



Original article

Sexually Transmitted Infection Testing Among Adolescents and Young Adults in the United States



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A B S T R A C T

Purpose: Persons aged 15–25 years have high sexually transmitted infection (STI) rates and suboptimal screening. There has been limited research analyzing barriers to STI testing at a national level. We examined STI testing among 15–25 year olds and reasons for not testing.

Methods: We used data from a national survey of youth. Bivariate and multivariable analyses examined differences in testing behaviors by demographics, separately by sex. Among sexually experienced respondents who reported never being tested, health system–related reasons for not testing were examined in bivariate and multivariable analyses.

Results: Females (16.6%) were more likely to have ever been tested compared with males (6.1%, $p < .01$) in the last 12 months. Among sexually experienced respondents who were never tested, 41.8% did not seek testing because they felt they were not at risk for STIs. Males (60.1%) had significantly higher reports of foregoing testing for confidentiality reasons compared with females (39.9%, $p < .01$). Non-Hispanic whites (44.9%) the highest reports of this compared with other ethnic/racial groups ($p < .01$).

Conclusions: This national-level study found that most of the 15–25 year olds never received an STI test. In addition, confidentiality concerns may deter youth from seeking STI testing. Appropriate strategies to minimize these concerns may be useful. Potential strategies to ameliorate these issues may include engaging clinicians who frequently serve adolescents and young adults to address confidentiality issues with youth patients.

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IMPLICATIONS AND CONTRIBUTION

This study highlights the lack of sexually transmitted infection (STI) testing and barriers to such testing among adolescents and young adults, nationally. Confidentiality concerns, missed opportunities for STI testing, and costs were found to be important barriers to testing. Understanding these barriers at a national level is critical given the high risk of STIs in this group.

Adolescents and young adults aged 15–25 years have one of the highest burden of reported sexually transmitted infections (STIs) and those who are sexually active account for approximately half of reported STI cases annually [1]. Receipt of STI services including screening, treatment, and counseling remains suboptimal in this group [2–4]. A national survey of reproductive

age women found no change in the receipt of STI services among adolescents from 2002 to 2006–2010 and a decrease in receipt of services from public clinics among U.S. women aged 15–44 years over time [2].

One goal of the Affordable Care Act (ACA) is to improve U.S. health care coverage for all Americans by helping reduce barriers to accessing medical care [5]. The Congressional Budget Office estimates that ACA will ultimately lower the number of uninsured by 26 million by 2017 [5,6]. Further reducing financial barriers to accessing preventive services, ACA included a provision of the law allowing dependents to obtain health insurance

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through a parent's plan until the age of 26 years [5]. Although this provision may increase access to STI services by helping lessen financial barriers, adolescents and young adults still may not seek STI services given fear and stigma surrounding STIs [6–9]. A few studies have shown that adolescents view confidentiality as a key concern in seeking general medical care and/or STI testing in a pediatric setting [7]. Specifically, one study of general health care found that patients may delay or forego treatment, or provide inaccurate information regarding clinical symptoms and the onset of illness for reasons related to confidentiality [7,9]. Another study of STI testing in a pediatric setting found that a common reason adolescents report going without health care services was that they did not want their parents to know (17%) [9]. A separate study examining factors associated with adolescent access to general health care services found similar results where 35% of adolescent respondents did not seek services for fear that parents would find out [10]. Although there have been a few studies assessing the effect of confidentiality concerns on sexually transmitted disease (STD) testing from the adolescent perspective, most of these studies are older. In addition, findings may not be as relevant to young adults given recent health policy changes that allow young adults to remain on their parents' insurance plan. Our study aims to provide a current assessment of STD testing behaviors among adolescents and young adults including potential barriers to testing.

Research has shown that adolescents and young adults may avoid seeking health services for various reasons; however, to our knowledge, there is a lack of current research examining both STI testing and barriers to accessing STI testing at health clinics at a national level. The purpose of this study was to examine STI testing, including testing location, among adolescent and young adults in the United States. We also examined reasons for not getting an STI test with a focus on factors associated with the health care system and confidentiality.

Methods

Sampling frame

Our study is a secondary analysis of data from the Get Yourself Tested (GYT) campaign survey. The survey evaluated the impact of the GYT campaign on adolescents (15–19 years) and young adults (20–25 years) and assessed current health-seeking behaviors [11]. A sample of households from KnowledgePanel, (GfK, Blue Ash, OH) a probability-based Web panel designed to be representative of 97% of U.S. households, was selected for inclusion in the study [12]. The study sample included noninstitutionalized adolescents and young adults who participated in the survey August 10 through September 19, 2013 [11]. Respondents who were at least 18 years old at enrollment provided informed consent [11]. For participants younger than 18 years, parents or guardians provided consent for participation [11]. For the original survey, Centers for Disease Control and Prevention's (CDC) National Center for HIV/AIDS, Viral Hepatitis, STI, and TB Prevention's ethics review determined that the survey was exempt as it was part of a program evaluation. This secondary analysis was approved by the CDC institutional review board.

