PUBLIC HEALTH

The protective value of school enrolment against sexually transmitted disease: a study of high-risk African American adolescent females

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Objective: To identify whether school enrolment is protective against laboratory-confirmed diagnosis of sexually transmitted diseases (STDs) and against a spectrum of sexual risk factors.
Methods: A cross-sectional study of 715 African-American adolescent females (15–21 years old) was conducted. Data collection included an audio-computer-assisted self-interview lasting about 60 min and a self-collected vaginal swab for nucleic acid amplification testing of *Trichomonas vaginalis*, *Chlamydia trachomatis* and *Neisseria gonorrhoeae*.
Results: In total, 65% were enrolled in school. After adjusting for age and whether adolescents resided with a family member, those not enrolled were twice as likely to test positive for one of the three STDs compared with those enrolled (adjusted OR2; 95% CI 1.38 to 2.91). Similarly, school enrolment was protective against risk factors contributing to STD acquisition. The measures of sexual risk behaviour of 8 of 10, retained significance after adjusting for the covariates, and 2 of the 3 psychosocial mediators retained significance.
Conclusion: This study provides initial evidence suggesting that keeping high-risk African-American adolescent females in school (including forms of school that occur after high-school graduation) may be important from a public health standpoint.

Sexually transmitted diseases (STDs) are a common source of adolescent morbidity, with their sequelae being especially problematic and costly in females.[1 2] The prevalence of STDs in the US is greatest among adolescents and young adults.[3] Further, among adolescents and young adults, the prevalence is substantially higher for African-Americans.[3] Owing to a combination of biological factors (eg, cervical ectopy) and social factors (eg, having sex with older partners who may have greater prevalence of STDs and experiencing power imbalances that compromise safer sex), African-American adolescent females and young adults are more likely to be infected with an STD than their male counterparts.[1–3] Further, African-American adolescent females living in the Southern US experience disproportionately high rates of STDs.[1 4–6]

Emerging evidence has identified multiple factors that may protect African-American adolescent females from the acquisition of STDs.[7–10] Although many of these factors can be located at the individual level, a growing portion of identified protective factors are best described as contextual. Contextual factors are features or structures of the physical and social environment. Clearly, one of the most salient contextual factors relative to adolescents is the school environment. Schools may serve as a microcosm of positive adult influences for adolescents, regardless of grade, level or type (eg, high school, alternative school, vocational school, community college). Also, the social organisation of school may be a form of social capital for those enrolled. Social capital is a concept that has been widely applied to public health. The term has been defined in many ways, but central factors generally include trust, reciprocity and cooperation among members of a social network that aims to achieve common goals.[11] Both positive adult influences and social capital have been shown to have protective effects against adolescent females' sexual risk behaviour.[12–14] Evidence also suggests that organised social activity may be an important protective factor against sexual risk behaviour for African-American adolescent females.[15 16]

To the extent that schools may serve as a conduit for entry into other forms of social activity, such evidence intimates that school enrolment could be a critically valuable protective factor. In addition, schools may provide a protected and monitored environment. Previous research has examined the protective role of adolescents' connectedness to their schools against engaging in health-risk behaviours.[17 18] Unfortunately, empirical investigations into the question of whether being enrolled in school itself, irrespective of school or teacher connectedness, may be a protective factor against adolescent females' sexual risk behaviour and acquisition of STDs have not been published.

The purpose of this study was twofold. Firstly, the study identified whether school enrolment was protective against laboratory-confirmed diagnosis for any of three non-viral STDs (chlamydia, gonorrhoea and trichomoniasis). Secondly, the study identified whether school enrolment was protective against a spectrum of sexual risk behaviours and known psychosocial mediators of these behaviours.

METHODS

Study sample

Participants were 715 African-American adolescent females enrolled in a randomised trial of an HIV prevention programme. Only data collected at baseline (before any intervention occurred) were used for this study. Recruitment sites were an urban, publicly funded, STD clinic, a teen clinic based in a large public hospital and a family planning clinic (all clinics were located in the same urban area of Southern USA.). From March 2002 through August 2004 project recruiters screened female teens to assess eligibility. Adolescents were eligible to participate if they were African-American females, 15–21 years old, and reported sexual activity in the previous 60 days.

