

Evaluation of Syndromic Algorithms for Managing Sexually Transmitted Infections Among Pregnant Women in Kenya

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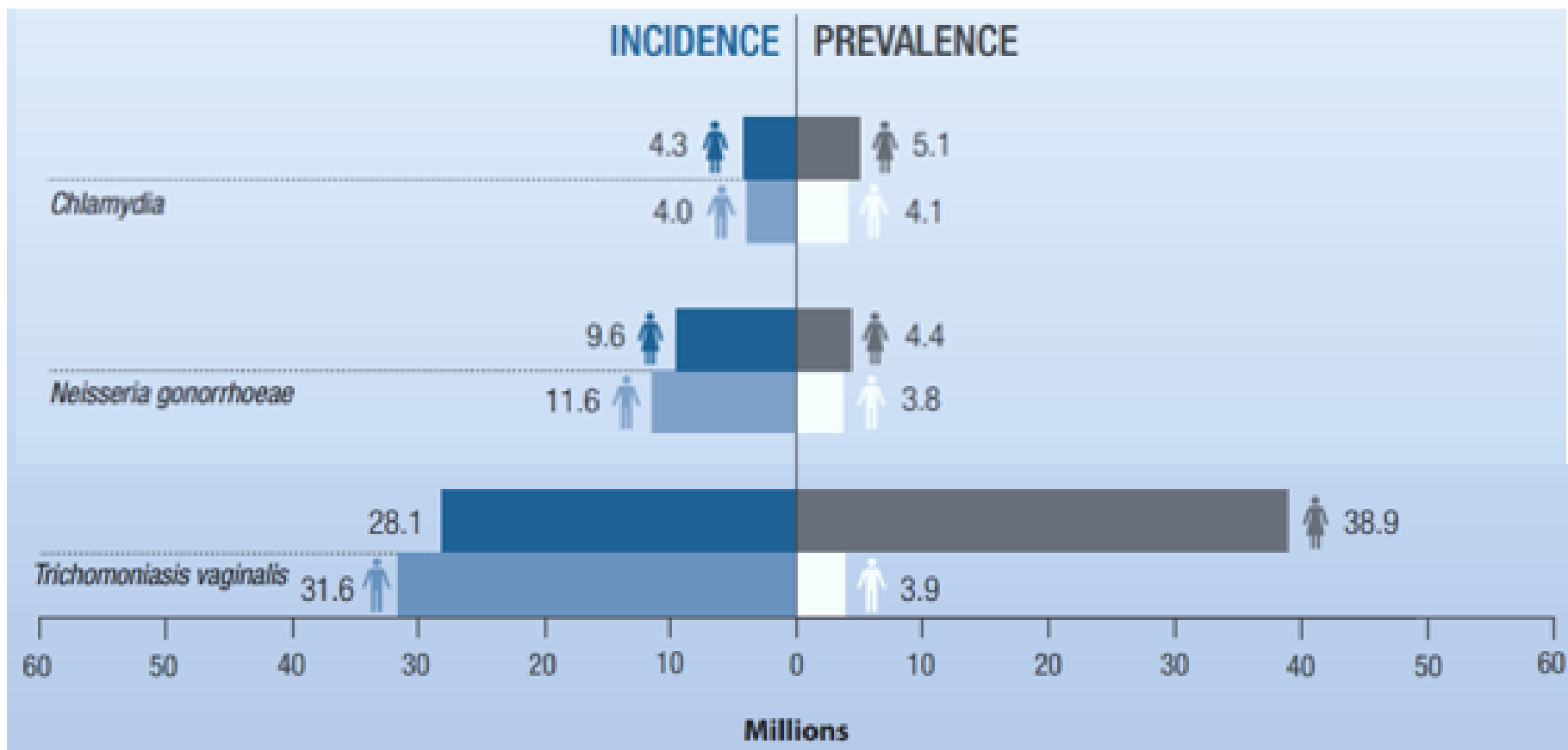
Disclosures

- No conflicts of interest to declare

Sexually Transmitted Infections (STIs)