The GYT survey included information on participant demographics and sexual behaviors. Although the actual GYT survey instrument used the term sexually transmitted disease, for our purposes, we have used the term sexually transmitted infection. For this analysis, we used the following demographic

variables: age, sex, race/ethnicity, income, financial dependence on parents, education, U.S. region, and insurance status. Race/ethnicity was recoded into the following groups: Hispanic, non-Hispanic white, non-Hispanic black, and other (includes those who reported multiple races). Income was asked of parents if the respondent was aged <18 years and was recoded using median income level for a household of four based on the 2011 American Community Survey—\$50,502 [13]. As STIs are related to sexual behaviors, we also examined whether respondents ever had sex (“sexually experienced”), their age at first sex, and number of lifetime partners. Sex was defined as oral, vaginal, or anal sex.

To evaluate access to STI services, we examined STI testing, location of STI testing, context of STI test, reasons for testing, and potential barriers to accessing STI testing including issues related to confidentiality. With the exception of last testing location, STI testing was limited to the last 12 months and was measured by responses to the question “Have you ever been tested for STIs other than HIV, such as chlamydia or gonorrhea?” Location of the most recent STI test was also asked of respondents who have ever been tested in their lifetime. For this analysis, those who reported seeing an obstetrics and gynecology doctor were recoded as private physician. The context of STI testing was determined by responses to the question, “The last time you were tested for STIs other than HIV, did you specifically go to get tested for STIs or did it happen as part of another type of visit?” In addition, respondents were asked the reasons why they received the last STI test; these response were recoded into “suspected an STI” and “my health care provider suggested I get tested.” Respondents who had not had an STI test were provided with a list of possible reasons (mark all that apply); the variable was recoded into separate yes/no variables. Reasons related to confidentiality and health system factors were analyzed for this analysis and include: “don't want parents to find out,” “concerned about confidentiality,” “doctor or health care provider has never suggested it,” “embarrassed or difficult to ask to be tested,” and “cost or lack of insurance.” “Don't want parents to find out” and “concerned about confidentiality” were combined into “confidentiality concerns” for this analysis. Responses listed as “other” that reported cost or insurance as barriers were included in the cost or insurance barrier reason.

Statistical analysis

Rao–Scott chi-square tests were used to compare STI testing by several demographic and sexual behavior measures included in this study. Given differences in existing STI screening guidelines for men and women, analysis of testing behavior was examined separately for female and male respondents [2]. Among those who ever had sex (sexually experienced), multivariable analyses were conducted to examine predictors of testing after adjustment for variables examined in bivariate analyses.

For sexually experienced adolescents and young adults, Rao–Scott chi-square tests were used to analyze location of the most recent STI test among those who had never been tested by demographic characteristics, testing context, and reasons given for getting tested. In addition, among those sexually experienced participants who reported not being tested and who did not report that they were “not at risk for STIs,” health system–related reasons for not getting tested were analyzed by demographic characteristics. Bivariate chi-squares were conducted to examine each reason for not testing by demographics,

Table 1

Sexually transmitted infection testing within the last 12 months among adolescents and young adults by demographics, health insurance, and sexual behaviors among females and males, 2013

Variable	Female (n = 2,572) ^a				Male (n = 1,446) ^a			
	Unweighted		Weighted		Unweighted		Weighted	
	Total	Not tested	Tested	Total	Total	Not tested	Tested	Total
	n (%)	%	%	%	n (%)	%	%	%
Demographics								
Age (years)								
15–19	822 (20.5)	93.3**	6.7	43.9	725 (50.2)	97.6**	2.4	45.1
20–25	1,750 (43.6)	75.7	24.3	56.1	720 (49.8)	90.9	9.1	54.9
Race/ethnicity								
Hispanic	460 (17.9)	83.3	16.7	20.2	281 (19.4)	91.2**	8.8	20.7
Non-Hispanic white	1,598 (62.1)	84.6	15.4	54.9	905 (62.6)	97.2	2.8	59.8
Non-Hispanic black	278 (10.8)	76.6	23.4	15.7	127 (8.8)	84.4	15.6	11.0
Other, non-Hispanic	236 (9.2)	88.4	11.6	9.2	132 (9.1)	89.7	10.3	8.4
Household income								
<\$50,000	1,510 (58.7)	79.5**	20.5	45.0	712 (49.3)	93.3	6.7	41.9
\$50,000 or more	1,962 (41.3)	86.6	13.4	55.0	733 (50.7)	94.4	5.6	58.1
Financial dependence on parents								
Totally dependent	655 (26.2)	93.6**	6.4	32.6	559 (40.1)	96.3**	3.6	35.8
Mostly dependent	396 (15.8)	86.6	13.3	20.4	272 (19.5)	97.4	2.6	21.5
Somewhat dependent	419 (16.8)	76.4	23.6	17.6	217 (15.6)	91.9	8.1	19.3
Not dependent	1,030 (41.2)	74.1	25.9	29.4	345 (8.9)	88.7	11.3	23.4
Current education								
In high school	551 (21.6)	96.0**	4.1	26.3	560 (39.5)	98.5*	1.5	28.7
In college	871 (34.2)	79.8	20.2	38.1	361 (25.5)	92.3	7.7	31.7
In business, technical, or vocational school after high school	30 (1.2)	84.3	15.7	1.3	27 (1.9)	90.0	10.0	3.3
Not in school	1,096 (43.0)	78.0	22.0	34.2	470 (33.1)	92.4	7.6	36.3
U.S. census region								
Northeast	409 (15.9)	80.2	19.8	17.3	262 (18.1)	95.5	4.5	18.4
Midwest	708 (27.5)	86.1	13.9	21.2	385 (26.6)	94.9	5.1	21.6
South	831 (32.3)	84.1	15.8	36.9	461 (31.9)	93.7	6.3	35.2
West	624 (24.6)	82.2	17.8	24.6	337 (23.3)	92.3	7.7	24.8
Insurance								
Private	1,455 (57.4)	84.4**	15.5	59.6	826 (58.2)	94.0	6.0	61.8
Public	481 (19.0)	72.2	27.8	16.9	205 (14.5)	89.4	10.6	11.8
None	385 (15.2)	87.9	12.0	12.4	210 (14.8)	94.7	5.3	14.2
Do not know/not sure	213 (8.4)	89.7	10.3	11.1	177 (12.5)	98.0	2.0	12.2
Sexual behaviors								
Ever had sex*								
Sexually experienced	518 (23.2)	73.8**	27.0	30.6	488 (40.6)	97.4**	9.8	37.1
Not sexually experienced	1,719 (76.8)	97.0	3.0	69.4	713 (59.4)	90.1	2.6	62.9
Age at fist sex								
<15 years	258 (16.4)	62.5	37.5	14.3	101 (16.5)	81.5	18.5	14.2
≥15 years	1,315 (83.6)	72.2	27.8	85.6	512 (83.5)	90.3	9.6	85.7
Number of lifetime partners								
One	385 (24.7)	86.4**	13.6	29.4	158 (26.0)	95.8*	1.9	27.3
Two	211 (13.6)	75.3	24.7	12.5	106 (17.4)	89.5	3.9	15.9
Three	150 (9.6)	76.0	23.9	10.5	80 (13.2)	89.5	4.3	13.8
Four or more	810 (52.1)	59.2	40.8	47.6	264 (43.4)	84.4	3.1	43.0

