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The importance of school staff referrals and follow-up in connecting high school students to HIV and STD testing

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Each author should report their contribution to the manuscript. If Conditions 1, 2 and 3 (below) are not met, please recognize other contributions in the acknowledgements.

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Catherine N. Rasberry (1) made substantial contributions to the conception and design of the study and the analysis and interpretation of data; (2) drafted the article; and (3) gave final approval of the version to be published.

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Conflict of interests

The Authors declare that there are no conflicts of interest.

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Abstract

This study examined predictors of having received HIV and sexually transmitted disease (STD) testing and having been referred by school staff for HIV/STD testing. In 2014, students in seven high schools completed paper-and-pencil questionnaires assessing demographic characteristics, sexual behavior, referrals for HIV/STD testing, and HIV/STD testing. The analytic sample (n=11,303) was 50.7% female, 40.7% Hispanic/Latino, 34.7% black/African American (non-Hispanic), and mean age was 15.86 (SD=1.22). After controlling for demographic characteristics, significant predictors of reporting having been tested for HIV or STDs were reporting having received a referral for HIV/STD testing (OR=3.18; 95% CI=2.14–4.70) and reporting staff following-up on the referral (OR=3.29; 95% CI=1.31–8.23). Students reporting referrals had significantly higher odds of being male (OR=2.49; 95% CI=1.70–3.65), “other” or multiracial (non-Hispanic) (compared to white, non-Hispanic) (OR=2.72; 95% CI=1.35–5.46), sexual minority (OR=3.80; 95% CI=2.57–5.62), and sexually experienced (OR=2.58; 95% CI=1.76–3.795). School staff referrals with follow-up may increase HIV/STD testing among students.

Keywords

adolescent; youth; HIV; sexually transmitted diseases; sexually transmitted infections; schools; referral; testing

Background

Young people in the United States are at disproportionately high risk for acquiring sexually transmitted diseases (STDs). In 2008, almost half of the estimated 19.7 million new STDs in the United States were among young people between 15 and 24 years of age (Satterwhite et al., 2013), despite this age group typically representing closer to 14% of the U.S. population (Central Intelligence Agency, 2016). Nearly 10,000 young people ages 13–24 were diagnosed with HIV in 2014 (Centers for Disease Control and Prevention, 2015a). For many young people, sexual behaviors that place them at risk for HIV and other STDs are initiated in the teenage years. Data collected from high school students across the U.S. show that in 2015, almost half (41.2%) reported having ever had sex, and 11.5% of students reported they had had sex with four or more partners (Centers for Disease Control and Prevention, 2016). Approximately 30.1% of U.S. high school students reported being currently sexually active (i.e., “having had sexual intercourse with at least one person during the 3 months before the survey”), and among those youth, 43.1% had not used a condom during last sexual intercourse (Centers for Disease Control and Prevention, 2016).

In light of both HIV and STD rates and the prevalence of sexual risk behaviors reported among youth, several clinical guidelines recommend testing youth for HIV and other STDs, although these vary slightly by organization or agency (American Academy of Pediatrics Committee on Pediatric AIDS, 2011; Centers for Disease Control and Prevention, 2006, 2015d; LeFevre & U.S. Preventive Services Task Force, 2014; Meyers et al., 2008; U.S.

Preventive Services Task Force, 2013). The U.S. Centers for Disease Control and Prevention (CDC) recommends testing all adolescents and adults ages 13–64 for HIV at least once as part of routine medical care (Centers for Disease Control and Prevention, 2006). In addition, CDC recommends chlamydia and gonorrhea screening for all sexually active women younger than 25 years of age, chlamydia screening for young men in high-prevalence clinical settings or who are in populations with high infection, and annual chlamydia, gonorrhea, syphilis, and HIV screening for young men who have sex with men (Centers for Disease Control and Prevention, 2015d).