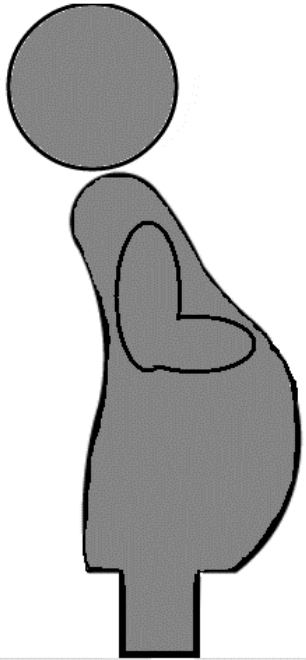
Type of Agent	Pathogen/organism	Condition
Viruses	Human Papillomavirus	Warts
	Herpes Simplex	Herpes
	Hepatitis B	Hepatitis
	HIV	HIV/AIDS
Bacteria	Chlamydia trachomatis	Chlamydia
	Neisseria Gonorrhoeae	Gonorrhoea
	Treponema pallidum	Syphilis
	Hemophilus ducreyi	Chancroid
Fungi	Candida albicans	Candidiasis
Protozoa	Trichomonas vaginalis	Trichomoniasis
Insects	Sarcoptes scabii	Scabies

Prevalence & incidence of CT, GC and TV in the African region



Source: World Health Organization, Dept. of Reproductive Health and Research. **Global incidence and prevalence of selected curable sexually transmitted infections – 2008** World Health Organization: Geneva, Switzerland <http://www.who.int/reproductivehealth/publications/rtis/stisestimates/en/>

STI prevalence in pregnant African women



- **Chlamydia (CT) 3-9%**
- **Gonorrhea (GC) 2-7%**
- **Trichomoniasis (TV) 15-32%**
- **Asymptomatic 10-45%**

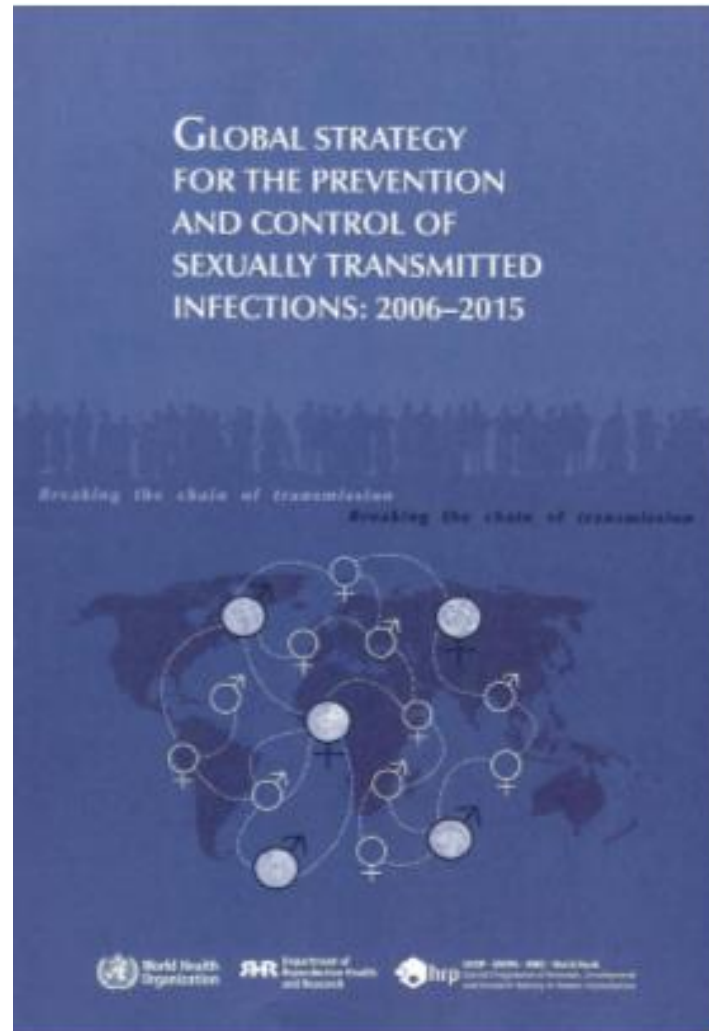
Fanck (2000); Rastagi (2003); Gray (2001); Farler (2003); Mullick (2005)