Table shows unweighted n and weighted column percentage and 95% confidence interval.

^a Represents unweighted n's.**p* < .05; ***p* < .01.

separately. For these analyses only, those who reported that they did not know if they had insurance were excluded because of small cell sizes. To obtain adjusted odds ratios (AORs), multivariable logistic regression models were conducted for each reason for not testing, separately. Data were analyzed using SAS version 9.2 (SAS Institute, Inc., Cary, NC).

Before the study sample was drawn, a base weight was applied to offset known selection deviations to the respondent selection process [11,12]. In addition, a panel poststratification weight was used before sample selection to address potential issues in noncoverage and nonresponse sampling and non-sampling errors [11,12]. A set of study specific poststratification

weights were applied once the study was finalized and were used in analyses to adjust for the study's sample design and for survey nonresponse errors. [11,12].

Results

A total of 3,639 parents of 15–17 year olds and 5,510 18–25 year olds were sampled from KnowledgePanel. Of the 3,639 parents sampled, 1,330 (36.5%) provided consent making the adolescent eligible for the study. Of eligible 15–17 year olds, 90.0% (1,197) completed the survey. Among 18–25 year olds (n = 5,510), 51.2% completed surveys. Respondents who refused

Table 2

Multivariable analysis of sexually transmitted infection testing among sexually experienced adolescents and young adults in the last 12 months by demographics and sexual behaviors, 2013

Variable	Female (n = 2,572) ^a	Male (n = 1,445) ^a
	AOR (95% CI)	AOR (95% CI)
Demographics		
Age (years)		
15–19	Reference	Reference
20–25	1.11 (.61–2.02)	2.12 (.65–6.96)
Race/ethnicity		
Hispanic	.91 (.56–1.47)	2.87** (1.17–7.04)
Non-Hispanic white	Reference	Reference
Non-Hispanic black	1.72 (.98–3.00)	5.42** (1.93–15.2)
Other, non-Hispanic	1.28 (.56–2.92)	5.71** (1.73–18.83)
Household income		
<\$50,000	Reference	Reference
\$50,000 or more	1.21 (.80–1.81)	.63 (.30–1.29)
Financial dependence on parents		
Totally dependent	Reference	Reference
Mostly dependent	.98 (.47–2.05)	.49 (.14–1.73)
Somewhat dependent	1.15 (.59–2.27)	.77 (.25–2.37)
Not dependent	1.13 (.60–2.12)	1.30 (.46–3.70)
Current education		
In high school	Reference	Reference
In college	1.27 (.41–3.88)	1.87 (.42–8.43)
In business, technical, or vocational school after high school	.92 (.18–4.55)	.24 (.01–3.83)
Not in school	.91 (.29–2.89)	1.02 (.23–4.62)
Region		
Northeast	1.44 (.86–2.41)	.69 (.23–2.10)
Midwest	1.12 (.69–1.83)	1.56 (.60–4.04)
South	Reference	Reference
West	1.38 (.86–2.21)	1.77 (.69–4.48)
Insurance		
Private	Reference	Reference
Public	1.36 (.83–2.24)	1.79 (.60–5.37)
None	.45** (.25–.81)	.65 (.24–1.79)
Do not know/not sure	1.45 (.59–3.57)	.38 (.08–1.81)
Sexual behaviors		
Age at first sex (years)		
<15	Reference	Reference
≥15	.98 (.59–1.64)	.56 (.22–1.47)
Number of lifetime partners		
One	Reference	Reference
Two	2.16* (1.11–4.17)	3.17 (.88–11.47)
Three	2.04 (1.00–4.20)	2.22 (.61–8.04)
Four or more	4.25** (2.54–7.11)	3.41* (1.15–10.12)

Multivariable analyses were based on weighted data.