Despite these recommendations, adolescents and young adults have relatively low rates of testing. In 2013, approximately 22% of sexually experienced U.S. high school students reported having ever been tested for HIV (Centers for Disease Control and Prevention, 2015c). Recent results from an online survey of a national sample of young people ages 15–25 demonstrated that among 15–19 year old respondents, only 6.7% of respondents had been tested for STDs within the last 12 months (Cuffe, Newton-Levinson, Gift, McFarlane, & Leichliter, 2016). Low testing rates may reflect that adolescents in the U.S. have relatively low levels of routine use of preventive care (Irwin Jr., Adams, Park, & Newacheck, 2009; Yu, Bellamy, Schwalberg, & Drum, 2001), and certain subgroups of youth—such as male, racial/ethnic minority, and/or uninsured youth—are even less likely to seek care (Irwin Jr. et al., 2009; Yu et al., 2001). Low healthcare utilization and testing rates among teens provide an opportunity for school staff to improve teens' access to these services.

One approach to increasing adolescents' access to sexual health services, including HIV and STD testing, is through the use of referrals to community-based sexual health services by school staff (Cicatelli Associates Inc. & National Coalition for STD Directors, 2015; Dittus et al., 2014; Lezin, Witt, Taylor, & Bliesner, 2009). A recent study in Los Angeles used a systems-level approach of creating referrals systems within high schools so that school staff, such as school nurses, could refer students to existing providers of sexual and reproductive health care in their communities (Dittus et al., 2014). Findings revealed significant intervention effects for females in terms of increasing reports of doctor/nurse visits STD testing or treatment and increasing HIV testing among females in the intervention schools relative to those in the control schools, but revealed no statistically significant intervention effects for males (Dittus et al., 2014).

Referrals may be particularly valuable to young people because adolescents do not always know where to access services in their community—particularly confidential services (Beeson et al., 2016). Adolescents stress confidentiality as critically important for them to consider seeking sexual health services (Coker et al., 2010; Kadivar et al., 2014; Lehrer, Pantell, Tebb, & Shafer, 2007), given that they sometimes want to receive services without their parents (Jones & Boonstra, 2004) or peers finding out (Morris et al., in press). The desire for confidentiality, frequently combined with the need for low-cost or free services (Morris et al., in press) can make it harder for youth to find appropriate service providers. Trained school staff can become resources for youth to help refer them to sources of care that best meet their needs in terms of confidentiality, cost, and other more individualized factors.

Within referral system approaches, one important aspect of making a referral is follow-up. Follow-up is the process of checking back with students to determine if students secured the services to which they were referred and to gain feedback for better tailoring of future referrals, and it can vary in its level of formality. From the follow-up process, staff can learn more about barriers students face in accessing the recommended service and can get a firsthand account of a student's experiences with the provider (Center for Mental Health in Schools at UCLA, 2007; Cicatelli Associates Inc. & National Coalition for STD Directors, 2015).

Research Questions

Considering the important role that referrals may hold in increasing adolescent access to HIV and STD testing, and considering that staff involvement may increase likelihood of receipt of services, the study team used data collected for the baseline evaluation of a school-centered HIV prevention project to answer five research questions:(1) What percentage of students referred by school staff for HIV and/or STD testing reported that they had ever been tested for HIV or STDs? (2) What percentage of students referred by school staff for HIV and/or STD testing reported that they received the testing specifically because of the referral? (3) Which students were most likely to be referred by school staff for services such as HIV and STD testing? (4) Did receipt of a referral from school staff for HIV or other STD testing significantly predict students' reports of getting tested for HIV or other STD? (5) Among all students who reported having received a referral from school staff for the HIV or STD testing, was referral follow-up by school staff (i.e., having the staff member check to see if the student received the service) a significant statistical predictor of students reporting they had been tested for HIV or other STDs?

Method

Program Background

The data used to answer the research questions were collected in December 2014 as baseline data for an evaluation of a school-centered HIV prevention project. The project uses a multi-component approach to prevention, including supporting schools to build systems and tools that allow school staff to more easily connect students to HIV and STI-related services—testing, treatment, prevention education—in their communities (Centers for Disease Control and Prevention, 2015e). Although increasing school staff referral for HIV/STD testing is a specific program goal for this project, no program activities related to referral had been implemented with school staff or students at the time of baseline data collection. The study's instrument and protocols were approved by ICF International's Institutional Review Board (IRB) for the Protection of Human Subjects and the Research Review Board of the participating school district.

