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Screening Young Adults for Prevalent Chlamydial Infection in Community Settings

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Abstract

PURPOSE—Community-based testing may identify young adults in the general population with sexually transmitted chlamydial infection. To develop selective screening guidelines appropriate for community settings, the authors conducted a cross-sectional analysis of the National Longitudinal Study of Adolescent Health Wave III (April 2, 2001 – May 9, 2002).

METHODS—Separately for women and men, we developed three predictive models using unconditional multiple logistic regression for survey data. To account for racial/ethnic disparity in prevalence, initial models included identical predictor characteristics plus information on 1) respondent's race/ethnicity; or 2) respondent's most recent partner's race/ethnicity; or 3) no information on race/ethnicity.

RESULTS—*C. trachomatis* diagnosis was available for 10,928 (88.6%) of the sexually experienced respondents. A combination of five characteristics for women and six characteristics for men identified approximately 80% of infections while testing ≤50% of the population. Information regarding race/ethnicity dramatically affected algorithm performance.

CONCLUSION—Using race/ethnicity in any screening algorithm is problematic and controversial, but the model without race information missed many diagnoses in the minority groups. Universal screening in high prevalence regions and selective screening in low prevalence regions may be one method of reaching the affected populations while avoiding the stigma of guidelines incorporating race/ethnicity.

Chlamydia trachomatis, with an estimated three million new infections each year, is the most common bacterial sexually transmitted infection (STI) in the United States (US), especially among adolescents and young adults (1). Black, Native American, and Latino women and men are disproportionately burdened with infection (2). Although predominately asymptomatic

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(3,4) chlamydial infection may cause pelvic inflammatory disease, ectopic pregnancy, and tubal infertility in women (5–7). Chlamydial infection increases susceptibility to and transmission of HIV in women and men (8,9).

Testing and treatment for chlamydial infection can lower the prevalence of infection (10–12) and the incidence of pelvic inflammatory disease (13). The US Preventive Services Task Force "strongly recommends" that clinicians routinely screen all sexually active women aged 25 years or younger for chlamydial infection (14). Screening rates, however, remain low (15,16) despite the inclusion of chlamydial screening in the Health Plan Employer Data and Information Set performance measures (17). Furthermore, chlamydial infection in men is only just being addressed by the newest recommendations (18).

Expanding screening from clinic to community settings may increase screening, particularly among minority populations experiencing high prevalence and limited access to care. Community-based screening may also facilitate testing men. Selective screening criteria to identify individuals at greatest risk of infection may help make such programs logistically and economically feasible (19,20). In community settings, screening guidelines should be based on data from the general population, rather than algorithms derived from clinical data. Wave III of the National Longitudinal Study of Adolescent Health (Add Health) was used to develop criteria for screening young women and men in the US general population for prevalent chlamydial infection.

MATERIALS AND METHODS

Study design and sample

Add Health is a prospective cohort study that has followed nearly 20,000 adolescents into adulthood over three waves of data collection (21). For this study, we conducted a cross-sectional analysis of Wave III (April 2, 2001 to May 9, 2002), which targeted all Wave I participants. Our study population was restricted to Wave III participants responding "Yes" when asked "Have you ever had vaginal intercourse?" The University of North Carolina institutional review board approved all study procedures.

The two-stage sampling of Add Health has been described in detail elsewhere (21,22). Briefly, a systematic random sample of secondary schools was chosen to ensure that the schools were representative of all US secondary schools with respect to key characteristics. The original participants were identified from students in grades seven through 12. Oversampling some black and Latino students enhanced precision of estimates for these groups. Post-stratification sampling weights adjusted for persons who did not participate in Wave III. After accounting for design effect, the Add Health Wave III cohort provides a representative sample of young adults aged 18 to 26 years living in the US.

Interview and specimen collection

For non-sensitive issues, the interviewer recorded responses into a computer. For sensitive issues like sexual behavior, the participant used computer-assisted self-interview (CASI) to enter responses directly into the computer.

Respondents were asked to provide a urine specimen to test for *Chlamydia trachomatis*, for which they received $10. A more detailed description of Add Health STI testing is available elsewhere (23). Specimens were tested for *C. trachomatis* per manufacturer instructions using ligase chain reaction (LCR™) amplification technology in the Abbott LCx® Probe System (Abbott Laboratories, Abbott Park, IL), except that specimens exceeding the recommended volume were tested.

Measures

The outcome variable was a positive *C. trachomatis* test result. Possible predictor variables were derived from the self-reported demographic, behavior, perceived risk, and health care factors available from the in-home interview.

Statistical analyses

We conducted analyses using Stata Version 7.0 (Stata Corporation, College Station, TX). Evaluation of model fit and bootstrap estimates were obtained from unweighted data. All other analyses accounted for Add Health's complex survey design by using school as the primary sampling unit, region of the country as the stratification variable, and post-stratification weights.

Analyses were performed separately by gender to accommodate sex-specific differences in predictors of STI and prevalence of chlamydial infection (24–27). In preliminary analyses, we examined the frequency distribution of potential predictor characteristics and calculated bivariate prevalence odds ratios (OR) and 95 percent confidence intervals (CI) to assess the association between each characteristic and chlamydial infection.

For each gender, we developed three separate predictive models using either 1) the respondent's race/ethnicity; 2) the respondent's most recent partner's race/ethnicity; or 3) no information on respondent's or partner's race/ethnicity to account for the racial/ethnic disparity in prevalence. The initial starting models included one of the race/ethnicity components and all variables with bivariate $p<0.25$. Variables with excessive missing data, extreme collinearity, or uninformative distributions were excluded from the starting models, regardless of p-value. Each model included only respondents with complete information on all variables in that full model.

Predictive model development used unconditional multiple logistic regression for survey data with a backwards elimination strategy (28). We removed variables one at a time from the model, beginning with the variable with the largest p-value. The model-based c-statistic, the area under the receiver operating characteristic (ROC) curve, was compared between successive models to ensure that variable removal did not adversely affect model performance. A change in area under the ROC curve<0.01 was acceptable. Backwards elimination stopped when all remaining variables had $p<0.05$. We assessed the equality of the three ROC areas (29). We also examined the models for collinearity and overly influential covariate patterns (30).

We created three sets of clinical risk scores from each final model. The first was a simple summation of the beta coefficients for the models, reflecting the predicted probability of infection. The second was a weighted risk score calculated by multiplying the regression coefficients by two and rounding to the nearest integer. The third was an unweighted risk score that assigned each risk category a value of one, regardless of its strength of association with infection, and each reference category a value of zero. Sensitivity and specificity of each predictive model and its risk scores were assessed at three hypothetical program-driven cutoffs based on a maximum percentage of the population (≤ 70, ≤ 50, ≤ 30) to receive a diagnostic test. We validated model and risk score performance using 1,000 bootstrap samples with replacement (28), although this technique could not accommodate Add Health's survey design.

RESULTS

Study population

Of the 18,924 Add Health participants in the nationally representative Wave I sample, 1,109 (5.9%) refused participation, 3,493 (18.5%) could not be located or were unable to participate,

and 14,322 (75.7%) were located and agreed to participate in Wave III. Of these, 12,334 (86.1%) reported ever having vaginal intercourse. *C. trachomatis* results were available for 10,928 (88.6%) of the sexually experienced participants (57.7% of the original Wave I sample). Reasons for unavailable test results included inability or refusal to provide a urine specimen, processing errors due to shipping, or laboratory problems.

