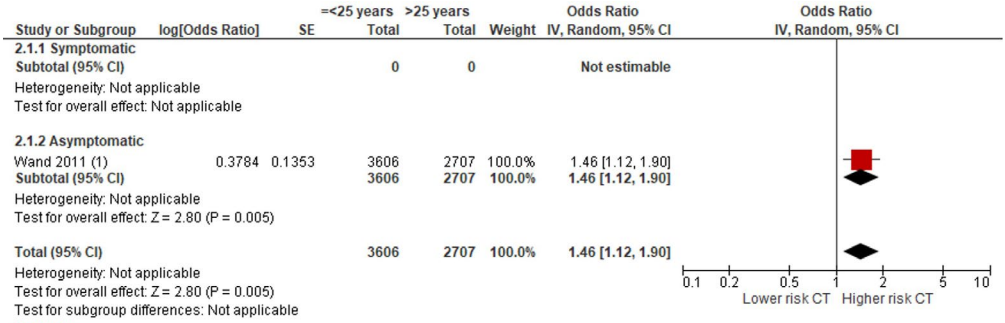
Forest plots, by risk factor

Younger age group: <25 versus =>25 years of age

Risk of NG



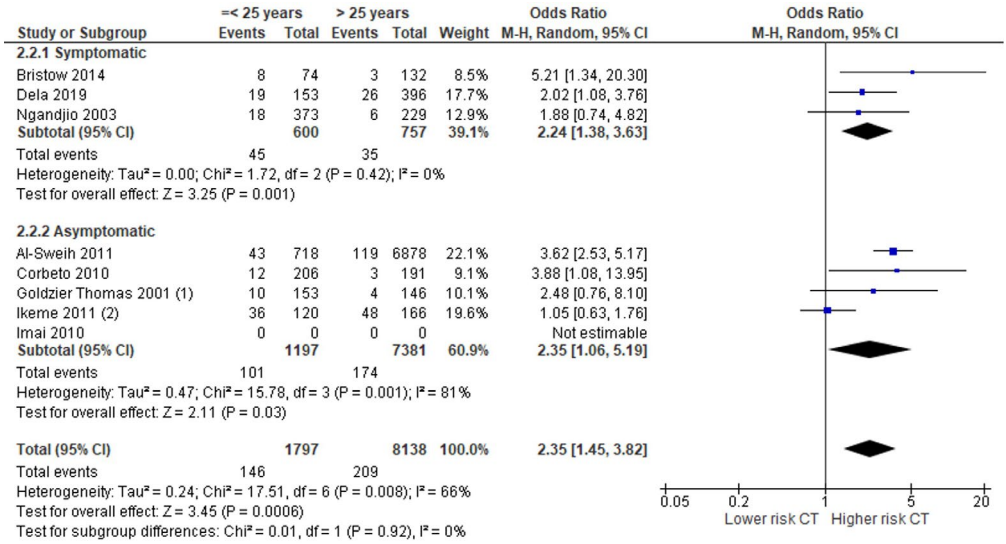
Risk of CT, adjusted



Footnotes

(1) Adjusted for country of birth, marital status, employment, smoking, alcohol use, prior CT, condom use, sexual partners

Risk of CT



Other age groups

Risk of NG

Study or Subgroup	Age group comparison (y)	Younger group		Older group		Odds ratio [95% CI]	Findings
		Events	Total	Events	Total		
Symptomatic							
Huppert 2008	14-17 vs 18-21	n/r	188	n/r	143	Not reported	Not associated with NG
Pepin 2004	<30 vs =>30	12	527	2	198	2.28 [0.51, 10.30]	
Kufa 2018	<35 vs =>35	121	600	19	158	1.85 [1.10, 3.11]	

Risk of CT, adjusted

Study or Subgroup	Age group comparison (y)	Younger group (n)	Older group (n)	Adjusted odds ratio [95% CI]
Asymptomatic				
Mossong 2009 (1)	15-17 vs 18-19	340	303	0.50 [0.27, 0.91]
Mossong 2009 (1)	15-17 vs 20-22	340	428	0.56 [0.32, 1.0]
De Lima 2014 (2)	15-17 vs 20-24	346	356	2.16 [1.18, 3.97]
Yeung 2014 (3)	16-19 vs 20-24	742	1,145	1.23 [0.81, 1.85]
Mossong 2009 (1)	15-17 vs 23-25	340	284	1.3 [0.59, 2.5]
Yeung 2014 (3)	16-19 vs 24-29	742	1,140	4.35 [2.27, 8.33]
Imai 2011 (4)	18 vs 21-36	786	1,288	1.99 [1.42, 2.79]
Imai 2011 (4)	19 vs 21-36	1,074	1,288	2.10 [1.55, 2.84]
Imai 2011 (4)	20 vs 21-36	842	1,288	1.45 [1.04–2.03]

1. Adjusted for number of partners in past 12 months and reported condom use
2. Adjust for age at first intercourse and number of lifetime sexual partners
3. Adjusted for number of partners in pas 12 months, education, duration of recent partnership, diagnosis of CT in past 12 months
4. Adjusted for condom use and number of sexual partners.

Risk of CT

Study or Subgroup	Age group comparison (y)	Younger group		Older group		Odds ratio [95% CI]	Findings
		Events	Total	Events	Total		
Symptomatic							
Huppert 2008	14-17 vs 18-21	n/r	188	n/r	143	Not reported	Younger age group were more likely to have CT older age group; 29.2% vs. 18.0%, p= 0.02
Bhatla 2013	25-39 vs 40-49	20	29	8	29	5.83 [1.88, 18.10]	
Pepin 2004	<30 vs =>30	19	527	4	198	1.81 [0.61, 5.40]	
Kufa 2018	<35 vs =>35	118	600	16	158	2.17 [1.25, 3.78]	
Tibaldi 2009	Childbearing vs menopause	38	10,293				
Asymptomatic							
Obasi 2001	15-17 vs 18-19	53	2,748	72	2,655	0.71 [0.49, 1.01]	
Imai 2004	18-19 vs =>24	Not reported				5.91 [1.61, 21.78]	
Imai 2004	20-21 vs =>24	Not reported				4.11 [1.10, 15.33]	
Imai 2004	22-23 vs =>24	Not reported				0.66 [0.66, 12.03]	
Tibaldi 2009	Childbearing vs menopause	88	99,950	1	164	0.14 [0.02, 1.04]	

Risk of NG and/or CT, adjusted

Study or Subgroup	Age group comparison (y)	Younger group (n)	Older group (n)	Adjusted odds ratio [95% CI]
Asymptomatic				
Mbivzo 2001 (1)	<20 vs 20-49	44	349	3.85 [1.37, 10.82]

1. Adjusted for age at first marriage, sexual debut, frequency of partner travels, previous STI, type of vaginal discharge, and pH level.

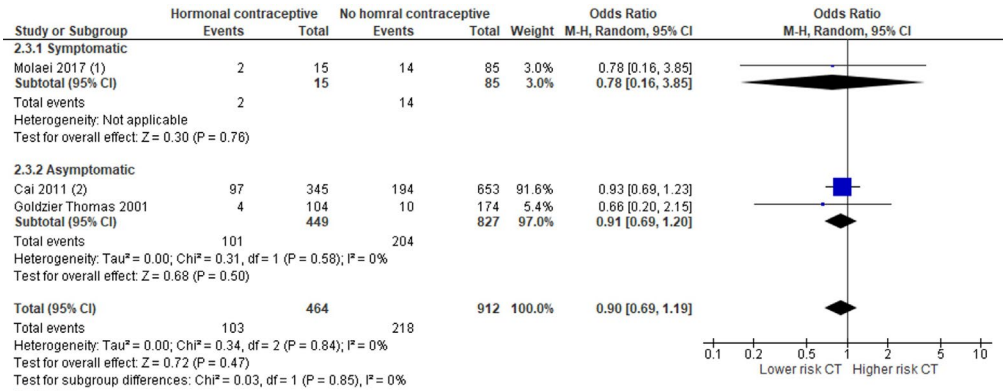
Risk of NG and/or CT

Study or Subgroup	Age group comparison (y)	Younger group		Older group		Odds ratio [95% CI]
		Events	Total	Events	Total	
Symptomatic						
Fonck 2000 (1)	<20 vs =>20	15	55	38	232	1.91 [0.96, 3.81]
Fonck 2000 (2)	<20 vs =>20	20	72	24	262	3.81 [1.96, 7.42]
Total			**127**		**494**	**2.72 [1.38, 5.34]**
Total events		35		59		