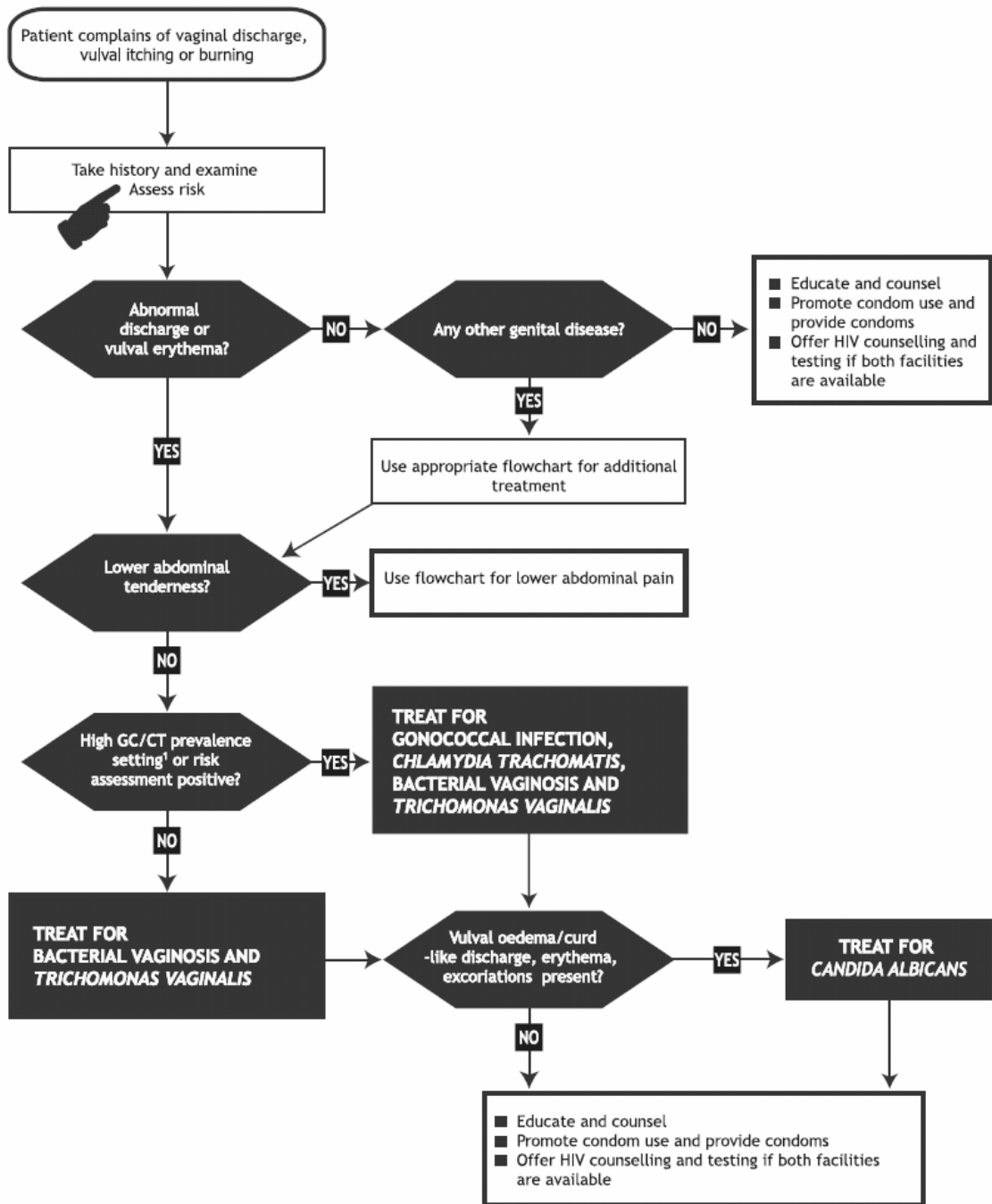
Infection with GC, CT, TV

- **3-fold ↑ HIV acquisition risk**
- **5-fold ↑ pelvic inflammatory disease risk**
- **1.5-fold ↑ preterm labor risk**

Kissinger & Adamski (2013); Laga et al (2007); McClelland et al (2007); Van Der Pol et al (2008); Mavedzenge et al (2010); Moodley et al (2002); Paisarntantiwong et al (1995); Cotch et al (1997); Mullick et al (2005); Minkoff et al (1984); Johnson et al (2011); Azargoon et al (2007); Mathai et al (1998)

