RISK FACTORS FOR TRICHOMONIASIS AMONG WOMEN WITH HUMAN IMMUNODEFICIENCY VIRUS (HIV) INFECTION AT A PUBLIC CLINIC IN LOS ANGELES COUNTY, CALIFORNIA: IMPLICATIONS FOR HIV PREVENTION

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Abstract. Persons with human immunodeficiency virus (HIV) infection who subsequently develop an acute sexually transmitted disease have an increased probability of transmitting HIV. Therefore, characterizing such persons can help direct prevention efforts to a group who are likely to be continuing sources of HIV transmission. We assessed the incidence and factors associated with trichomoniasis in a cohort of HIV-infected women receiving care at a public clinic in Los Angeles County, California from 1992 through 1995. Demographic, clinical, and behavioral data were available from medical records and from patient interviews. Trichomonas infection was the most frequently identified sexually transmitted disease and was found in 37 (17.4%) of 212 women representing a crude incidence rate of 14.1 per 100 person-years experience. The crude rate of trichomoniasis was highest in black women (69.0 per 100 person-years), women with a history of trading sex for drugs or money (51.0 per 100 person-years), those using crack or cocaine (35.5 per 100 person-years), women with four or more sex partners (43.0 per 100 person years), and those born in the United States (23.3 per 100 person-years). Among women with severe immunosuppression (CD4+ count < 200), 18.4% (18 of 98) were diagnosed with trichomoniasis. After multivariate analysis using a Cox proportional hazards approach, black race (adjusted rate ratio [RR] = 5.6, 95% confidence interval [CI] = 2.3, 13.3) continued to be strongly associated with Trichomonas infection. Trading sex for money or drugs (adjusted RR = 25.2, 95% CI = 4.3, 148.6) and single marital status (adjusted RR = 3.7, 95% CI = 1.1, 13.0) were independent risk factors for trichomoniasis in nonblack women but not among black women. Data from this study indicate that Trichomonas may be a frequently acquired infection in HIV-positive women. Our findings suggest that HIV-infected women who are black, and nonblack women who trade sex for money or drugs or are unmarried, are at increased risk of trichomoniasis and therefore may be more likely to transmit HIV infection. Local HIV prevention strategies should target such women for intervention efforts.

Aggressive human immunodeficiency virus (HIV) infection prevention efforts must involve many different methods of interrupting disease transmission. One such approach is the identification and targeting of persons who may be more likely to transmit HIV infection. Persons with recognized HIV infection who subsequently develop a sexually transmitted disease (STD) are one such group. The occurrence of an acute STD provides direct evidence of the practice of unprotected sex. Moreover, concurrent STDs, both ulcerative and nonulcerative, in an HIV-infected person may increase the risk of HIV transmission to an uninfected partner. Therefore, characterizing persons with HIV infection who subsequently develop an STD can help in the targeting of educational efforts to a group with a higher probability of transmitting HIV.

One common STD, particularly affecting women, is infection with Trichomonas vaginalis. Trichomonas infection can induce both lesions and infiltration of leukocytes in the genital area. Such pathology may amplify the risk of HIV transmission by both increasing the portal of entry for HIV in an uninfected person or by expanding the portal of exit for the virus in an HIV-infected individual. Two cross-sectional studies in Africa have demonstrated an association between Trichomonas and HIV infection in women, and a single prospective study implicated Trichomonas as a risk factor for subsequent HIV infection among women in Kinshasa, Zaire. Despite the possible importance of Trichomonas in the transmission dynamics of HIV, there is a paucity of information on the prevalence and incidence of Trichomonas infection, especially in areas heavily affected by HIV and few data exist on the occurrence of infection with this important agent among women after they have become HIV-infected. We assessed the incidence and risk factors for trichomoniasis in a cohort of HIV-infected women receiving care at a public outpatient clinic in Los Angeles County, California.

