Identifying cervical infection among pregnant women in Nairobi, Kenya: limitations of risk assessment and symptom-based approaches

T Thomas, S Choudhri, C Kariuki, S Moses

Objectives: To examine characteristics of pregnant women associated with cervical infection, and to evaluate the accuracy of symptom-based and risk assessment systems which have been developed for identifying cervical infection in antenatal women.

Methods: Interviews were conducted and physical examinations performed on 291 consecutive antenatal clinic attenders in Nairobi, Kenya. Vaginal, cervical, urinary and blood specimens were also obtained for analysis.

Results: The following disease prevalences were observed: candidiasis 26.2%; trichomoniasis 19.9%; bacterial vaginosis 20.6%; any vaginal infection 53.8%; chlamydial cervicitis (CT) 8.8%; gonococcal cervicitis (GC) 2.4%; any cervical infection 10.8%. The only statistically significant association with GC and/or CT cervical infection was the presence of cervical friability (OR = 2.1, P = 0.05). There were trends towards associations with the presence of endocervical mucopur (OR = 2.6, P = 0.06), reporting a new sex partner in the past 3 months (OR = 2.2, P = 0.16) and reporting that a sex partner had an STD-related symptom (OR = 4.4, P = 0.13). There were no associations with other demographic, behavioural or medical characteristics. Risk scores previously developed for detecting GC/CT cervicitis in developing country antenatal populations generally performed poorly.

Conclusions: The prevalences of vaginal and cervical infection observed were extremely high among these “low risk” women. Owing probably to high levels of vaginal infection and to behavioural characteristics of this urban population, factors which elsewhere have been associated with cervical infection were not found to be so in this setting. Further work on symptom-based approaches and risk assessment for STD case detection in pregnant women is required before STD management recommendations can be generalised.

Keywords: STD case management; antenatal women; risk assessment; developing countries

Introduction

The detection and management of sexually transmitted diseases (STDs) in individuals who present to health facilities is an important component of STD control strategies. Early diagnosis and effective treatment reduces an individual’s infectivity, and contact with a health provider provides opportunity for advice on the importance of reducing risk-taking behaviour and for ensuring that partners are effectively treated. Effective management should be provided at the point of first contact with the health system, and extend throughout all health facilities offering care. As many women in developing countries routinely attend antenatal, family planning, and maternal and child health clinics, there are potentially important opportunities in these settings to detect and effectively manage STDs. There is therefore a great deal of interest at the present time in attempting to integrate STD-related services into women’s health care.

Because of the general lack of adequate laboratory facilities and the difficulties in making accurate specific clinical diagnoses, simplified STD management algorithms, using syndromic approaches, have been developed and implemented in many African countries. Patients presenting to health facilities are diagnosed and treated on the basis of their presenting symptoms, with some or all of the aetiological possibilities covered in a standardised manner. Guidelines using simple algorithms have been developed by the World Health Organization and others. To identify individuals with asymptomatic infection and in some situations to improve the accuracy of algorithms for syndromic STD management, there are two additional options. One is to apply risk assessment, in which risk scores are developed based on a combination of characteristics associated with the individual, with these scores used to predict the presence of infection. The second is to include simple “bedside” biological tests to improve diagnostic accuracy, such as the leukocyte esterase dipstick test (LED) to predict gonococcal or chlamydial urethral infection in men and cervical infection in women. Unfortunately, little evaluation of the validity of these approaches has been undertaken. Furthermore, as validity will likely vary with different populations, evaluation is required in a variety of settings. As cervical infection is a source of considerable morbidity among women, we examined the potential value of risk assessment and a symptom-based
approach in detecting cervical infection among a population of antenatal clinic attenders in Nairobi, Kenya.

Methods
The study was conducted in June and July 1994 among 291 consecutive women attending an antenatal clinic operated by the Nairobi City Council serving a low socio-economic status population. After obtaining informed consent, demographic and behavioural information was collected, as well as a medical history. Abdominal and pelvic examinations were then performed. After insertion of an un lubricated speculum, the cervix was cleaned using a large cotton swab and examined for the presence of cervical ectopy or ulceration. Vaginal material was obtained from the lateral fornix for wet preparation. A sterile dacron swab was then placed in the endocervix and rotated to obtain a specimen for the leukocyte esterase dipstick test. This specimen was also assessed for mucopurulence and induced bleeding (friability). Subsequent endocervical swabs were obtained for gram stain and culture for Neisseria gonorrhoeae and for Chlamydia trachomatis enzyme immunoassay (Syva MicroTrak Chlamydia EIA, Syva, San Jose, USA).