Syndromic Management



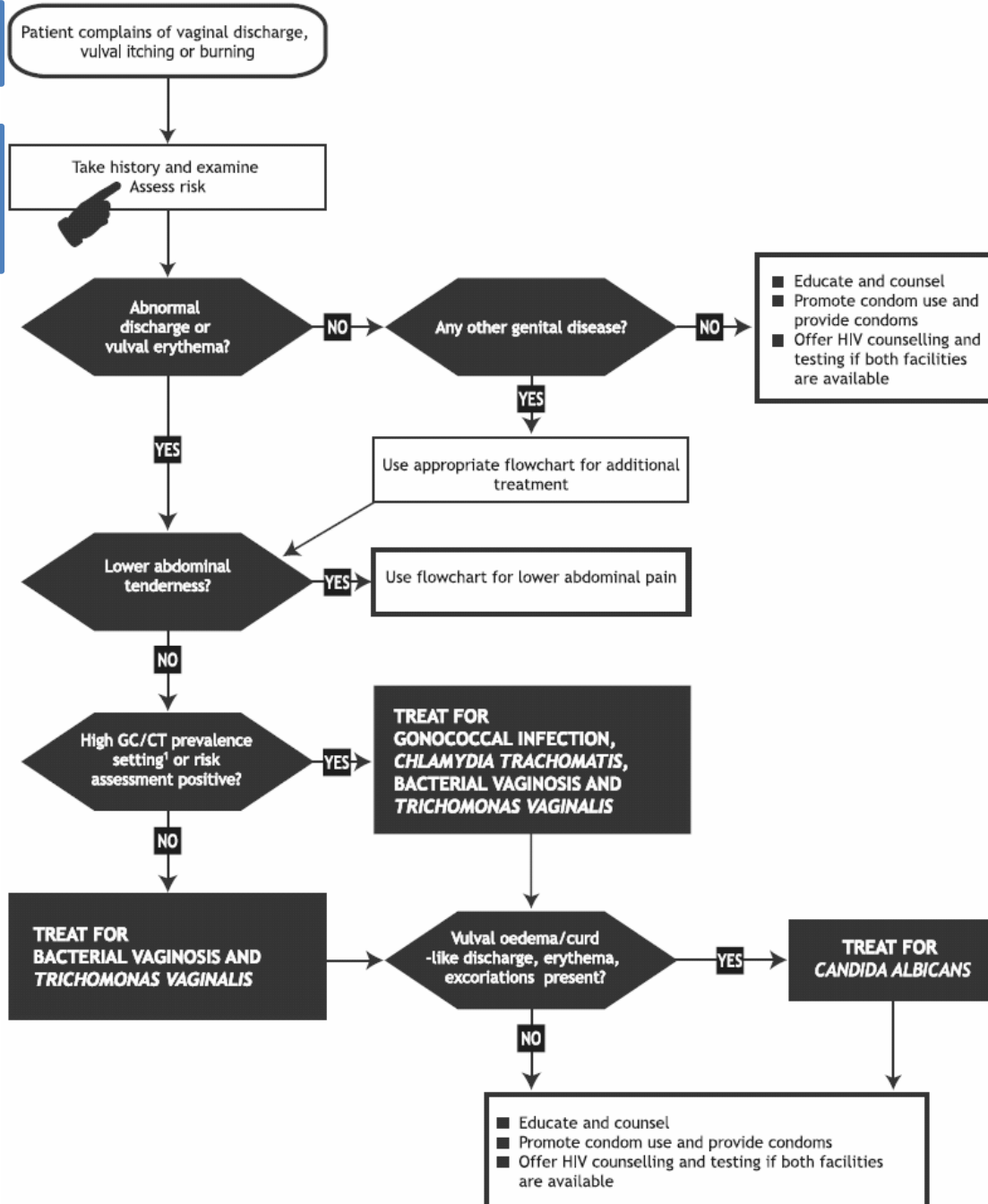


Patient-reported symptoms



Patient-reported symptoms

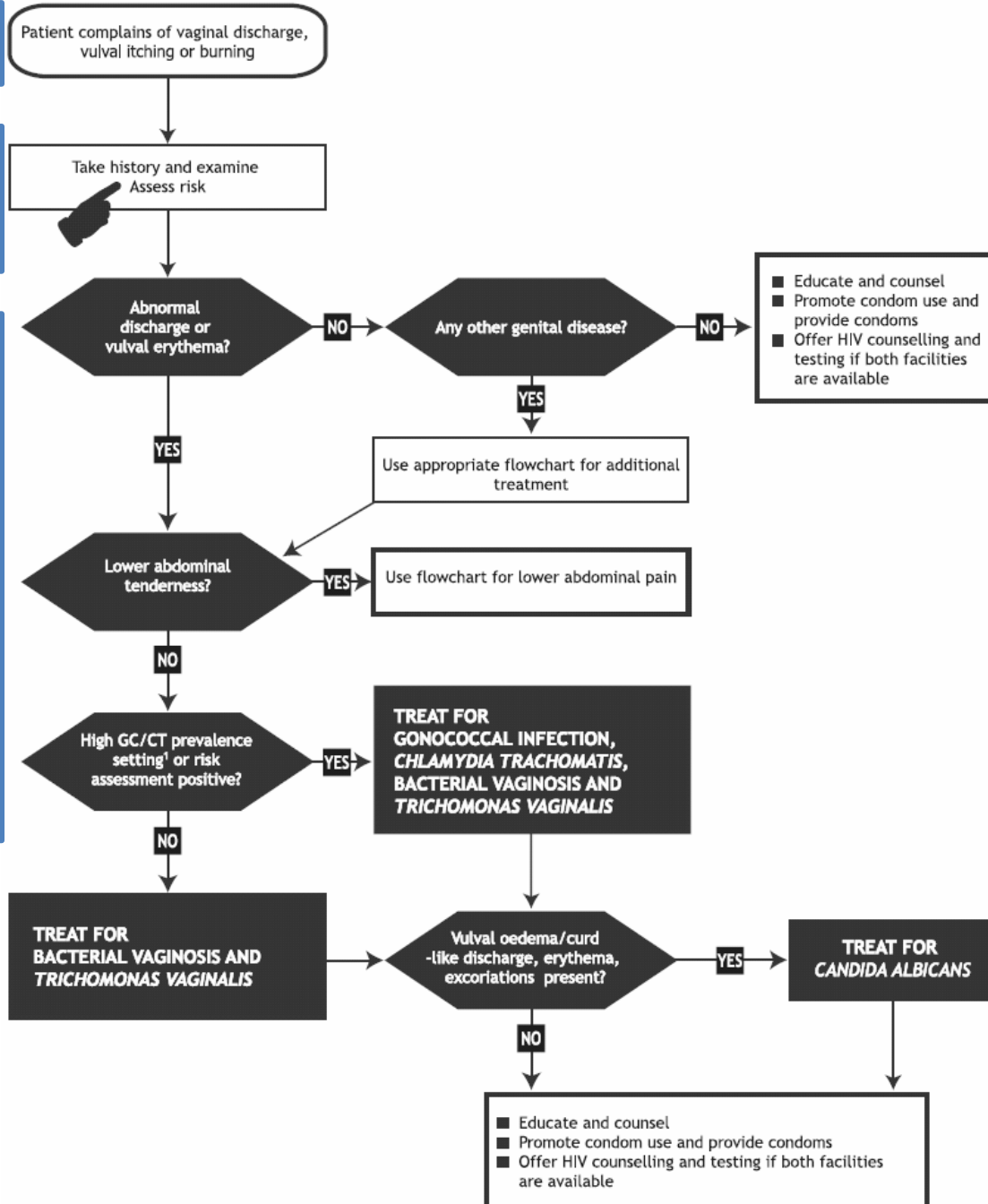
Clinical examination and risk assessment



Patient-reported symptoms

Clinical examination and risk assessment

Evaluation of key syndromes



Patient-reported symptoms

Patient complains of vaginal discharge, vulval itching or burning

Clinical examination and risk assessment

Take history and examine
Assess risk

Evaluation of key syndromes

Abnormal discharge or vulval erythema?

NO

Any other genital disease?

NO

- Educate and counsel
- Promote condom use and provide condoms
- Offer HIV counselling and testing if both facilities are available

YES

YES

Use appropriate flowchart for additional treatment

Lower abdominal tenderness?