Among participants with chlamydia test results, 50.0 percent of the study sample was women (Table 1). The majority (67.8%) was white, with representation of black (16.7%), Latino (11.5%), Asian American (3.2%), and Native American (0.8%) women and men. The mean age of participants was 21.9 years (standard error (SE), 0.12 years). The mean age at sexual debut was 16.4 years (SE, 0.06 years) and the mean number of sex partners during the past year was 1.8 partners (SE, 0.03 partners). On average, women had fewer partners (1.5 partners, SE 0.04) than men (2.0 partners, SE 0.06).

Women

Bivariate analyses—The overall prevalence of chlamydial infection among sexually experienced women was 5.1 percent (95% CI 4.2%, 6.0%). Women who were black (OR 5.7, 95% CI 3.9, 8.5) or Native American (OR 6.1, 95% CI 2.3, 16.1) were more likely to have chlamydial infection as compared to whites (Table 2). Women reporting black partners (OR 6.9, 95% CI 4.5, 10.6) also were more likely to have chlamydial infection. When compared to women with no sex partners in the past year, the relation between number of partners and infection was nearly twice as strong for two or more sex partners (OR 7.4, 95% CI 2.8, 19.2) than for one partner (OR 3.4, 95% CI 1.4, 8.5). While a moderate or high perceived risk of STI (OR 5.5, 95% CI 3.1, 9.8) was indicative of infection, neither STI symptoms within the past 24 hours (OR 1.0, 95% CI 0.6, 1.8) nor STI symptoms (OR 1.0, 95% CI 0.7, 1.4), testing (OR 1.1, 95% CI 0.8, 1.5), or diagnosis (OR 1.6, 95% CI 1.0, 2.4) within the past year, showed substantive association with prevalent chlamydial infection.

Multivariate analyses—We constructed three reference models for women that included the race/ethnicity component (respondent's race, partner's race, or no race) and 17 characteristics with bivariate $p<0.25$. After removing variables that minimally predicted infection, number of partners, perceived risk of STI, and student status consistently remained important across the three final models (Table 3a). The final models with respondent race (area under ROC curve=0.77) and partner race (area under ROC curve=0.75) information performed comparably and both performed substantially better than the model without race information (area under ROC curve=0.70). The areas under the three curves differed significantly ($p<0.001$; Figure 1a).

Risk Scores—The weighted risk scores from the model with respondent race information ranged from zero for a white woman, with no sex partners in the past year, low perceived risk of STI, who was a current student, aged 22 – 24 years, to a score of 13 for a Native American woman, with two or more sex partners in the past year, moderate or high perceived risk of STI, not a current student, and was either younger than age 22 or older than age 24 years (Table 3a). Using the weighted risk score to identify no more than 50 percent of the population for testing, the sensitivity of the model with respondent race information (84.1%) was slightly higher than the model with partner race information (81.3%), but substantially higher than the model with no race information (60.1%; Table 4a).

The performance of the three models varied markedly when stratified by race (Table 5a). Among white women, the models had low sensitivity. Among black women, however, with one exception the sensitivities of the models with respondent and partner race information were above 90 percent; the model with no race information performed poorly. Testing ≤50 percent

using the weighted risk score from the model without race information was 61.8 percent sensitive among black women, compared to 99.4 percent in the race and 94.7 percent in the partner race information models.

To illustrate the impact of the differing sensitivities across the three models, we examined the estimated number of infections correctly identified in the general population of women aged 18 to 26 years (Table 6a). The race information model weighted risk score would correctly identify 142,350 out of 142,776 infections among black women. The model without race information would miss more than 50,000 of these infections. Among white women, the difference in the number of missed infections between the models with and without race information was fewer than 10,000. The number of women of all races without infection who were identified for testing (i.e. false positives) was large, regardless of the model.

Men

Bivariate analyses—The overall prevalence of chlamydial infection among sexually experienced men was 3.9 percent (95% CI 3.1%, 4.8%). Men who were black (OR 8.0, 95% CI 4.9, 13.1), Native American (OR 5.7, 95% CI 2.1, 15.6), or Latino (OR 5.3, 95% CI 2.9, 9.9) were more likely to have chlamydial infection as compared to whites. Men reporting black (OR 5.9, 95% CI 3.4, 10.4) or Latino (OR 3.5, 95% CI 1.6, 7.8) partners were also more likely to have chlamydial infection (Table 2). Similar to women, a moderate or high perceived risk of STI (OR 5.2, 95% CI 2.6, 10.4) was indicative of infection. Unlike women, STI symptoms (OR 2.4, 95% CI 1.5, 3.8) or diagnosis (OR 2.6, 95% CI 1.4, 5.0) within the past year as well as no recent antibiotic use (OR 2.9, 95% CI 1.4, 6.2) and shared housing (OR 2.3, 95% CI 1.5, 3.7) were linked to prevalent chlamydial infection.

Multivariate analyses—We constructed three reference models for men that included the race/ethnicity component and 16 characteristics with bivariate $p<0.25$. A core set of characteristics – perceived risk of STI, military history, shared housing, and high school degree – remained important in all three models (Table 3b). The final respondent race (area under ROC curve=0.74) and partner race (area under ROC curve=0.75) information models were comparable, and superior to the model without race information (area under ROC curve=0.69). The areas under the three curves differed significantly ($p=0.02$; Figure 1b).

Risk scores—The weighted risk scores from the model with respondent race information ranged from zero for a white man, with low perceived risk of STI, no military history, lived alone, graduated from high school, and accessed health care within the past year, to 12 for a black man, with moderate or high perceived risk of STI, military experience, shared housing, not a high school graduate, and had not recently accessed health care (Table 3b). Using a weighted score to test ≤50 percent of those screened by the model with respondent race information yielded a sensitivity of 82.5 percent and specificity of 55.3 percent (Table 4b).

The performance of these models also varied by race (Table 5b). Among black men, using weighted risk scores to test ≤50 percent was 100 percent sensitive for the respondent race information model, but only 71.4 percent sensitive for the no race information model. All models had low sensitivity for white men

Using the survey weights to estimate the number of infections correctly identified in the general population of men aged 18 to 26 years, the race information model weighted risk score would correctly identify all 80,756 infections among black men (Table 6b). The model without race information would identify only 54,152 of these infections. Again, the numbers of men tested who did not have chlamydial infection was large.

Using bootstrap techniques, validation of models for both women and men demonstrated consistent performance over 1000 replications.

DISCUSSION

Current guidelines recommend annual universal testing of sexually active young women for chlamydial infection (14,31), but only an estimated 55 – 66 percent of females aged 15 – 19 were screened in 2000 (15). Self-report of STI testing is even lower (16). One reason for low screening rates may be that these guidelines require women to visit health care providers. Community-based screening may expand screening coverage among young people who are often uninsured and unlikely to access health care regularly (32–34). Community screening may also promote testing programs for men and may be an effective way to lessen the racial/ethnic disparity.

Our proposed screening criteria are unique because they were developed from a representative sample of the population they are designed to serve. Additionally, the guidelines are available for women and men. A combination of five characteristics for women (race/ethnicity, number of sex partners in the past year, perceived risk of STI, current student status, and age) and six characteristics for men (race/ethnicity, perceived risk of STI, military history, shared housing, high school degree, and recent health care use) provide potentially useful screening tools. However, implementation of these criteria may be problematic because of the inclusion of race-related information. Applying these criteria to select no more than 50 percent of the population for diagnostic testing could identify approximately 80 percent of infections in women and men. Many uninfected people would be tested, but there is little evidence supporting durable distress or harm after STI population screening (35). Also, fewer uninfected people would be tested than would be tested under universal screening guidelines.