Abbreviations: A-CASI, audio-computer-assisted self-interview; STD, sexually transmitted disease

Exclusion criteria were being married, pregnant or attempting to become pregnant. Of 1558 adolescents screened, 874 were eligible and asked to participate in the study. The study achieved an 82% baseline participation rate (n = 715). The institutional review board at Emory University, Atlanta, Georgia, USA, approved the study protocol before implementation.

Data collection

Data collection included (a) an audio-computer assisted self-interview (A-CASI) lasting about 60 min and (b) a self-collected vaginal swab for nucleic acid amplification testing to detect *Trichomonas vaginalis*, *Chlamydia trachomatis* and *Neisseria gonorrhoeae*. Participants were compensated by an amount of $50 for their completion of these procedures.

Self-reported measures

On the basis of evidence suggesting the possibility of decreased reporting bias,[19] all correlates were assessed using A-CASI. By providing a voice track that delivered each question to adolescents through headphones, A-CASI technology may have reduced problems that otherwise would have been posed by illiteracy. For this study, we selected 13 outcome measures (other than laboratory-confirmed STD prevalence) to represent the spectrum of sexual risk behaviours and psychosocial mediators.

Sexual-risk behaviours

Unless otherwise noted, the recall period for sexual risk was limited to the 60 days that preceded study enrolment. In addition to assessing the frequency of unprotected vaginal sex, we also assessed the frequency of unprotected anal sex as well as whether adolescents had engaged in anal sex in their lifetime. For those reporting that they had current boyfriends, we assessed whether adolescents believed their boyfriends were also having sex with other female partners. The frequency of having sex while high or drunk was assessed, as was the frequency of having sex with a male partner who was high or drunk. Adolescents were also asked how many male partners they had had penile–vaginal sex with in the past 60 days, whether they had sex with a "casual" partner and whether they had sex with a man who had recently been in jail, juvenile detention or prison. Adolescents were also asked to indicate whether their "typical" sex partners were ⩾5 years older than themselves (evidence suggests that older partners pose a greater risk of STD transmission).[20 21]

Psychosocial mediators

A five-item scale assessed how frequently (in the past 60 days) adolescents had communicated with their male partners about sex-related issues such as the prevention of STDs and AIDS. For example, one item read: "During the past 60 days, how many times have you and your boyfriend or sex partner(s) talked about how to use condoms?" Response alternatives were provided on a Visual Analogue Scale ranging from 1 ("never") to 4 ("⩾7-times"). The obtained interitem correlation coefficient for this scale measure of $\alpha = 0.84$ indicated adequate reliability. Evidence suggesting validity of the measure has been published in a previous study by our research team.[22]

A measure of power in relationships was adopted from Pullerwitz *et al*.[23] A 12-item version of this measure yielded adequate reliability ($\alpha = 0.80$). Items included statements such as: "I am more committed to our relationship than my partner." and "My partner does what he wants even if I don't want him to." Response alternatives were provided on a four-point scale ranging from 1 "strongly disagree" to 4 "strongly agree."

Finally, we assessed adolescents' level of fear regarding condom negotiation. The measure was also adopted from previous studies published by our research team.[24 25] This eight-item scale produced adequate reliability ($\alpha = 0.80$). All items began with the stem "I have been worried …" For example, one item read: "I have been worried that if I talked about using condoms with my boyfriend or sex partner(s) he would threaten to hit me."

