Chlamydia trachomatis Age-Specific Prevalence in Women Who Used an Internet-Based Self-screening Program Compared to Women Who Were Screened in Family Planning Clinics

Charlotte A. Gaydos, DrPH, Mathilda Barnes, BS,* Bulbul Aumakhan, MD, MPH, PhD,* Nicole Quinn, BS,* Catherine Wright, MPH,† Patricia Agreda, BS, MS,* Pamela Whittle, BS,‡ and Terry Hogan, MPH**

Objectives: To determine whether women who collect self-collected vaginal swabs at home demonstrated a higher positivity of *Chlamydia trachomatis* than women in family planning clinics.

Methods: Collection kits for vaginal swabs were internet requested, collected at home, and mailed to a laboratory for testing; questionnaires were completed about acceptability and sexual risk history. Infected women received treatment at participating clinics. Age-specific prevalences were compared to those from family planning clinics.

Results: Chlamydia positivity was 10.3% for 1171 females mailing swabs; prevalences ranged from 3.3% to 5.5% in family planning. Positivity for internet age groups was much higher than those for family planning age groups. The positivity for internet participants ranged from a low of 4.4% in Baltimore in 2005 to a high of 15.2% Baltimore in 2007. Family planning clinic prevalence in Baltimore and Maryland ranged from a low of 3.3% in Baltimore in 2006 to a high of 5.5% in Baltimore in 2008. The median age for all years for internet users in Baltimore and Maryland combined was 23 years; the median age for all years for attendees to family planning clinics who had chlamydia testing performed was 23 years.

Conclusions: Internet recruited women demonstrated higher positivity of chlamydia than those in family planning, providing new options for chlamydia screening programs.

Recognizing the national initiative to improve adolescent health by the year 2010, which has emphasized the need to reduce the proportion of young adults with *Chlamydia trachomatis* (CT) infections,[1] an Internet-based website (available at: www.iwantthekit.org) was designed in 2004 promoting home self sampling.[2] The website offered both CT screening and education as an innovative strategy to recruit young women to collect vaginal swabs and mail them to a laboratory for testing. This program provided women the opportunity to obtain self-sampling kits to collect vaginal specimens. A prevalence of 9.1% was observed from 1203 women in multiple jurisdictions who accessed chlamydia screening via the Internet.[2] The Centers for Disease Control and Prevention (CDC) traditionally assess national chlamydia positivity among women in a screening population for women screened in family planning clinics, sexually transmitted disease (STD) clinics, and other clinics, in which chlamydia screening and treatment services are supported by the National Infertility Prevention Project (IPP) in the United States. We have chosen to compare internet positivity with that observed in family planning clinics as 2 types of screening programs.

Both Baltimore and the State of Maryland, who report separately, are noted to be high positivity areas in the United States. Located in Department of Health and Human Services Region III, Baltimore, MD ranked fourth among US cities with case rates of 1166.0/100,000 population and the State of Maryland ranked 13th among states with overall chlamydia case rates of 412.2/100,000 population in 2007.[3] In family planning clinics, chlamydia prevalence in 2006 in the United States ranged from a low of 5.5% in Region I (Northeast US) to a high of 11.3% in Region VI (New Mexico, Oklahoma, Arkansas, Texas, Louisiana),[4] while prevalence in Maryland in 2007 was 4.1%, compared to 6.7% in all of Region III, which includes Maryland, Virginia, West Virginia, Pennsylvania, Delaware, the District of Columbia, Baltimore, and Philadelphia.[4] We wished to demonstrate that the internet-based screening could provide another tool in our "tool box" to increase screening and perhaps demonstrate a higher positivity in a "screening" population than a family planning screening population. We anticipated that internet screening might appeal to young women, who do not go to family planning clinics for their annual screening and hypothesized a higher positivity might be found, especially if this method appealed to women who have higher sexual risk factors and who are "internet users and shoppers." Our objective was to discover whether an internet recruitment approach, along with use of a home-sampling kit, identified a higher positivity of chlamydia in age-specific groups than a traditional method of screening women visiting family planning clinic in Baltimore and Maryland.