Add Health reinforces previous findings of discernible differences in infection prevalence across racial/ethnic groups, with black and Native American females and black, Latino, and Native American males, more likely to have a prevalent chlamydial infection than their white counterparts. The Add Health design ensured that estimated effects were independent of clinician reporting and health care seeking behavior – common explanations for racial/ethnic differences in reported infection rates. Furthermore, the oversampling of some black and Latino groups enhanced the precision of these estimates.

The two models developed with race/ethnicity information were similar in both constituent characteristics and overall performance because of the strong correlation between a respondent's and partner's race/ethnicity. In contrast, the performance of the model developed without race/ethnicity information was greatly diminished. Despite the inclusion of numerous covariates at the outset, no proxy for socioeconomic status (such as insurance or job status) or other connection to elevated prevalence remained in the final models. Detailed data on sexual networks or environmental characteristics that may address the disparity in infection were unavailable in these data and would not be typically available for use in routine screening settings.

Ideally, screening guidelines would identify individuals for testing based solely on risk behaviors. Risk stratification appears to differ by race/ethnicity (36). Chlamydial infection is increased among white young adults with traditional risk behaviors, but black young adults are at high risk of chlamydial infection even when practicing behaviors that are low risk for white youth (36). This observation may explain why the model without race/ethnicity information performed poorly among non-white subpopulations. The models with race/ethnicity information performed well among minority populations because nearly everyone was tested.

The use of race/ethnicity in any STI screening algorithm is undoubtedly controversial (37). Both inclusion and exclusion of race/ethnicity as a risk marker may have unintended adverse consequences. Using the model with a race/ethnicity criterion ignores both contemporary and historical context and may further marginalize minority communities, possibly leading to stigmatization and perpetuation of inappropriate and incorrect stereotypes. Using the model without race/ethnicity information would result in a dramatic reduction in the number of persons appropriately tested and treated. In essence, selective screening without race/ethnicity as a criterion deprives care for those with the highest prevalence.

The most satisfactory approach to deal with this conundrum is universal testing for persons in this age group. Alternatively, because the primary risk factor for chlamydial infection is encountering an infected partner, targeting screening to high prevalence areas also may be a reasonable, cost-efficient strategy (38). This strategy would increase testing among minority populations, but the primary determinant would be prevalence and geographical area, not race/ethnicity.

Universal screening for chlamydial infection in men in this age group is not recommended in the current CDC guidelines despite recognition of a potential benefit. Given limited resources and the infrequency of health care visits for young adult men, selective community-based screening may provide a reasonable option to expand screening to men. Our models and associated risk scores provide one of the first algorithms to reach this group.

The validity of our results depends on the representativeness of the original school-based sample, nonresponse to the Wave III follow-up survey, truthful reporting on sexual experience, refusal or other problems that led to a missing outcome, and the characteristics of the diagnostic test. The original sample included only students on school registers, but an evaluation of school dropouts suggests any resultant bias in Add Health is small (39). Poststratification sample weight adjustment accounted for the 24 percent of Wave I participants who could not be located for Wave III, a bias that was also small (40). Both the frequency and validity of responses to sensitive questions about sexual experiences were likely improved through the use of CASI (41–45). Additionally, participants who did and did not provide urine specimens for STI testing were similar (46). Earlier analyses show prevalence estimates were robust to differences in characteristics of non-respondents and diagnostic test performance (4). Imperfect sensitivity may have slightly reduced estimates in low prevalence populations and slightly increased estimates in high prevalence populations (4).

Young adults in the US are at risk of chlamydial infection. Minority women and men are disproportionately affected. Broadening screening programs beyond clinic settings may reduce the STI burden by increasing screening and treatment. Universal screening should be implemented in high prevalence regions. In low prevalence regions, selective screening may suffice. When selectively screening, locally relevant information will be critical for determining whether the use of race/ethnicity is appropriate to improve the guidelines' performance. The value of screening men must be duly considered. The performance of these selective screening guidelines, which require neither medical nor laboratory information to identify individuals for urine-based diagnostic testing, supports the practicality of community-based chlamydial screening for women and men, although neither the effectiveness nor programmatic feasibility of these guidelines has been determined. With greater screening coverage and treatment for the infected, the incidence and prevalence of chlamydial infection in young people, and the sequelae manifest throughout adulthood, will likely diminish.

ABBREVIATIONS

Add Health

National Longitudinal Study of Adolescent Health

CASI
computer-assisted self-interview

CI
confidence interval

OR
odds ratio

ROC
receiver operating characteristic

SE
standard error

STD
sexually transmitted disease

STI
sexually transmitted infection

US
United States

References

1. Weinstock H, Berman S, Cates W Jr. Sexually transmitted diseases among American youth: incidence and prevalence estimates, 2000. Perspect Sex Reprod Health 2004;36(1):6–10. [PubMed: 14982671]
2. Sexually Transmitted Disease Surveillance, 2004. Atlanta, GA: Centers for Disease Control and Prevention, U.S. Department of Health and Human Services; 2005.
3. Institute of Medicine (U.S.). Committee on Prevention and Control of Sexually Transmitted Diseases. In: Eng, TR.; Butler, WT., editors. The hidden epidemic: confronting sexually transmitted diseases. Washington, D.C: National Academy Press; 1997.
4. Miller WC, Ford CA, Morris M, Handcock MS, Schmitz JL, Hobbs MM, et al. Prevalence of chlamydial and gonococcal infections among young adults in the United States. Jama 2004;291(18):2229–36. [PubMed: 15138245]
5. Westrom, L.; Eschenbach, D. Pelvic inflammatory disease. In: Holmes, KK., editor. Sexually transmitted diseases. 3. New York: McGraw-Hill Health Professions Division; 1999. p. 783-809.
6. Cates W Jr, Wasserheit JN. Genital chlamydial infections: epidemiology and reproductive sequelae. Am J Obstet Gynecol 1991;164(6 Pt 2):1771–81. [PubMed: 2039031]
7. Holmes, KK. Sexually transmitted diseases. 3. New York: McGraw-Hill Health Professions Division; 1999.
8. Fleming DT, Wasserheit JN. From epidemiological synergy to public health policy and practice: the contribution of other sexually transmitted diseases to sexual transmission of HIV infection. Sex Transm Infect 1999;75(1):3–17. [PubMed: 10448335]
9. Cohen MS. Sexually transmitted diseases enhance HIV transmission: no longer a hypothesis. Lancet 1998;351(Suppl 3):5–7. [PubMed: 9652712]
10. Mertz KJ, Levine WC, Mosure DJ, Berman SM, Dorian KJ. Trends in the prevalence of chlamydial infections. The impact of community-wide testing. Sex Transm Dis 1997;24(3):169–75. [PubMed: 9132985]
11. Hillis SD, Nakashima A, Amsterdam L, Pfister J, Vaughn M, Addiss D, et al. The impact of a comprehensive chlamydia prevention program in Wisconsin. Fam Plann Perspect 1995;27(3):108–11. [PubMed: 7672100]