Laboratory-assessed measures

Adolescents were instructed in the correct procedure for collecting a vaginal swab specimen using a model of the vagina to teach the correct technique. They were then asked to self-collect a vaginal swab specimen that was subsequently evaluated for *T vaginalis*, *C trachomatis* and *N gonorrhoeae*. *T vaginalis* was assayed using a non-commercial real-time PCR assay.[26] *C trachomatis* and *N gonorrhoeae* were initially assayed using the Abbott LCx Probe System[27–29] (Abbott Laboratories, Abbot Park, Illinois, USA). However, in September 2002, this Abbot assay was discontinued, and we began using the BDProbeTec ET Chlamydia trachomatis and Neisseria gonorrhoeae Amplified DNA Assay (Becton Dickinson, Sparks, Maryland, USA).[30]

Data analysis

Bivariate associations

All continuous variables were assessed for normality by calculating their degree of skewness and kurtosis. Skewness and kurtosis ratios exceeding an absolute value of 2 were considered to be an indication of a non-normal distribution. Subsequently, all non-normal continuous variables were dichotomised by performing a median split. Associations between dichotomous correlates and the outcome measure were assessed by the use of prevalence ratios, their 95% confidence intervals (CIs), and their respective p values. Significance was defined by an α level $\leqslant 0.05$.

Identification and control of covariates

Two key covariates were identified: age and whether adolescents currently resided with a family member (ie, mother, father, both mother and father, or a relative). Conceivably, each of these variables could be associated with school enrolment and independently associated with the 13 assessed outcomes. To control for this likely source of confounding, each outcome was tested in a separate hierarchical logistic regression model. The models were used to calculate adjusted odds ratios (ORs), their 95% CIs, and the corresponding p values of school enrolment (block 2) after entering age and whether adolescents' resided with a family member (block 1).

RESULTS

Characteristics of the sample

The average age of the adolescents was 17.8 years (standard deviation 1.72). About three quarters (75.8%) resided with at least one family member. Most (65.3%) were students currently enrolled in school. The median level of education fell between grades 10 and 11 (this equates with age 15–17 years). Table 1 shows the percentage of adolescents enrolled in school by age. More than 1 of every 6 (17.6%) adolescents tested positive for *C trachomatis*. *T Vaginalis* was also common (12.9%) and 4.9% tested positive for *N gonorrhoeae*. More than 1 of every 5 (22.7%) adolescents tested positive for 1 of 3 STDs, with 5.7% testing positive for 2 STDs and 0.4% testing positive for all 3. Overall, 206 adolescents (28.8%) tested positive for at least one of the three STDs.

Table 1 Percentage of adolescents enrolled in school by age (n = 715)

Age (years)	Number	% Enrolled in school
15	76	96.8
16	104	89.4
17	145	82.8
18	139	48.9
19	124	47.6
20	73	45.2
21	52	47.1

Bivariate associations

Table 2 shows the number and percentage of adolescents not enrolled and enrolled in school who tested positive for at least one of the three assessed STDs. Of 248 adolescents not enrolled in school, 35.5% tested positive as compared with 25.5% among the 467 adolescents who were enrolled in school. Those not enrolled were 1.4 times more likely to test positive ($p = 0.004$). Table 2 shows information, in an identical manner, for the assessed sexual risk behaviours and psychosocial mediators. Each of these measures also achieved significance.

Logistic regression analyses

Table 3 shows the adjusted ORs. School enrolment remained significantly associated with testing positive for ⩾1 STDs after controlling for the two covariates (age and whether adolescents currently resided with a family member). Those not enrolled were twice as likely to test positive compared with those enrolled. Table 3 also shows that 8 of the 10 measures of sexual risk behaviour retained significance after adjusting for the covariates and that 2 of the 3 psychosocial mediators retained significance.