AOR = adjusted odds ratio; CI = confidence interval.

^a Represents unweighted n's.

* $p < .05$; ** $p < .01$.

to answer questions regarding testing status ($n = 64$) were excluded from the analysis. A total of 3,953 adolescents and young adults were included in the final sample for analysis.

Overall, 11.5% of respondents reported that they received an STI test in the last 12 months. When asked how respondents knew they were tested, 48.7% reported that their doctor or nurse informed them they were being tested, 45.0% reported that they asked to be tested, 34.0% were tested as part of their routine health care, and 19.1% reported that their provider called with their results.

Adolescent and young adult females (16.6%) were more likely to have reported receiving an STI test in the last 12 months than males (6.1%, $p < .01$). STI testing varied by several demographic characteristics (Table 1). Young adult females (24.3%) and males (9.1%) reported higher testing in the last 12 months than

adolescent females (6.7%) and males (2.4% $p < .01$). Among male respondents, non-Hispanic black males (15.6%) had the highest testing ($p < .01$). When testing patterns were analyzed by income, 20.5% of female respondents who had a household income of <\$50,000 were tested in the last 12 months compared with 13.4% of those with higher household income ($p < .01$). Respondents who were not financially dependent on their parents (25.9%) had the highest testing ($p < .01$) compared with those who were dependent to varying extents. Adolescents and young adults attending high school at the time of the survey reported very low testing proportions among both females (4.1%) and males (1.5%, $p < .01$). There were no differences in STI testing by census region or age at first sex (both sexes) and household income (males only).

In adjusted analyses stratified by sex, the odds of testing among non-Hispanic black males (AOR = 5.42; 95% confidence interval [CI] = 1.93–15.20), non-Hispanic other (AOR = 5.71; 95% CI = 1.73–18.83), and Hispanic (AOR = 2.87; 95% CI = 1.17–7.04) were higher than non-Hispanic whites (Table 2). The odds of testing were lower among sexually experienced females with no insurance (AOR = .45; 95% CI = .25–.81). The likelihood of testing significantly increased as the number of lifetime partners increased in both sexes. The odds of testing were highest among sexually experienced females with two (AOR = 2.16; 95% CI = 1.11–4.17) or more than four (AOR = 4.25; 95% CI = 2.54–7.11) lifetime partners. The odds of testing among sexually experienced males were highest in those with four or more lifetime partners (AOR = 3.41; 95% CI = 1.15–10.12).

Of sexually experienced adolescents and young adults who reported ever receiving an STI test in their lifetime, most reported that their most recent test was performed at a private physician's office (64.8%) followed by family planning clinics (13.0%), community clinics or health departments (10.5%), school-based clinics (6.9%), STI clinics (2.2%), and other locations (2.6%). Overall, the most recent testing location was related to several demographics (Table 3). Specifically, among sexually experienced respondents that were last tested at a private physician's clinic, the majority self-identified as non-Hispanic white (55.4%). Hispanic respondents were least likely to have gone to family planning clinics (4.5%) or community health clinics (3.6%) compared with other races. Respondents who reported attending an STI clinic were largely from the west (73.9%), and half of those who went to a community clinic were from the south (50.8%).

Financial considerations and reasons for getting tested also appeared to impact testing location among those who have ever received a test in their lifetime (Table 3). Although a majority (60.6%) of respondents reportedly used private insurance, this significantly varied by location. Most respondents who utilized the private physician's office used private insurance (73.0%), but only 40.4% of family planning clinic, 28.2% of STI clinic, and 40.3% of community clinic attendees did so. Differences in testing location were detected by household income ($p < .01$). Of those who received their last test at a family planning clinic, most had household incomes of <\$50,000 per year (68.5%). Similar differences were detected in school-based clinic (68.5%) and community clinic or health department (77.9%) locations. In addition, reports of going specifically for an STI test were highest for STI clinics (97.3%). Provider suggesting that an STI test was highest for private doctors (42.2%).

Among sexually experienced adolescents and young adults who were never tested in their lifetime, 41.8% did not seek testing because they felt that they were not at risk for STIs.

Table 3

Most recent testing locations among sexually experienced adolescents and young adults who have ever received a sexually transmitted infection (STI) test in their lifetime: demographics and sexual behaviors, 2013