12. Johnson RE, Newhall WJ, Papp JR, Knapp JS, Black CM, Gift TL, et al. Screening tests to detect *Chlamydia trachomatis* and Neisseria gonorrhoeae infections--2002. MMWR Recomm Rep 2002;51 (RR15):1–38. [PubMed: 12418541]quiz CE1-4
13. Scholes D, Stergachis A, Heidrich FE, Andrilla H, Holmes KK, Stamm WE. Prevention of pelvic inflammatory disease by screening for cervical chlamydial infection. N Engl J Med 1996;334(21): 1362–6. [PubMed: 8614421]
14. Screening for chlamydial infection: recommendations and rationale. Am J Prev Med 2001;20(3 Suppl):90–4.
15. Levine WC, Dicker LW, Devine O, Mosure DJ. Indirect estimation of Chlamydia screening coverage using public health surveillance data. Am J Epidemiol 2004;160(1):91–6. [PubMed: 15229122]
16. Tao G, Tian LH, Peterman TA. Estimating Chlamydia Screening Rates by Using Reported Sexually Transmitted Disease Tests for Sexually Active Women Aged 16 to 25 Years in the United States. Sex Transm Dis. 2006
17. Burstein GR, Snyder MH, Conley D, Newman DR, Walsh CM, Tao G, et al. Chlamydia screening in a Health Plan before and after a national performance measure introduction. Obstet Gynecol 2005;106(2):327–34. [PubMed: 16055583]
18. Meeting Report: male chlamydia screening consultation. Atlanta, GA: Centers for Disease Control and Prevention, U.S. Department of Health and Human Services; 2007.
19. Stamm WE. Expanding efforts to prevent chlamydial infection. N Engl J Med 1998;339(11):768–70. [PubMed: 9731096]
20. Roberts TE, Robinson S, Barton P, Bryan S, Low N. Screening for *Chlamydia trachomatis*: a systematic review of the economic evaluations and modelling. Sex Transm Infect 2006;82(3):193–200. [PubMed: 16731666]
21. Bearman, PS.; Jones, J.; Udry, JR. The National Longitudinal Study of Adolescent Health: study design. Chapel Hill, NC: Carolina Population Center, University of North Carolina at Chapel Hill; 2004. http://www.cpc.unc.edu/projects/addhealth/design
22. Resnick MD, Bearman PS, Blum RW, Bauman KE, Harris KM, Jones J, et al. Protecting adolescents from harm. Findings from the National Longitudinal Study on Adolescent Health. Jama 1997;278 (10):823–32. [PubMed: 9293990]
23. The Add Health Biomarkers Team. Biomarkers in Wave III of the Add Health Study. Chapel Hill, NC: Carolina Population Center, University of North Carolina at Chapel Hill; 2004. http://www.cpc.unc.edu/projects/addhealth/files/biomark.pdf
24. Pugatch D, Ramratnam M, Strong L, Feller A, Levesque B, Dickinson BP. Gender Differences in HIV Risk Behaviors among Young Adults and Adolescents Entering a Massachusetts Detoxification Center. Subst Abus 2000;21(2):79–86. [PubMed: 12466648]
25. Ellen JM, Langer LM, Zimmerman RS, Cabral RJ, Fichtner R. The link between the use of crack cocaine and the sexually transmitted diseases of a clinic population. A comparison of adolescents with adults. Sex Transm Dis 1996;23(6):511–6. [PubMed: 8946638]
26. Trends in sexual risk behaviors among high school students--United States, 1991–2001. MMWR Morb Mortal Wkly Rep 2002;51(38):856–9. [PubMed: 12363337]
27. Burstein GR, Waterfield G, Joffe A, Zenilman JM, Quinn TC, Gaydos CA. Screening for gonorrhea and chlamydia by DNA amplification in adolescents attending middle school health centers. Opportunity for early intervention. Sex Transm Dis 1998;25(8):395–402. [PubMed: 9773430]
28. Harrell, FE. Regression modeling strategies: with applications to linear models, logistic regression, and survival analysis. New York: Springer; 2001.
29. DeLong ER, DeLong DM, Clarke-Pearson DL. Comparing the areas under two or more correlated receiver operating characteristic curves: a nonparametric approach. Biometrics 1988;44(3):837–45. [PubMed: 3203132]
30. Hosmer, DW.; Lemeshow, S.; Byrns, PJ. Applied logistic regression. New York: Wiley; 1989.
31. Recommendations for the prevention and management of *Chlamydia trachomatis* infections, 1993. MMWR Morb Mortal Wkly Rep 1993;42(RR12)
32. Rietmeijer CA, Bull SS, Ortiz CG, Leroux T, Douglas JM Jr. Patterns of general health care and STD services use among high-risk youth in Denver participating in community-based urine chlamydia screening. Sex Transm Dis 1998;25(9):457–63. [PubMed: 9800256]

33. Celum CL, Bolan G, Krone M, Code K, Leone P, Spaulding C, et al. Patients attending STD clinics in an evolving health care environment. Demographics, insurance coverage, preferences for STD services, and STD morbidity. Sex Transm Dis 1997;24(10):599–605. [PubMed: 9383850]
34. Geisler WM, Chyu L, Kusunoki Y, Upchurch DM, Hook EW 3rd. Health insurance coverage, health care-seeking behaviors, and genital chlamydial infection prevalence in sexually active young adults. Sex Transm Dis 2006;33(6):389–96. [PubMed: 16505745]
35. Mills N, Daker-White G, Graham A, Campbell R. Population screening for *Chlamydia trachomatis* infection in the UK: a qualitative study of the experiences of those screened. Fam Pract. 2006
36. Hallfors DD, Iritani BJ, Miller WC, Bauer DJ. Sexual and drug behavior patterns and HIV and STD racial disparities: the need for new directions. Am J Public Health 2007;97(1):125–32. [PubMed: 17138921]
37. Plant AJ, Rushworth RL. Death by proxy": ethics and classification in epidemiology. Soc Sci Med 1998;47(9):1147–53. [PubMed: 9783857]
38. Manhart LE, Marrazzo JM, Fine DN, Kerani RP, Golden MR. Selective testing criteria for gonorrhea among young women screened for Chlamydial infection: contribution of race and geographic prevalence. J Infect Dis 2007;196(5):731–7. [PubMed: 17674316]
39. Udry JR, Chantala K. Missing school dropouts in surveys does not bias risk estimates. Soc Sci Res 2003;32(2):294–311.
40. Chantala, K.; Kalsbeek, WD.; Andraca, E. Chapel Hill, NC: Carolina Population Center, University of North Carolina at Chapel Hill; 2004. Non-response in wave III of the Add Health study. http://www.cpc.unc.edu/projects/addhealth/files/W3nonres.pdf
41. Kurth AE, Martin DP, Golden MR, Weiss NS, Heagerty PJ, Spielberg F, et al. A comparison between audio computer-assisted self-interviews and clinician interviews for obtaining the sexual history. Sex Transm Dis 2004;31(12):719–26. [PubMed: 15608586]
42. Macalino GE, Celentano DD, Latkin C, Strathdee SA, Vlahov D. Risk behaviors by audio computer-assisted self-interviews among HIV-seropositive and HIV-seronegative injection drug users. AIDS Educ Prev 2002;14(5):367–78. [PubMed: 12413183]
43. Metzger DS, Koblin B, Turner C, Navaline H, Valenti F, Holte S, et al. Randomized controlled trial of audio computer-assisted self-interviewing: utility and acceptability in longitudinal studies. HIVNET Vaccine Preparedness Study Protocol Team. Am J Epidemiol 2000;152(2):99–106. [PubMed: 10909945]
44. Murphy DA, Durako S, Muenz LR, Wilson CM. Marijuana use among HIV-positive and high-risk adolescents: a comparison of self-report through audio computer-assisted self-administered interviewing and urinalysis. Am J Epidemiol 2000;152(9):805–13. [PubMed: 11085391]
45. Turner CF, Ku L, Rogers SM, Lindberg LD, Pleck JH, Sonenstein FL. Adolescent sexual behavior, drug use, and violence: increased reporting with computer survey technology. Science 1998;280 (5365):867–73. [PubMed: 9572724]
46. Ford CA, Jaccard J, Millstein SG, Miller WC. Who refuses to provide a urine specimen for *Chlamydia trachomatis* and *Neisseria gonorrhoeae* testing [abstract]? J Adolesc Health 2004;34:144.