DISCUSSION

We found that school enrolment is a protective factor among a high-risk sample of African-American adolescent females. Notably, school enrolment retained statistical significance in association with laboratory-confirmed STD after adjusting for age and whether adolescents resided with a family member. The mechanism through which school enrolment translates into significantly lower STD prevalence may be explained by the study findings related to adolescents' behaviour and attitudes. Adolescents enrolled in school were less likely to have multiple sex partners in the past 60 days. It may be that African-American adolescent females who are enrolled in school have limited time to pursue multiple partnerships. Adolescents enrolled in school were also less likely to report having sex with risky partners (ie, causal partners, older partners and recently incarcerated partners). Evidence shows that these populations of sex partners pose undue risks of transmitting STDs.[8–10] Thus, it may be that protection is conferred through schools by providing adolescent females with a relatively safer population of potential male sex partners. Also interesting is that those enrolled in school (in adjusted analyses) held more favourable perceptions of personal power in their relationships with male sex partners and were less likely to report fears of negotiating condom use with their sex partners. In both instances, it may be that the school environment is empowering to African-American adolescent females and therefore provides a unique type of social capital. The concept of the school environment as a form of social capital for adolescents is certainly intriguing. Moreover, it may be that schools provide adolescents and young adults with social norms that promote safer sex behaviours. Future studies should assess whether school enrolment is protective against other forms of health-risk behaviours for adolescents. Similarly, subsequent studies designed to identify causal pathways between school enrolment, psychosocial mediators, and adolescents' sexual risk behaviours could greatly build on this study.

Finally, it is worth noting that three outcomes failed to retain significance after adjustment for the covariates. Two of these (any unprotected vaginal sex and the perception that a male sex partner is also having sex with other females) are quite distinct with regard to STD risk. The first may be a measure that may not provide a great deal of precision regarding STD risk because it does not consider the level of probable risk that the sex partner is infected with an STD. If, for example, condom use were imperfect (ie, incorrect use of condoms), then even one exposure to an infected partner would naturally be far more risky than dozens of unprotected acts with uninfected partners.

Table 2 Associations between school enrolment and selected outcome measures among African-American adolescent females (n = 715)

Outcome	Non-enrolled (n = 248), n (%)	Enrolled PR (n = 467) n (%)	95% CI	p Value
Tested positive for at least one STD*	88 (35.5)	118 (25.3)	1.4 (1.18 to 1.77)	0.004
Sexual risk behaviours				
Any unprotected vaginal sex†	160 (65)	263 (56.4)	1.15 (1.02 to 1.30)	0.026
Any unprotected anal sex†	27 (10.9)	23 (4.9)	2.21 (1.30 to 3.77)	0.003
Ever had anal sex	42(16.9)	33 (7.1)	2.40 (1.56 to 3.68)	0.001
Boyfriend has sex with other females‡	65 (58.6)	97 (26.7)	2.17 (1.72 to 2.74)	0.009
Had sex while high or drunk†	115 (46.4)	116 (24.8)	1.87 (1.52 to 2.30)	0.001
Had sex while partner was high or drunk†	152 (61.3)	169 (36.2)	1.69 (1.45 to 1.98)	0.001
Had vaginal sex with ⩾2 partners†	106 (42.7)	131 (28.1)	1.52 (1.24 to 1.87)	0.001
Had sex with a casual partner†	96 (38.7)	129 (27.6)	1.40 (1.13 to 1.74)	0.002
Had sex with a partner recently incarcerated§	54 (21.8)	68 (14.6)	1.50 (1.08 to 2.06)	0.015
Had sex with partner at least 5 years older†	52 (21)	46 (9.9)	2.22 (1.48 to 3.07)	0.001
Psychosocial mediators				
Less frequent sex-related communication†	139 (56.6)	215 (46.6)	1.22 (1.05 to 1.41)	0.01
Less perceived power in relationships	139 (56.6)	207 (44.4)	1.26 (1.09 to 1.47)	0.003
Greater fear of condom use negotiation†	95 (38.3)	119 (25.5)	1.50 (1.20 to 1.88)	0.001

STD, sexually transmitted disease.
*Includes laboratory-confirmedSTD.
†Past 60 days.
‡Among 475 adolescents who reported having a current boyfriend, 112 were not enrolled in school and 363 were enrolled.
§Includes jail, juvenile detention or prison.