METHODS

Internet Program

The program was originally open to women aged 14 years and older who resided in the State of Maryland, including Baltimore. Although other jurisdictions were added later, we

From the *Division of Infectious Diseases, Medicine, Johns Hopkins University, Baltimore, MD; †Family Planning Clinics of Philadelphia, Philadelphia, PA; and ‡Baltimore City Health Department, Baltimore, MD

Supported by the NIBIB, NIH U54EB007958; NIAID, NIH U01 AI068613.

Correspondence: Charlotte A. Gaydos, MS, MPH, DrPH, Division of Infectious Diseases, 530 Rangos Bldg, 855 N. Wolfe St, Baltimore, MD 21205. E-mail: cgaydos@jhmi.edu.

Received for publication September 14, 2009, and accepted June 29, 2010.

DOI: 10.1097/OLQ.0b013e3182039d7f

Copyright © 2011 American Sexually Transmitted Diseases Association
All rights reserved.

Copyright © by the American Sexually Transmitted Diseases Association. Unauthorized reproduction of this article is prohibited.

compared only age-specific prevalences from the Internet program in Baltimore and Maryland to age-specific prevalences of women who attended family planning clinics in these areas. Data were recorded separately for Baltimore city and the remainder of the State of Maryland. The Internet outreach program was approved by the Institutional Review Boards of Johns Hopkins University, The Baltimore City Health Department, and the State of Maryland.

The web-site was advertised on the radio and in free community magazines. Originally, kits were available for pickup at community locations or sent by mail upon Internet or phone request. Although a phone number was listed on the website, as well as an initial list of over 1200 mapped pharmacy/community locations, where women could pick up a kit, 86.6% of the women who ordered kits used the Internet email service to request them. Only 3.8% were picked up at pharmacies, and 1% came from other community sites such as health fairs through December 2005. In January 2006, the pharmacy and community pickup methods were discontinued due to the poor participation. Since then, the Internet request and phone requests have been the only options for ordering a kit and 97.1% of participants have used the Internet to request kits, and 2.9% used the toll free number for request. The return rate for requested kits has steadily risen every year since the beginning of the program. In 2004, the return rate was approximately 31%, and in 2008 it was 38.5%, but in 2009 the return rate was 43%.

From July 2004 through 2008, 1176 women in Baltimore and Maryland jurisdictions returned self-collected vaginal swab specimens in a "dry" state by mail to the laboratory. Five swabs were not tested due to missing consent forms. Thus, 1171 swabs were tested for chlamydia by nucleic acid amplification tests according to manufacturer's instructions. The home-collection kit included a questionnaire, which could alternatively be answered on the website. Chlamydia test results were used to determine age-specific chlamydia prevalences, which were calculated separately for participants from Baltimore and the remainder of Maryland.

Family Planning Clinics

The following are the 2 major programmatic efforts in the Infertility Prevention Project: testing for chlamydia in STD clinics and screening for chlamydia in Family Planning clinics. IPP FP clinics do not provide "testing"; they primarily provide screening, i.e., routine testing of young women seeking reproductive health services. The Region III IPP's FP selective screening criteria indicate that all women aged <30 years should be offered a chlamydia test, regardless of why they attend the clinic. The chlamydia samples were cervical specimens collected by clinicians. The majority of FP clients come to these clinics for contraceptive services. These are young sexually active women seeking routine gynecological care with their major goal usually being to leave the clinic with an effective birth control method. In IPP STD clinics, female patients have higher sexual risk behaviors and reported symptoms than IPP FP clinics, usually because clients' visit reasons are tied much more closely to acute care and sexually transmitted infection (STI) testing and treatment concerns. We chose to compare the screening program in FP clinics to the internet screening program, where women who are not attending STD clinics for acute care, but are self motivated to seek chlamydia screening by collecting a specimen at home.

Chlamydia positivity data from females tested for chlamydia at public Family Planning Clinics in Baltimore and the remaining jurisdictions in Maryland are collected by the Region III IPP and the CDC. The age-specific chlamydia prevalence data for 2004–2008 for Maryland and Baltimore family planning clinics, which report separately, were obtained from the Region III IPP Prevalence Monitoring Database administered by the Family Planning Council, Philadelphia, PA.

