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RESEARCH ARTICLE

Identifying Relationships Between High-Risk Sexual Behaviors and Screening Positive for Chlamydia and Gonorrhea in School-Wide Screening Events

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ABSTRACT

BACKGROUND: This article describes a school-wide sexually transmitted infection (STI) screening to identify adolescent high-risk sexual behaviors, STI history/incidence, and presence of chlamydia and gonorrhea, and examines relationships between high-risk behaviors and screening positive for chlamydia and gonorrhea in an alternative high school setting.

METHODS: School-wide chlamydia and gonorrhea education and screening was provided to 869 adolescents; 226 males and 282 females 14-20 years (mean age = 17.07) consented to urine screening. Relationships were examined between screening positive, history of STIs, and high-risk sexual behaviors.

RESULTS: A majority (69%) of the adolescents consented to screening: 17.76% (92) had a history of STI; 8.83% (46) tested positive at screening. More females than males tested positive ($p = .001$). Significant relationships existed between history of STIs and ≥ 4 sexual partners ($p = .0022$), no condom use ($p = .06$), and sexual intercourse in last 3 months ($p = .03$).

CONCLUSIONS: School-Based Health Center (SBHC) screening was well accepted by students and staff. Sexually transmitted infection history was correlated with all identified high-risk sexual behaviors supporting the need for in-depth assessment, counseling, and testing of adolescents wherever they present for care. This study also provides an example of the role SBHCs can play in the national strategy to control chlamydia and gonorrhea in adolescents.

Keywords: child and adolescent health; community health; risk behaviors; school-based clinics; reproductive health.

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Adolescents carry significant disease burden from sexually transmitted infections (STIs), in particular *Chlamydia trachomatis* (chlamydia) and *Neisseria gonorrhoeae* (gonorrhea),[1,2] yet they are the least likely to have access to primary care services and few receive comprehensive health counseling and screening services from their primary care providers, including assessment of sexual risk behaviors and STIs.[3-6] The Centers for Disease Control and Prevention (CDC) estimates that although 15- to 24-year-olds represent only 25% of the sexually experienced population, they account for nearly half of all new STI diagnoses. Chlamydia and gonorrhea are 2 of the most commonly reported infectious diseases in the United States and their rates continue to increase.[1,7] In 2008-2009, chlamydia rates for males and females increased 2.4% for those aged 15-19 and 4.0% for those aged 20-24. The prevalence of these STIs is highest among females aged 15 to 19 years and males aged 15- to 24-years old with higher rates in males 20-24 years.[2,8] Gonorrhea, although not as prevalent as chlamydia, is still an important health concern among adolescents due to the high rate of co-occurrence of the 2 infections. In addition, the CDC reports that cases of chlamydia

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and gonorrhea are substantially underreported due to the asymptomatic nature of these diseases.

Although chlamydia and gonorrhea are easily detected and treated, recommended annual screening remains underutilized.[7] Given the asymptomatic nature of chlamydia, its high prevalence, and serious and potentially long-term sequelae in women, screening adolescent women for chlamydia has been stressed by the US Preventive Services Task Force.[9] Annual screening for chlamydia is recommended for all sexually active women ≤ 25 years old, with screening at more frequent intervals based on individual sexual risk.[9] There continues to be controversy over the value of routine STI screening for adolescent males. Some question whether screening young men is a cost effective, efficient approach to reducing morbidity from STIs,[9,10] others propose this is another way to decrease and prevent negative sequelae in asymptomatic women and men and improve adolescent health.[11,12] Routine screening for sexually active adolescent males is not recommended unless in a clinic where there is a high prevalence of STIs.[9] Regardless of this controversy, there is agreement that STIs in adolescents are a major public health concern.[1,2,8] Untreated, these STIs can lead to severe health consequences including pelvic inflammatory disease, ectopic pregnancy, increased likelihood of HIV infection if exposed, epididymitis, urethritis, sterility, and infertility.[8] These health issues and their concomitant psychological consequences place a large economic toll on the United States. The CDC estimates that $15.4 billion were spent on costs associated with treated and untreated STIs in 2009.[13]

Current American Academy of Pediatrics recommendations for well adolescent health care include assessment of and preventive health education for risky sexual behaviors with subsequent screening for STIs during well child exams.[3] However, research shows that when adolescents see primary care providers, little time is spent on preventive care and few adolescents are asked specifically about their confidential risk behaviors, including risks for STIs.[5,14] Some of the key risk factors that should be assessed include number of sexual partners, use of condoms, and exposure to STIs. These are also standard research and CDC reporting measures used to describe high-risk sexual behaviors.[15]