Table 3 Adjusted associations between school enrolment and selected outcome measures among African-American adolescent females (n = 715)

Outcome	Adjusted OR* (95% CI)	p Value
Tested positive for at least one STD†	2.01 (1.38 to 2.91)	0.001
Sexual risk behaviours		
Any unprotected vaginal sex‡	1.34 (0.95 to 1.89)	0.09
Any unprotected anal sex‡	2.15 (1.15 to 4.01)	0.016
Ever had anal sex	2.66 (1.57 to 4.51)	0.001
Boyfriend has sex with other females§	1.5 (0.99 to 2.29)	0.06
Had sex while high or drunk‡	2.27 (1.6 to 3.22)	0.001
Had sex while partner was high or drunk‡	2.61 (1.86 to 3.67)	0.001
Had vaginal sex with ⩾2 partners‡	1.92 (1.36 to 2.73)	0.001
Had sex with a casual partner‡	1.59 (1.19 to 2.27)	0.01
Had sex with a partner recently incarcerated¶	1.96 (1.26 to 3.05)	0.003
Had sex with partner at least 5 years older‡	2 (1.26 to 2.47)	0.001
Psychosocial mediators		
Less frequent sex-related communication‡	1.28 (0.92 to 1.79)	0.15
Less perceived power in relationships	1.76 (1.26 to 2.47)	0.001
Greater fear of condom use negotiation‡	1.83 (1.28 to 2.61)	0.001

STD, sexually transmitted disease.
*Adjusted for age and whether adolescents resided with a family member.
†Includes laboratory-confirmedSTD.
‡Past 60 days.
§Among 475 adolescents who reported having a current boyfriend, 112 were not enrolled in school and 363 were enrolled.
¶Includes jail, juvenile detention or prison

Indeed, one of the primary strategies of gauging STD risk is based on the use of proxy measures that point to partnerships where transmission potential may exist. An important proxy measure is the practice of concurrent relationships[31 32] (in this study, concurrency was assessed by the second measure—ie, having sex with a male who had sex with other females). Although this proxy measure did not retain significance, the overall weight of evidence supports the protective value of school enrolment.

Limitations

Although findings from any study of human sexual behaviour are limited by the use of self-reported measures, this limitation may be minimal in this study, given the consistency of evidence from the self-reported data with the laboratory-confirmed data. The use of a convenience sample and the cross-sectional study design limit the generalisability of the findings and the ability to establish directionality of associations, respectively. In addition, as this is an observational study, an important limitation is that the relationship between school enrolment and outcomes may be confounded by unknown personal characteristics of the girls who drop out of school or do not continue to attend school after high-school graduation. For example, evidence suggests the possibility that peer networks may vary substantially between in-school and out-of-school adolescents.[33] Clearly, such network affiliations may account for the differences observed in this study. Evidence also suggests that dropouts may be more likely to come from families with low incomes[34] and that they are more likely to engage in acts of violence against others.[35] These observations suggest that the familial and social milieu among those not enrolled in school may, be quite different from those remaining in school, and these differences may thus account for differences in sexual risk behaviours and the prevalence of sexually transmitted infections.

Another limitation is that we did not assess school attendance and school connectedness. These two variables may have added precision to the analysis, perhaps showing even greater effects. However, the findings are robust in that they suggest a protective role of school enrolment irrespective of attendance frequency and school connectedness. Future studies that build from this initial set of findings should be prospective and may include other populations of high-risk adolescents. Future studies should also investigate whether adolescents' aspirations for their future may be associated with their sexual risk behaviours (and STD prevalence) independently from school enrolment. Similarly, it may be worth investigating whether various forms of familial and social deprivation are independently associated with these outcomes. Indeed, it is also plausible that such forms of deprivation may drive both school dropouts and risky sexual behaviours.

Key messages

- Keeping African-American adolescent females in high school and in post high-school education programmes may avert incident cases of chlamydia, trichomoniasis and gonorrhoea.
- Compared with their out-of-school counterparts, adolescents enrolled in school held more favourable perceptions of personal power in their relationships with male sex partners and were less likely to report fears of negotiating condom use. These findings suggest the possibility that school environments may be empowering.
- Multiple forms of sexually transmitted infection-associated risk behaviour were considerably less common among in-school adolescents. Subsequent studies are needed to better understand the cause and effect relationships that seem to confer a protective effect of school enrolment on the sexual risk behaviours of this population.