1. Non-pregnant women
2. Pregnant women

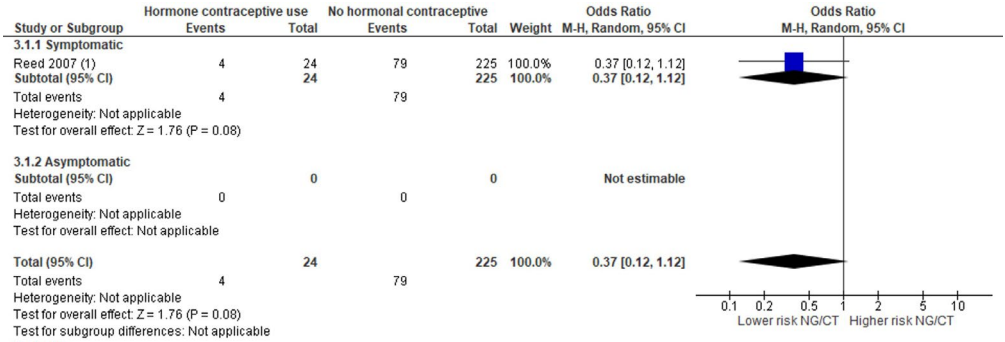
Hormonal contraceptive use

Risk of CT



Footnotes
(1) Oral contraceptives
(2) Oral contraceptives

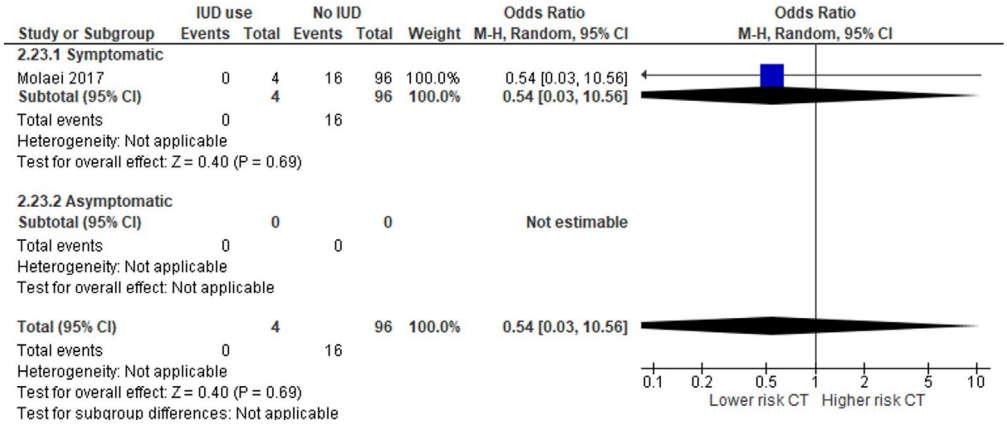
Risk of NG and/or CT



Footnotes
(1) Adolescents

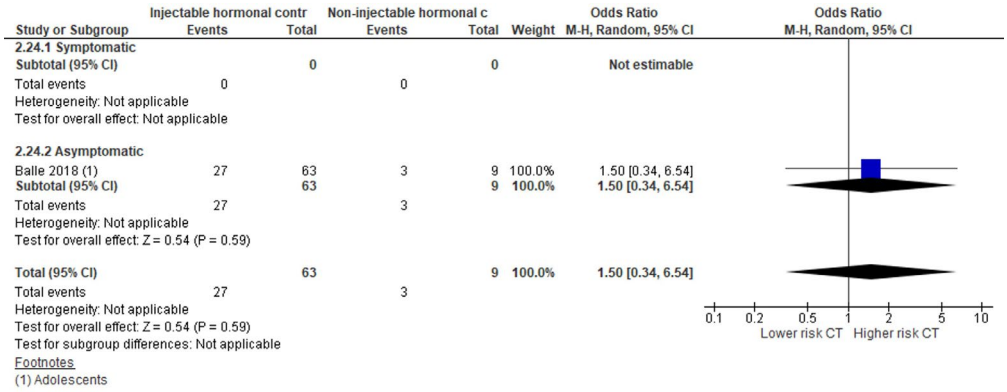
IUD use

Risk of CT



Contraceptive method

Risk of CT

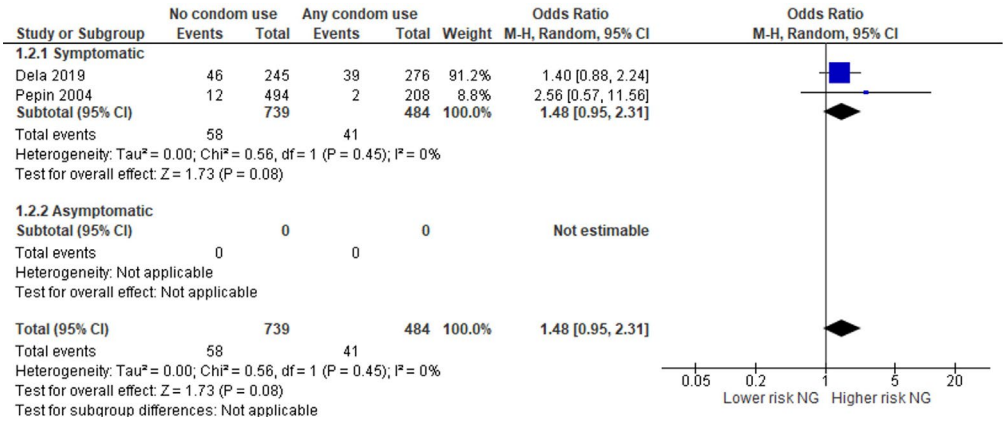


Study or Subgroup	Comparison	Findings
Symptomatic		
Huppert 2003 (1)	Type of contraceptive	No differences in women with or without CT

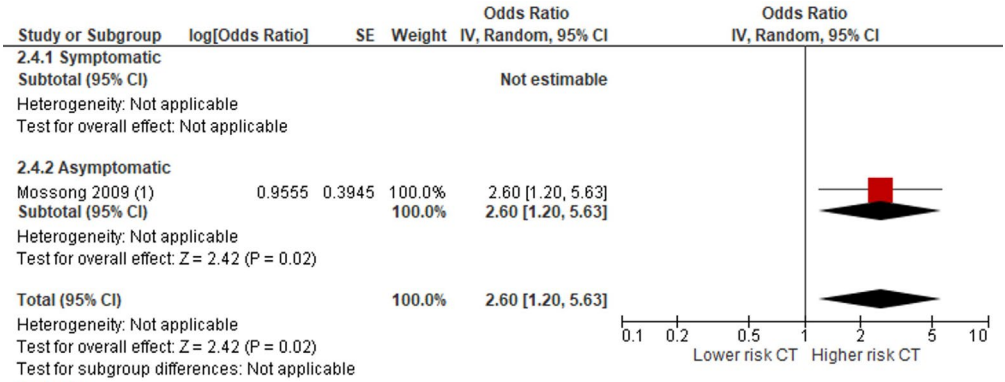
1. Adolescents

No condom use

Risk of NG



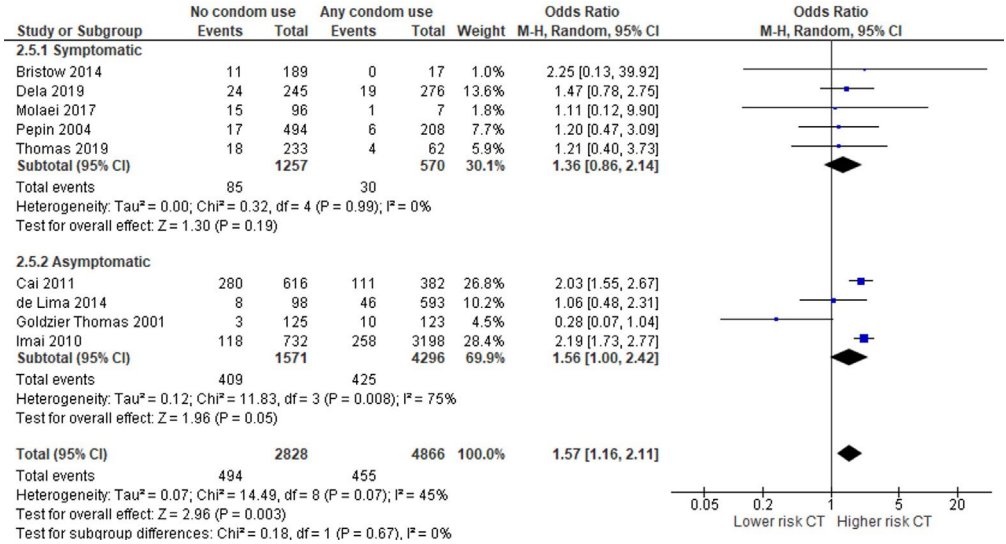
Risk of CT, adjusted



Footnotes

(1) Never vs always; adjusted for age, sex, setting, number of sexual partners in past year

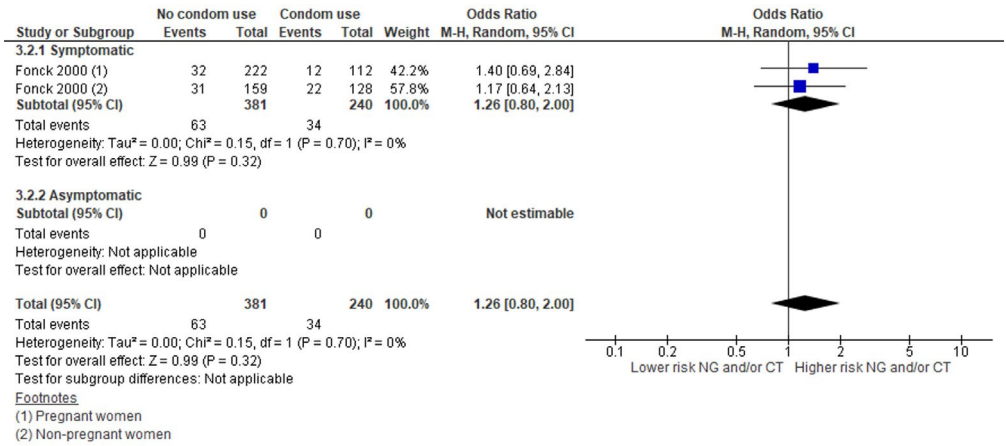
Risk of CT



Study or Subgroup	No condom use		Condom use		Findings
	Events	Total	Events	Total	
Symptomatic					
Hubbert 2003	Not reported				No differences in condom use in those with or without CT
Asymptomatic					
Corbeto 2010 (1)	n/r	210	n/r	183	Not significantly associated with the presence of CT