Statistical Analysis

Age of participants was categorized into four 5-year age categories: 15 to 19, 20 to 24, 25 to 29, and 30 or older. Program-specific (Internet and IPP FP) Chlamydia positivity percents were calculated by age categories for each year (2004–2008) and location (Baltimore and Maryland). Overall program-specific positivity percents during 2004–2008 were compared using the chi square tests for Baltimore and Maryland as well as individually within year and age categories. Multiple comparisons were adjusted using Bonferroni method with $P < 0.008$ considered to be statistically significant for comparisons within 4 age categories and $P < 0.005$ for comparisons within 5 study years. Analyses were performed using the statistical software package, Statistical Analysis Software (SAS version 9.1, Cary, NC).

RESULTS

Demographics for the internet participants and the family planning patients are shown in Table 1. From the 1171 Internet samples, 10.3% of vaginal swabs were chlamydia positive by a nucleic acid amplification test assay. This prevalence was higher in comparison to family planning prevalences, which ranged from 3.3% to 5.5% by year. All but 4 infected women from the Internet program were successfully treated by participating health clinics. Of Internet participants, 45% were from Baltimore city and 55% were from the remainder of Maryland. The prevalence for Baltimore was 11.1%%, while for the remainder of Maryland it was 9.9% ($P = 0.494$). Over all age groups by year, prevalence for Internet participants ranged from a low of 4.4% in Baltimore in 2005 to a high of 15.2% Baltimore in 2007 (Table 2). The prevalence for family planning clinics in Baltimore and Maryland ranged from a low of 3.3 in Baltimore in 2006 to a high of 5.5% in Baltimore in 2008 (Table 2).

The median age of Internet participants was 23 years (range: 14–63 years.). The median age of infected women who were recruited from the Internet screening was 20 years and for uninfected women was 23 years ($P < 0.001$). The mean age of infected women from Internet was 21 years and for uninfected women 26 years ($P < 0.001$). By comparison, the median age for women who were tested in family planning clinics in Baltimore and Maryland by year ranged from 23 to 27 years depending on year and whether Baltimore or Maryland jurisdiction. The median age was 23 years for every year for Maryland, and for Baltimore it ranged from 26 to 27 years. Over all, the median age for all years for Baltimore and Maryland combined was 23 years (Personal communication, Catherine Wright, Region III Prevalence Monitoring Database). The mean age of family planning patients was 21 years for women infected with CT and 25 years for uninfected women.

For all the Internet participants by age group, 25.9% were aged between 15 and 19 years, 16.4% infected; 33.9% were 20 to 24 years, 10.8% infected; and 17.8% were 25 to 29 years, 6.3% infected; and 21.7% were ≥30 years with 1.7% infected (Table 2). For family planning clients, the age catego-

Copyright © by the American Sexually Transmitted Diseases Association. Unauthorized reproduction of this article is prohibited.

TABLE 1. Demographic Characteristics of Internet Participants and Family Planning Patients for Years 2004–2008

Characteristic	Internet Program (N = 1171)	Family Planning (N = 168,360)	*P*
Mean age (±SD), yr	25 (±9)	24.5 (±7)	0.02
Age categories, N (%)			
10–14	9 (0.8%)	1494 (0.9%)	0.78
15–19	299 (25.6%)	41,017 (24.4%)	0.37
20–24	391 (33.4%)	56,225 (33.4%)	1.00
25–29	212 (18.1%)	36,206 (21.5%)	0.005
≥30	255 (21.8%)	33,385 (19.8%)	0.10)
Missing	5 (0.4%)	33 (0.0%)	<0.0001
Location, N (%)			
Baltimore	644 (55%)	15,645 (9.3%)	<0.0001
Maryland	527 (45%)	152,715 (90.7%)	
Race, N (%)*			
White	293 (25.0%)	75,154 (44.6%)	<0.0001
Black	785 (67.0%)	46,907 (27.8%)	<0.0001
Other	83 (7.1%)	32,019 (19.0%)	<0.0001
Missing	10 (0.9%)	14,580 (8.6%)	<0.0001

Student *t* test and χ^2 analysis used.
*Totals of individual race categories may not equal total test numbers, due to the ability to select more than one race.

ries and race are shown in Table 1 and the percent infected for each year are shown in Table 2.