When screening is conducted, it has been noted that there is often overscreening of older women whereas too few young women are being screened.[16] Differential screening based on race/ethnicity, age, insurance status, and sexual health history is also a concern as this may lead to higher reported rates in specific populations and underreporting in other groups.[17] Other missed opportunities for screening may be due to provider perceptions of risk status or incomplete history provided by patients. A study of the association between self-report of abstinence and STIs in young adults found a discrepancy between young adults' self-reported sexual behaviors and positive STI status, with a significant number of adolescents who reported sexual abstinence also testing positive for STIs and/or pregnancy.[18] This further supports the need for routine STI screening for adolescents/young adults.

School-Based Health Centers (SBHCs) have been identified as a place where STI screening, education, and treatment can be offered to adolescents in a comfortable, confidential, and efficient setting. Research has demonstrated that school-based screenings are effective at identifying adolescents positive for chlamydia and gonorrhea, and that the prevalence of STIs in the high school student population is high enough to justify school-based screening for chlamydia.[6,8,9,19] This type of screening captures adolescents who would not have made an appointment or driven to a health care clinic to screen for STIs, and, in addition, identifies those without symptoms who otherwise would not have tested or believed they were susceptible. A criticism of school-based screenings is that many are ''wall-to-wall'' screening of large groups of adolescents during a limited time period, which addresses some of the issues but does not take full advantage of school-based resources.[19] Also, a lack of routine screening during scheduled visits was identified as a missed opportunity for early detection of STIs.[20] Furthermore, the primary focus of many programs is on screening of young women. While this is an important focus, the addition of screening young men has been identified as an important consideration to reduce morbidity for both young women and young men.[8,12] Researchers emphasize the need for SBHCs to maximize their opportunities to educate, screen, and treat adolescents to address health risks and improve health.[20,21]

In response to these important issues, an on-site SBHC in Michigan offered biannual chlamydia and gonorrhea screening events to all students in a public alternative high school who were present in school on the day of the event. The screening events were an expansion of health promotion services offered on a regular basis through the on-site SBHC and were supported by the administration and faculty of the school. These events provided health education to alert adolescents to their potential sexual health risks; gathered data on the sexual behaviors of the adolescents; offered urine screening for chlamydia and gonorrhea; and provided treatment and safer sex planning for those adolescents with positive screens. The purpose of this study was to describe the high-risk sexual behaviors and the history and incidence of previous STI's within this adolescent population; determine the presence of chlamydia and gonorrhea in this sample; and examine the relationships between high-risk sexual behaviors and testing positive for chlamydia and gonorrhea.

METHODS

Participants

Data were gathered from 8 school-wide screening events conducted biannually at the alternative high school from fall 2005 through spring 2009. A total of 869 adolescents between ages 14 and 20 participated in the school-wide chlamydia and gonorrhea screening event by attending an education session and completing a sexual health questionnaire. A maximum of 148 adolescents participated in each event. Of the total subjects, 752 (86.54%) identified themselves as sexually active and 521 (69%) of the sexually active subjects consented to urine chlamydia and gonorrhea screening. The primary reason for declining testing was having been tested for an STI within the past 6 months (69%, N = 156).

The mean age of adolescents consenting to the urine screening (N = 521) who responded to age (N = 509) was 17.07 years (range 14-20 years). Of the adolescents responding to race and gender, the majority identified as white 22.98% (N = 111), or African American 59.63% (N = 288) and 55.51% (N = 282) were females (Table 1). These adolescent demographics are representative of the student population in the Alternative High School from 2005 to 2009. Percent of adolescents reporting sexual activity in the study also corresponds with reported sexual activity on youth risk behavior surveys distributed school-wide in 2005 (82%), 2007 (83%), and 2009 (83%).

Procedure

All adolescents present at the alternative high school on the day of the screening event received an in-depth educational presentation which included a discussion of the risks, susceptibility, transmission, symptoms, treatment, and prevention of chlamydia and gonorrhea. This was integrated into the school day as part of their health curriculum. Adolescents then completed a confidential sexual health questionnaire assessing sexual risk behaviors and received additional information about STIs. All adolescents were offered the opportunity for confidential urine screening to determine the presence of chlamydia and gonorrhea. Questionnaire completion and urine screening were conducted on an individual basis outside of the classroom during the event day. All students participated so that it was not possible for other adolescents or school staff to know who chose to be screened maintaining confidentiality. When results were received, those testing positive were then contacted through typical clinic processes by the SBHC health professionals for treatment and follow-up.