PATIENTS AND METHODS

Patients. Data were available from review of the medical records of HIV-infected women ≥ 13 years of age receiving medical care at the largest HIV outpatient clinic in Los Angeles County as part of the Centers for Disease Control and Prevention (CDC) Adult/Adolescent Spectrum of Disease Study. This site, which provides routine care to HIV-infected patients, is the largest HIV outpatient clinic in the county and reports approximately 21% of all local cases of acquired immunodeficiency syndrome (AIDS) in women. The population in the geographic catchment area for this clinic is predominantly minority with Latinos comprising 64%, blacks 6%, Asian and other groups 11%, and whites 9%. The facility provides comprehensive care and serves as a primary care provider. Beginning in January 1992, all HIV-infected women were enrolled from this facility. Women were targeted at this site as a way of increasing the representation of women in both the local and national (CDC-
sponsored) sample. Trained medical records technicians re-
view medical records for basic demographic data, HIV-ex-
posure category, AIDS-defining conditions, CD4+ lympho-
cyte count, and the occurrence of other infections and con-
ditions including trichomoniasis. Routine screening for
Trichomonas infection is not performed. The medical record
is was re-reviewed at six-month intervals. Trichomoniasis
was defined as T. vaginalis infection confirmed through di-
rect microscopy or cytology (Pap smear). Culture for Trich-
omonas is not routinely performed at this facility.

After approval of the primary care provider, all women
are asked to complete a standardized 45-min interview as
part of the CDC Supplement to HIV-AIDS Surveillance Pro-
ject.10 The questionnaire is administered by trained inter-
viewers and includes information on demographics, drug
use, sexual behavior, and access to medical and social ser-
vices. Participants are interviewed a single time.

Human Subject Protection Committee approval was ob-
tained from a federally assured Institutional Review Board.
Informed consent, including consent to link medical record
information with data from patient interview, was obtained
from each participant. Racial identification was based on
self-report.

Statistical analysis. Data from the medical record review
were linked to data obtained from patient interview. Risk
factors assessed included CD4+ lymphocyte count/µL (<
100, 100–300, and > 300), age group (13–24, 25–34, 35–
44, and > 44 years), and HIV risk group (heterosexual con-
tact, injection drug use, transfusion, or none identified) from
the medical record and race/ethnicity (white, black, Latino,
or other), country of origin (United States or foreign born),
marital status, education (< 12 years, 12 years, or > 12
years), income (< $10,000 or ≥ $10,000), drug use (crack
or cocaine, other drugs, or none), exchanging sex for money
or drugs, and number of sex partners (in the previous five-
year period) from the interview. The denominator for cal-
culation of rates was person-years. The amount of person-
time contributed by each patient was determined from time
of study entry to first occurrence of Trichomonas infection
or, for women without trichomoniasis, date of last contact
with the facility or date of death.

Assessment of factors associated with trichomoniasis was
completed for those women for whom data were also avail-
able from an interview. Initial bivariate analysis was con-
ducted for the available demographic and behavioral factors.
The chi-square test, Mantel-Haenszel chi-square test, and
Mantel-Haenszel chi-square test for trend were used to as-
sess apparent differences. Multivariate analysis used a Cox
proportional hazards approach to control for potential con-
 founding variables and to assess interactions. Separate mod-
els were created for each independent variable. The software
program EGRET (Statistics and Epidemiology Research
Corporation, Seattle, WA) was used for all multivariate anal-
yses. Variable selection for the final Cox model was based
on the change in estimate criterion.11 Specifically, if addition
of a covariate altered the rate ratio by greater than 10%, it
was then included in the model. Interaction terms were add-
ed to the model based on biologic plausibility and a score
test \( P \) value < 0.20. Adjusted rate ratios (RRs), 95% confi-
dence intervals (CIs), limits, and \( P \) values were calculated.
Attributable fractions or the proportion of trichomoniasis at-
tributable to each exposure were computed. To evaluate the
adequacy of the Cox model, both residual and influence
measures were assessed and results from the Cox analyses
were compared with those obtained using stratified analy-
sis.12

RESULTS

Through the study period medical record review had been
completed for 379 HIV-infected women and interviews had
been conducted with 212 (54%) women who contributed 262
person-years experience. A pending backlog of interviews,
the inability to access women because of illness or death,
patient refusal to participate, and difficulty in locating pa-
ients reduced interview completion rates. The female pop-
ulation obtaining care at this clinic is diverse, with minority
women (black and Latino) accounting for 89%; 33 (15%) con-
tributed to injection drug use. Women who were interviewed
did not differ significantly in demographic and risk charac-
teristics from those who were not interviewed.