Previous STDs were common among the Internet participants, with 55.6% reporting a history of an STI; 59.9% reporting multiple partners, while 39.6% indicated they had a new partner in the previous 90 days; and only 13.6% used condoms consistently. Anal sex was reported by 29.6%; educational level was primarily high school (38.3%). Nearly 40% of internet women reported no symptoms and 30% reported only vaginal discharge. Thus, only slightly over 30% of Internet users reported any genital symptoms other than vaginal discharge or reported multiple symptoms (mostly in combina-

TABLE 2. Age-Specific Infection Proportions by Baltimore and Maryland for *Chlamydia trachomatis* in Women Using Internet Screening Program and Women Attending Family Planning (FP) Clinics for Period of 2004–2008

Year	Location	Age/Program N (% Positive)	15–19	20–24	25–29	≥30	Total
2004	Baltimore	Internet	55 (18.2%)	43 (7.0%)	34 (5.9%)	44 (4.6%)	176 (9.7%)
		FP	250 (12.0%)	856 (8.1%)	862 (2.6%)	1183 (2.8%)	3166 (4.9%)
	Maryland	Internet	45 (22.2%)	50 (10.0%)	36 (16.7%)	52 (0%)	183 (11.5%)*
		FP	9236 (7.3%)	11,241 (4.3%)	6329 (2.3%)	7524 (1.1%)	34,705 (4.0%)
2005	Baltimore	Internet	18 (0%)	38 (7.9%)	20 (5.0%)	15 (0%)	91 (4.4%)
		FP	351 (9.7%)	936 (6.7%)	1025 (3.6%)	1119 (1.5%)	3449 (4.4%)
	Maryland	Internet	35 (8.6%)	28 (10.7%)	20 (10.0%)	11 (0%)	94 (8.5%)
		FP	8992 (7.3%)	11,118 (4.4%)	6671 (1.9%)	6752 (0.8%)	33,879 (4.0%)
2006	Baltimore	Internet	22 (31.8%)	38 (10.5%)	15 (0%)	6 (0%)	81 (13.6%)*
		FP	228 (11.0%)	812 (4.3%)	1023 (2.8%)	1192 (1.3%)	3270 (3.3%)
	Maryland	Internet	21 (23.8%)	21 (4.8%)	18 (5.6%)	12 (0%)	72 (9.7%)
		FP	8174 (7.2%)	10,588 (4.0%)	6756 (2.2%)	5376 (1.4%)	31,177 (4.0%)
2007	Baltimore	Internet	27 (18.5%)	34 (23.5%)	15 (13.3%)	23 (0%)	99 (15.2%)*
		FP	181 (9.9%)	700 (5.4%)	930 (3.8%)	966 (1.4%)	2782 (3.8%)
	Maryland	Internet	25 (8.0%)	56 (14.3%)	24 (0%)	53 (1.9%)	158 (7.0%)
		FP	7016 (7.9%)	9591 (4.1%)	6114 (1.9%)	4625 (0.7%)	27,560 (4.1%)
2008	Baltimore	Internet	18 (27.8%)	36 (11.1%)	7 (14.3%)	14 (7.1%)	75 (14.7%)*
		FP	273 (15.0%)	821 (7.3%)	1177 (3.3%)	703 (3.3%)	2978 (5.5%)
	Maryland	Internet	33 (24.2%)	47 (14.9%)	23 (0.0%)	24 (4.2%)	127 (12.6%)*
		FP	6316 (7.9%)	9562 (4.2%)	5319 (2.4%)	3945 (1.2%)	25,342 (4.3%)
Total	Baltimore	Internet	140 (19.3%)†	189 (11.6%)†	91 (6.6%)	102 (2.9%)	522 (11.1%)‡
		FP	1283 (11.5%)	4125 (6.4%)	5017 (3.2%)	5163 (2.0%)	15,645 (4.4%)
	Maryland	Internet	159 (17.6%)†	202 (11.9%)†	121 (7.4%)†	152 (1.3%)	634 (9.9%)‡
		FP	39,734 (7.5%)	52,100 (4.2%)	31,189 (2.1%)	28,222 (1.0%)	152,663 (4.1%)

*$P < 0.005$ (Internet vs. FP within years).
†$P < 0.008$ (Internet vs. FP within age categories).
‡$P < 0.0001$ (Internet vs. FP overall test).