Table 1. **Demographic Characteristics of Students Consenting to Urine Screening (N = 512). p Values Are From a Chi-Square Test or Fisher's Exact Test Where Expected Cell Counts Were Below 5**

	Total N (%)	Positive N (%)	Negative N (%)
Gender (N = 508)*			
Female	282 (55.51)	36 (6.9)	246
Male	226 (44.49)	10 (1.9)	216
Race/Ethnicity (N = 483)†			
African American	288 (59.63)	31 (73.81)	257
White	111 (22.98)	2 (4.76)	109
Hispanic	21 (4.35)	2 (4.76)	19
African American/Hispanic	3 (0.62)	0	3
Other	60 (12.42)	7 (16.67)	53

*p = .0011; †p = .0570.

Instruments

For the purposes of data analysis, key variables of the confidential adolescent sexual health questionnaire were consolidated to reflect the indicators of ''high-risk behaviors'' identified by the CDC (number of sexual partners; condom use; sexual intercourse with in the last 3 months) and used in this study. Sexual intercourse was defined as vaginal, oral, or anal intercourse. Number of sexual partners was defined as having ≥ 4 or <4 sexual partners. Condom use was defined as no condom use with last intercourse or reported condom use with last intercourse. Sexual intercourse in last 3 months was defined as reported sexual intercourse within the last 3 months or no reported sexual intercourse within the last 3 months. Adolescents were also asked whether they ever had an STI in the past. A positive response was defined as ''lifetime history of STI'' for this study. Adolescents whose urine collected at the time of study was positive for chlamydia and/or gonorrhea, were classified as ''event screening positive'' for this study. Positivity was calculated using the method described by the CDC[13] by dividing the number testing positive for chlamydia and/or gonorrhea (numerator) by the total number tested (denominator) and is expressed as a percentage. Both lifetime history of STI and event screening positive at the time of study were analyzed against each of the 3 identified high-risk sexual behaviors.

Data Analysis

Descriptive statistics, including means and frequency distributions, were used to identify the percentages of adolescents exhibiting high-risk sexual behaviors. Bivariate analyses were used to examine the relationship between the occurrence of lifetime history of STI and event screening positive and the high-risk sexual behaviors of number of sexual partners, condom use, and having sexual intercourse within last 3 months. Chi-square tests were employed to examine differences between these variables and gender and race/ethnic groups.

RESULTS

Eight hundred and sixty-nine adolescents participated in this study. Of those adolescents, 86.54% (N = 752) indicated they had sexual intercourse at least once in their lifetime. Of those adolescents responding to STI history questions, 6.94% (51/735) reported a history of chlamydia, 2.18%, (16/735) reported a history of gonorrhea, and 7.76% (56/735) reported other STIs (syphilis, herpes, trichomoniasis, or multiple STIs); 45.05%, (351/779) of adolescents indicated they had sexual intercourse with ≥ 4 partners; 83.13% (616/741) stated that they had sexual intercourse within the 3 months prior to screening event, and 36.02%, (264/733) adolescents reported not using a condom the last time of sexual intercourse.

Of those who identified as sexually active, 69.28% (N = 521) consented to urine chlamydia and gonorrhea screening. Of these, 46 tested positive for chlamydia and/or gonorrhea giving a positivity of 8.8% (46/521). The average age of the adolescents screened was 17.07 years, (range: 14-20 years, median = 17). Of the 226 males who were screened for chlamydia and gonorrhea, 10 (1.9%) tested positive. Of the 282 females who were screened for chlamydia and gonorrhea, 36 (6.9%) tested positive. Of the adolescents testing positive for an STI who indicated their race (N = 42), 4.76% (2) were white, 73.81% (31) were African American, 4.76% (2) were Hispanic, and 16.67% (7) indicated other (Table 1). When the number of adolescents who tested positive for the first time for an STI during this screening were combined with adolescents who indicated a prior history of chlamydia and/or gonorrhea, an overall total of 18.8% (163/869) were found to have had an STI in their lifetime. The screening event positives and lifetime history of STIs were each compared through statistical analyses to determine if there were associations with the identified high-risk sexual behaviors.

To determine the relationship between number of sexual partners and event screening positivity of STI or lifetime history of STI, chi-square test was performed. When the lower risk subjects (<4 sexual partners) were compared with the higher risk (≥4 sexual partners), no significant difference (p = .69) was found in event screening positivity of STI. However, when lifetime history of STI was examined, there was a statistically significant difference (p = .0023). In this study, having ≥ 4 sexual partners was correlated with having a lifetime history of STI's, but not with event screening positivity of STI (Tables 2 and 3).