1. Condom use at last sexual contact

Risk of NG and/or CT

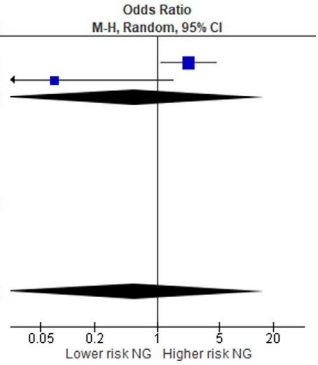


Footnotes
(1) Pregnant women
(2) Non-pregnant women

Inconsistent condom use

Risk of NG

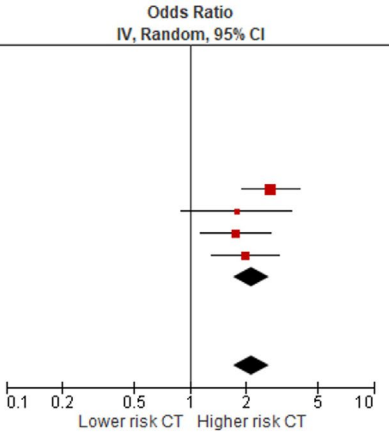
Study or Subgroup	Inconsistent condom use Events	Total	Consistent condom use Events	Total	Weight	Odds Ratio M-H, Random, 95% CI
1.3.1 Symptomatic						
Dela 2019 (1)	26	137	13	139	59.4%	2.27 [1.11, 4.63]
Pepin 2004 (2)	0	152	2	56	40.6%	0.07 [0.00, 1.51]
Subtotal (95% CI)		**289**		**195**	**100.0%**	**0.56 [0.02, 16.08]**
Total events	26		15			
Heterogeneity: Tau² = 4.82; Chi² = 4.77, df = 1 (P = 0.03); I² = 79%						
Test for overall effect: Z = 0.34 (P = 0.73)						
1.3.2 Asymptomatic						
Subtotal (95% CI)		**0**		**0**		**Not estimable**
Total events	0		0			
Heterogeneity: Not applicable						
Test for overall effect: Not applicable						
Total (95% CI)		**289**		**195**	**100.0%**	**0.56 [0.02, 16.08]**
Total events	26		15			
Heterogeneity: Tau² = 4.82; Chi² = 4.77, df = 1 (P = 0.03); I² = 79%						
Test for overall effect: Z = 0.34 (P = 0.73)						
Test for subgroup differences: Not applicable						



Footnotes
(1) Rarely vs always/on most occasion
(2) Sometimes vs always

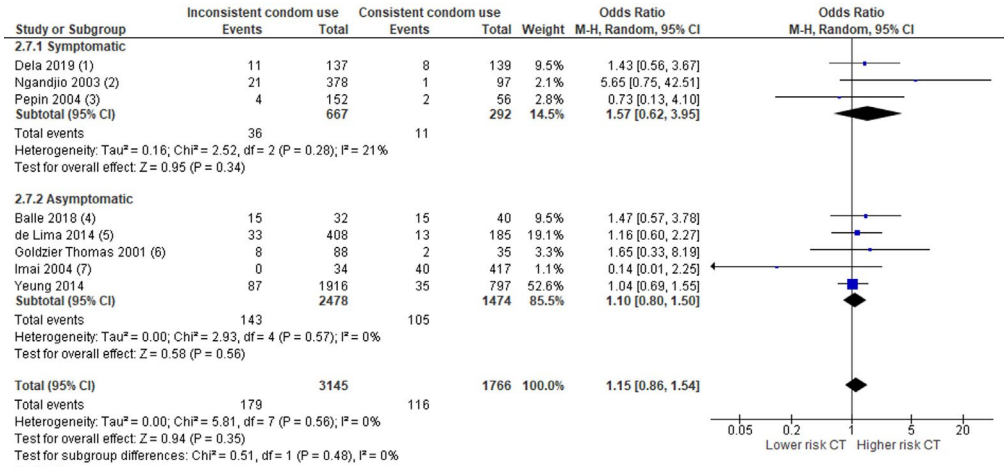
Risk of CT, adjusted

Study or Subgroup	log[Odds Ratio]	SE	Weight	Odds Ratio IV, Random, 95% CI
2.6.1 Symptomatic				
Subtotal (95% CI)				**Not estimable**
Heterogeneity: Not applicable				
Test for overall effect: Not applicable				
2.6.2 Asymptomatic				
Imai 2010 (1)	1.008	0.1841	37.7%	2.74 [1.91, 3.93]
Mossong 2009 (2)	0.5878	0.3537	10.2%	1.80 [0.90, 3.60]
Wand 2011 (3)	0.5766	0.2238	25.5%	1.78 [1.15, 2.76]
Wand 2011 (4)	0.6931	0.2198	26.5%	2.00 [1.30, 3.08]
Subtotal (95% CI)			**100.0%**	**2.16 [1.73, 2.70]**
Heterogeneity: Tau² = 0.00; Chi² = 2.81, df = 3 (P = 0.42); I² = 0%				
Test for overall effect: Z = 6.82 (P < 0.00001)				
Total (95% CI)			**100.0%**	**2.16 [1.73, 2.70]**
Heterogeneity: Tau² = 0.00; Chi² = 2.81, df = 3 (P = 0.42); I² = 0%				
Test for overall effect: Z = 6.82 (P < 0.00001)				
Test for subgroup differences: Not applicable				



Footnotes
(1) Adjusted for history of sexual partners, age, smoking
(2) Sometimes vs always, adjusted for age, sex, setting, number of sexual partners in past year
(3) Non-backpackers;adjusted for age, country of birth, marital status, employment, prior CT, alcohol use, sexual partners, sex...
(4) Backpackers; adjusted for age, country of birth, marital status, employment, prior CT, alcohol use, sexual partners, sex overseas

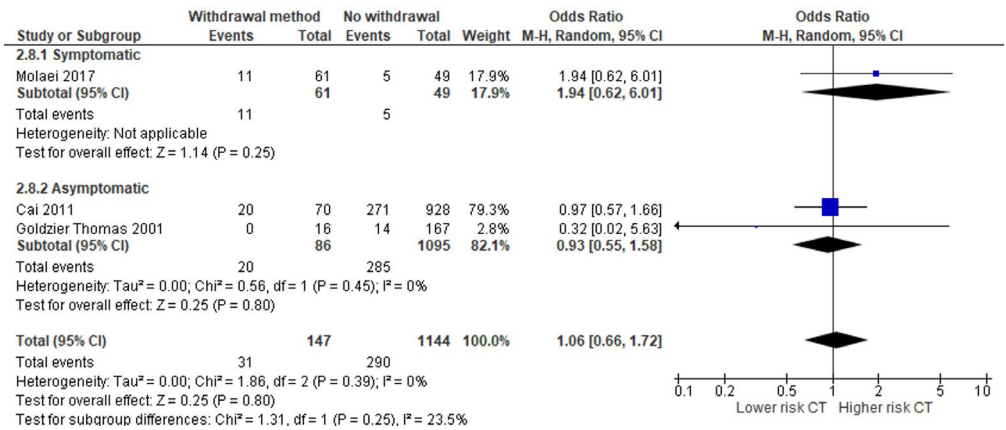
Risk of CT



Footnotes
(1) Rarely vs always/on most occassion
(2) Never or occassionally vs always
(3) Sometimes vs always
(4) Irregular condom use over the past year in adolescents and young women
(5) Sometimes/rarely vs always
(6) Sometimes vs always
(7) Not always vs always