YES

Use flowchart for lower abdominal pain

NO

High GC/CT prevalence setting¹ or risk assessment positive?

YES

TREAT FOR GONOCOCCAL INFECTION, CHLAMYDIA TRACHOMATIS, BACTERIAL VAGINOSIS AND TRICHOMONAS VAGINALIS

NO

TREAT FOR BACTERIAL VAGINOSIS AND TRICHOMONAS VAGINALIS

Vulval oedema/curd-like discharge, erythema, excoriations present?

YES

TREAT FOR CANDIDA ALBICANS

NO

- Educate and counsel
- Promote condom use and provide condoms
- Offer HIV counselling and testing if both facilities are available

Syndrome-informed treatment

Advantages

- **Simple problem-oriented approach**
- **Avoids costly diagnostics**
- **Treats co-morbid infections**
- **Treatment given at first visit**
- **Easily integrated into routine healthcare**

Bosu WK, Trop Med Int Health 1999;4:114-119; Pettifor et al., Sex Transm Dis 2000;27:371-385

Aim

- **To evaluate the diagnostic validity of syndromic algorithms for CT, GC and TV in a pregnant cohort in Kenya**

Methods

- **Design: Enrollment date from prospective study**
- **Setting: 2 facilities in Western Kenya**
- **Population: HIV-uninfected ♀; >14 years old; >14 weeks gestation**
- **STI symptoms and signs assessed by study nurses**
- **Laboratory methods:**
 - **Wet mount microscopy for TV**
 - **NAAT for CT/GC**

Statistical analysis

- **Excluded participants without baseline STI status documented**
- **Self-reported symptoms and clinical signs per national guidelines**
- **Laboratory diagnosis for CT/GC/TV as gold standard**
- **Assessed:**
 - **Sensitivity**
 - **Specificity**
 - **Positive predictive value (PPV)**
 - **Negative predictive value (NPV)**

Validation of Flowcharts

Gold Standard Reference Test
(Laboratory assay)

Pos Neg

Pos A B

Neg C D

Syndromic flowchart

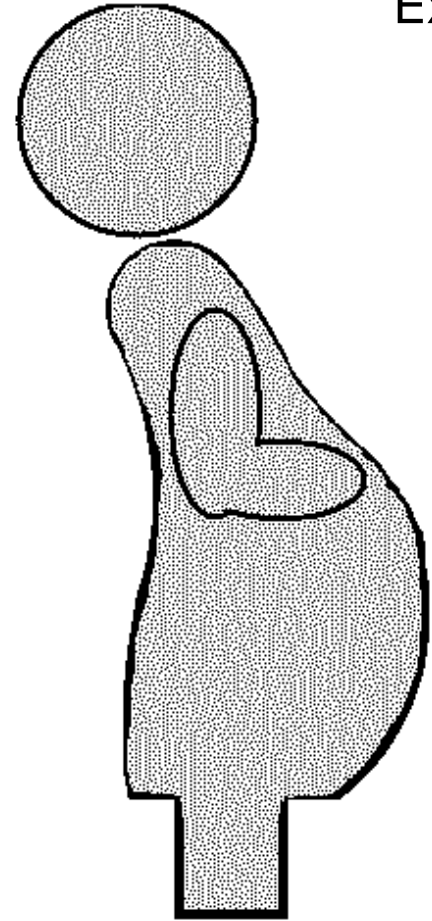
Sensitivity = $A/(A+C)$ **Positive predictive value (PPV)** = $A/(A+B)$

Specificity = $D/(B+D)$ **Positive predictive value (NPV)** = $C/(C+D)$

Results

1,275 (99% of total study population)

Excl. HIV seroconverters (n=25); incomplete STI assessment (n=4)



Results

1,275 (99% of total study population)