A chi-square test was performed to determine the relationship between condom use at last intercourse and event screening positivity of STI or lifetime history of STI. When the lower risk subjects (use of condom at last intercourse) were compared with the higher risk (no use of condom at last intercourse), no significant association (p = .63) was found in event screening positivity of STI. However, when lifetime history of STI was examined, there was a statistically significant difference (p = .03). In this study, not using a condom at last sexual intercourse was correlated with having a lifetime history of STIs, but not with event screening positivity of STI (Tables 2 and 3).

Table 2. **Association of Event Screening and Identified High-Risk Behaviors. p Values Are From a Chi-Square Test or Fisher's Exact Test Where Expected Cell Counts Were Below 5**

	Event Screening STI — N	
	Positive	**Negative**
Lifetime sexual partners*		
Less than 4	15	191
4 or more	21	232
Condom use at last intercourse†		
Yes	28	286
No	15	180
Last sexual intercourse‡		
Within last 3 months	38	401
6 months or more	3	70

*p = .6855; †p = .6298; ‡p = .3691.

Table 3. **Association of Lifetime History of STIs and Identified High-Risk Behaviors. p Values Are From a Chi-Square Test or Fisher's Exact Test Where Expected Cell Counts Were Below 5**

	History of STI — N	
	Positive	**Negative**
Lifetime sexual partners*		
Less than 4	53	256
4 or more	95	256
Condom use at last intercourse†		
Yes	91	378
No	69	195
Last sexual intercourse‡		
Within last 3 months	146	470
6 months or more	14	111

*p = .0023; †p = .0342; ‡p = .019.

A chi-square test was performed to determine the relationship between sexual intercourse and event screening positivity of STI or lifetime history of STI. When the lower risk subjects (no intercourse in last 3 months) were compared with the higher risk (reported intercourse in last 3 months), no association (p = .37) was found in event screening positivity of STI. However, when lifetime history of STI was examined, there was a statistically significant difference (p = .002). In this study, reported intercourse in the last 3 months was correlated with having a lifetime history of STIs, but not with event screening positivity of STI (Tables 2 and 3).

Chi-square analysis was used to examine whether sex and ethnic/racial disparities described in the literature related to the incidence of chlamydia and gonorrhea existed in this sample. Results of

the chi-square tests demonstrated that there was a significant gender difference ($p = .001$) in testing positive for chlamydia and/or gonorrhea. Females were more likely to have a positive test for chlamydia and/or gonorrhea than males. There was a weak significant association ($p = .057$) between having a positive test for chlamydia and/or gonorrhea at time of study and being African American.

DISCUSSION

This study provides an interesting snapshot of the sexual risk behaviors of adolescents in an alternative high school population. When compared with 2009 Michigan and CDC National Youth Risk Behavior Survey[22] statistics, a higher percentage of adolescents in this study, 86.5%, had ever had sex, than high school adolescents in Michigan (45%) or nationally (46%). While more than one half the study sample of adolescents (53.2%) had had ≥ 4 sex partners, in Michigan and nationwide, only 14% of high school adolescents reported they had ≥ 4 lifetime sex partners. Although this study sample exhibited more high-risk sexual behaviors than Michigan or national populations, more of these adolescents did use condoms (64%) than Michigan (61%) during last intercourse. Also, this combined sample of females' positivity for an STI (6.9%) was considerably lower than the positivity reported in the CDC's chlamydia profiles for 15- to 19-year-old Michigan women who tested in STD clinics (16.9%) and was the same as those screened in family planning clinics (6.9%).

This may provide support for effectiveness of the STI screening and educational awareness programs. Education about the risks for contracting chlamydia and/or gonorrhea and the possible sequelae was provided to a significant number of at risk adolescents biannually which may have raised awareness about the risks of STIs and impacted behaviors such as condom use and screening. During this study 69% (521/752) of the sexually active adolescents agreed to be screened, with 66% (282/430) of sexually active females screened. When those adolescents who declined screening because they had been tested within the past 6 months were included, 90% (677/752) of sexually active adolescents in this study had been screened for STIs. This surpasses the highest target set by *Healthy People 2020*'s objective to screen 57.9% of sexually active females aged 16-20[23] to reduce chlamydia rates among females.