Copyright © by the American Sexually Transmitted Diseases Association. Unauthorized reproduction of this article is prohibited.

tion with vaginal discharge). No comparable data were available for the family planning clients.

Compared to age-specific positivity proportions obtained for women attending family planning clinics for the City of Baltimore and the State of Maryland for 2004–2008, the CT positivity was higher among Internet female participants for all age categories with statistically significant differences between programs for age groups younger than 25 years for Baltimore and <30 years for Maryland (Table 2).

Although trends were similar for earlier years, data for 2007 are informative. Differences in prevalences in Baltimore were noted: for age 20 to 24 years, the prevalence for Internet recruited samples in Baltimore was 23.5%, compared to 5.4% in family planning, ($P = <0.001$), (Table 2).

Within each program, there were no any significant differences between Baltimore and State of Maryland and no any trends in chlamydia positivity observed by age categories.

Data from the Internet program questionnaires from women in Baltimore and Maryland demonstrated that 91.0% of participants reported a preference for self-collection of diagnostic specimens. Over 94% graded use of a self-obtained vaginal swab safe, 96.8% reported the collection was easy/very easy, and 91.7% indicated they would use the Internet program again. We do not have comparison data on the preference of women who did not use the internet program.

DISCUSSION

The internet-based screening program appeared to reach a group of high risk women and detected a high prevalence of chlamydia. The chlamydia prevalence was higher in the internet program than the prevalence observed in a group of women of comparable ages in 3 age-groups—15 to 19, 20 to 24, and 25 to 29 years, who attended family planning clinics during approximately the same time period in the both Baltimore and Maryland. While a limitation must be noted that substantially greater numbers of clients are screened at family planning clinics, the potential of the internet program to reach women of a higher prevalence was striking, but, the small sample size of internet participants in some cells may not have yielded stable positivity estimates. Collectively, these data from internet-recruited women may indicate that this type of chlamydia screening has merit in reaching a population that is different from those women who normally attend family planning clinics to receive chlamydia screening.

It is for the age group 15 to 19 years that the differences in prevalence were most striking. These young Internet users in all years in both Baltimore and Maryland had higher prevalences in all years except for Baltimore in 2005, during which only 18 women were tested from this age group and none was positive. We do not have a reason as to why the prevalence for 15 to 19 years olds fluctuated so much over the years, but speculate it may have been due to advertizing differences and the low numbers of participants we reached in different years (unstable estimates from low numbers). These small numbers are a limitation of the interpretation of the data. The Internet program prevalence in this age group in other years ranged from a low of 8.0% in 2007 for Maryland to a high of 31.8% in 2006 for Baltimore, while for this age group, positivity in family planning clinics ranged from the low of 7.2% in 2006, in Maryland to a high of 15.0% in 2008 in Baltimore. For the age group of 20 to 24 years, higher Internet prevalences were observed in almost all years except for Baltimore in 2004, where prevalence in family planning clinics was slightly higher (8.1% vs. 7.0%). It may be that it is for these 2 young age groups, that Internet prompted screening is most popular, but we have no way to determine this unless a clinical trial is performed.

Adolescents and young adults are engaged in using the internet for many activities. Almost all adolescents have gone on line and approximately 75% have a home computer.[5] Communicating by the internet with their peers may lead to high-risk behavior,[6] such as looking for sex partners.[7] However, the internet also provides a confidential site on which to seek information about STDs from reliable sources.[8,9] By providing the opportunity to also obtain screening for STDs, the Internet might prompt some young persons to get screened who otherwise would not attend a clinic. We are unable to ascertain whether the internet program actually captured a unique group who otherwise would not have been screened or whether they are females who have already accessed the healthcare system and already have had a chlamydia diagnosis and more likely to participate in the internet program (i.e., are they more aware of chlamydial infections?). We do know that approximately 30% report having had a previous chlamydia infection,[2] so awareness may be high about chlamydia.