The endocervical swab for LED testing was placed in a 1-5 ml tube containing 8 drops of normal saline and then agitated. The LE dipstick (Urastix, Miles Canada, Etobicoke, Canada) was then placed in the solution and after two minutes read against the colour standards of the manufacturer. An LED test was also performed on a specimen of first catch urine. After pre-test counselling, blood specimens were obtained for syphilis serology by the rapid plasma reagin test (Macro-Vue RPR Card Tests, Becton Dickinson International, Meylan, France) and HIV serology (Detect HIV 1/2, BioChem ImmunoSystems, Montréal, Canada). Positive RPR tests were confirmed by a Treponema pallidum haemagglutination test (THPA Test Kits, Biotec Laboratories, Ipswich, UK), and positive HIV serology by a second EIA (Recomblgen HIV 1/2, Cambridge Biotech, Galway, Ireland). Women were asked to return one week later for the results of their tests, and those testing positive were counselled and treated according to the recommended guidelines of the Kenyan Ministry of Health. Five women declined a pelvic examination and were excluded from analysis.

Wet preparations were made up by placing vaginal swabs into 0-2 ml of normal saline and putting a drop of the resulting solution onto a slide for microscopic examination. Trichomonas vaginalis infection (trichomoni asis) was defined as the presence of motile trichomonads on wet preparation. Bacterial vaginosis was defined as the presence of clue cells constituting greater than 20% of all vaginal epithelial cells in high power fields.11 Vaginal pH was measured and the amine odour test on vaginal fluid placed in 10% potassium hydroxide solution was also performed, but as these tests did not alter the diagnostic yield based on the presence of clue cells alone, only the clue cell data are reported. Candida albicans infection (candidiasis) was defined as the presence of yeasts or budding yeast forms on wet preparation, after adding one drop of potassium hydroxide solution. Cultures for N. gonorrhoeae were performed on Thayer-Martin media, and incubated and identified according to standard techniques. Chlamydia EIA, and HIV and syphilis serological tests, were performed according to the manufacturers’ instructions.

Results
The mean age of the study population was 23.6 years (SD 4.8 years), 88.5% of women were married, 71.0% reported more than one lifetime sex partner and 7.0% reported a new sex partner within the previous three months. There were 18.5% of women reporting the symptom of vaginal discharge, 9.1% reporting dysuria, 17.1% vaginal itching and 37.4% lower abdominal pain. Approximately 3% of the women reported STD-related symptoms in their male sex partner. Only one woman reported receiving money for sex and only one woman reported condom use within the previous three months. The prevalences of vaginal infection, cervical infection, syphilis and HIV-1 infection are shown in table 1. Over half of the women had at least one type of vaginal infection and many had more than one simultaneously. Almost 11% of the women had either gonococcal or chlamydial cervicitis, and one woman had a dual cervical infection. Of the 31 women with cervical infection, 17 (55%) also had at least one vaginal infection. There was no statistical association, however, between the presence of cervical infection and the presence of vaginal infection. Over 3% of the women were sero-reactive for syphilis and almost 10% were infected with HIV-1. Small numbers had genital ulcers or genital warts. Overall, 37% of the women had at least one sexually transmitted disease (candidiasis and bacterial vaginosis excluded), and almost one-third had an STD that was treatable.

Table 2 examines various potential risk factors for their association with cervical infec-