Significant associations were found between each of the high-risk sexual risk behaviors (having ≥ 4 sexual partners, no condom use at last intercourse, and sexual activity within the past 3 months) and lifetime history of having an STI. This lends support to the need for discussion of sexual risk behaviors with adolescents, including the frequency of sexual activity, number of sexual partners, and use of condoms. However, only female gender was found to have a statistically significant association with the event screening positivity of STIs. These findings are consistent with other research on gender differences and STI positivity.[24] One explanation may be that many adolescent females have older sexual partners and older men are more likely to have an STI. In addition, women may be at greater risk of contracting an STI because they have difficulty in talking to their male partners about safer sex practices.[25] Furthermore, women's anatomy make them more susceptible to STIs. Regardless, these findings suggest that females should be targeted for specialized STI education, counseling, and testing.

One possible reason for lack of significant findings between the risk behaviors and positivity of a current STI may be due to the small sample size of adolescents who tested positive for an STI. The accuracy of the information students' provided on the sexual health questionnaire may also have been an issue. Another possibility for the lack of significance may be that some adolescents may have participated in the study on more than one occasion. It is hoped that adolescents who had previously participated in the screening program would have benefitted from the information provided, leading to a decrease in sexual risk behaviors, but this data was not collected. The alternative high school in this study has high student attrition rates. In response to this, new students are enrolled twice annually, therefore the number of adolescents involved in the study on more than 1 occasion is thought to be much lower than expected in a 3-year study with traditional high school students.

With respect to racial differences, this study only found a weakly significant relationship between race and testing positive for chlamydia and/or gonorrhea. This may be due to the small number of adolescents testing positive in this study. Environment may be a greater risk than race or ethnicity. According to the CDC, African American and Latino individuals may have a higher prevalence of STIs due to the lack of health care, poverty, and overall higher prevalence of disease in these populations. Other research proposes that racial differences are actually due to differential screening of these populations.[26] Providing education, screening, and care to all adolescents through SBHCs avoids the differential care observed in a variety of other healthcare settings, and focuses on the behaviors that need to be addressed to reduce STIs in the adolescent population.

IMPLICATIONS FOR SCHOOL HEALTH

School-Based Health Centers are in a prime position to lead school-wide STI screening efforts as many states allow adolescents to consent to STI screening and treatment confidentially, making a school-wide

screening easier to accomplish. Even so, barriers to school-wide screenings exist. These include funding for staff and supplies, school and parental ''buy-in'' to the screening, consent requirements, student suspicion affecting numbers testing, and parent resistance.[27]

This study provides an excellent example of the partnership that can occur between an on-site SBHC and the school staff and administration. By arranging to provide educational information during class time, all adolescents received information that could alert them to common STIs and their risks. In addition, all adolescents (present on the day of screening) were given individualized time to complete a sexual behavior questionnaire, received educational materials about STIs, and were offered the opportunity for confidential chlamydia and gonorrhea screening. This combined the benefit of mass screening with individualized attention to provide an effective and well-received program.

Nationally efforts are needed to increase adolescent access to sexual and reproductive health services to decrease the spread of STIs in the United States.[27] This study supports the need for in-depth assessment of high-risk sexual behaviors of adolescents in all settings in which they present for care to promote their health and reduce risks. It also provides an example of the role SBHCs can play in the national strategy to control chlamydia and gonorrhea in adolescents.

Human Subjects Approval Statement

Institutional review board approval of the study (HUM00000603) was obtained through the University of Michigan and informed consent was received from the adolescent subjects.