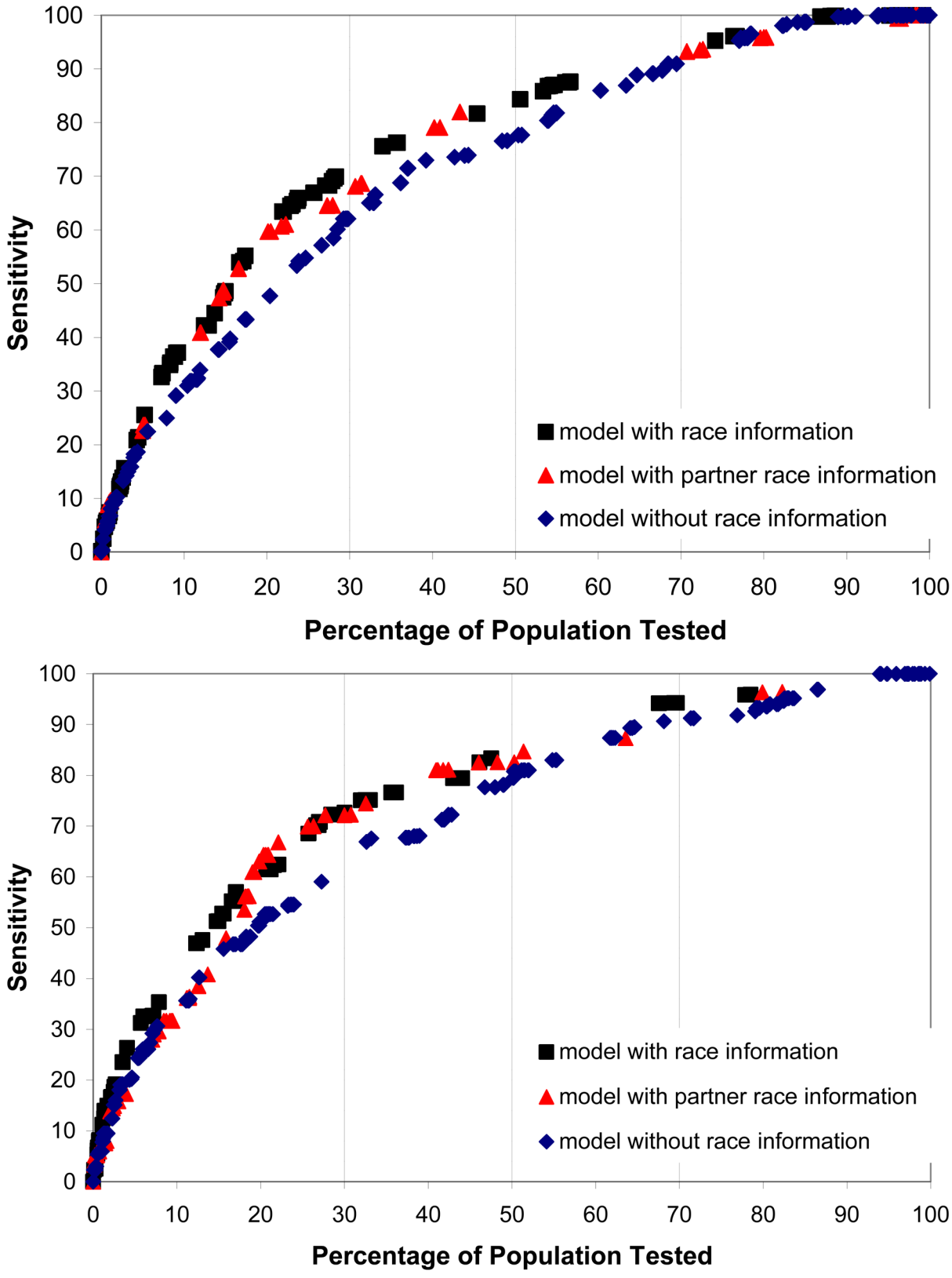

Figure 1.

Figure 1a. Sensitivity of Predicted Probabilities by Percentage of Population Tested among Sexually Experienced Women, National Longitudinal Study of Adolescent Health, 2001 – 2002. When testing 50% or less of the women, the sensitivity of the model with race information is 81.7% (test 45%), the sensitivity of the model with partner race information is 82.0% (test 43%), and the sensitivity of the model without race information is 76.6% (test 49%). The areas under the corresponding ROC curves differ significantly ($p<0.001$).

Figure 1b. Sensitivity of Predicted Probabilities by Percentage of Population Tested among Sexually Experienced Men, National Longitudinal Study of Adolescent Health, 2001 – 2002. When testing 50% or less of the men, the sensitivity of the model with race information is 83.3% (test 48%), the sensitivity of the model with partner race information is 82.5% (test 48%), and the sensitivity of the model without race information is 78.1% (test 49%). The areas under the corresponding ROC curves differ significantly ($p=0.02$).

Table 1

Characteristics of Sexually Experienced Respondents with Chlamydia trachomatis Test Results by Gender, National Longitudinal Study of Adolescent Health, 2001 – 2002

Characteristic	Women (n=5854) Number of Participants	Women (n=5854) Weighted Percent	Men (n=5074) Number of Participants	Men (n=5074) Weighted Percent
Chlamydial infection				
Positive	316	5.1	236	3.9
Negative	5538	94.9	4838	96.1
Race/ethnicity				
White	3178	68.2	2770	67.5
Black	1364	17.1	1033	16.3
Latino	909	11.0	864	11.9
Asian American	337	2.9	343	3.4
Native American	53	0.8	50	0.9
Partner race/ethnicity				
White	2534	62.0	2285	66.0
Black	1192	19.6	6387	13.0
Latino	739	11.1	595	12.3
Other	427	7.2	446	8.7
Region				
South	2216	38.8	1897	40.4
Outside South	3537	61.2	3101	59.6
Age, years				
18 – 21	2356	45.6	1775	42.5
22 – 24	3191	49.2	2942	49.4
25 – 26	307	5.2	357	8.1
Age at sexual debut, years				
10 – 16	3081	56.0	2623	53.6
17 – 25	2749	45.0	2420	46.4
Number of sex partners, past year				
0	459	6.9	489	9.3
1	3711	65.6	2604	51.6
2 – 50	1629	27.5	1914	39.1
Sexuality				
100% heterosexual	5600	96.1	5000	98.9
Not 100% heterosexual	227	3.9	58	1.1
Perceived risk of prevalent STI				
Low	5398	96.7	4659	96.1
Moderate or high	211	3.3	187	3.9
Perceived risk of lifetime HIV infection				
Low	5647	97.7	4844	96.6
Moderate or high	148	2.3	182	3.4
STI symptoms, past year				
Symptoms	1653	28.7	451	9.3
No Symptoms	4165	71.3	4580	90.7
STI test, past year				
Test	2172	36.9	902	18.2
No test	3631	63.1	4128	81.8
STI diagnosis, past year				
Diagnosis	840	14.1	228	4.3
No diagnosis	4919	85.8	4765	95.7
Insurance status				
Insurance	4612	77.1	3615	71.0
No insurance	1211	22.9	1431	29.0
Recent health care use				
Within past year	5473	93.9	3650	72.5
Longer than past year	375	6.1	1406	27.5
Forgone care, past year*				
Forgone care	1422	23.3	1261	24.3
No forgone care	4428	76.7	3809	75.7
Antibiotic use, past 30 days				
Antibiotic	943	16.8	537	11.0
No antibiotic	4904	83.2	4531	89.0
Hormonal contraception use, current				
Contraception	3724	64.8	3057	62.2
No Contraception	2101	35.2	1977	37.8
Condom use, past year				
100% use	1440	23.6	1633	32.1
Not 100% use	4352	76.4	3379	67.9
Pregnancy history, women only				