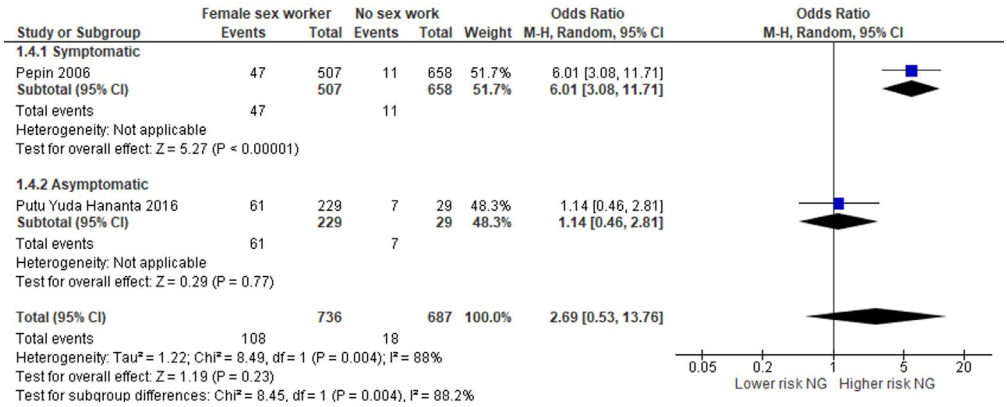
Withdrawal method

Risk of CT

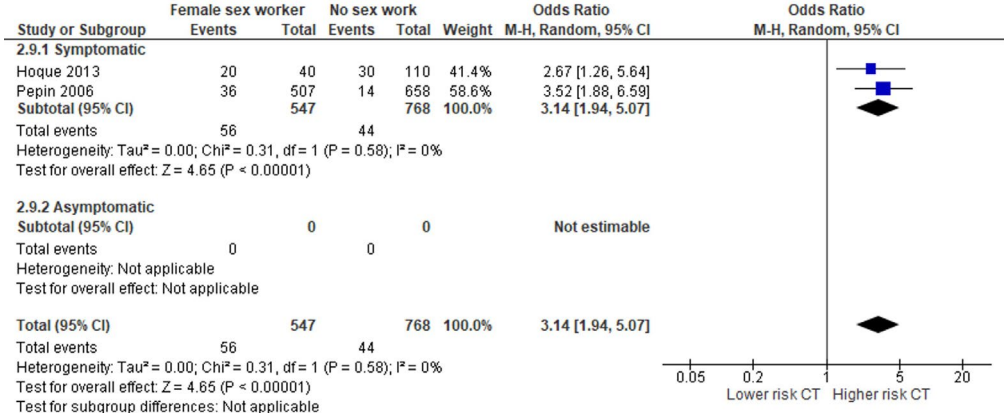


Female sex worker

Risk of NG



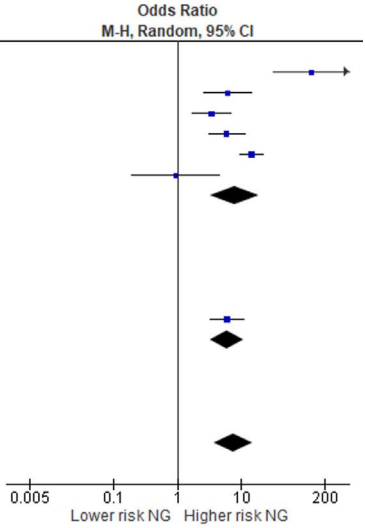
Risk of CT



Infected with CT

Risk of NG

Study or Subgroup	CT positive Events	Total	CT negative Events	Total	Weight	Odds Ratio M-H, Random, 95% CI
1.5.1 Symptomatic						
Barry 2008	15	25	3	251	10.7%	124.00 [30.84, 498.58]
Chirenje 2008	16	28	31	172	14.6%	6.06 [2.61, 14.10]
Reed 2007 (1)	19	61	22	189	15.6%	3.43 [1.70, 6.92]
Sonkar 2016	17	64	33	570	15.9%	5.89 [3.05, 11.35]
Sonkar 2017	54	147	64	1650	17.3%	14.39 [9.47, 21.86]
Zimba 2011	2	19	15	135	9.7%	0.94 [0.20, 4.48]
Subtotal (95% CI)		**344**		**2967**	**83.7%**	**7.70 [3.23, 18.33]**
Total events	123		168			
Heterogeneity: Tau² = 0.94; Chi² = 36.89, df = 5 (P < 0.00001); I² = 86%						
Test for overall effect: Z = 4.61 (P < 0.00001)						
1.5.2 Asymptomatic						
Al-Sweih 2011	13	176	111	8363	16.3%	5.93 [3.27, 10.75]
Subtotal (95% CI)		**176**		**8363**	**16.3%**	**5.93 [3.27, 10.75]**
Total events	13		111			
Heterogeneity: Not applicable						
Test for overall effect: Z = 5.86 (P < 0.00001)						
Total (95% CI)		**520**		**11330**	**100.0%**	**7.37 [3.64, 14.94]**
Total events	136		279			
Heterogeneity: Tau² = 0.71; Chi² = 37.90, df = 6 (P < 0.00001); I² = 84%						
Test for overall effect: Z = 5.55 (P < 0.00001)						
Test for subgroup differences: Chi² = 0.24, df = 1 (P = 0.63), I² = 0%						

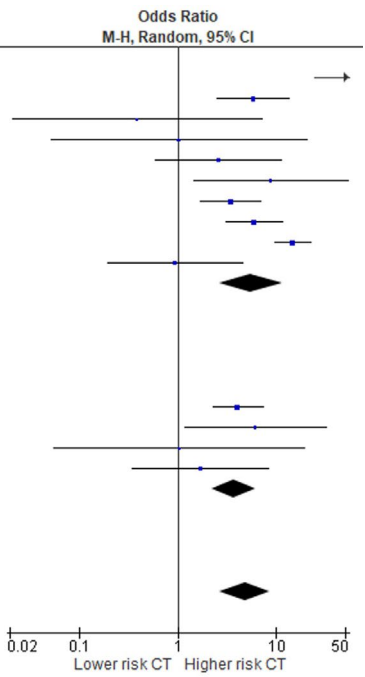


Footnotes
(1) Adolescents

Infected with NG

Risk of CT

Study or Subgroup	NG positive Events	Total	NG negative Events	Total	Weight	Odds Ratio M-H, Random, 95% CI
2.10.1 Symptomatic						
Barry 2008	15	18	13	258	7.3%	94.23 [24.20, 366.89]
Chirenje 2008	16	48	12	152	9.6%	5.83 [2.52, 13.53]
De Jongh 2010	0	6	23	140	3.0%	0.38 [0.02, 7.06]
Garcia 2007	0	4	11	117	2.9%	1.03 [0.05, 20.35]
Goyal 2011	3	8	43	228	6.8%	2.58 [0.59, 11.22]
Huppert 2003 (1)	4	6	14	75	5.6%	8.71 [1.45, 52.40]
Reed 2007 (2)	19	41	42	209	10.3%	3.43 [1.70, 6.92]
Sonkar 2016	17	50	47	584	10.5%	5.89 [3.05, 11.35]
Sonkar 2017	54	118	92	1679	11.4%	14.55 [9.58, 22.12]
Zimba 2011	2	17	17	137	6.5%	0.94 [0.20, 4.48]
Subtotal (95% CI)		**316**		**3579**	**73.8%**	**5.47 [2.63, 11.39]**
Total events	130		314			
Heterogeneity: Tau² = 0.91; Chi² = 44.32, df = 9 (P < 0.00001); I² = 80%						
Test for overall effect: Z = 4.54 (P < 0.00001)						
2.10.2 Asymptomatic						
Al-Sweih 2011	13	176	163	8415	10.8%	4.04 [2.25, 7.25]
Balle 2018 (3)	7	9	23	63	6.1%	6.09 [1.17, 31.79]
de Lima 2014	0	4	55	570	3.0%	1.03 [0.05, 19.42]
Guimaraes 2009 (4)	2	9	60	418	6.3%	1.70 [0.35, 8.40]
Subtotal (95% CI)		**198**		**9466**	**26.2%**	**3.68 [2.20, 6.16]**
Total events	22		301			
Heterogeneity: Tau² = 0.00; Chi² = 2.08, df = 3 (P = 0.56); I² = 0%						
Test for overall effect: Z = 4.98 (P < 0.00001)						
Total (95% CI)		**514**		**13045**	**100.0%**	**4.79 [2.68, 8.58]**
Total events	152		615			
Heterogeneity: Tau² = 0.73; Chi² = 52.60, df = 13 (P < 0.00001); I² = 75%						
Test for overall effect: Z = 5.28 (P < 0.00001)						
Test for subgroup differences: Chi² = 0.75, df = 1 (P = 0.39), I² = 0%						

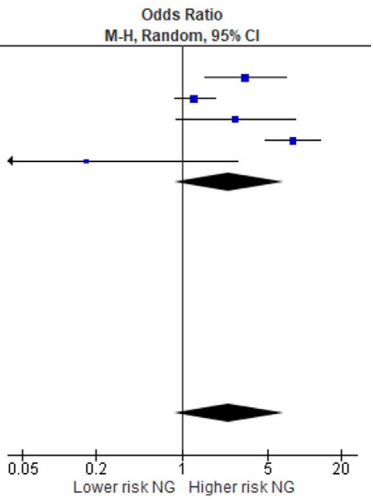


Footnotes
(1) Adolescents and young women (15-21 years)
(2) Adolescents
(3) Adolescents
(4) Adolescents

Infected with TV

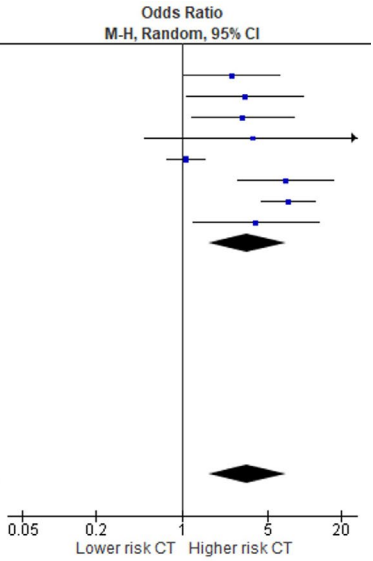
Risk of NG

Study or Subgroup	TV Events	TV Total	No TV Events	No TV Total	Weight	Odds Ratio M-H, Random, 95% CI
1.6.1 Symptomatic						
Chirenje 2008	16	36	32	164	22.6%	3.30 [1.54, 7.07]
Lewis 2003	43	291	113	941	24.9%	1.27 [0.87, 1.86]
Sonkar 2016	4	22	46	612	19.7%	2.73 [0.89, 8.42]
Sonkar 2017	25	79	93	1718	24.2%	8.09 [4.82, 13.58]
Zimba 2011	0	18	19	138	8.6%	0.17 [0.01, 2.86]
Subtotal (95% CI)		**446**		**3573**	**100.0%**	**2.41 [0.87, 6.70]**
Total events	88		303			
Heterogeneity: Tau² = 1.05; Chi² = 37.91, df = 4 (P < 0.00001); I² = 89%						
Test for overall effect: Z = 1.68 (P = 0.09)						
1.6.2 Asymptomatic						
Subtotal (95% CI)		**0**		**0**		**Not estimable**
Total events	0		0			
Heterogeneity: Not applicable						
Test for overall effect: Not applicable						
Total (95% CI)		**446**		**3573**	**100.0%**	**2.41 [0.87, 6.70]**
Total events	88		303			
Heterogeneity: Tau² = 1.05; Chi² = 37.91, df = 4 (P < 0.00001); I² = 89%						
Test for overall effect: Z = 1.68 (P = 0.09)						
Test for subgroup differences: Not applicable						