Similarly, the Internet age group 25 to 29 years had higher prevalences in most of the years, except for Baltimore in 2006 and Maryland in 2007–2008, which may have been due to small numbers of women in this age group tested via the Internet program in these years. Finally, for women aged 30 years and older, the chlamydia prevalences for both Internet and Family Planning are low, as expected in this age group. In most years, Family Planning had higher positivity rates but differences were small, and may reflect the low numbers of women screened via the Internet in this age group. We acknowledge that the internet screening program might access the women who are more likely to be symptomatic, than those women who access family planning clinics, thus leading to the higher prevalences demonstrated in the internet program. We speculate that the reason for the large differences in positivity between the 2 groups may be because internet-based self selecting screening may also be based more on self-perceived risk, which probably differs largely from yearly screening for family planning, where a woman is getting screened based on attending the clinic for reasons than risk or screening (PAP, contraception). Also, as we do not have a definitive reason as to why the internet population demonstrated higher positivity than the women in family planning from the same area, we assume that more women with higher risk behavior and/or symptoms, who desired more privacy and confidentiality, may have accessed the internet program, since we did not have access to any behavior data from family planning. The convenience of internet use and self-seeking health behavior are difficult to measure, but recent perceived risk behavior may have motivated use, as well as issues of privacy and confidentiality. This is a limitation of the 2 comparison groups but raises the question whether these women would get ever get screened or how long it would be before they accessed screening in family planning or diagnostic testing in a STD clinic. We suggest that if this tool of convenience and self motivation gets them screened as opposed to no screening or faster than if they had to go to a clinic, then this is the eventual outcome that is desired.

More than half of women under 26 years of age, who should be screened for chlamydia annually according to professional organizations and CDC guidelines are not receiving screening according to the State of Health Care Quality (Health Employer Data Information Set) measures, and a national survey indicated that less than one-third of physicians routinely

Copyright © by the American Sexually Transmitted Diseases Association. Unauthorized reproduction of this article is prohibited.

screen women for chlamydia.[10,11] Educating and recruiting women to screen themselves via the internet or by other outreach methods may help increase coverage for more women at risk for chlamydia.

Young women, especially adolescents, may be reluctant to attend clinics, have parental, privacy, and confidentiality concerns; fear of pelvic examinations; or lack of funds or insurance.[12,13] Focus groups have indicated that young women desire the availability of a "home chlamydia test."[14,15] Making home screening available to women may help alleviate many of these barriers and problems associated with clinic screening. Previous studies have demonstrated that this method of self-collection of vaginal swabs is both accurate and acceptable to women.[16–21] While not the focus of this paper, our most recent publication for internet jurisdictions, demonstrated that 90.9% stated they would prefer to collect their own specimen and 91.7% of women indicated they would use the Internet method again.[2] A limitation of looking at the acceptability of only the internet users for self-collected samples is that it is unknown what the preferences are of women not using the program. However, in earlier studies, we and others have accessed the acceptability of women in a clinic for self-collected samples at home and they are overwhelmingly positive.[14–19,22] Graseck et al. reported that women were more likely to choose to screen for STIs at home (75.7%) compared to a clinic (16.1%) or with their own medical provider (8.2%), $P < 0.001$.[22] More study of outreach programs for self-screening through the internet and at home is needed. Implementation of this type of approach for chlamydia screening may improve access and provide higher screening and rescreening rates.