Variable	Private doctor; n = 724 ^a	Family planning clinic; n = 170 ^a	School-based clinic; n = 76 ^a	STI clinic; n = 20 ^a	Community clinic or health department; n = 127 ^a	Other location; n = 24 ^a
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
Demographics						
Age (years)						
15–19	14.4 (10.1–18.8)	22.4 (10.4–34.5)	5.0 (0–10.2)	5.9 (0–14.2)	13.1 (4.1–22.1)	2.9 (0–8.9)
20–25	85.6 (81.2–89.9)	77.6 (65.5–89.6)	95.0 (89.8–100.0)	94.1 (85.8–100.0)	86.9 (77.8–95.9)	97.1 (91.1–100.0)
Gender						
Female	74.7 (68.8–80.6)	80.1 (66.8–93.3)	63.0 (45.0–81.1)	60.6 (25.3–96.0)	57.8 (42.3–73.4)	63.8 (26.7–100.0)
Male	25.3 (19.4–31.2)	19.9 (6.7–33.2)	37.0 (18.9–55.0)	39.4 (4.0–74.7)	42.2 (26.6–57.7)	36.2 (0–73.3)
Race/ethnicity*						
Hispanic	7.8 (4.6–11.0)	4.5 (1.3–7.7)	10.5 (0–22.1)	23.6 (0–56.6)	3.6 (.2–7.1)	.9 (0–2.2)
Non-Hispanic white	55.4 (49.5–61.4)	40.7 (27.9–53.4)	43.4 (26.5–60.3)	11.2 (0–23.6)	45.8 (30.9–60.6)	63.6 (30.7–96.4)
Non-Hispanic black	18.2 (13.1–23.3)	22.0 (10.4–33.6)	32.5 (13.3–51.7)	15.0 (0–42.0)	19.4 (7.2–31.5)	17.2 (0–43.9)
Other, non-Hispanic	18.5 (13.9–23.1)	32.8 (20.4–45.3)	13.6 (5.3–21.8)	50.1 (13.0–87.3)	31.2 (16.3–46.2)	18.3 (0–42.7)
U.S. census region**						
Northeast	20.1 (15.3–24.9)	11.3 (4.3–18.3)	20.7 (3.8–37.6)	8.1 (0–17.8)	15.7 (5.2–26.3)	14.4 (0–34.1)
Midwest	19.1 (14.9–23.2)	21.3 (9.9–32.7)	14.4 (1.2–27.6)	3.3 (0–7.8)	21.0 (8.5–33.6)	25.2 (0–51.7)
South	36.4 (30.6–42.3)	25.1 (14.7–35.4)	41.5 (24.2–58.8)	14.8 (0–31.6)	50.8 (35.8–65.9)	55.8 (22.5–89.2)
West	24.3 (19.3–29.4)	42.4 (29.1–55.6)	23.4 (10.7–36.1)	73.9 (50.9–96.9)	12.4 (4.9–20.0)	4.6 (0–11.4)
Insurance** ^b						
Private	73.9 (68.8–78.9)	40.4 (27.2–53.7)	66.0 (48.6–83.5)	28.2 (0–64.3)	40.3 (24.1–56.5)	11.1 (0–23.3)
Public	17.3 (13.0–21.6)	32.8 (19.7–46.0)	13.2 (3.7–22.7)	36.9 (0–78.4)	34.0 (19.9–48.0)	29.9 (0–65.1)
None	8.8 (5.5–12.2)	26.7 (15.7–37.7)	20.7 (3.7–37.8)	34.9 (.5–69.3)	25.7 (12.7–38.7)	59.0 (21.3–96.6)
Household income**						
<\$50,000	44.2 (38.4–50.0)	68.5 (56.2–80.9)	68.5 (52.2–84.9)	48.5 (11.9–85.1)	77.9 (65.4–90.4)	71.8 (34.3–100.0)
\$50,000 or more	55.8 (50.0–61.6)	31.5 (19.1–43.8)	31.5 (15.1–47.8)	51.5 (14.9–88.1)	22.1 (9.6–34.6)	28.2 (0–65.7)
Financial dependence on parents*						
Totally dependent	15.4 (10.6–20.3)	14.6 (5.6–23.7)	27.7 (8.5–46.9)	26.8 (0–66.9)	7.9 (2.3–13.4)	1.1 (0–3.5)
Mostly dependent	11.6 (8.0–15.1)	22.0 (10.4–33.6)	16.5 (4.2–28.9)	2.8 (0–8.5)	7.0 (.5–13.5)	26.4 (0–56.9)
Somewhat dependent	25.7 (20.2–31.2)	14.0 (6.0–22.1)	28.4 (12.8–44.1)	32.5 (3.4–61.6)	32.5 (17.6–47.4)	5.8 (0–16.9)
Not dependent	47.3 (3.0–41.4)	49.3 (36.1–62.5)	27.3 (13.8–40.8)	37.9 (3.3–72.6)	52.7 (37.4–67.9)	66.6 (34.9–98.3)
Testing practices						
Context of test**						
Went specifically for STI test	21.4 (16.3–26.5)	33.0 (20.3–45.6)	55.3 (38.0–72.5)	97.3 (93.5–100.0)	44.3 (28.8–59.7)	26.7 (0–64.2)
Was part of another visit	78.6 (73.5–83.7)	67.0 (54.4–79.7)	44.7 (27.5–62.0)	2.7 (0–6.5)	55.7 (40.3–71.2)	73.3 (35.8–100.0)
Reasons for testing						
Suspected STI**	20.5 (15.5–25.4)	19.1 (9.7–28.6)	29.4 (13.5–45.4)	74.7 (51.8–97.6)	28.8 (13.7–44.0)	49.0 (12.6–85.5)
Provider suggested**	42.2 (36.3–48.1)	42.4 (29.8–55.0)	26.7 (13.2–40.2)	12.6 (0–28.4)	31.2 (18.2–44.2)	8.4 (0–19.4)

Last testing location is based on a single response question on the survey.

Table shows unweighted n and weighted column percentage and 95% CI. Chi-squares compared most recent testing location to demographics.

CI = confidence interval.

^a Represents unweighted n's.