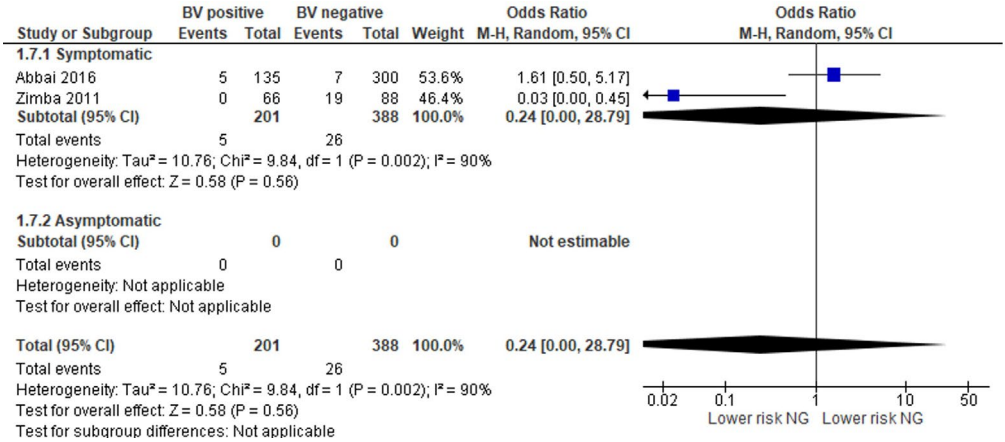
Risk of CT

Study or Subgroup	TV Events	TV Total	No TV Events	No TV Total	Weight	Odds Ratio M-H, Random, 95% CI
2.11.1 Symptomatic						
Chirenje 2008	9	36	19	164	13.1%	2.54 [1.04, 6.21]
De Jongh 2010	6	18	17	128	11.9%	3.26 [1.08, 9.86]
Goyal 2011	8	20	32	183	12.6%	3.15 [1.19, 8.32]
Huppert 2003	2	4	16	77	7.2%	3.81 [0.50, 29.20]
Lewis 2003	49	291	148	941	15.7%	1.08 [0.76, 1.55]
Sonkar 2016	9	22	55	612	13.1%	7.01 [2.87, 17.14]
Sonkar 2017	28	79	119	1718	15.1%	7.38 [4.49, 12.13]
Zimba 2011	5	18	12	138	11.4%	4.04 [1.23, 13.27]
Subtotal (95% CI)		**488**		**3961**	**100.0%**	**3.43 [1.65, 7.10]**
Total events	116		418			
Heterogeneity: Tau² = 0.85; Chi² = 47.56, df = 7 (P < 0.00001); I² = 85%						
Test for overall effect: Z = 3.31 (P = 0.0009)						
2.11.2 Asymptomatic						
Subtotal (95% CI)		**0**		**0**		**Not estimable**
Total events	0		0			
Heterogeneity: Not applicable						
Test for overall effect: Not applicable						
Total (95% CI)		**488**		**3961**	**100.0%**	**3.43 [1.65, 7.10]**
Total events	116		418			
Heterogeneity: Tau² = 0.85; Chi² = 47.56, df = 7 (P < 0.00001); I² = 85%						
Test for overall effect: Z = 3.31 (P = 0.0009)						
Test for subgroup differences: Not applicable						

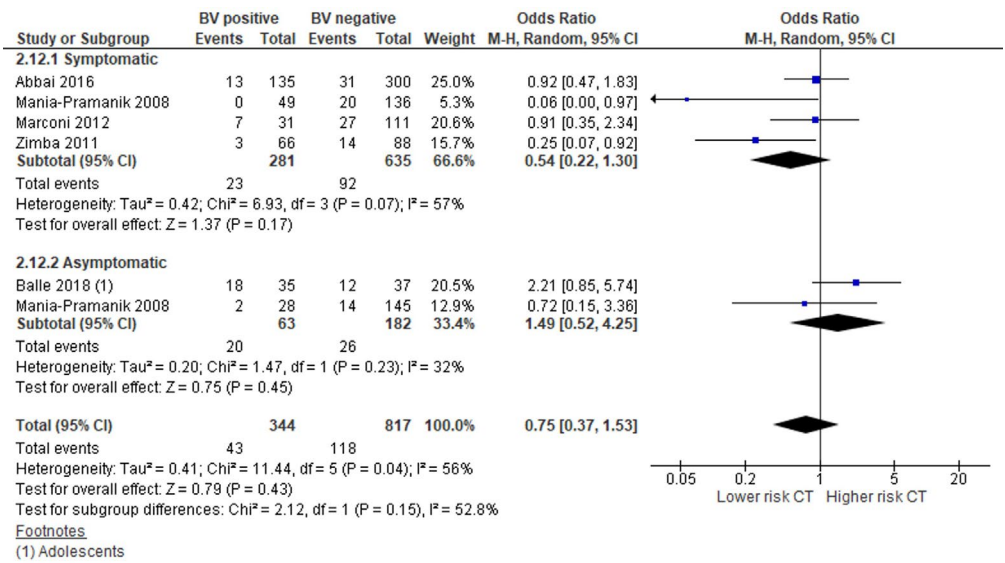


Infected with BV

Risk of NG



Risk of CT

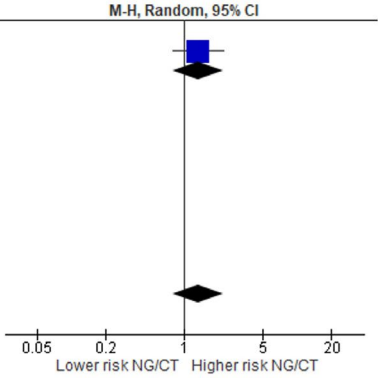


Footnotes

(1) Adolescents

Risk of NG and/or CT

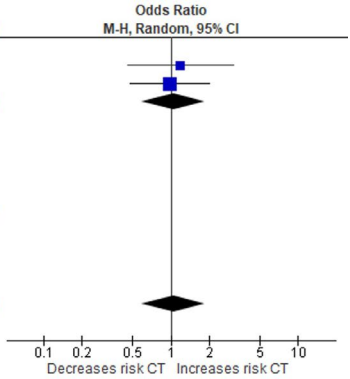
Study or Subgroup	BV positive Events	Total	BV negative Events	Total	Weight	Odds Ratio M-H, Random, 95% CI
3.3.1 Symptomatic						
Landers 2004	33	276	30	322	100.0%	1.32 [0.78, 2.23]
Subtotal (95% CI)		**276**		**322**	**100.0%**	**1.32 [0.78, 2.23]**
Total events	33		30			
Heterogeneity: Not applicable						
Test for overall effect: Z = 1.05 (P = 0.30)						
3.3.2 Asymptomatic						
Subtotal (95% CI)		**0**		**0**		**Not estimable**
Total events	0		0			
Heterogeneity: Not applicable						
Test for overall effect: Not applicable						
Total (95% CI)		**276**		**322**	**100.0%**	**1.32 [0.78, 2.23]**
Total events	33		30			
Heterogeneity: Not applicable						
Test for overall effect: Z = 1.05 (P = 0.30)						
Test for subgroup differences: Not applicable						



Vaginal discharge

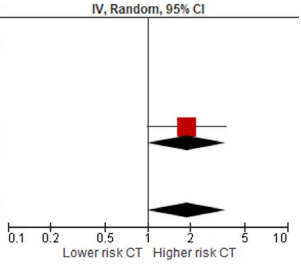
Risk of NG

Study or Subgroup	Vaginal discharge Events	Total	No vaginal discharge Events	Total	Weight	Odds Ratio M-H, Random, 95% CI
1.8.1 Symptomatic						
Barry 2008	9	127	9	149	36.2%	1.19 [0.46, 3.09]
Dela 2019	80	489	10	60	63.8%	0.98 [0.48, 2.01]
Subtotal (95% CI)		**616**		**209**	**100.0%**	**1.05 [0.59, 1.86]**
Total events	89		19			
Heterogeneity: Tau² = 0.00; Chi² = 0.10, df = 1 (P = 0.75); I² = 0%						
Test for overall effect: Z = 0.16 (P = 0.87)						
1.8.2 Asymptomatic						
Subtotal (95% CI)		**0**		**0**		**Not estimable**
Total events	0		0			
Heterogeneity: Not applicable						
Test for overall effect: Not applicable						
Total (95% CI)		**616**		**209**	**100.0%**	**1.05 [0.59, 1.86]**
Total events	89		19			
Heterogeneity: Tau² = 0.00; Chi² = 0.10, df = 1 (P = 0.75); I² = 0%						
Test for overall effect: Z = 0.16 (P = 0.87)						
Test for subgroup differences: Not applicable						