CONCLUSION

Given their disproportionately high risk of STD/HIV infection, prevention efforts provided to African-American adolescent females are clearly warranted. Findings from this study suggest that keeping adolescents in school whether it is high school, college, vocational school, etc, may be important from a public health standpoint. Being in school may provide structure, purpose and a prosocial network that potentially encourages and supports healthy decisions. The provision of school opportunities to high-risk adolescents is potentially beneficial from multiple perspectives (eg, dealing with racial disparities in education, occupation and income) and benefits the recipients in numerous respects.

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REFERENCES

1 **Bolan G**, Ehrhardt AA, Wasserheit JN. Gender perspectives and STDs. In: Holmes KK, Sparling PF, Mardh P, *et al*, eds. *Sexually transmitted diseases*. New York, NY: McGraw-Hill, 1999:117–28.
2 **Berman SM**, Hein K. Adolescents and STDs. In: Holmes KK, Sparling PF, Mardh P, *et al*, eds. *Sexually transmitted diseases*. New York, NY: McGraw-Hill, 1999:129–42.
3 **Centers for Disease Control and Prevention**. *Sexually transmitted disease surveillance, 2004*. Atlanta, GA: US Department of Health and Human Services, 2004.
4 **Centers for Disease Control and Prevention**. *HIV/AIDS surveillance report, year-end edition*. Atlanta, GA: US Department of Health and Human Services, 1998:1–44.
5 **Valleroy LA**, MacKellar DA, Karon A, *et al*. HIV infection in disadvantaged out-of-school youth: prevalence for US job corps entrants, 1990 through 1996. *J Acquir Immune Defic Syndr* 1998;**19**:67–73.
6 **Cates W**. Estimates of the incidence and prevalence of sexually transmitted diseases in the United States. *Sex Transm Dis* 1999;**26**(Suppl 4):S2–7.
7 **Vision D**, Salazar LF, Crosby RA, *et al*. Ecological factors associated with STD-risk behaviors among detained adolescent females. *Social Work* 2006;**51**:71–9.
8 **DiClemente RJ**, Salazar LS, Crosby RA. Prevention and control of sexually transmitted infections among adolescents: the importance of a socio-ecological perspective–a commentary. *Public Health* 2005;**119**:825–36.
9 **DiClemente RJ**, Crosby RA. Sexually transmitted diseases among adolescents: risk factors, antecedents, and prevention strategies. In: Adams GR, Berzonsky M, eds. *Blackwell handbook of adolescence*. Oxford, UK: Blackwell, 2003:573–605.
10 **DiClemente RJ**, Wingood GM, Crosby RA. A contextual perspective for understanding and preventing STD/HIV among adolescents. In: Romer D, eds. *Reducing adolescent risk:toward an integrated approach*. Thousand Oaks, CA: Sage, 2003:366–73.
11 **Putnam RD**. *Bowling Alone: the collapse and revival of American community*. New York, NY: Touchstone, 2000.
12 **Crosby RA**, Leichliter JS, Brackbill RM. Longitudinal prediction of STDs among adolescents: results from a national survey. *Am J Prev Med* 2000;**18**:312–17.
13 **Crosby RA**, Holtgrave DR. The protective value of social capital against teen pregnancy. *J Adolesc Health* 2006;**38**:556–9.
14 **Crosby RA**, Holtgrave DR, DiClemente RJ, *et al*. Social capital as a predictor of adolescents' sexual risk behavior: a state-level exploratory study. *AIDS Behav* 2003;**7**:245–52.
15 **Crosby RA**, DiClemente RJ, Wingood GM, *et al*. African American adolescent females' membership in community organizations is associated with STD/HIV-protective behaviors: a prospective analysis. *J Epi Community Health* 2002;**23**:549–50.
16 **Crosby RA**, DiClemente RJ, Wingood GM, *et al*. African American adolescent females' membership in social organizations is associated with protective behaviour against HIV infection. *Ethn Dis* 2002;**12**:186–92.