Procedure

A self-administered paper-and-pencil questionnaire was provided to a census of students in seven high schools in a large urban school district in south Florida participating in an innovative HIV prevention program. Passive parental consent forms in three languages—English, Spanish, and Haitian Creole—were distributed to students in advance of the survey.

Parents who did not want their students to participate were asked to return the form with an indication that they did not give consent for participation, essentially opting their students out. Teachers collected consent forms and returned them to the study team.

On the day of the survey, teachers read a script with details about the survey, including information for students to provide assent for participation, and distributed the surveys to students. Students whose parents had indicated they did not provide consent for participation were provided with a decoy survey booklet that looked identical to the survey on the outside but contained no survey questions. All other students were reminded that participation was voluntary that they could choose to not take, or stop taking, the survey at any time. Students returned surveys and the decoy surveys by placing them in large manila envelopes, which were immediately collected by the study team.

Instrumentation

The questionnaire was anonymous and included 46 items (57 distinct questions, when accounting for multi-part questions) for completion within a 50-minute class period. The questions addressed students' demographic characteristics, sexual risk behaviors, perceptions of school climate, experiences with bullying or harassment, and school experiences related to HIV and STD (e.g., having been taught about AIDS or HIV, having seen posters or messages related to HIV or STDs, having been referred by school staff for HIV or STD testing or treatment).

Measures

Of the 46 items on the survey, a few key measures are included in the current analyses. Student characteristics include sex, age, race/ethnicity, and sexual minority status. Sex was reported as either male or female. Age was reported as a categorical variable, with response options for each year of age ranging from "12 years old or younger" to "18 years old or older." Race and ethnicity were assessed by two separate items, but were compiled into a four-category composite variable for the analyses; the final race and ethnicity categories included (1) black, non-Hispanic, (2) white, non-Hispanic (used as the referent group), (3) Hispanic (of any race), and (4) other or multiracial. Sexual minority status was a composite variable created based on responses to three items and included students who reported (1) best describing themselves as gay or lesbian, or bisexual, (2) having had sex with partners of the same sex, and/or (3) being attracted to people of the same sex.

Students answered "yes" or "no" to the question "Have you ever had sex?" where sex was defined as "vaginal, oral, or anal sex." Having ever been tested for HIV or STDs was assessed by creating a composite variable from two items: (1) "Have you ever been tested for HIV, the virus that causes AIDS? (Do not count tests done if you donated blood)?" and (2) "Have you ever been tested for other sexually transmitted diseases (STDs) such as genital herpes, chlamydia, syphilis, or genital warts?" Both questions included response options of "yes", "no", and "I don't know". Students who answered yes to one or both of these questions, were coded as having ever been tested for HIV or STDs. Students who had missing data for both questions or answered "I don't know" for both questions were excluded from further multivariate analyses. Because these items did not specify the location

of testing, this measure cannot be used to distinguish between testing provided on school property (e.g., in a school-based health clinic) and testing conducted off-site by community providers.

Receipt of referrals from school staff for HIV or STD testing or treatment was assessed by a composite variable created from two items: “During this school year, did a staff member at your school (such as a teacher, counselor, nurse, coach, or other school staff) provide you with a referral to HIV testing services or treatment?” and “During this school year, did a staff member at your school (such as a teacher, counselor, nurse, coach, or other school staff) provide you with a referral to STD testing services and treatment?” Both questions had response options of “yes” and “no”. Students who answered yes to one or both of these questions were coded as having received a referral during the current school year for HIV or STD testing services and treatment. Students who had missing data for both questions were excluded from further multivariate analyses.