Risk of CT, adjusted

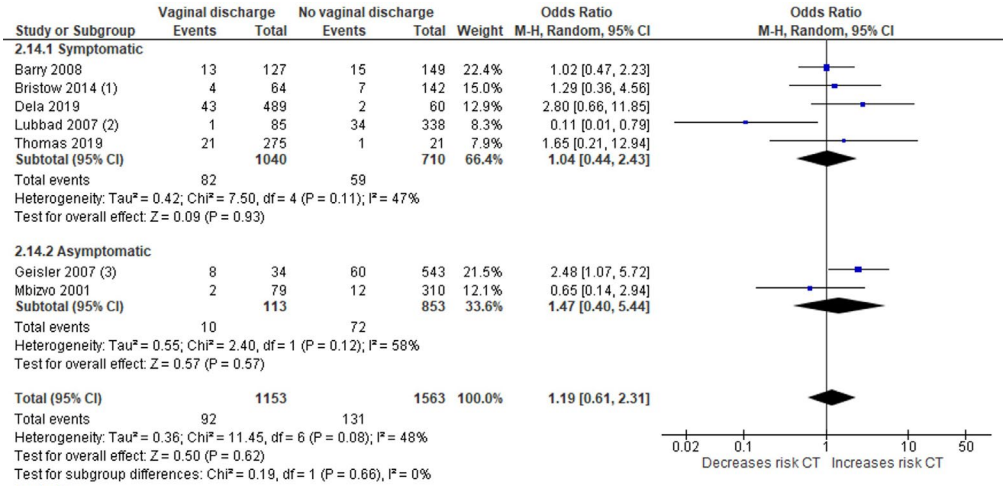
Study or Subgroup	log[Odds Ratio]	SE	Vaginal discharge Total	No vaginal discharge Total	Weight	Odds Ratio IV, Random, 95% CI
2.13.1 Symptomatic						
Subtotal (95% CI)			**0**	**0**		**Not estimable**
Heterogeneity: Not applicable						
Test for overall effect: Not applicable						
2.13.2 Asymptomatic						
Obasi 2001 (1)	0.6419	0.33	207	4483	100.0%	1.90 [1.00, 3.63]
Subtotal (95% CI)			**207**	**4483**	**100.0%**	**1.90 [1.00, 3.63]**
Heterogeneity: Not applicable						
Test for overall effect: Z = 1.95 (P = 0.05)						
Total (95% CI)			**207**	**4483**	**100.0%**	**1.90 [1.00, 3.63]**
Heterogeneity: Not applicable						
Test for overall effect: Z = 1.95 (P = 0.05)						
Test for subgroup differences: Not applicable						



Footnotes

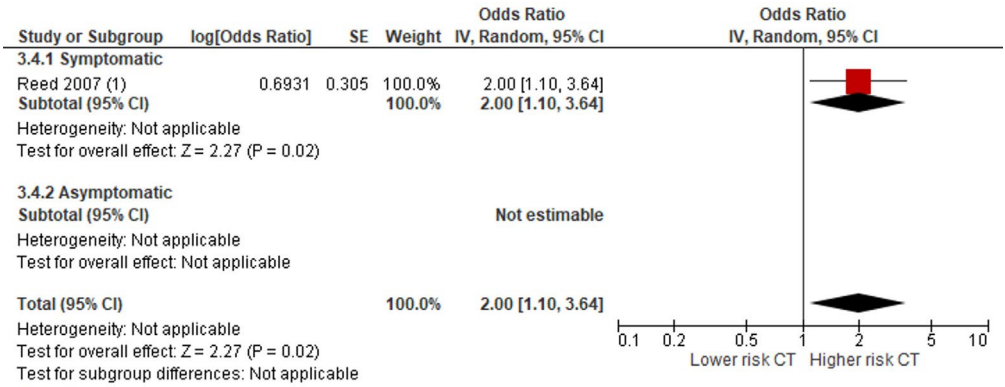
(1) Self-reported VD in adolescents, adjusted for age in years

Risk of CT



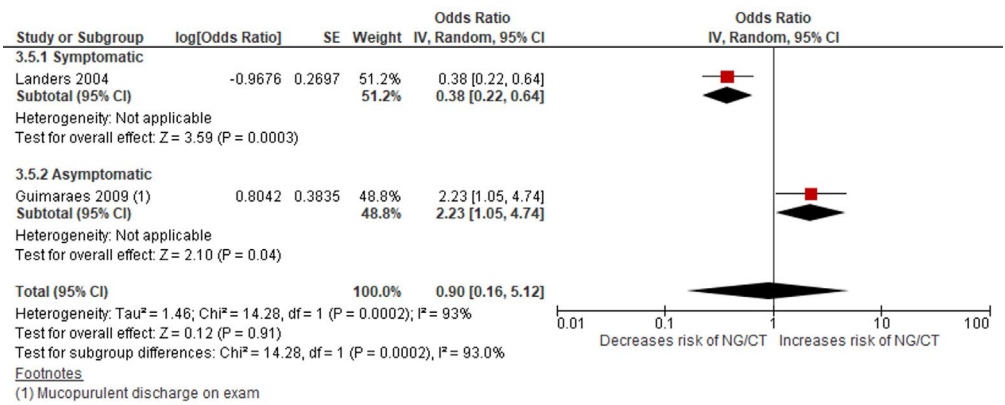
Footnotes
(1) Increased VD
(2) Complaints of VD in pregnant women
(3) VD on exam

Risk of NG and/or CT, adjusted



Footnotes
(1) Cervical discharge on exam in adolescents, adjusted for race, new partner in last 3 months, yeast forms on gram stain

Risk of NG and/or CT

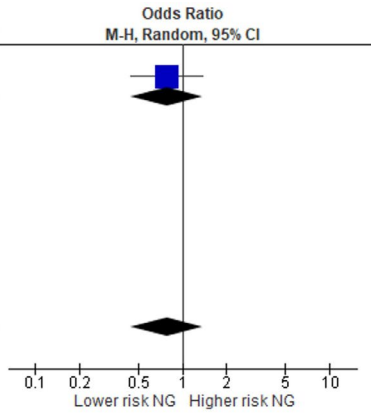


Footnotes
(1) Mucopurulent discharge on exam

Itching

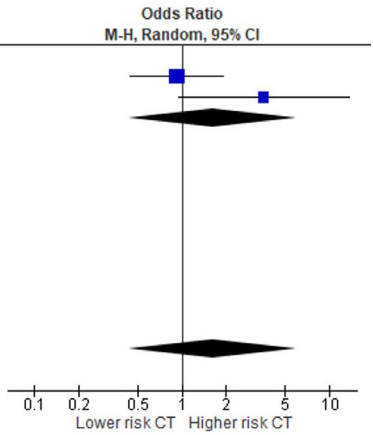
Risk of NG

Study or Subgroup	Itching Events	Itching Total	No itching Events	No itching Total	Weight	Odds Ratio M-H, Random, 95% CI
1.9.1 Symptomatic						
Dela 2019	18	129	72	420	100.0%	0.78 [0.45, 1.37]
Subtotal (95% CI)		**129**		**420**	**100.0%**	**0.78 [0.45, 1.37]**
Total events	18		72			
Heterogeneity: Not applicable						
Test for overall effect: Z = 0.85 (P = 0.39)						
1.9.2 Asymptomatic						
Subtotal (95% CI)		**0**		**0**		**Not estimable**
Total events	0		0			
Heterogeneity: Not applicable						
Test for overall effect: Not applicable						
Total (95% CI)		**129**		**420**	**100.0%**	**0.78 [0.45, 1.37]**
Total events	18		72			
Heterogeneity: Not applicable						
Test for overall effect: Z = 0.85 (P = 0.39)						
Test for subgroup differences: Not applicable						



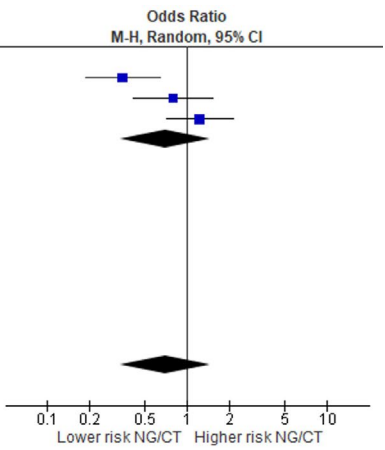
Risk of CT

Study or Subgroup	Itching Events	Itching Total	No itching Events	No itching Total	Weight	Odds Ratio M-H, Random, 95% CI
2.15.1 Symptomatic						
Dela 2019	10	129	35	420	58.6%	0.92 [0.44, 1.92]
Molaei 2017	13	59	3	41	41.4%	3.58 [0.95, 13.49]
Subtotal (95% CI)		**188**		**461**	**100.0%**	**1.62 [0.44, 6.01]**
Total events	23		38			
Heterogeneity: Tau² = 0.62; Chi² = 3.09, df = 1 (P = 0.08); I² = 68%						
Test for overall effect: Z = 0.72 (P = 0.47)						
2.15.2 Asymptomatic						
Subtotal (95% CI)		**0**		**0**		**Not estimable**
Total events	0		0			
Heterogeneity: Not applicable						
Test for overall effect: Not applicable						
Total (95% CI)		**188**		**461**	**100.0%**	**1.62 [0.44, 6.01]**
Total events	23		38			
Heterogeneity: Tau² = 0.62; Chi² = 3.09, df = 1 (P = 0.08); I² = 68%						
Test for overall effect: Z = 0.72 (P = 0.47)						
Test for subgroup differences: Not applicable						



Risk of NG and/or CT

Study or Subgroup	Itching Events	Itching Total	No itching Events	No itching Total	Weight	Odds Ratio M-H, Random, 95% CI
3.6.1 Symptomatic						
Fonck 2000 (1)	23	184	30	103	33.2%	0.35 [0.19, 0.64]
Fonck 2000 (2)	26	213	18	121	32.2%	0.80 [0.42, 1.52]
Landers 2004	22	185	41	413	34.6%	1.22 [0.71, 2.12]
Subtotal (95% CI)		**582**		**637**	**100.0%**	**0.70 [0.33, 1.48]**
Total events	71		89			
Heterogeneity: Tau² = 0.34; Chi² = 9.16, df = 2 (P = 0.01); I² = 78%						
Test for overall effect: Z = 0.93 (P = 0.35)						
3.6.2 Asymptomatic						
Subtotal (95% CI)		**0**		**0**		**Not estimable**
Total events	0		0			
Heterogeneity: Not applicable						
Test for overall effect: Not applicable						
Total (95% CI)		**582**		**637**	**100.0%**	**0.70 [0.33, 1.48]**
Total events	71		89			
Heterogeneity: Tau² = 0.34; Chi² = 9.16, df = 2 (P = 0.01); I² = 78%						
Test for overall effect: Z = 0.93 (P = 0.35)						
Test for subgroup differences: Not applicable						