Trichomonas infection was the most common STD diag-
nosed and was identified in 37 (17.4%) women, representing
a crude incidence rate of 1.41 per 100 person-years experi-
ence. Nearly 40% of black women were found to be infect-
ed. In contrast, chlamydial (2.9%) and gonococcal infections
(1.6%) were relatively infrequent. Diagnosis of chlamydial
infection at this facility during the study period was done
using an enzyme immunoassay. Bivariate analysis identified
several factors associated with trichomoniasis in this cohort.
The rate of Trichomonas infection was higher among blacks,
never married women, and in women with 12 years of ed-
ucation. (Table 1). Trichomoniasis was also associated with
crack or cocaine use, the trading of sex for money or drugs,
and multiple sex partners (Table 2). Among women with
severe immunosuppression (CD4+ count < 200), 18.4% (18
of 98) were diagnosed with trichomoniasis.

After controlling for other variables through multivariate
analysis, black race continued to be strongly associated with
Trichomonas infection (Table 3). The rate of trichomoniasis
was nearly six times as great in black women than other
racial/ethnic groups. The proportion of trichomoniasis in this
cohort attributable to black race was 46.6%. Trading sex for
money or drugs and single marital status were independent
risk factors for trichomoniasis in nonblack women but not
among black women (Table 3). The rate of trichomoniasis
in nonblack women with a history of trading sex was 25
times greater than in nonblack women without such a his-
tory. Unmarried nonblack women had a rate of Trichomonas
infection that was nearly four times higher than married non-
black women. The proportion of trichomoniasis attributable
to trading sex and to single marital status was 15.6% and
27.6%, respectively. Women who reported crack or cocaine
use (adjusted RR = 1.6, 95% CI = 0.57, 4.31), black women
of low income (adjusted RR = 5.6, 95% CI = 0.72, 44.1),
and nonblack women reporting four or more sex partners
(adjusted RR = 1.8, 95% CI = 0.36, 9.5) had higher adjusted
rates of Trichomonas infection; however, these differences
were not statistically significant.
Data from this study suggest that *Trichomonas vaginalis* may be a frequently acquired infection in women with recognized HIV infection. Our findings suggest that women who are black, and nonblack women who trade sex for money or drugs or who are unmarried are at increased risk of trichomoniasis. These findings suggest that important race-based differences exist in the dynamics of *Trichomonas* transmission among women with HIV infection in Los Angeles.

The substantially elevated rate of trichomoniasis in black women may indicate a high prevalence of *Trichomonas* infection among the sex partners of these women. The finding of a racial association independent of other factors, and the apparent marginal importance of other exposures for black women, would support such a premise. Reliable data are lacking on the prevalence and incidence of community trichomoniasis in Los Angeles County and therefore it is unknown how common *Trichomonas* may be among local black men. However, very high rates (58%) of trichomoniasis exist in the dynamics of *Trichomonas* transmission among sex partners of these women. The finding of a racial association independent of other factors, and the apparent marginal importance of other exposures for black women, would support such a premise. Reliable data are lacking on the prevalence and incidence of community trichomoniasis in Los Angeles County and therefore it is unknown how common *Trichomonas* may be among local black men. However, very high rates (58%) of trichomoniasis among women with recognized HIV infection at a public clinic in Los Angeles County, California, 1992–1995