For students who responded yes to one or both of the items about referrals, related additional questions were asked: “Did you receive HIV testing because of the referral?” and/or “Did you receive STD testing because of the referral?” Students were also asked “Did that person check to see that you received HIV testing?” and/or “Did that person check to see that you received STD testing?” Response options for these four questions included “yes”, “no”, or “I don’t want to say”. Composite variables were created for having received HIV or STD testing because of a referral and for having a school staff member check (follow-up) to see that the student received the service for which he/she was referred. Students who answered yes to one or both of the testing questions, were coded as having ever been tested for HIV or STDs because of the referral, and students who answered yes to one or both of the questions on follow-up from school staff were coded as having had school staff follow-up on the referral (i.e., having had a school staff member check to see that they received the HIV or STD testing). Students who had missing data for both questions or answered “I don’t want to say” for both questions in either set were excluded from further multivariate analyses related to that variable.

Participants

Participants in the study included 11,681 students enrolled in the seven high schools participating in an innovative HIV prevention program in a large urban school district in the southeastern United States. The response rate, based on the percentage of students who completed the survey out of the total number of students enrolled on the days of data collection, was 79.5%. The seven participating schools were selected for the program, in part, due to having high percentages of black and/or Hispanic students enrolled, which aligned well with the public health objectives of the program. For this reason, the sample includes higher percentages of black and/or Hispanic students than might have been found in a random selection of schools. A small percentage of students (2.7%) turned in surveys with substantial missing data (25% or more of items missing). In addition, we limited our analyses to students who reported being 13 or older because (1) CDC’s recommendations for HIV testing begin at age 13, and (2) respondents who reported being 12 or younger exhibited aberrant patterns of responses, with inappropriate skip behavior and response rates

well above national and sample averages for sexual activity and variables such as being transgender. Records from the 319 students with substantial missing data and records from the additional 59 students who did not report being 13 years old or older were removed from the dataset to create a final analytic sample of 11,303.

Data Analysis

Data were analyzed using IBM SPSS Statistics, version 21.0 (IBM Corp., 2012) and STATA version 13 (StataCorp, 2013). Descriptive statistics were calculated for each variable for the overall sample, and for the students who received referrals for HIV or STD testing/treatment. Because most of the sample did not receive a staff referral or receive HIV/STD testing due to a referral, the distribution of the dependent variables was skewed toward 0. To correct for potential bias and inefficiency of the logistic regression resulting from a zero-inflated sample, Firth's penalized maximum likelihood logistic regression (PML logistic) was used. Regressions examined if staff referrals during the current school year were a significant statistical predictor of having ever been tested for HIV or other STDs, and to identify predictors of referral during the current school year for HIV or STD testing or treatment. Chi-square analyses were used to determine if students who received staff follow-up on their referral differed significantly from those who did not in terms of reporting having received HIV or STD testing because of the referral or ever. PML logistic regressions were also used to determine if staff follow-up on the referral was a significant statistical predictor of having ever been tested for HIV or STDs while controlling for other key demographic factors. For each regression, an initial model was run that controlled for all proposed independent variables and/or control variables. Findings from these models are presented in the text. In the tables, interested readers will find a second set of models that exclude any variables found to be non-significant in the full initial models.

Results

Table 1 provides full characteristics for the analytic sample. Approximately half (50.7%) of the students were female and the majority of students reported being Hispanic/Latino (40.7%) or black/African American, non-Hispanic (34.7%). Mean age was 15.86 (SD=1.22). More than one-tenth (12.9%) of students were identified as sexual minority based on reported attraction to the same sex, having had sex with same sex partners, or identifying as gay, lesbian, or bisexual, and 76.5% of these students were female. Approximately two-fifths (40.7%) of students reported having ever had sex, and 17.0% of all students reported having ever been tested for HIV or other STDs (30.2% of the sexually experienced students). Among all students in the sample, 1.3% (n=144) reported having been referred by a staff member at their school for either HIV or STD testing services or treatment during the school year (among sexually experienced students, 2.2% (n=96)).