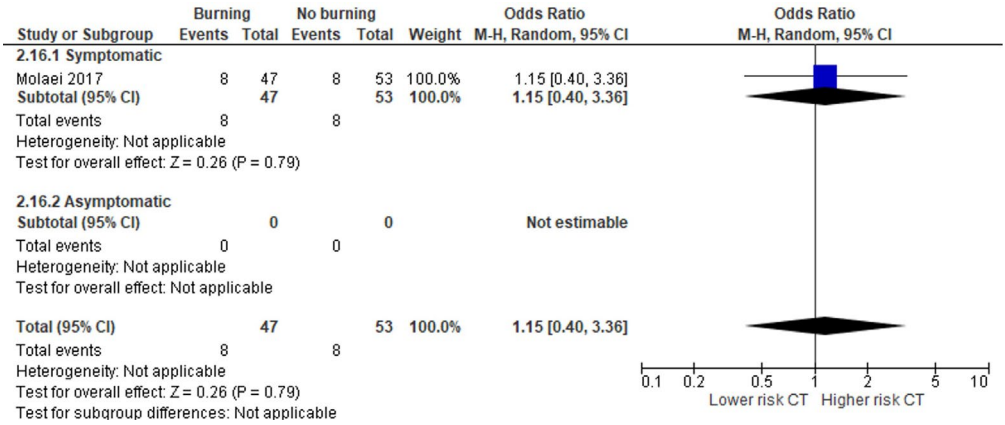
Footnotes

(1) Non-pregnant women

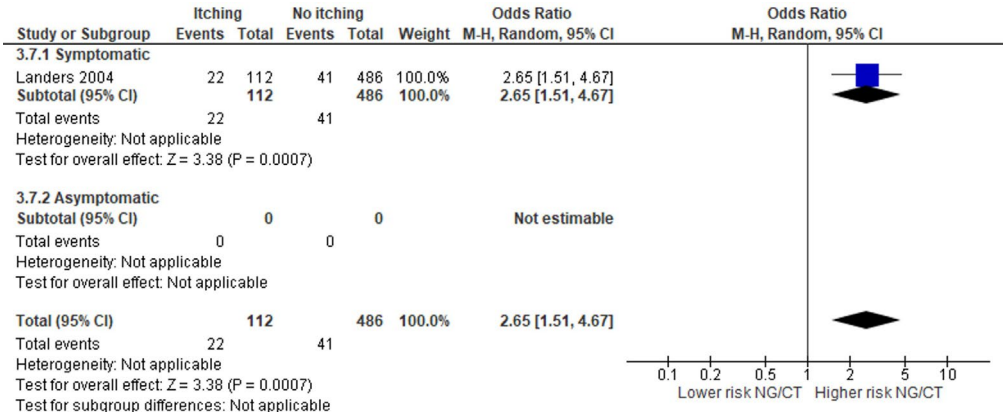
(2) Pregnant women

Burning

Risk of CT

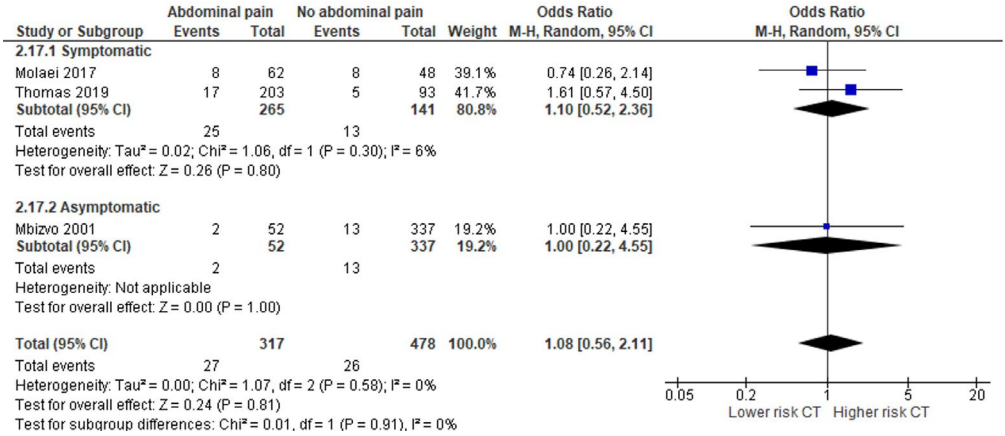


Risk of NG and/or CT

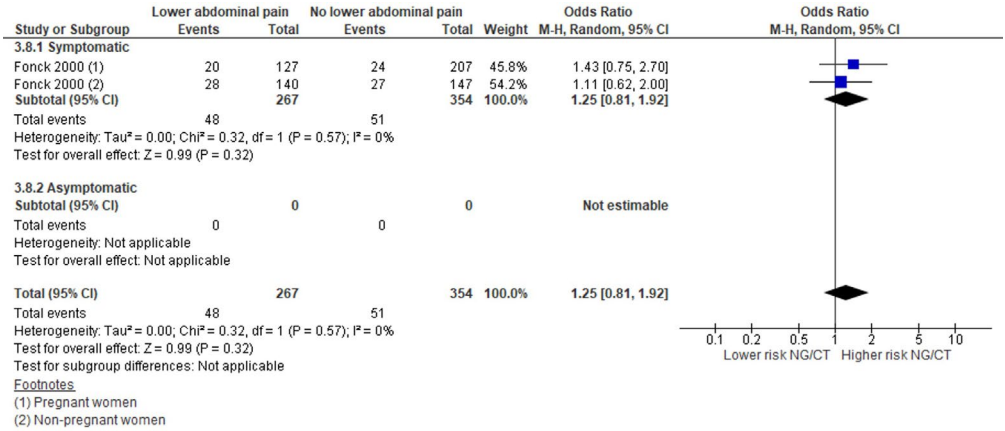


Lower abdominal pain

Risk of CT



Risk of NG and/or CT

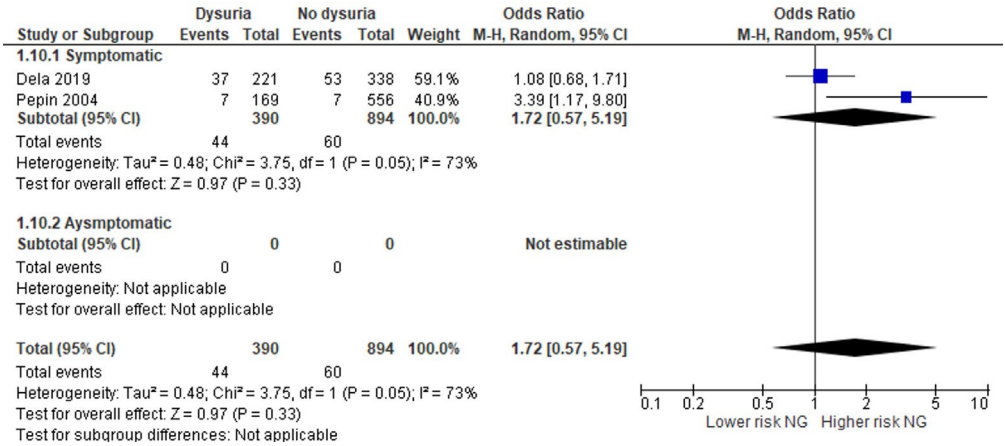


Study or Subgroup	Lower abdominal pain		No lower abdominal pain		Findings
	Events	Total	Events	Total	
Symptomatic					
Reed 2007 (1)	Not reported				On bivariate analysis, did not significantly differ between groups