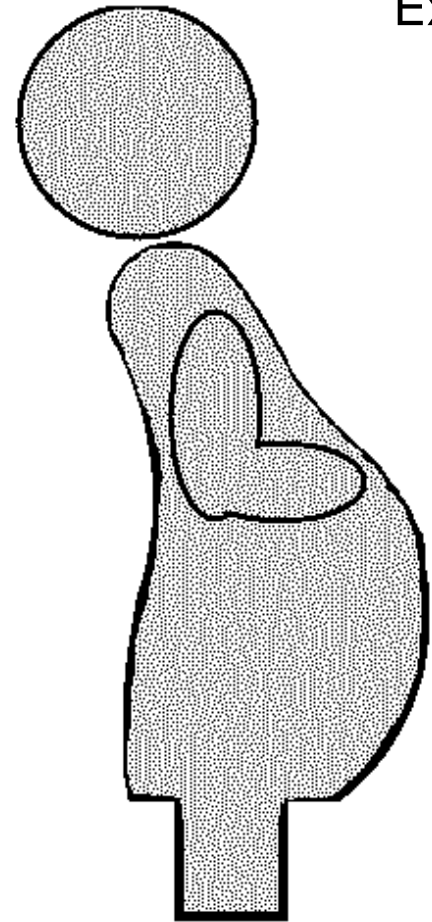
Excl. HIV seroconverters (n=25); incomplete STI assessment (n=4)

- **Median**

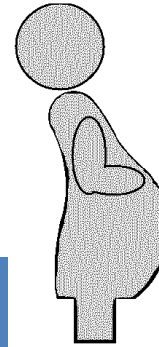
- Age 22 years (IQR 19-27)
- Gestational age 22 weeks (16-26)

- **Frequency**

- 78% married
- 55% reported condomless sex
- 94% reported no prior STIs



1,275



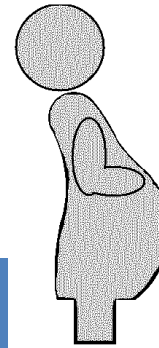
Any STI

163 (13%)

No STI

1,112 (87%)

1,275



Any STI

163 (13%)

No STI

1,112 (87%)

Asymptomatic

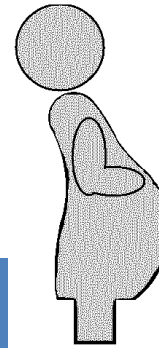
Any STI 75%

CT 74%

GC 91%

TV 66%

1,275



Any STI

163 (13%)

No STI

1,112 (87%)

Self-reported

Abnormal discharge*

20%

9%

Vaginal itching*

18%

12%

Clinically assessed¹

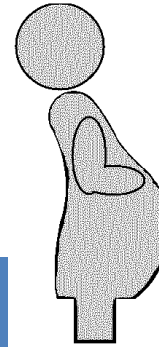
Any signs*

19%

10%

* $p < 0.05$; ¹ Clinically assessed signs include abnormal vaginal discharge and cervical mucopus

1,275



Any STI

163 (13%)

No STI

1,112 (87%)

Self-reported	CT	GC	TV	
Abnormal discharge	17%	9%	29%	9%
Vaginal itching	17%	9%	25%	12%
Clinically assessed ¹				
Any signs	16%	9%	24%	10%

¹ Clinically assessed signs include abnormal vaginal discharge and cervical mucopus

Performance of Syndromic Algorithms

Approach	Sensitivity	Specificity	PPV	NPV
Self-reported symptoms only¹	25%	84%	19%	88%

¹ Self-reported symptoms include abnormal vaginal discharge and vaginal itching

Performance of Syndromic Algorithms

Approach	Sensitivity	Specificity	PPV	NPV
Self-reported symptoms only¹	25%	84%	19%	88%
Clinical signs only²	19%	89%	21%	88%

¹ Self-reported symptoms include abnormal vaginal discharge and vaginal itching

² Clinically assessed signs include abnormal vaginal discharge and cervical mucopus

Performance of Syndromic Algorithms

Approach	Sensitivity	Specificity	PPV	NPV
Self-reported symptoms only¹	25%	84%	19%	88%
Clinical signs only²	19%	89%	21%	88%
Clinical signs & self-reported symptoms^{1,2}	61%	52%	22%	86%

¹ Self-reported symptoms include abnormal vaginal discharge and vaginal itching

² Clinically assessed signs include abnormal vaginal discharge and cervical mucopus