Characteristic	Women (n=5854) Number of Participants	Women (n=5854) Weighted Percent	Men (n=5074) Number of Participants	Men (n=5074) Weighted Percent
Ever pregnant	2477	42.0		
Never pregnant	3331	58.0		
Marital status				
Married	1356	23.4	806	15.1
Not married	4498	76.6	4266	84.9
Housing				
Shared housing	2592	42.7	2712	52.7
Live alone	3262	57.3	2360	47.3
Student status				
Current student	2224	37.2	1606	31.0
Not a current student	3629	62.8	3465	69.0
High school graduate				
Graduate	5335	90.0	4529	88.0
Not a graduate	516	10.0	542	12.0
Military history				
Ever military	97	1.5	367	6.8
Never military	5752	98.5	4702	93.2
Employment status				
Job	3989	67.8	3764	74.4
No job	1865	32.2	1310	25.6
Functional poverty, past year				
Able to pay rent, utilities	5502	93.8	4841	95.9
Unable to pay rent, utilities	323	6.2	205	4.1

STI, sexually transmitted infection

* Forgone care defined by response to question “Has there been any time in the past 12 months when you thought you should get medical care, but you did not?”

Table 2

Bivariate Association of Prevalent Chlamydial Infection and Potential Predictor Characteristics among Sexually Experienced Respondents by Gender, National Longitudinal Study of Adolescent Health, 2001 – 2002

Characteristic	Women Prevalence Odds Ratio (95% CI)	Men Prevalence Odds Ratio (95% CI)
Race/ethnicity		
White	1.0	1.0
Black	5.7 (3.9 – 8.5)	8.0 (4.9 –13.1)
Latino	1.8 (1.1 – 2.9)	5.3 (2.9 – 9.9)
Asian American	1.2 (0.5 – 2.8)	1.0 (0.3 – 2.8)
Native American	6.1 (2.3 – 16.1)	5.7 (2.1 – 15.6)
	p < 0.001	p < 0.001
Partner's race/ethnicity		
White	1.0	1.0
Black	6.9 (4.5 – 10.5)	5.9 (3.4 – 10.4)
Latino	2.3 (1.0 – 5.0)	3.5 (1.6 – 7.8)
Other	1.7 (0.8 – 3.8)	1.6 (0.5 – 5.1)
	p < 0.001	p < 0.001
Region		
South	1.4 (0.9 – 2.1)	1.7 (1.1 – 2.8)
Outside South	1.0	1.0
	p = 0.10	p = 0.03
Age, years		
18 – 21	1.5 (1.1 – 2.2)	1.0 (0.6 – 1.5)
22 – 24	1.0	1.0
25 – 26	2.1 (1.3 – 3.5)	0.8 (0.4 – 1.6)
	p < 0.01	p = 0.82
Age at sexual debut, years		
10 – 16	1.4 (1.0 – 2.0)	2.0 (1.3 –3.0)
17 – 25	1.0	1.0
	p = 0.04	p < 0.01
Number of sex partners, past year		
0	1.0	1.0
1	3.4 (1.4 – 8.5)	1.6 (0.7 – 3.3)
2 – 50	7.4 (2.8 –19.2)	2.3 (1.1 – 5.0)
	p < 0.001	p = 0.04
Sexuality		
100% heterosexual	1.0	1.0
Not 100% heterosexual	0.6 (0.2 – 1.6)	2.6 (0.8 – 8.8)
	p = 0.31	p = 0.11
Perceived risk of prevalent STI		
Low	1.0	1.0
Moderate or high	5.5 (3.1 – 9.8)	5.2 (2.6 –10.4)
	p < 0.001	p < 0.001
Perceived risk of HIV infection		
Low	1.0	1.0
Moderate or high	2.0 (0.9 – 4.5)	2.4 (1.1 – 5.1)
	p = 0.09	p = 0.03
STI symptoms, past year		
Symptoms	1.0 (0.7 – 1.4)	2.4 (1.5 – 3.8)
No Symptoms	1.0	1.0
	p = 0.99	p < 0.001
STI test, past year		
Test	1.1 (0.8 – 1.5)	1.1 (0.8 – 1.9)
No test	1.0	1.0
	p = 0.53	p = 0.68
STI diagnosis, past year		
Diagnosis	1.6 (1.0 – 2.4)	2.6 (1.4 – 5.0)
No diagnosis	1.0	1.0
	p = 0.04	p < 0.01
Insurance status		
Insurance	1.0	1.0
No insurance	1.4 (0.99 – 2.0)	1.9 (1.2 – 3.0)
	p = 0.08	p = 0.01
Recent health care use		
Within past year	1.0	1.0
Longer than past year	0.8 (0.4 – 1.6)	1.4 (0.99 – 2.0)
	p = 0.60	p = 0.08
Forgone care, past year*		
Forgone care	1.2 (0.8 – 1.6)	1.2 (0.8 – 1.8)
No forgone care	1.0	1.0
	p = 0.32	p = 0.34
Antibiotic use, past 30 days		
Antibiotic	1.0	1.0
No antibiotic	1.5 (0.99 – 2.3)	2.9 (1.4 – 6.2)

Characteristic	Women Prevalence Odds Ratio (95% CI)	Men Prevalence Odds Ratio (95% CI)
	p = 0.06	p = 0.01
Hormonal contraception use		
Contraception	1.0	1.0
No Contraception	1.4 (0.9 – 2.0)	1.1 (0.8 – 1.6)
	p = 0.11	p = 0.43
Condom use, past year		
100% use	1.0	1.0
Not 100% use	1.0 (0.7 – 1.5)	0.9 (0.6 – 1.4)
	p = 0.81	p = 0.65
Pregnancy history, women only		
Never pregnant	1.0	
Ever pregnant	1.8 (1.2 – 2.5)	
	p < 0.01	
Marital status		
Married	1.0	1.0
Not married	2.6 (1.5 – 4.4)	1.3 (0.8 – 3.0)
	p < 0.01	p = 0.30
Housing		
Shared housing	1.3 (0.9 – 1.9)	2.3 (1.5 – 3.7)
Live alone	1.0	1.0
	p = 0.17	p < 0.001
Student status		
Current student	1.0	1.0
Not a current student	1.8 (1.2 – 2.6)	1.6 (1.1 – 2.6)
	p < 0.01	p = 0.03
High school graduate		
Graduate	1.0	1.0
Not a graduate	1.4 (0.9 – 2.1)	2.2 (1.3 – 3.6)
	p = 0.17	p < 0.01
Military history		
Never military	1.0	1.0
Ever military	2.9 (1.2 – 5.5)	1.6 (0.9 – 3.0)
	p = 0.01	p = 0.13
Employment status		
Job	1.0	1.0
No job	1.3 (0.9 – 1.8)	1.8 (1.2 – 2.8)
	p = 0.14	p = 0.01
Functional poverty, past year		
Able to pay rent, utilities	1.0	1.0
Unable to pay rent, utilities	1.4 (0.8 – 2.5)	1.1 (0.5 – 2.5)
	p = 0.21	p = 0.81

CI, confidence interval; STI, sexually transmitted infection p-value for adjusted Wald F-test

* Forgone care defined by response to question “Has there been any time in the past 12 months when you thought you should get medical care, but you did not?”