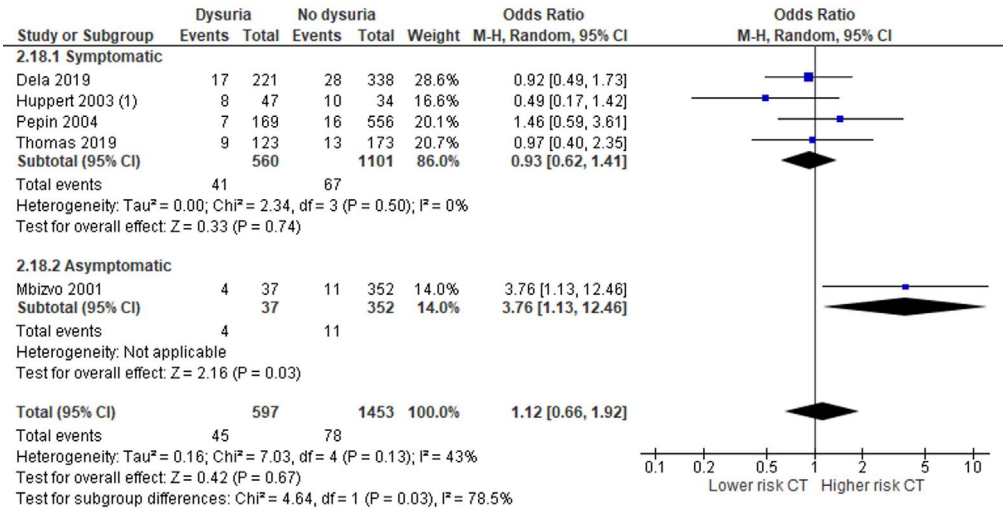
1. Adolescents

Dysuria

Risk of NG



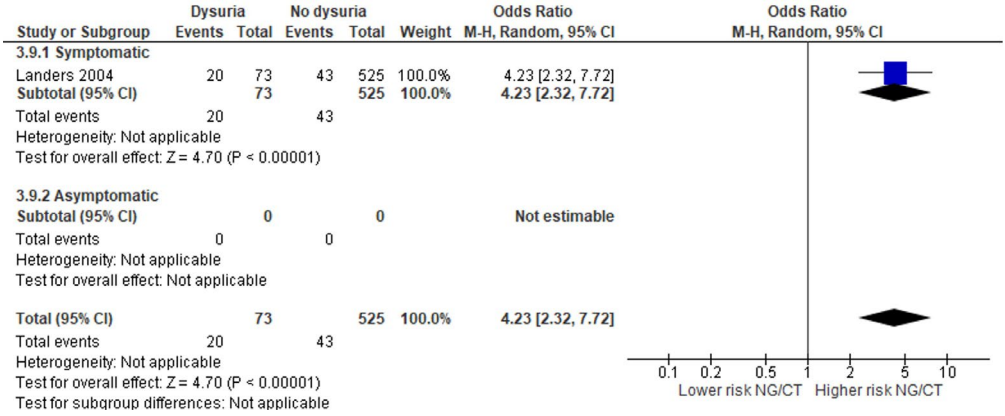
Risk of CT



Footnotes

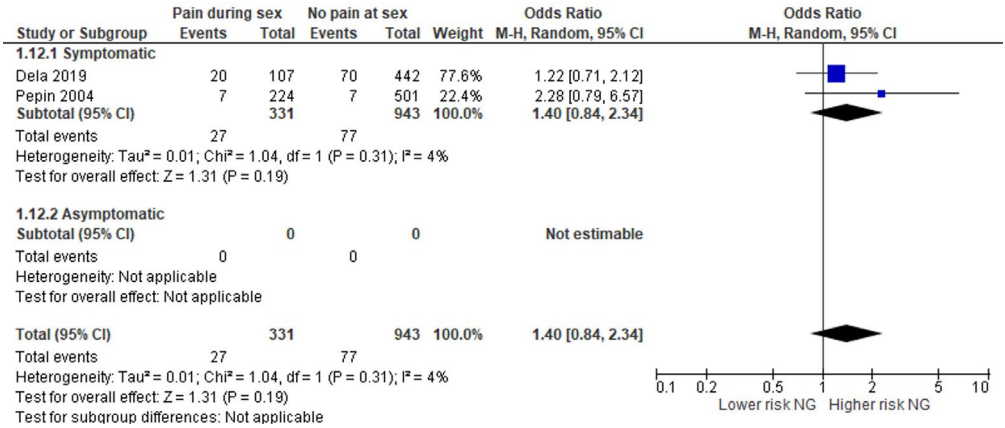
(1) Urinary symptoms: dysuria or urinary frequency in adolescents (15-21 years)

Risk of NG and/or CT

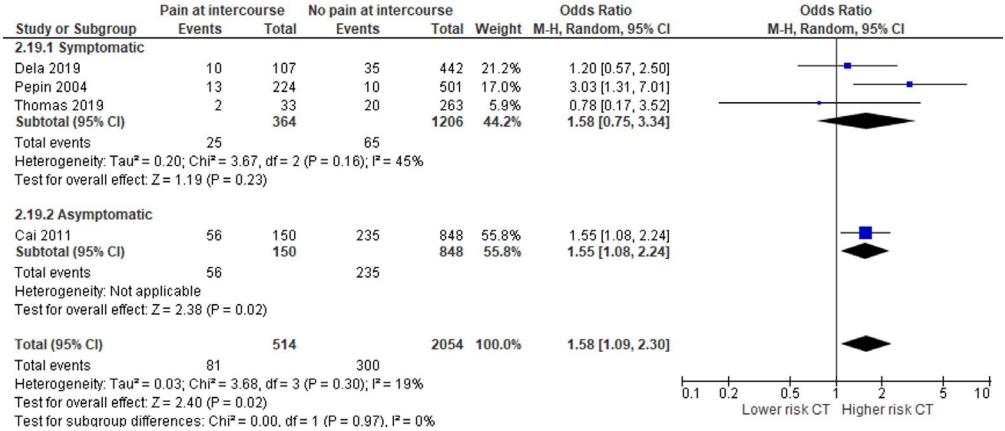


Pain at sexual intercourse

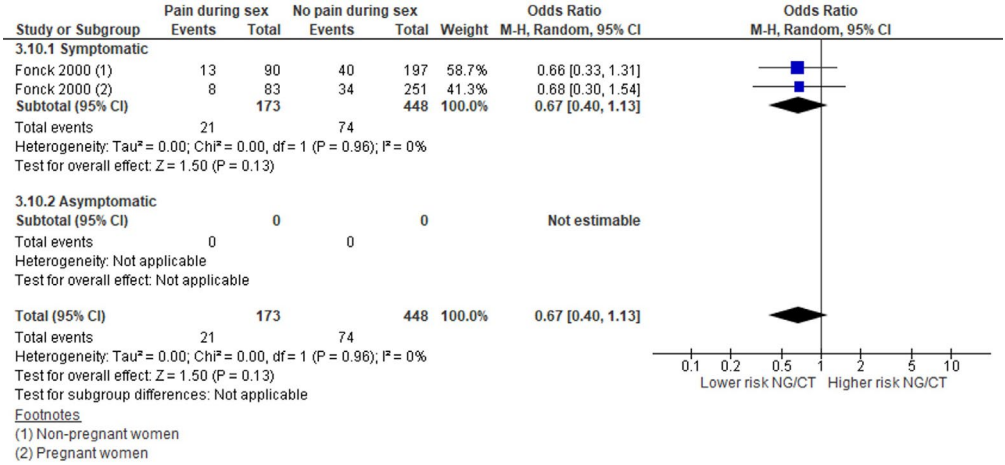
Risk of NG



Risk of CT



Risk of NG and/or CT



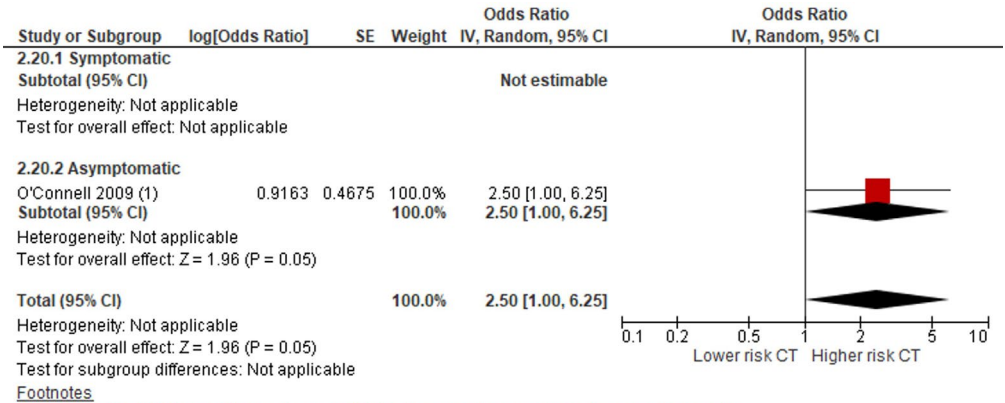
Any symptoms

Risk of NG

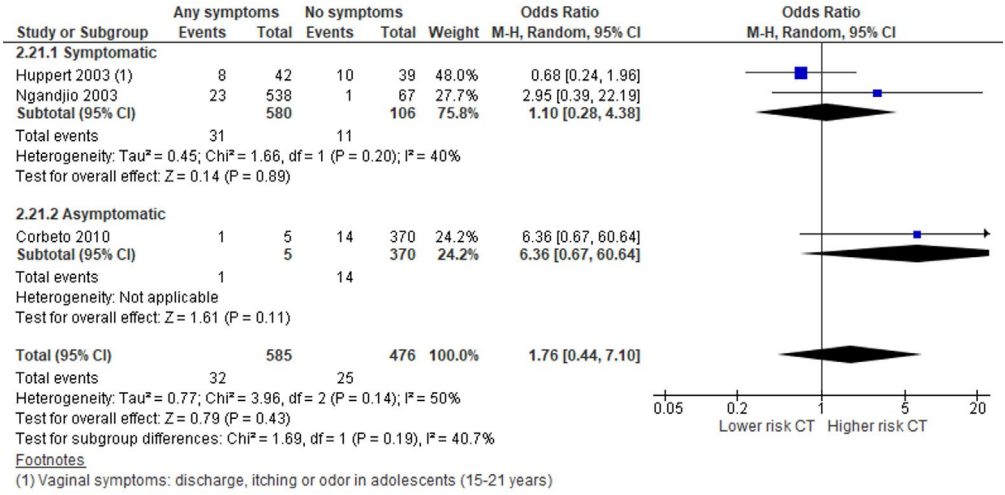
Study or Subgroup	Any symptoms		No symptoms		Findings
	Events	Total	Events	Total	
Symptomatic					
Huppert 2008 (1)	Not reported				No significant difference, 10.7% vs 9.7%
Sonkar 2017 (2)	Not reported				No clear symptom that is specific to or associated with NG

1. Adolescents; symptoms of cervicitis.
2. Symptoms of cervicitis, abnormal vaginal discharge, lower abdominal pain (10%), burning pain on micturation, excessive genital secretion, pain during intercourse, foul smell, itching and dysuria.

Risk of CT, adjusted



Risk of CT



Footnotes

(1) Vaginal symptoms: discharge, itching or odor in adolescents (15-21 years)

Study or Subgroup	Any symptoms		No symptoms		Findings
	Events	Total	Events	Total	
Symptomatic					
Huppert 2008 (1)	Not reported				Women with symptoms of cervicitis were more likely to have CT; 36.9% vs 19.8%, p=0.02
Sonkar 2017	Not reported				No clear symptom that is specific to or associated with CT

1. Adolescents; symptoms of cervicitis.
2. Symptoms of cervicitis, abnormal vaginal discharge, lower abdominal pain (10%), burning pain on micturation, excessive genital secretion, pain during intercourse, foul smell, itching and dysuria.

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