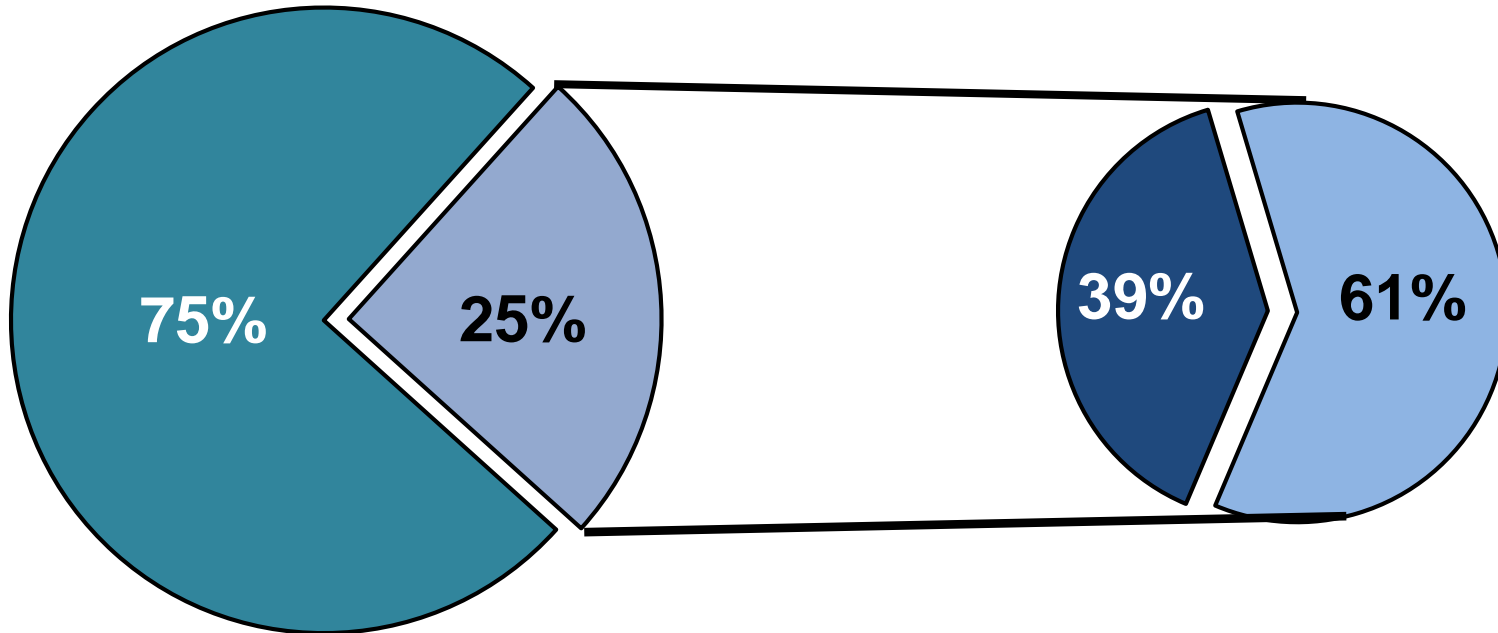
Performance of Syndromic Algorithms

STI	Sensitivity	Specificity
CT	61%	51%
GC	67%	50%
TV	67%	52%

Performance of Syndromic Algorithms

All women with laboratory confirmed STIs
(n=163)

All symptomatic women with laboratory confirmed STIs
(n=41)



■ No self-reported symptoms
■ Self-reported symptoms

■ No clinical signs
■ Clinical signs

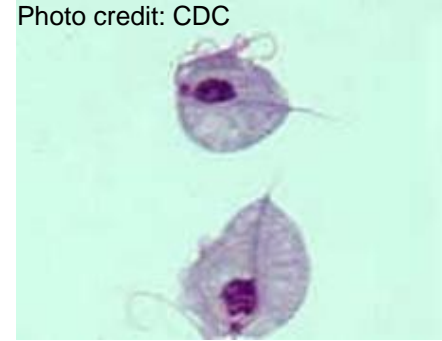
Main findings & Implications

- **Appreciable STI prevalence, frequently asymptomatic**
- **Low sensitivity with syndromic diagnosis**
- **Missed opportunities for clinical intervention**
- **Improved, accessible STIs diagnostics are needed**

Limitations

- **Only CT, GC, and TV included**
- **Wet mount – low sensitivity**
 - TV prevalence likely underestimated

Photo credit: CDC



Garber et al (2005)

Conclusions

- Prevalence of STIs in pregnancy was common
- Improved detection of asymptomatic infections is needed
- Effective STI management could improve maternal health outcomes

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