Table 3

Table 3a. Adjusted Odds Ratios and Risk Scores of Prevalent Chlamydial Infection by Predictor Characteristics among Sexually Experienced Women, National Longitudinal Study of Adolescent Health, 2001 – 2002

Characteristic	Model with Respondent Race Information (n=5239) area under ROC curve=0.7654				Model with Partner Race Information (n=4455) area under ROC curve=0.7519				Model with No Race Information (n=5252) area under ROC curve=0.6950			
	OR (95% CI)	β	W	U	OR (95% CI)	β	W	U	OR (95% CI)	β	W	U
Race/ethnicity												
White	1.0		0	0								
Black	5.6 (3.7–8.3)	1.72	3	1								
Latino	1.5 (0.9–2.8)	0.44	1	1								
Asian American	1.5 (0.6–3.7)	0.39	1	1								
Native American	6.5 (2.3–18.7)	1.88	4	1								
Partner race/ethnicity												
White					1.0		0	0				
Black					6.3 (4.1–9.8)	1.85	4	1				
Latino					2.0 (0.8–5.1)	0.72	1	1				
Other					1.9 (0.8–4.1)	0.62	1	1				
Number of partners, past year												
0	1.0		0	0	1.0		0	0	1.0		0	0
1	4.0 (1.5–10.7)	1.39	3	1	3.4 (1.1–10.9)	1.23	2	1	4.0 (1.5–10.9)	1.40	3	1
2 – 50	8.1 (3.0–21.8)	2.09	4	1	6.0 (1.9–19.2)	1.80	4	1	7.4 (2.7–20.5)	2.01	4	1
Perceived risk of prevalent STI												
Low	1.0		0	0	1.0		0	0	1.0		0	0
Moderate or high	3.5 (1.8–6.5)	1.24	2	1	3.3 (1.7–6.4)	1.21	2	1	3.7 (2.1–6.3)	1.30	3	1
Student status												
Current student	1.0		0	0	1.0		0	0	1.0		0	0
Not a current student	2.2 (1.4–3.3)	0.77	2	1	1.9 (1.2–2.9)	0.63	1	1	2.0 (1.3–3.0)	0.68	1	1
Age, years												
18 – 21	1.7 (1.2–2.3)	0.52	1	1					1.5 (1.1–2.2)	0.43	1	1
22 – 24	1.0		0	0					1.0		0	0
25 – 26	1.9 (1.0–3.4)	0.62	1	1					2.1 (1.2–3.7)	0.74	1	1
Marital status												
Married									1.0		0	0
Not married									2.8 (1.5–5.2)	1.03	2	1
Pregnancy history												
Never pregnant									1.0		0	0
Ever pregnant									1.8 (1.2–2.6)	0.57	1	1
Hormonal contraception												
Contraception									1.0		0	0
No contraception									1.5 (1.0–2.4)	0.44	1	1
Constant		− 6.03				− 5.64				− 6.64		

Table 3b. Adjusted Odds Ratios and Risk Scores of Prevalent Chlamydial Infection by Predictor Characteristics among Sexually Experienced Men, National Longitudinal Study of Adolescent Health, 2001 – 2002

Characteristic	Model with Respondent Race Information (n=4529) area under ROC curve=0.7447				Model with Partner Race Information (n=3614) area under ROC curve=0.7481				Model with No Race Information (n=4541) area under ROC curve=0.6894			
	OR (95% CI)	β	W	U	OR (95% CI)	β	W	U	OR (95% CI)	β	W	U
Race/ethnicity												
White	1.0		0	0								
Black	7.0 (4.3–11.3)	1.94	4	1								
Latino	4.1 (2.2–7.3)	1.40	3	1								
Asian American	1.0 (0.4–2.9)	0.02	0	1								

Table 3a. Adjusted Odds Ratios and Risk Scores of Prevalent Chlamydial Infection by Predictor Characteristics among Sexually Experienced Women, National Longitudinal Study of Adolescent Health, 2001 – 2002

Characteristic	Model with Respondent Race Information (n=5239) area under ROC curve=0.7654				Model with Partner Race Information (n=4455) area under ROC curve=0.7519				Model with No Race Information (n=5252) area under ROC curve=0.6950			
	OR (95% CI)	β	W	U	OR (95% CI)	β	W	U	OR (95% CI)	β	W	U
Native American	5.4 (2.0–14.2)	1.68	3	1								
Partner race/ethnicity												
White					1.0		0	0				
Black					4.2 (2.3–7.8)	1.45	3	1				
Latino					2.7 (1.2–6.1)	1.01	2	1				
Other					1.6 (0.5–5.6)	0.49	1	1				
Perceived risk of prevalent STI												
Low	1.0		0	0	1.0		0	0	1.0		0	0
Moderate or high	3.5 (1.8–6.9)	1.26	3	1	3.5 (1.4–9.0)	1.27	3	1	4.1 (2.1–8.0)	1.42	3	1
Military history												
Never military	1.0		0	0	1.0		0	0	1.0		0	0
Ever military	2.4 (1.2–4.9)	0.89	2	1	2.2 (0.99–5.1)	0.80	2	1	1.9 (1.0–3.7)	0.66	1	1
Region												
Outside South					1.0		0	0	1.0		0	0
South					2.1 (1.3–3.5)	0.75	1	1	1.9 (1.2–3.0)	0.63	1	1
Housing												
Shared housing	2.0 (1.2–3.2)	0.68	1	1	1.9 (1.1–3.3)	0.66	1	1	2.3 (1.4–3.6)	0.82	2	1
Live alone	1.0		0	0	1.0		0	0	1.0		0	0
High school graduate												
Graduate	1.0		0	0	1.0		0	0	1.0		0	0
Not a graduate	1.7 (1.0–3.1)	0.56	1	1	2.2 (1.1–4.5)	0.80	2	1	1.8 (1.0–3.3)	0.60	1	1
Recent health care use												
Within past year	1.0		0	0								
Longer than past year	1.5 (1.0–2.1)	0.39	1	1								
Antibiotic use, past 30 days												
Antibiotic									1.0		0	0
No antibiotic									2.9 (1.3–6.7)	1.07	2	1
STI diagnosis, past year												
Diagnosis									1.0		0	0
No diagnosis									1.9 (1.2–3.2)	0.66	1	1
Age at sexual debut, years												
10 – 16									1.0		0	0
17 – 25									1.7 (1.1–2.9)	0.56	1	1
Number of partners, past year												
0									1.0		0	0
1									1.4 (0.6–3.0)	0.33	1	1
2 – 50									1.5 (0.6–3.3)	0.39	1	1
Constant		− 4.87				− 4.97				− 6.03		

ROC, receiver operating characteristic; OR, odds ratio; CI, confidence interval; β, regression coefficient; W, weighted score; U, unweighted score; STI, sexually transmitted infection

Table 4

Table 4a. Performance of Selective Screening Criteria among Sexually Experienced Women, National Longitudinal Study of Adolescent Health, 2001 – 2002