REFERENCES

1. Gavin L, MacKay AP, Brown K, et al. Sexual and reproductive health of persons aged 10-24 years-United States, 2000-2007. *MMWR Surveill Summ*. 2009;58(6):1-58.
2. Datta SD, Sternberg M, Johnson RE, et al. Gonorrhea and chlamydia in the United States among persons 14 to 39 years of age, 1999 to 2002. *Ann Intern Med.* 2007;147:89-96.
3. Committee on Adolescence: American Academy of Pediatrics. Achieving quality health services for adolescents. *Pediatrics*. 2008;121(6):1263-1270.
4. Hambige SJ, Emersmann MS, Federico S, et al. Disparities in pediatric preventive care in the United States, 1993-2002. *Arch Pediatr Adolesc Med*. 2007;161:30-36.
5. Adams SH, Husting S, Zahnd E, et al. Adolescent services: rates and disparities in preventive health topics covered during routine medical care in a California sample. *J Adolesc Health*. 2009;44(6):536-545.
6. Asbel LE, Newbern CE, Salmon M, et al. School-based screening for *Chlamydia trachomatis* and *Neisseria gonorrhoeae* among Philadelphia public high school students. *Sex Transm Dis*. 2006;33(10):614-620.
7. 2009 Sexually Transmitted Disease Surveillance: STDs in Adolescents and Young Adults. Available at: http://www.cdc.gov/std/stats09/adol.htm. Accessed March 5, 2011.
8. Joffe A, Rietmeijer CA, Chung SE, et al. Screening asymptomatic adolescent men for *chlamydia trachomatis* in school-based health centers using urine-based nucleic acid amplification tests. *Sex Transm Dis*. 2008;35(suppl 11):S19-23.
9. Barry PM, Scott KC, McCright J, et al. Stay in school? Results of a sexually transmitted diseases screening program in San Francisco high schools-2007. *Sex Transm Dis*. 2008;35(6):550-552.
10. Meyers DS, Halvorson H, Luckhaupt S. Screening for chlamydial infection: an evidence update for the US Preventive Services Task Force. *Ann Intern Med*. 2007;147(2):135-142.
11. Gift TL, Blake DR, Gaydos CA, et al. The cost effectiveness of screening men for *Chlamydia trachomatis*: a review of the literature. *Sex Transm Dis*. 2008;35(suppl 11):S51-60.
12. Blake DR, Quinn TC, Gaydos CA. Should asymptomatic men be included in chlamydia screening programs? Cost-effectiveness of Chlamydia screening among male and female entrants to a national job training program. *Sex Transm Dis*. 2008;35(1):91-101.
13. 2009 Sexually Transmitted Diseases Surveillance: Trends in Sexually Transmitted Diseases in the United States: National Data for Gonorrhea, Chlamydia and Syphilis. Available at: http://www.cdc.gov/std/stats09/trends.htm. Accessed March 5, 2011.
14. Irwin CE, Adams SH, Park J, et al. Preventive care for adolescents: few get visits and fewer get services. *Pediatrics*. 2009;123(4):e565-e572.
15. Youth Risk Behavior Surveillance: United States, 2009. Available at: http://www.cdc.gov/mmwr/pdf/ss/ss5905.pdf. Accessed March 3, 2011.
16. Berman SM, Satterwhite CL. A paradox: overscreening of older women for chlamydia while too few younger women are being tested. *Sex Transm Dis*. 2011;38:130-132.
17. Wiehe SE, Rosenman MB, Wang J, et al. Chlamydia screening among young women: individual and provider level differences in testing. *Pediatrics*. 2011;127:e336-344.
18. Diclemente RJ, Sales JM, Danner F, et al. Association between sexually transmitted diseases and young adults' self-reported abstinence. *Pediatrics*. 2011;127(2):208-213.
19. Cohen DA, Nsuami M, Martin DH, et al. Repeated school-based screening for sexually transmitted diseases: a feasible strategy for reaching adolescents. *Pediatrics*. 1999;104(6):1281-1285.
20. Braun RA, Provost JM. Bridging the gap: using school-based health services to improve chlamydia screening among young women. *Am J Public Health*. 2010;100(9):1624-1629.
21. Nsuami M, Taylor SN, Sanders LS, et al. Missed opportunities for early detection of chlamydia and gonorrhea in school-based health centers. *Sex Transm Dis*. 2006;33(12):703-705.
22. Youth Online: High School Youth Risk Behavior Surveillance. Available at: http://apps.nccd.cdc.gov/youthonline/App/Default.aspx. Accessed August 2, 2011.
23. Sexually Transmitted Diseases: Objectives. Available at: http://healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicid=37. Accessed March 3, 2011.
24. Yan AF, Chiu Y, Stoesen CA, et al. STD/HIV-related sexual risk behaviors and substance use among US rural adolescents. *J Natl Med Assoc*. 2007;99(12):1386-1394.
25. Hwang LY, Shafer MB, Pollack LM, et al. Sexual behaviors after universal screening of sexually transmitted infection in healthy young women. *Obstet Gynecol*. 2007;109(1):105-113.
26. Marchell AV, Malson P, Ellen JM, et al. Annual physical examination reports vary by gender once teenagers become sexually active. *J Adolesc Health*. 2011;49(1):47-52.
27. Michigan Department of Community Health: Division of Health, Wellness and Disease Control. Guide to implementing a sexually transmitted disease school wide screening. Available at: http://hcet.info/Documents/Guide%20to%20School-wide%20STD%20Screening.pdf. Accessed August 2, 2011.