REFERENCES

1. Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion Division of Adolescent and School Health Resources and Services Administration Maternal and Child Health Bureau. Improving the Health of Adolescents and Young Adults: A Guide for States and Communities. Centers for Disease Control and Prevention, 2005.
2. Gaydos CA, Barnes M, Aumakhan B, et al. Can E-Technology through the Internet be used as a new tool to address the *Chlamydia trachomatis* epidemic by home sampling and vaginal swabs? Sex Transmit Dis 2009; 36:577–580.
3. Centers for Disease Control and Prevention. Sexually Transmitted Disease Surveillance, 2006. Atlanta, GA: US Department of Health and Human Services, 2007.
4. Centers for Disease Control and Prevention. Sexually Transmitted Disease Surveillance Supplement 2006, Chlamydia Prevalence Monitoring Project. US Department of Health and Human Services, Centers for Disease Control and Prevention, 2007.
5. Rideout V, Roberts DF, Foehr UG. Generation M: Media in the Lives of 8–18 Year Olds. Menlo Park, CA: Kaiser Family Foundation, 2005.
6. Wolak J, Mitchell KJ, Finkelhor D, et al. Escaping or connecting? Characteristics of youth who form close online relationships. J Adolesc Health 2003; 25:105–109.
7. McFarlane M, Bull SS, Rietmeijer CA. The Internet as a newly emerging risk environment for sexually transmitted diseases. JAMA 2002; 284:443–446.
8. Borzekowski DL, Rickert VI. Adolescent cybersurfing for health information: A new resource that crosses barriers. Arch Pediatr Adolesc Med 2001; 155:813–817.
9. Gould MS, Munfakh JL, Lubell K, et al. Seeking help from the Internet during adolescence. J Am Acad Child Adolesc Psychiatry 2002; 41:1182–1189.
10. National Committee for Quality Assurance. The State of Health Care Quality 2004. National Committee for Quality Assurance, 2005. HEDIS. Available at: http://www.ncqa.org/communications/SOMC/SOHC2004.pdf.
11. St. Lawrence JS, Montano DE, Kasprzyk D, et al. STD screening, testing, case reporting, and clinical and partner notification practices: A national survey of US physicians Am J Pub Health 2002; 92:1784–1788.
12. ACOG Committee Opinion. Sexually transmitted diseases in adolescents. Obstet Gynecol 2004; 104:891–889.
13. Jones RK, Purcell A, Singh S, et al. Adolescents' reports of parental knowledge of adolescents' use of sexual health services and their reactions to mandated parental notification for prescription contraception. JAMA 2005; 293:340–348.
14. Blake DR, Keatney MH, Oakes M, et al. Improving participation in Chlamydia screening programs. Arch Pediatr Adolesc Med 2003; 157:523–529.
15. Gaydos CA, Rizzo-Price PA, Barnes M, et al. The use of focus groups to design an Internet-based program for Chlamydia screening with self-administered vaginal swabs: What women want. Sexual Health 2006; 3:209–215.
16. Newman SB, Nelson MB, Gaydos CA, et al. Female prisoners' preference of collection methods for testing for *Chlamydia trachomatis* and *Neisseria gonorrhoeae* infection. Sex Transmit Dis 2003; 30:306–309.
17. Stephenson J, Carder C, Copas A, et al. Home screening for Chlamydial genital infection: Is it acceptable to young men and women? Sex Transmit Infect 2000; 76:25–27.
18. Hsieh YH, Howell MR, Gaydos JC, et al. Preference among female army recruits for use of self-administered vaginal swabs or urine to screen for *Chlamydia trachomatis* genital infections. Sex Transmit Dis 2003; 30:769–773.
19. Chernesky MA, Hook EW III, Martin DH, et al. Women find it easy and prefer to collect their own vaginal swabs to diagnose *Chlamydia trachomatis* or *Neisseria gonorrhoeae* infections. Sex Transmit Dis 2005; 32:729–733.
20. Schachter J, Chernesky MA, Willis DE, et al. Vaginal swabs are the specimens of choice when screening for *Chlamydia trachomatis* and *Neisseria gonorrhoeae*: Results from a multicenter evaluation of the APTIMA assays for both infections. Sex Transmit Dis 2005; 32:725–728.
21. Hobbs MM, van der Pol B, Totten P, et al. From the NIH: Proceedings of a workshop on the importance of self-obtained vaginal specimens for detection of sexually transmitted infections. Sex Transmit Dis 2008; 35:8–13.
22. Graseck AS, Secura GM, Allsworth JE, et al. Home screening compared with clinic-based screening for sexually transmitted infections. Obstet Gynecol 2010; 115:745–752.

Copyright © by the American Sexually Transmitted Diseases Association. Unauthorized reproduction of this article is prohibited.