^b "Do not know" answers have been suppressed from this analysis because of small cell count. Chi-square values represent the three levels presented.

* $p < .05$; ** $p < .01$.

Another common reason for not seeking STI testing was that their medical provider did not suggest it (32.5%). We found significant differences by some demographics for both confidentiality concerns and cost/lack of insurance as reasons for not testing (Table 4). Respondents aged 20–25 years had higher reports of not testing due to confidentiality reasons (54.7%) and cost/lack of insurance (81.7%, $p < .01$). Similarly, for education, college students (41.9%) were most likely to report confidentiality concerns ($p < .01$). In addition, males (60.1%) had significantly higher reports of not testing due to confidentiality concerns compared with females (39.9%, $p < .01$). Non-Hispanic whites (44.9%) also had higher reports than other ethnic groups ($p < .01$). Those with no financial dependence on their parents were the least likely to report this concern as a reason for not testing (15.3%, $p < .01$). For insurance, respondents who had public insurance (5.4%) had the lowest reports of not testing due to of cost or lack of insurance ($p < .05$).

Finally, a multivariable analysis showed that the odds of not testing due to confidentiality concerns were 3.79 times higher in those who identified as other, non-Hispanic compared with non-Hispanic white ($p < .01$, Table 5). The odds of Hispanic respondents not testing due to being too embarrassed or difficulty asking for testing were 2.33 times those of non-Hispanic whites ($p < .05$). The odds of not testing due to young adults aged 20–25 years due to cost or lack of insurance were 2.25 times those of adolescents ($p < .01$).

We performed a post hoc analysis to further assess the impact of confidentiality concerns on adolescent and young adult STI testing behaviors. Among sexually experienced respondents who have never been tested in their lifetime, respondents who had a provider suggest that testing were more likely to cite confidentiality concerns as a reason for not testing (24.1%) compared with respondents who reported that providers that never suggested testing (14.3%, $p < .01$). While controlling for the effect of insurance status on testing behaviors, a relationship was detected

Table 4

Reasons for never getting tested for STI among sexually experienced adolescents and young adults by demographics, 2013

Variable	Confidentiality concerns; n = 200 ^a	Provider did not suggest it; n = 360 ^a	Embarrassed/difficult to ask for testing; n = 193 ^a	Cost or lack of insurance; n = 142 ^a
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
Age (years)				
15–19	45.2** (35.7–54.8)	36.4 (29.2–43.6)	38.1 (28.2–48.0)	18.3** (9.9–26.6)
20–25	54.7 (45.2–63.3)	63.6 (56.4–70.8)	61.9 (51.9–71.8)	81.7 (73.4–90.1)
Gender				
Female	39.9** (30.7–49.1)	40.3 (33.1–47.5)	41.8 (31.8–51.7)	38.2 (27.2–49.3)
Male	60.1 (50.9–69.3)	59.7 (52.5–66.9)	58.2 (48.3–68.2)	61.8 (50.7–72.8)
Race/ethnicity				
Hispanic	25.4 (16.8–34.1)	23.9 (16.9–30.9)	31.0 (21.2–40.8)	21.6 (11.8–31.3)
Non-Hispanic white	44.9** (35.5–54.3)	63.0 (55.4–70.6)	46.1 (36.0–56.2)	58.9 (46.9–70.8)
Non-Hispanic black	12.8 (5.9–19.6)	6.5 (3.1–9.9)	12.8 (5.2–20.4)	5.9 (0–12.3)
Other, non-Hispanic	16.9 (8.6–25.2)	6.6 (2.3–10.9)	10.1 (2.8–17.4)	13.6 (4.6–22.7)
Education				
In high school	24.2** (16.7–31.8)	18.2 (12.9–23.5)	14.8 (8.8–20.9)	9.0 (2.7–15.4)
In college	41.9 (32.3–51.6)	40.1 (32.6–47.5)	41.7 (31.3–52.0)	36.8 (25.1–48.2)
In business, technical, or vocational school after high school	5.1 (0–10.3)	3.0 (0–6.4)	5.4 (0–11.2)	3.4 (0–9.7)
Not in school	28.8 (19.9–37.6)	38.7 (31.2–46.2)	38.1 (28.2–47.9)	50.8 (38.8–62.8)
U.S. census region				
Northeast	19.1 (11.5–26.8)	16.3 (11.0–21.6)	19.9 (11.9–27.7)	12.4 (5.6–19.1)
Midwest	17.1 (10.6–23.5)	23.3 (17.3–29.3)	23.5 (15.0–31.9)	24.3 (14.7–33.9)
South	39.6 (30.2–49.1)	37.4 (29.9–44.8)	32.5 (22.9–42.1)	39.3 (27.2–51.4)
West	24.2 (15.2–33.1)	23.0 (16.2–29.8)	24.2 (14.6–33.7)	24.0 (13.9–34.2)
Insurance				
Private	55.0 (45.3–64.7)	66.5 (59.1–73.8)	51.6 (41.3–62.0)	58.1* (46.4–69.8)
Public	17.8 (10.5–25.0)	12.0 (7.2–16.9)	15.8 (8.0–23.6)	5.4 (1.5–9.4)
None	14.0 (6.6–21.3)	15.8 (9.6–22.0)	19.6 (11.2–28.0)	28.7 (18.0–39.3)
Do not know	13.2 (6.8–19.7)	5.7 (2.7–8.7)	13.0 (5.8–20.1)	7.8 (1.0–14.6)
Household income				
<\$50,000	43.7 (34.0–53.4)	44.6 (37.0–52.2)	50.0 (39.7–60.3)	52.7 (40.7–64.7)
\$50,000 or more	56.3 (46.6–66.0)	55.4 (47.8–63.0)	50.0 (39.7–60.3)	47.3 (35.3–59.3)
Financial dependence on parents				
Totally dependent	31.1** (22.2–39.9)	24.9 (18.3–31.5)	20.3 (12.3–28.3)	20.5 (11.7–29.3)
Mostly dependent	29.0 (20.2–37.8)	24.9 (17.8–31.9)	29.4 (19.8–39.1)	23.1 (13.0–33.1)
Somewhat dependent	24.6 (15.9–33.3)	21.1 (15.1–27.0)	25.6 (16.2–35.0)	19.6 (9.2–30.0)
Not dependent	15.3 (8.4–22.2)	29.1 (22.4–35.8)	24.7 (16.0–33.4)	36.8 (24.9–48.6)
Provider suggested STI testing				
Yes	6.9** (2.2–11.5)	.2** (0–5)	3.9 (.7–7.2)	6.5 (.9–12.1)
No	89.2 (83.7–94.7)	97.2 (94.4–100.0)	92.0 (87.5–96.5)	88.3 (81.6–95.1)
Do not remember	3.9 (.7–7.1)	2.5 (0–5.3)	4.1 (1.0–7.2)	5.2 (1.3–9.0)