<table>
<thead>
<tr>
<th>Table 1  Prevalence of vaginal and cervical infections, as well as other sexually transmitted diseases, among antenatal clinic attenders (N = 286)</th>
<th>Number</th>
<th>Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaginal infection:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Candidiasis</td>
<td>75</td>
<td>26-2%</td>
</tr>
<tr>
<td>Trichomoniasis</td>
<td>57</td>
<td>19-9%</td>
</tr>
<tr>
<td>Bacterial vaginosis</td>
<td>59</td>
<td>20-6%</td>
</tr>
<tr>
<td>Any vaginal infection</td>
<td>154</td>
<td>53-8%</td>
</tr>
<tr>
<td>Cervical infection:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chlamydial cervicitis</td>
<td>25</td>
<td>8-8%</td>
</tr>
<tr>
<td>Gonococcal cervicitis</td>
<td>7</td>
<td>2-4%</td>
</tr>
<tr>
<td>Any cervical infection</td>
<td>31</td>
<td>10-8%</td>
</tr>
<tr>
<td>Other STDs:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active syphilis (positive RPR and TPHA)</td>
<td>9</td>
<td>3-1%</td>
</tr>
<tr>
<td>HIV-1 infection</td>
<td>26</td>
<td>9-1%</td>
</tr>
<tr>
<td>Genital ulcer</td>
<td>3</td>
<td>1-1%</td>
</tr>
<tr>
<td>Genital warts</td>
<td>9</td>
<td>3-1%</td>
</tr>
<tr>
<td>Any STD*</td>
<td>107</td>
<td>37-4%</td>
</tr>
<tr>
<td>Any treatable STD†</td>
<td>90</td>
<td>31-5%</td>
</tr>
</tbody>
</table>

*Candidiasis and bacterial vaginosis excluded.
†Trichomoniasis, chlamydial cervicitis, gonococcal cervicitis, genital ulcer or active syphilis.
Table 2  Characteristics of antenatal clinic attenders with and without gonococcal and/or chlamydial cervical infection (N = 286)

<table>
<thead>
<tr>
<th>Risk determinants:</th>
<th>Infected (N = 31)</th>
<th>Uninfected (N = 255)</th>
<th>Odds Ratio</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age &lt; 25 years</td>
<td>74.2%</td>
<td>62-0%</td>
<td>1.8</td>
<td>0.13*</td>
</tr>
<tr>
<td>Unmarried status</td>
<td>9.7%</td>
<td>11.8%</td>
<td>0.8</td>
<td>NS</td>
</tr>
<tr>
<td>&gt; 1 sex partner in past 3 months</td>
<td>9.7%</td>
<td>67.0%</td>
<td>1.5</td>
<td>NS</td>
</tr>
<tr>
<td>&gt; 1 lifetime sex partner</td>
<td>74.2%</td>
<td>70.6%</td>
<td>1.2</td>
<td>NS</td>
</tr>
<tr>
<td>New sex partner in past 3 months</td>
<td>12.9%</td>
<td>63.0%</td>
<td>2.2</td>
<td>0.16*</td>
</tr>
<tr>
<td>Partner has STD-related complaint</td>
<td>6.5%</td>
<td>17.0%</td>
<td>4.1</td>
<td>0.04*</td>
</tr>
<tr>
<td>No other pregnancy within 5 years</td>
<td>3.2%</td>
<td>3.5%</td>
<td>0.9</td>
<td>NS</td>
</tr>
<tr>
<td>Never used condom</td>
<td>10.0%</td>
<td>5.1%</td>
<td>2.1</td>
<td>0.23*</td>
</tr>
</tbody>
</table>

Signs:
- Vaginal discharge: 9.4% 18.4% 1.0 NS
- Dysuria: 9.7% 9.0% 1.1 NS
- Vaginal itch: 12.9% 17.0% 0.7 NS
- Lower abdominal pain: 35.5% 37.4% 1.0 NS
- Dyspareunia: 22.6% 18.0% 1.3 NS

LED test result:
- On cervical swab, > trace: 87.1% 80-6% 1.6 NS
- On urine, > trace: 33.3% 33.7% 1.0 NS

By Fisher’s Exact Test.

Table 3  Symptoms and LED test results among antenatal clinic attenders with and without vaginal infection (N = 286)