Percent Tested	Model with Respondent Race Information (n=5239)			Model with Partner Race Information (n=4455)			Model with No Race Information (n=5252)		
	Cutoff	Sensitivity	Specificity	Cutoff	Sensitivity	Specificity	Cutoff	Sensitivity	Specificity
Predicted Probability									
≤ 70	0.02	87.6	45.0	0.02	82.0	58.7	0.02	90.9	31.7
≤ 50	0.03	81.7	56.5	0.02	82.0	58.7	0.04	76.6	52.4
≤ 30	0.05	69.9	73.8	0.04	64.6	74.0	0.05	62.1	71.9
Weighted Risk Score									
≤ 70	6	84.1	53.3	4	81.3	53.5	7	80.4	48.0
≤ 50	6	84.1	53.3	4	81.3	53.5	8	60.1	73.0
≤ 30	7	66.9	76.4	6	61.0	80.1	8	60.1	73.0
Unweighted Risk Score									
≤ 70	3	74.7	59.4	3	54.3	77.8	4	77.5	48.9
≤ 50	3	74.7	59.4	3	54.3	77.8	5	46.7	79.9
≤ 30	4	31.9	91.3	3	54.3	77.8	5	46.7	79.9

Table 4b. Performance of Selective Screening Criteria among Sexually Experienced Men, National Longitudinal Study of Adolescent Health, 2001 – 2002

Percent Tested	Model with Respondent Race Information (n=4529)			Model with Partner Race Information (n=3614)			Model with No Race Information (n=4541)		
	Cutoff	Sensitivity	Specificity	Cutoff	Sensitivity	Specificity	Cutoff	Sensitivity	Specificity
Predicted Probability									
≤ 70	0.01	94.3	31.3	0.01	87.3	37.2	0.02	90.6	32.7
≤ 50	0.02	83.3	53.9	0.02	82.5	52.9	0.03	78.1	52.1
≤ 30	0.04	72.2	73.3	0.03	72.2	73.8	0.04	59.0	74.0
Weighted Risk Score									
≤ 70	2	82.5	55.3	2	84.7	49.7	5	87.3	39.8
≤ 50	2	82.5	55.3	3	74.5	68.0	6	67.7	64.0
≤ 30	4	70.2	74.9	4	63.0	81.0	7	46.8	84.2
Unweighted Risk Score									
≤ 70	2	71.7	61.7	2	80.3	57.6	4	79.2	51.4
≤ 50	2	71.7	61.7	2	80.3	57.6	4	79.2	51.4
≤ 30	3	42.8	89.1	3	46.6	86.2	5	50.4	81.6

Table 5

Table 5a. Performance of Selective Screening Criteria to Test <50% of Sexually Experienced Women by Respondent's Race, National Longitudinal Study of Adolescent Health, 2001 – 2002

	Model with Respondent Race Information (n=5239)						**Model with Partner Race Information (n=4455)**						**Model with No Race Information (n=5252)**					
	White		**Black**		**Other**		**White**		**Black**		**Other**		**White**		**Black**		**Other**	
	SEN	**SPE**	**SEN**	**SPE**	**SEN**	**SPE**	**SEN**	**SPE**	**SEN**	**SPE**	**SEN**	**SPE**	**SEN**	**SPE**	**SEN**	**SPE**	**SEN**	**SPE**
Predicted Probability 61.9	66.9	99.4	4.9	77.1	55.2	60.2	73.9	99.4	6.4	90.8	29.0	72.5	56.1	79.0	39.9	80.5	46.5
Weighted Risk Score 61.9	67.2	99.4	4.9	94.7	31.4	64.5	66.1	94.7	3.7	88.9	34.9	55.6	75.5	61.8	63.4	68.1	70.2
Unweighted Risk Score 47.3	75.3	90.4	21.0	98.3	17.4	31.9	90.0	70.3	41.5	70.5	49.2	42.0	82.7	48.5	74.1	54.6	72.3

Table 5b. Performance of Selective Screening Criteria to Test <50% of Sexually Experienced Men by Respondent's Race, National Longitudinal Study of Adolescent Health, 2001 – 2002

	Model with Respondent Race Information (n=4529)						Model with Partner Race Information (n=3614)						Model with No Race Information (n=4541)					
	White		Black		Other		White		Black		Other		White		Black		Other	
	SEN	SPE	SEN	SPE	SEN	SPE	SEN	SPE	SEN	SPE	SEN	SPE	SEN	SPE	SEN	SPE	SEN	SPE
Predicted Probability 42.0	74.5	100	0	99.7	6.9	56.1	66.5	99.4	6.7	87.0	28.1	65.6	57.3	83.9	28.9	81.8	47.9
Weighted Risk Score 42.0	74.5	100	0	96.8	16.2	33.7	81.1	96.8	13.4	86.6	52.1	58.7	69.2	71.4	45.2	71.1	56.3
Unweighted Risk Score 31.2	78.1	86.2	25.5	90.9	18.6	56.1	68.9	94.1	20.6	86.8	35.8	65.6	56.4	83.4	28.4	86.6	48.0

SEN, sensitivity; SPE, specificity

Table 6

Table 6a. Performance of Selective Screening Criteria to Test <50% of Population of Sexually Experienced Women by Respondent's Race, National Longitudinal Study of Adolescent Health, 2001 – 2002

	Model with Respondent Race Information			Model with Partner Race Information			Model with No Race Information		
	White	**Black**	**Other**	**White**	**Black**	**Other**	**White**	**Black**	**Other**
Subpopulation Number of infections	4,644,760 (130,771)	945,760 (142,776)	935,181 (40,995)	4,644,760 (130,771)	945,760 (142,776)	935,181 (40,995)	4,644,760 (130,771)	945,760 (142,776)	935,181 (40,995)
Predicted Probability									
Infections detected	80,476	142,350	30,467	78,744	141,957	37,209	94,241	110,927	32,207
Tests among uninfected	1,497,806	763,240	395,175	1,178,214	751,707	634,648	20,22,722	499,754	491,501
Weighted Risk Score									
Infections detected	80,476	142,350	38,249	84,299	135,240	36,463	71,189	90,716	27,114
Tests among uninfected	1,490,527	763,240	611,534	1,532,016	773,572	582,162	1,141,263	318,130	276,393
Unweighted Risk Score									
Infections detected	59,157	127,225	40,098	41,667	100,435	28,909	58,780	75,345	23,496
Tests among uninfected	1,105,094	634,370	742,951	449,814	469,847	454,571	824,402	226,904	264,591

Table 6b. Performance of Selective Screening Criteria to Test <50% of Population of Sexually Experienced Men by Respondent's Race, National Longitudinal Study of Adolescent Health, 2001 – 2002

	Model with Respondent Race Information			Model with Partner Race Information			Model with No Race Information		
	White	Black	Other	White	Black	Other	White	Black	Other
Subpopulation Number of infections	4,276,592 (60,848)	838,491 (80,756)	958,632 (55,640)	4,276,592 (60,848)	838,491 (80,756)	958,632 (55,640)	4,276,592 (60,848)	838,491 (80,756)	958,632 (55,640)
Predicted Probability									
Infections detected	24,964	80,756	55,508	34,142	80,287	48,383	40,114	66,179	45,025
Tests among uninfected	1,032,140	757,735	839,715	1,412,997	705,771	649,052	1,761,285	526,613	449,725
Weighted Risk Score									
Infections detected	24,964	80,756	55,508	20,529	78,202	48,186	36,750	54,152	39,023
Tests among uninfected	1,032,140	757,735	744,493	795,655	656,299	432,242	1,255,578	403,546	368,593
Unweighted Risk Score									
Infections detected	16,367	69,822	48,700	34,142	75,961	48,309	40,114	65,287	48,714
Tests among uninfected	879,713	552,387	724,975	1,310,123	601,589	579,504	1,797,801	538,094	450,062