Table shows unweighted n and weighted row percentage and 95% CI. Reasons for foregoing testing were recoded into separate variables. Confidentiality concerns include “concerned about confidentiality” and “do not want parents to find out.”

CI = confidence interval; STI = sexually transmitted infection.

^a Represents unweighted n's.

* $p < .05$; ** $p < .01$.

between confidentiality and provider testing recommendation ($\chi^2 = 8.4, p < .01$). Specifically, when controlling for the effect of insurance status, the odds of never testing due to confidentiality concerns among sexually experienced respondents who had a provider suggest testing were 1.9 times higher than those who never had a provider suggest testing ($p < .01$).

Discussion

Although CDC and the United States Prevention Task Force recommend STI screening for sexually active young, nonpregnant women, we found low proportions of receiving an STI test, even among subpopulations with annual screening recommendations [14,15]. National guidelines do not have widespread screening recommendations for men; thus, it was not surprising that we found higher testing for female respondents were substantially higher than males [1,15]. With the exception of STI clinics, study results also indicate that more females aged ≤ 25 years are being

screened during health visits nonspecific to STIs. A previous study found that screening often occurs during annual gynecological examinations [1]. We also found that uninsured females had lower reports of STI testing than their insured counterparts. Finally, those with a higher number of sex partners had the highest reports of STI testing.

Our study also found that most respondents who have ever been tested for an STI in their lifetime received an STI test at a private physician office; however, it is important to note that one in three adolescents and young adults still utilized public clinics for their last test (e.g., family planning, school based, STI, and community health clinics). In addition, testing locations varied by income and insurance status, and even among the insured, cost was cited as a reason why respondents had never received an STI test in their lifetime. Although the ACA is expected to reduce financial barriers to care seeking, these findings support a need for safety net providers [5,6]. These safety net clinics often serve as a means to accessing confidential and the same day

Table 5

Multivariable logistic regression analysis of reasons for never getting tested for STI among sexually experienced adolescents and young adults by demographics, 2013

Variable	Confidentiality concerns n = 200 ^a	Provider did not suggest it n = 360 ^a	Embarrassed/difficult to ask for testing n = 193 ^a	Cost or lack of insurance n = 142 ^a
	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)
Age (years)				
15–19	Reference	Reference	Reference	Reference
20–25	.82 (.43–1.57)	1.04 (.61–1.78)	.76 (.38–1.52)	2.25** (.95–5.34)
Gender				
Male	Reference	Reference	Reference	Reference
Female	1.19 (.75–1.90)	1.06 (.73–1.55)	.91 (.56–1.49)	.89 (.50–1.58)
Race/ethnicity				
Hispanic	1.52 (.85–2.72)	.9 (.52–1.53)	2.33* (1.30–4.17)	.65 (.30–1.43)
Non-Hispanic white	Reference	Reference	Reference	Reference
Non-Hispanic black	1.50 (.66–3.39)	.46* (.23–.93)	1.72 (.79–3.77)	.52 (.15–1.79)
Other, non-Hispanic	3.79** (1.65–8.68)	.73 (.33–1.62)	1.78 (.72–4.38)	2.40 (.92–6.26)
Education				
In high school	Reference	Reference	Reference	Reference
In college	.85 (.39–1.85)	.84 (.43–1.65)	1.54 (.64–3.70)	.82 (.24–2.76)
In business, technical, or vocational school after high school	1.20 (.21–6.78)	.66 (.15–2.92)	3.30 (.70–15.70)	.02** (<.01–.21)
Not in school	.59 (.24–1.45)	.67 (.32–1.40)	1.53 (.55–4.27)	.77 (.21–2.89)
U.S. census region				
Northeast	.99 (.52–1.91)	.75 (.42–1.32)	1.79 (.93–3.45)	.57 (.27–1.22)
Midwest	.79 (.42–1.48)	.90 (.55–1.47)	1.76 (.93–3.34)	.89 (.44–1.80)
South	Reference	Reference	Reference	Reference
West	.81 (.41–1.59)	.83 (.48–1.43)	1.05 (.52–2.12)	.82 (.35–1.93)
Insurance				
Private	Reference	Reference	Reference	Reference
Public	1.78 (.89–3.58)	1.11 (.59–2.09)	1.82 (.86–3.88)	.40 (.14–1.15)
None	1.06 (.51–2.17)	.96 (.53–1.75)	1.40 (.70–2.81)	1.44 (.72–2.87)
Don't Know	1.45 (.67–3.14)	.51 (.26–1.02)	1.65 (.73–3.73)	.75 (.21–2.68)
Household income				
<\$50,000	1.01 (.61–1.67)	1.11 (.74–1.67)	1.19 (.72–1.96)	1.22 (.68–2.18)
\$50,000 or more	Reference	Reference	Reference	Reference
Financial dependence on parents				
Totally dependent	Reference	Reference	Reference	Reference
Mostly dependent	1.17 (.61–2.23)	1.15 (.65–2.05)	1.78 (.86–3.69)	1.07 (.45–2.53)
Somewhat dependent	1.30 (.66–2.53)	1.29 (.71–2.33)	1.76 (.83–3.73)	1.06 (.45–2.53)
Not dependent	.47* (.22–.99)	1.00 (.56–1.78)	.92 (.42–1.99)	1.27 (.57–2.86)
Provider suggested STI testing ^b				
Yes	1.69 (.60–4.80)	—	.89 (.34–2.32)	1.74 (.47–6.36)
No	Reference	—	Reference	Reference
Do not remember	.32* (.12–.82)	—	.78 (.26–2.41)	.65 (.20–2.08)