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Bivariate analysis of selected demographic and clinical factors and trichomoniasis among women with human immunodeficiency virus (HIV) infection at a public clinic in Los Angeles County, California, 1992–1995</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor*</td>
<td>No.</td>
</tr>
<tr>
<td>Race/ethnicity</td>
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<tr>
<td>White</td>
<td>21</td>
</tr>
<tr>
<td>Black</td>
<td>56</td>
</tr>
<tr>
<td>Latino</td>
<td>133</td>
</tr>
<tr>
<td>Asian/other</td>
<td>2</td>
</tr>
<tr>
<td>HIV risk group</td>
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<tr>
<td>Heterosexual</td>
<td>79</td>
</tr>
<tr>
<td>Transfusion</td>
<td>18</td>
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<tr>
<td>IDU</td>
<td>33</td>
</tr>
<tr>
<td>None identified</td>
<td>82</td>
</tr>
<tr>
<td>Age group (years)</td>
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<tr>
<td>13–24</td>
<td>34</td>
</tr>
<tr>
<td>25–34</td>
<td>90</td>
</tr>
<tr>
<td>35–44</td>
<td>57</td>
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<td>&gt;44</td>
<td>31</td>
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<tr>
<td>Education</td>
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</tr>
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<td>&lt;12 years</td>
<td>131</td>
</tr>
<tr>
<td>12 years</td>
<td>50</td>
</tr>
<tr>
<td>&gt;12 years</td>
<td>31</td>
</tr>
<tr>
<td>Income</td>
<td></td>
</tr>
<tr>
<td>≤$10,000</td>
<td>165</td>
</tr>
<tr>
<td>≥$10,000</td>
<td>47</td>
</tr>
<tr>
<td>Marital status</td>
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<td>Yes</td>
<td>84</td>
</tr>
<tr>
<td>No</td>
<td>128</td>
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<tr>
<td>Country of origin</td>
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</tr>
<tr>
<td>United States</td>
<td>93</td>
</tr>
<tr>
<td>Other</td>
<td>119</td>
</tr>
<tr>
<td>CD4 + cell count/µl</td>
<td></td>
</tr>
<tr>
<td>&gt;500</td>
<td>35</td>
</tr>
<tr>
<td>200–400</td>
<td>79</td>
</tr>
<tr>
<td>100–199</td>
<td>32</td>
</tr>
<tr>
<td>&lt;100</td>
<td>66</td>
</tr>
</tbody>
</table>

*IDU = intravenous drug user.
†Test for homogeneity.

### DISCUSSION

The substantially elevated rate of trichomoniasis in black women may indicate a high prevalence of *Trichomonas* infection among the sex partners of these women. The finding of a racial association independent of other factors, and the apparent marginal importance of other exposures for black women, would support such a premise. Reliable data are lacking on the prevalence and incidence of community trichomoniasis in Los Angeles County and therefore it is unknown how common *Trichomonas* may be among local black men. However, very high rates (58%) of trichomoniasis exist among young, inner-city, black men have been noted elsewhere. The association with black race may also reflect decreased use of barrier protection in this population. We did not have reliable information on condom use in this group of women. Alternatively, it is possible that practices, such as douching, which is reportedly more common in black women and can increase susceptibility to infection, could predispose to trichomoniasis and explain the racial association observed. We did not obtain information on the practice of douching in this cohort of women. It is also conceivable that there exists a genetic or racial-based heightened susceptibility to *T. vaginalis* in black women; however, such a phenomenon has not been recognized. Although race is

### TABLE 2

Bivariate analysis of selected behavioral factors and trichomoniasis among women with human immunodeficiency virus infection at a public clinic in Los Angeles County, California, 1992–1995

<table>
<thead>
<tr>
<th>Factor</th>
<th>No.</th>
<th>No. (%) with trichomoniasis</th>
<th>Rate per 100 person-years</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drug use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>147</td>
<td>19 (12.9)</td>
<td>10.0</td>
<td>Referent</td>
</tr>
<tr>
<td>Crack/cocaine</td>
<td>33</td>
<td>12 (36.4)</td>
<td>35.5</td>
<td>0.001</td>
</tr>
<tr>
<td>Other drugs</td>
<td>32</td>
<td>6 (18.8)</td>
<td>15.7</td>
<td>0.028</td>
</tr>
<tr>
<td>No. of sex partners</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;4</td>
<td>181</td>
<td>24 (13.3)</td>
<td>10.4</td>
<td>0.001</td>
</tr>
<tr>
<td>≥4</td>
<td>31</td>
<td>13 (41.9)</td>
<td>43.0</td>
<td>0.001</td>
</tr>
<tr>
<td>Trading sex*</td>
<td>No</td>
<td>189</td>
<td>27 (14.2)</td>
<td>11.1</td>
</tr>
<tr>
<td>Yes</td>
<td>23</td>
<td>10 (43.5)</td>
<td>51.0</td>
<td>0.001</td>
</tr>
<tr>
<td>Prior STD†</td>
<td>No</td>
<td>142</td>
<td>21 (14.8)</td>
<td>12.3</td>
</tr>
<tr>
<td>1</td>
<td>29</td>
<td>6 (20.7)</td>
<td>14.5</td>
<td>0.056</td>
</tr>
<tr>
<td>≥2</td>
<td>41</td>
<td>10 (24.4)</td>
<td>19.8</td>
<td>0.07</td>
</tr>
</tbody>
</table>

* For money or drugs.
† STD = sexually transmitted disease.