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Infected</th>
<th>Uninfected</th>
<th>Odds Ratio</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Candidiasis:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vaginal discharge</td>
<td>25.3%</td>
<td>16-1%</td>
<td>2.5</td>
<td>0.11</td>
</tr>
<tr>
<td>Vaginal itch</td>
<td>26.7%</td>
<td>13.7%</td>
<td>2.3</td>
<td>0.02</td>
</tr>
<tr>
<td>Vaginal discharge and/or itch</td>
<td>41.3%</td>
<td>22-3%</td>
<td>2.5</td>
<td>0.002</td>
</tr>
<tr>
<td>Dyspareunia</td>
<td>20.0%</td>
<td>18.0%</td>
<td>1.1</td>
<td>NS</td>
</tr>
<tr>
<td><strong>Trichomoniasis:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vaginal discharge</td>
<td>26.3%</td>
<td>16-6%</td>
<td>1.8</td>
<td>0.13</td>
</tr>
<tr>
<td>Vaginal itch</td>
<td>21.1%</td>
<td>16-2%</td>
<td>1.4</td>
<td>NS</td>
</tr>
<tr>
<td>Vaginal discharge and/or itch</td>
<td>33.3%</td>
<td>25-8%</td>
<td>1.4</td>
<td>NS</td>
</tr>
<tr>
<td>Dyspareunia</td>
<td>26.3%</td>
<td>16-6%</td>
<td>1.8</td>
<td>0.13</td>
</tr>
<tr>
<td><strong>Bacterial vaginosis:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vaginal discharge</td>
<td>15.3%</td>
<td>19-4%</td>
<td>0.8</td>
<td>NS</td>
</tr>
<tr>
<td>Vaginal itch</td>
<td>18.6%</td>
<td>16-7%</td>
<td>1.1</td>
<td>NS</td>
</tr>
<tr>
<td>Vaginal discharge and/or itch</td>
<td>25.4%</td>
<td>27-8%</td>
<td>0.9</td>
<td>NS</td>
</tr>
<tr>
<td>Dyspareunia</td>
<td>22.0%</td>
<td>17-6%</td>
<td>1.3</td>
<td>NS</td>
</tr>
<tr>
<td><strong>Candidiasis and/or trichomonias:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vaginal discharge</td>
<td>25.2%</td>
<td>14-0%</td>
<td>2.1</td>
<td>0.05</td>
</tr>
<tr>
<td>Vaginal itch</td>
<td>25.2%</td>
<td>12-9%</td>
<td>2.1</td>
<td>0.05</td>
</tr>
<tr>
<td>Vaginal discharge and/or itch</td>
<td>37.4%</td>
<td>20-5%</td>
<td>2.3</td>
<td>0.003</td>
</tr>
<tr>
<td>Dyspareunia</td>
<td>22.6%</td>
<td>15-8%</td>
<td>1.6</td>
<td>0.19</td>
</tr>
</tbody>
</table>

LED test result in association with any vaginal infection:
- On cervical swab, > trace: 90.1% 71-0% 3.7 < 0.001
- On urine, > trace: 44.4% 20-6% 3.1 < 0.001

Only 214 women had LED tests performed on urine.

Table 4  Performance of previously developed algorithms in predicting gonococcal and/or chlamydial cervical infection among antenatal women in Nairobi, Kenya

<table>
<thead>
<tr>
<th>Zaire algorithm, 1993*</th>
<th>GCCT+</th>
<th>GCCT−</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score+</td>
<td>5</td>
<td>46</td>
<td>51</td>
</tr>
<tr>
<td>Score−</td>
<td>22</td>
<td>141</td>
<td>163</td>
</tr>
<tr>
<td>Totals</td>
<td>27</td>
<td>187</td>
<td>214</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>19%</td>
<td>72%</td>
<td>0.27</td>
</tr>
<tr>
<td>Specificity</td>
<td>75%</td>
<td>74%</td>
<td>0.001</td>
</tr>
<tr>
<td>Positive predictive value</td>
<td>10%</td>
<td>16%</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Mwanza *Kisu* algorithm‡

<table>
<thead>
<tr>
<th>GCCT+</th>
<th>GCCT−</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score+</td>
<td>4</td>
<td>32</td>
</tr>
<tr>
<td>Score−</td>
<td>27</td>
<td>233</td>
</tr>
<tr>
<td>Totals</td>
<td>31</td>
<td>255</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>13%</td>
<td>46%</td>
</tr>
<tr>
<td>Specificity</td>
<td>87%</td>
<td>84%</td>
</tr>
<tr>
<td>Positive predictive value</td>
<td>11%</td>
<td>11%</td>
</tr>
</tbody>
</table>

*From Reference 5.
‡From Reference 6.