Table shows unweighted n and weighted row percentage and 95% CI. Reasons for foregoing testing were recoded into separate variables. Confidentiality concerns include “concerned about confidentiality” and “do not want parents to find out.”

AOR = adjusted odds ratio; CI = confidence interval; STI = sexually transmitted infection.

^a Represents unweighted n's.

^b Analyzing “provider suggested STI testing” by “provider did not suggest” resulted in multicollinearity and was removed.

* $p < .05$; ** $p < .01$.

services at reduced or no cost among groups such as the uninsured or those seeking same day services [6,16].

Similar to other studies focusing on general health care and STI testing in a pediatric setting, our national study found that privacy and confidentiality concerns prevented some adolescents and young adults from seeking STI testing [8,9]. Previous research has found that adolescent and young adult patients may avoid health care due to fear of being stigmatized and embarrassment in revealing sexual behaviors to medical providers [5,7,16]. In addition, we found that respondents who were not financially dependent on their parents were the least likely to report confidentiality as a reason for avoiding STI testing. Sexually experienced adolescents and young adults may forego recommended screening in fear of parents finding out about STI services rendered during medical examinations [1]. For example, among insured adolescents and young adults, insurance communications sent to policy holders, such as explanation of

benefits, may inadvertently reveal STI testing status to parents [6,8,17].

Finally, other commonly reported reasons for not receiving an STI test included the provider not suggesting it or adolescents and young adults being embarrassed or finding it difficult to ask for testing. Indeed, a significant proportion of this national sample of adolescents and young adults cited that their health care provider never suggested an STI test. This may indicate missed opportunities in STI screening and supports findings from several studies that identified such missed opportunities for STI screening [4,10,11,18]. Appropriate sexual risk assessments during routine examinations may serve as a strategy for educating adolescents and young adults on the importance of STI testing when engaging in sexual activities, particularly among women.

This study has some limitations. Survey participation among adolescents aged < 18 years were suboptimal. Demographic data of nonresponders were not available to determine if they differed

from respondents. It is possible that the nonresponse group, teens that did not have parental permission, had higher testing proportions than those who were able to participate in the study. Respondents were asked to describe their household income before initiating the survey; therefore, it was assumed that parents of adolescents aged 15–17 years responded to the household income question [11]. It is possible that respondents did not know that they were tested and we do not know if those who avoided testing given confidentiality concerns were actually symptomatic for an STI. Some sample sizes were small (e.g., school-based and STI clinic testing sites); therefore, caution should be used when extrapolating these results to the U.S. adolescent and young adult population. Efforts were made to control nonresponse and noncoverage biases in the GYT survey design by applying poststratification adjustments based on recent data from the Current Population Survey [11].

Despite these limitations, our study findings highlight the need for addressing not only financial barriers to accessing STI screening services, but other barriers relating to missed opportunities in STI screening and concerns about confidentiality. These study results provide a national-level analysis of barriers to seeking testing services in adolescents and young adults. Medical providers can use this information to help improve or develop appropriate STI screening practices for adolescents and young adult patients. Our study results also highlight the importance of examining clinic and insurance plan privacy policies given confidentiality and privacy concerns that may deter adolescents and young adults from seeking STI testing. Appropriate strategies to minimize confidentiality related barriers to seeking STI services among adolescents and young adults need to be further investigated. Given the paucity of current research, there is a need for more research examining the effect of confidentiality concerns on testing behaviors. Potential strategies may include collaborations with insurance plans to reduce confidentiality barriers and involvement with providers who frequently serve adolescents and young adults.

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