### TABLE 3

Factors independently associated with trichomoniasis among women with human immunodeficiency virus infection, Los Angeles County, California, 1990–1995

<table>
<thead>
<tr>
<th>Factor</th>
<th>Adjusted rate ratio*</th>
<th>95% CI†</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Race/ethnicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>5.6</td>
<td>(2.3, 13.3)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Nonblack</td>
<td>Referent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trading sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-black</td>
<td>25.2</td>
<td>(4.3, 148.6)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
<td>Referent</td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>0.98</td>
<td>(0.19, 5.1)</td>
<td>0.89</td>
</tr>
<tr>
<td>No</td>
<td>Referent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single marital status</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Nonblack</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>3.7</td>
<td>(1.1, 13.0)</td>
<td>0.05</td>
</tr>
<tr>
<td>No</td>
<td>Referent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>0.65</td>
<td>(0.18, 2.3)</td>
<td>0.62</td>
</tr>
<tr>
<td>No</td>
<td>Referent</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Adjusted rate ratio computed using Cox proportional hazards model.
† CI = confidence interval.
not a modifiable factor, such as exchanging sex for money, the identification of race as a risk factor can assist in the targeting of education and other intervention efforts.

Among nonblack women, two factors, single marital status and trading sex for money or drugs, were independently associated with trichomoniasis. These findings may indicate that clients of women who trade sex may be more likely to have *Trichomonas* infection. Data from other studies suggest that paying consorts may also be resistant to using condoms. Such factors could increase the risk of trichomoniasis independent of other factors, including, for example, the number of sex partners. The increased rate of *Trichomonas* infection in unmarried, nonblack women observed could be a result of decreased condom use by these women or may reflect a higher prevalence of *Trichomonas* infection in the partners of such women. Marital status has been found to be significantly associated with the level of STD/HIV preventive practices.

Our study did not confirm the findings of a cross-sectional study by Ghys and others, which reported higher rates of *Trichomonas* at lower CD4 cell levels and suggested that *Trichomonas* may be an opportunistic infection among women with HIV.

Trichomoniasis is not a reportable condition in most health jurisdictions and prevalence surveys for STDs often do not include attempts to recover *Trichomonas*. Relatively few current data are available on the occurrence of *Trichomonas* infection in the United States. A large, multicenter study of nearly 14,000 pregnant women found an overall *Trichomonas* prevalence of 12.6%. Among black women, 22.8% were infected and black race was strongly associated with trichomoniasis in multivariate analysis. Cigarette smoking, single marital status, lower educational attainment, and increasing numbers of sexual partners were also identified as risk factors for *Trichomonas* infection. A recent report, which documented the occurrence of STDs in 372 sexually active, inner-city women in Brooklyn, New York, found a high prevalence of *Trichomonas* (27%) in a population that was 92% black. *Trichomonas* was the most frequently identified STD and infection was associated with crack cocaine use and increasing numbers of sex partners. Another study of 279 women, 96% of whom were black, from a public STD clinic in Baltimore, Maryland found a prevalence of *Trichomonas* infection of 19% and similarly, trichomoniasis was the most commonly found STD. Small numbers of nonblack women precluded an assessment of race/ethnicity as a risk factor for *Trichomonas* infection in these studies. A larger study of 818 women, evaluated on a monthly basis for a six-month period, found 21% to be infected with *Trichomonas* and estimated a rate of 5.4 per 100 person-months. *Trichomoniasis was associated with increasing numbers of sex partners, and the use of oral contraceptives was found to be protective. Race was not assessed as a possible risk factor. Older data, however, have noted substantial race-specific differences in the occurrence of trichomoniasis. A large study from the early 1960s that assessed the prevalence of *Trichomonas* in PAP smears from more than 30,000 women working in various Philadelphia, Pennsylvania industries reported finding *Trichomonas* in 30.4% of black women and 10.9% of white women. Though recent data are limited and were obtained among selected groups of women, they suggest that *T. vaginalis* is an exceptionally common infection, and often the most frequently identified STD, among poor urban women, particularly those who are black.