Vaginosis: No demographic, historical or behavioural factors were significantly associated with cervical infection, although there were trends towards associations with a partner having an STD-related complaint and reporting a new sex partner in the previous three months. However, as noted above, very few women reported partners having STD-related complaints (2-1%) or a new sex partner in the previous three months (7-0%). None of the symptoms of vaginal discharge, dysuria, vaginal itch, lower abdominal pain or dyspareunia were associated with cervical infection, and the only signs on physical examination which were associated with cervical infection were the presence of cervical friability or of endocervical mucopus. Neither the LED test on urine nor on cervical secretions were associated with cervical infection. On logistic regression analysis, there were trends towards associations with cervical infection for only the presence of endocervical mucopus (odds ratio 3-0, 95% confidence interval 0-9—9-0, P = 0-06) and for cervical friability (odds ratio 1-9, 95% confidence interval 0-9—4-5, P = 0-11).

On the other hand, as shown in table 3, vaginal infections, particularly candidiasis and/or trichomoniasis, were associated with the presence of symptoms. Vaginal discharge and/or itch were associated with candidiasis, and there was a trend towards vaginal discharge being associated with trichomoniasis. Both vaginal discharge and itch were associated with the presence of candidiasis and/or trichomoniasis. Furthermore, a positive LED test on either urine or cervical secretions was strongly associated with the presence of vaginal infection, although many uninfected women also had positive LED tests. Among women without evidence of vaginal infection, there was a trend towards an association between a positive urine LED test and the presence of cervical infection (odds ratio 2-5), but there were only 14 women without vaginal infection who had cervical infection, and this association did not reach statistical significance (95% confidence interval 0-7—8-6, P = 0-13).

The accuracy of the WHO algorithm for identifying cervical infection among women with discharge (without a specimen examination) was evaluated on the 53 women (18-5%) who complained of vaginal discharge. Six of these women (11-1%) had either gonococcal or chlamydial infection, similar to the prevalence of cervical infection among asymptomatic women. According to the WHO algorithm, risk assessment is considered positive (and treatment provided for gonococcal and chlamydial cervical infection) if two or more of the following factors are present: age less than 21 years, unmarried status, report of more than one sex partner, and report of a new sex partner within the past three months. In this population, the sensitivity of the algorithm was 50% (3/6), the specificity 79%
Cervical infection in women in Kenya

(37/47) and the positive predictive value 12% (3/13).

Table 4 shows the accuracy in this population
of risk assessment algorithms developed in two other African countries for predicting
the presence of gonococcal and/or chlamydial
cervical infection in pregnant women. In the
Zairian algorithm,1 points are allocated as follows: 5 for unmarried status, 10 for reporting
more than one sex partner in the past year, 14
for age under 25, 11 for age 25–34, 1 for
reporting vaginal discharge, 1 for reporting
lower abdominal pain, 10 for a 1 + LED test, 12
for a 2 + LED test and 15 for a 3 + LED test.
Those women with scores over 28 are considered to have a cervical infection. We
only enquired as to new sex partners in the
previous three months, so had to use that
parameter as a surrogate for sex partners in
the past year. The sensitivity of the risk score
in identifying cervical infection in the Zaian
population was 72%, but in our population
only 19%. Specificities were about 75% in
both populations and positive predictive values
were both low. Several potential risk scores have been proposed previously in work in
Mwanza, Tanzania, but the one that performed
best in our population was a simplified risk
assessment algorithm designated “R1sim”.6 In this algorithm, points are allocated
as follows: 1 for age less than 25 years, 1
for being unmarried (or in a polygamous
marriage), 1 for having ever given birth previously, 1 for the last child having been born over five
years previously, and 1 for reporting more
than one sex partner in the previous year.
Those women with scores greater than or
equal to 3 are considered to have a cervical
infection. Again, we considered new sex part-
ners in the previous three months instead of
the previous year as a risk factor, and as we
had not asked systematically about previous
children, we did not use a history of previous
births as a risk factor, and therefore employed a
cut-off of 2 rather than 3. The sensitivity of
this risk score in identifying cervical infection in the Tanzanian population was 46%, but
in our population only 13%. Again, specificities
were high (both over 80%) and positive pre-
dictive values low.

Discussion

The prevalences found in this study of vaginal
and cervical infection, and of STDs in general,
were extremely high for what is often consid-
ered a “low risk” population. Although chlamydia EIA tests were not confirmed by a
blocking antibody assay, in a recent evaluation
of the Syva Micro Trak EIA system for detect-
ing chlamydial infection, only 6% of EIA posi-
tive specimens were not confirmed by blocking assay, and in half of these, organisms
were detected by direct fluorescent-antibody
analysis, suggesting that they were in fact true
positives.12 It is unlikely therefore that the
prevalence of chlamydial infection was signifi-
cantly over-estimated. On the other hand, as
only one cervical specimen was taken from
each woman for gonorrhoea culture, the fre-
quency of gonorrhoea in the population may
indeed have been under-estimated.