17 **Resnick MD**, Bearman PS, Blum RW, *et al*. Protecting adolescents from harm. Findings from the National Longitudinal Study on Adolescent Health. *JAMA* 1997;**278**:823–32.
18 **Voisin D**, Salazar L, Crosby RA, *et al*. Teacher connectedness and health-related outcomes among detained adolescents. *J Adoles Health* 2005;**37**:e17–23.
19 **Turner CF**, Ku L, Rogers SM, *et al*. Adolescent sexual behavior, drug use, and violence: increased reporting with computer survey technology. *Science* 1998;**280**:867–71.
20 **Begley E**, Crosby RA, DiClemente RJ, *et al*. Older partners and STD prevalence among pregnant African American teens. *Sex Transm Dis* 2003;**30**:211–13.
21 **DiClemente RJ**, Wingood GM, Crosby RA, *et al*. Sexual risk behaviors associated with having older sex partners: a study of African American female adolescents. *Sex Transm Dis* 2002;**29**:20–4.
22 **Crosby RA**, DiClemente RJ, Wingood GM, *et al*. Condom use and correlates of African American adolescent females' infrequent communication with sex partners about preventing sexually transmitted diseases and pregnancy. *Health Educ Behav* 2002;**29**:219–31.
23 **Pullerwitz J**, Gortmaker S, DeJong W. Measuring sexual power in HIV/STD research. *Sex Roles* 2000;**42**:637–60.
24 **DiClemente RJ**, Lodico M, Grinstead OA, *et al*. African-American adolescents residing in high-risk urban environments do use condoms: correlates and predictors of condom use among adolescents in public housing developments. *Pediatrics* 1996;**98**:269–78.
25 **Wingood GM**, DiClemente RJ. Gender related correlates and predictors of consistent condom use among young adult African American women: a prospective analysis. *Int J STD AIDS* 1998;**9**:139–45.
26 **Caliendo AM**, Jordan JA, Green AM, *et al*. Real-time PCR improves detection of trichomonas vaginalis infection compared with culture using self-collected vaginal swabs. *Infect Dis Obstest Gynecol* 2005;**13**:145–50.
27 **Carrol KC**, Aldeen WE, Morrison M, *et al*. Evaluation of the Abbott LCx chain reaction assay for detection of *Chlamydia trachomatis* and *Neisseria gonorrhoeae* in urine and genital swab specimens from a sexually transmitted disease clinic population. *J Clin Microbiol* 1998;**36**:1630–3.
28 **Lee HH**, Chernesky MA, Schachter J, *et al*. Diagnosis of *Chlamydia trachomatis* genitourinary infection in women by ligase chain reaction assay of urine. *Lancet* 1995;**345**:213–16.
29 **Smith KR**, Ching S, Lee H, *et al*. Evaluation of ligase chain reaction for use with urine for identification of *Neisseria gonorrhoeae* in females attending a sexually transmitted disease clinic. *J Clin Microbiol* 1995;**33**:455–7.
30 **Van der Pol BD**, Ferrero L, Buck-Barrington E, *et al*. Multicenter evaluation of the BDProbeTec ET system for detection of *Chlamydia trachomatis* and *Neisseria gonorrhoeae* in urine specimens, female endocervical swabs, and male urethral swabs. *J Clin Microbiol* 2001;**39**:1008–16.
31 **Rosenberg MD**, Gurvey JE, Adler N, *et al*. Concurrent sex partners and risk for sexually transmitted diseases among adolescents. *Sex Transm Dis* 1999;**26**:208–20.
32 **Gorbach PM**, Stoner BP, Aral SO, *et al*. ''It takes a village'': understanding concurrent sexual partnerships in Seattle, Washington. *Sex Transm Dis* 2002;**29**:453–62.
33 **Ellenbogen S**, Chamberland C. The peer relations of dropouts: a comparative study of at-risk and not at-risk youths. *J Adolesc* 1997;**20**:355–87.
34 **Stevenson W**, Maton KI, Teti DM. School importance and dropout among pregnant adolescents. *J Adolesc Health* 1998;**22**:376–82.
35 **Saner H**, Ellickson P. Concurrent risk factors for adolescent violence. *J Adolesc Health* 1996;**19**:94–103.