The high rate of trichomoniasis observed in women with HIV infection has potential implications for HIV prevention. The occurrence of an acute STD, including trichomoniasis, confirms the practice of unprotected sex and the accompanying potential for the spread of HIV. Moreover, concurrent STDs may amplify the risk of HIV transmission. Such coinfections can increase the level of viral-laden bodily fluids and/or the numbers of lymphocytes and macrophages present in the genital contact area. *Trichomonas* typically elicits an aggressive local cellular immune response with inflammation of the vaginal epithelium and exocervix. In addition, punctate hemorrhages can be observed colposcopically in 45% of infected women. The greater numbers of both free virus and viral-infected white blood cells may increase the probability of HIV exposure and transmission. Therefore, persons with HIV who develop trichomoniasis are likely to be an important source of continuing HIV transmission and characterizing such persons can assist in the targeting of prevention efforts. If *Trichomonas* is as common among HIV-infected women as our findings suggest, it could have a substantial population effect on HIV transmission even if trichomoniasis increases the risk of HIV transmission by only a small or modest amount.

Our data must be interpreted cautiously for several reasons. It is possible that some of the women in this clinic accessed care for STDs at alternative facilities. Therefore, the incidence of trichomoniasis observed may be an underestimate. Moreover, this possible under recognition, or misclassification of disease status, could be differentiated by race, marital status, and trading of sex and consequently our results could be biased by such misclassification. We believe that this potential limitation is mitigated since the clinic provides comprehensive services and is accessed by many of the women as a primary care provider. The use of only moderately sensitive techniques such as direct microscopy and cytology also indicate that the estimate of *Trichomonas* infection is spuriously low. In addition, we did not have data on the proportion of women who were diagnosed with trichomoniasis through PAP smear alone and it is possible that our findings could be a result of PAP screening practices. However, PAP smears were performed on a smaller proportion of black women (25%) than nonblack women (42%) and therefore could not explain the higher rate of *Trichomonas* infection in black women. It is also possible, since *Trichomonas* infection can be chronic in nature, that some of the trichomoniasis identified may not represent acute infection but rather chronic colonization that has been newly recognized. It is unlikely, however, for such a phenomenon to be differentiated by the various factors found to be associated with infection. In addition, it is possible that our results reflect, at least in part, diagnostic bias since clinicians could be more likely to selectively screen for STDs women who are black, unmarried, and report trading sex for money or drugs. Similarly, single women and those who trade sex might present for more screening if they were concerned about acquiring STDs. Another possible bias is that women with other STDs, as might be expected for unmarried women and those who trade sex, may be more likely to be evaluated...
for *Trichomonas*. However, the incidence of other STDs was quite low and therefore such a bias, if it exists, is probably small. A further limitation is the generalizability of our findings. This study focused on a selected, relatively small, group of women who are enrolled in health care and are receiving services at a single, albeit large, HIV clinic. Consequently, our findings cannot necessarily be extrapolated to other populations of HIV-infected women. The small sample size of this cohort also limited the statistical power to identify other, possibly important, factors associated with trichomoniasis. Finally, the attributable fractions we provide, which are dependent on the relative frequency of exposure, as well as the level of estimated risk, must be viewed as applying only to this cohort since, for example, the proportion of black women may vary considerably by subpopulation.

Nevertheless, our data indicate that trichomoniasis in HIV-infected women may be more common in blacks, and among nonblacks who are unmarried and trade sex. Our findings may be useful for targeting prevention efforts to interrupt HIV transmission since these persons may be more efficient transmitters of HIV. Health care providers and agencies directing HIV prevention funding should consider targeting women with one or more of these characteristics for educational intervention. Such efforts, to target persons with an increased probability of transmitting the virus, may be particularly important for those patients with severe immunosuppression. Aggressive detection and treatment of *Trichomonas* infection in HIV-infected women may help reduce subsequent HIV transmission.

Our data may also provide insight into the emerging patterns of the HIV epidemic in Los Angeles, which is increasingly affecting blacks and women.27,28 Part of this trend of HIV transmission may be a result of the amplifying effect of STDs, including trichomoniasis, on the local infection dynamics of HIV. In Los Angeles County, blacks have significantly higher rates of syphilis and gonorrhea than other racial/ethnic groups (STD Report, Los Angeles County Department of Health Services). Further study of the possible role of *Trichomonas* in the dynamics of HIV transmission is warranted.

Physicians should have a heightened index of suspicion for trichomoniasis in women who are black, and nonblack women who trade sex and are unmarried. The occurrence of any acute STD in an HIV-infected patient should prompt aggressive patient counseling at the provider level.

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