Two approaches, aetiology-based and clini-
cal assessment-based, have traditionally been
used by health care providers in managing
STDs. Management on the basis of aetiology
is the ideal approach, but requires laboratory
facilities, which are generally not available in
the resource-poor settings found in many
developing countries. Furthermore, because
of travel costs and for other reasons, patients
often do not return for follow-up to obtain
their results. The clinical diagnostic approach
obviates the need for a laboratory, but studies
have shown that even highly experienced clini-
cians fail to make the correct diagnosis and/or
miss concurrent infections in a significant
number of cases. In a Kenyan study of men
with gonococcal and non-gonococcal genital
discharges, 19% were incorrectly classified on
the basis of clinical criteria.13 In a South
African study of 100 men and 100 women
with genital ulcers,14 clinicians correctly iden-
tified only about one-third of the cases of
chancroid or syphilis in men, and about one-
half of cases in women, and less than 10% of
mixed infections. Thus, syndromic approaches to identifying sexually transmitted
infections in symptomatic individuals have
been developed, and risk assessment, using
demographic and behavioural information to
predict the likelihood of infection, has been
advocated for identifying infection among
asymptomatic individuals.1–4

Unfortunately, in this study, there were
very few demographic or behavioural risk fac-
tors identified which were associated with the
presence of cervical infection. Most of the
antenatal women in the study were married
and reportedly monogamous. This is consist-
tent with previous findings from Kenya that it
is primarily the behaviour of their male sex
partners which puts married women in Kenya
at risk of STDs.15 Previous studies from Zaire6
and Tanzania4 have identified the demo-
graphic factors of young age (under 25) and
being unmarried as important risk factors for
cervical infection in antenatal women, and
these two factors have been key ones in driv-
ning the development of risk scores for pre-
dicting the presence of cervical infection. As
these two factors were not associated with cer-
vical infection in our population, it is not sur-
prising that the scoring systems developed in
Zaire and Tanzania did not perform well. The
presence of vaginal discharge and a positive
LED test, which were predictive of cervical
infection in Zaire (and to a lesser extent in
Tanzania) were also not associated with cervi-
cal infection in our population, but rather
were associated with vaginal infection, which
was extremely common. It is thus likely that
the presence of vaginal infection overwhelmed
any effect of cervical infection on the LED
test. The best predictors of cervical infection
in our population were the presence of cervical
fraility or endocervical mucus, similar to
previous findings reported from Kenya.4 Most
health practitioners would likely diagnose cer-
vical infection on the basis of these signs, but
they are only useful in situations where speculum examinations can be performed. This unfortunately is not the case in most primary care settings in sub-Saharan Africa.

Treating all women with vaginal discharge for cervical infection, as is recommended in some syndromic approaches, would in this population have entailed treating 19% of the population, and would still have missed 81% of all cervical infections. Using the combination of symptoms and risk assessment recommended in the current WHO guidelines for women presenting to a health provider with vaginal discharge would have entailed treating about 5% of the population, but would have missed 90% of all cervical infections.

The detection and management of cervical infection in women, whether they have symptoms or not, is a difficult challenge. Further work on risk assessment and symptom-based approaches to case detection among antenatal women is required before guidelines can be generalised. As the behaviour of male partners may be an important factor predictive of risk for STDs in some populations of women, measures of perceived male risk behaviour should be evaluated in this respect and perhaps incorporated into risk scoring systems. It may also turn out that different risk scores will be required in different geographical locations, and that local research will therefore have to be conducted before specific recommendations can be made. If this is so, then the use of risk assessment for antenatal women may prove to be impracticable. However, syndromic approaches and risk assessment may have more validity in other accessible populations of women, such as family planning clinic attenders and women who present to health facilities specifically because of genital tract symptoms such as vaginal discharge, dysuria or lower abdominal pain. More research on STD case detection in such populations, including the use of syndromic approaches and risk assessment, is urgently required. As has been observed in the past, the burden of STDs and reproductive tract infections among African women is great, and little progress has been made in reducing it.