Characteristics of students who reported having received a referral from school staff for HIV or STD testing or treatment are provided in Table 1. Among the students who reported referrals, 47.6% reported that they had ever been tested for HIV or other STDs, and 25.8% reported that they received HIV or STD testing specifically because of the referral. In

addition, 30.2% reported that the staff member who made the referral checked with them to see that they received the HIV or STD testing.

A PML logistic regression analysis also was conducted with the full analytic sample to identify predictors of reports of having received a referral for HIV or STD testing or treatment during the school year. Independent variables in the initial model included sex, age, race/ethnicity, sexual minority status, and having ever had sex. Results indicate that male sex (OR, 2.49; 95% CI, 1.70–3.65), race/ethnicity of "other" or multiracial (non-Hispanic) (compared to the referent group of white, non-Hispanic) (OR, 2.72; 95% CI, 1.35–5.46), being a sexual minority youth (OR, 3.80; 95% CI, 2.57–5.62), and having ever had sex (OR, 2.58; 95% CI,1.76–3.79) were predictive of reporting having received a referral for HIV or STD testing or treatment (see Table 2).

A PML logistic regression analysis was conducted with the full analytic sample to identify if reporting having received a school staff referral for HIV or STD testing or treatment was a predictor of reporting having ever been tested for HIV or other STDs. The model controlled for sex, age, race/ethnicity, sexual minority status, and having ever had sex, and it included receipt of a school staff referral for HIV or other STD testing as an independent variable. Results indicate that being older (odds ratio [OR], 1.18; 95% CI, 1.13–1.24), having a race/ethnicity of black/African American, non-Hispanic (compared to the referent group of white, non-Hispanic) (OR, 1.39; 95% CI, 1.18–1.64), being a sexual minority youth (OR, 1.23; 95% CI, 1.06–1.43), having ever had sex (OR, 4.45; 95% CI, 3.94–5.03), and reporting having received a school staff referral for HIV or other STD testing (OR, 3.17; 95% CI, 2.14–4.70) were predictive of reporting having ever been tested for HIV or other STDs (see Table 3).

In order to explore the role of staff follow-up on referral (i.e., the referring staff member checked to see if the student received the HIV or STD testing), additional analyses on the subgroup of students who reported having received a referral (n=144) was conducted. Of these students, a significantly greater proportion reported having been tested specifically because of the referral when they received follow-up from a staff member; 59.4% of those with reported follow-up were tested because of the referral compared to 12.2% of those with no reported follow-up (X^2=25.62, p<.001). In terms of reporting having ever been tested for HIV or STDs, students who reported having received follow-up on their referrals also were more likely to report having ever been tested than those who did not report receiving follow-up; 71.9% of those with reported follow-up had been tested compared to 37.0% of those with no reported follow-up (X^2=10.86, p=.001).

Finally, a PML logistic regression analysis was conducted with the youth who reported they had received a referral for HIV or STD testing or treatment to determine if reported follow-up from school staff was a predictor of reporting having ever been tested for HIV or STDs. The model controlled for sex, age, race/ethnicity, sexual minority status, and having ever had sex, and included report of school staff follow-up on the referral as an independent variable. Results indicate that reported school staff follow-up on the referral was a significant predictor of reporting having ever been tested for HIV or other STDs (OR, 3.29; 95% CI, 1.31–8.23) (see Table 4).

Discussion

Although a subset of students in this study reported being referred for sexual health services such as HIV and STD testing or treatment, that group remains very small. Only 1.3% of all students, and 2.2% of sexually experienced students, reported having received such a referral. Given that more than 40% of the sample reported being sexually experienced, it is likely that a substantially larger percentage of youth could be appropriately referred for HIV or STD testing. It is, however, encouraging that referrals may be reaching an appropriate group. For example, students who reported having had sex were more likely to have reported receipt of a referral. In addition, students who were classified as being sexual minority youth were also more likely to report having received a referral, which is particularly meaningful for male sexual minority youth because young men who have sex with men face disproportionately high risk for acquiring HIV (Centers for Disease Control and Prevention, 2015b).

Furthermore, male students were more likely to have reported receiving referrals. It is possible the difference seen in the percent of males referred by school staff for HIV/STD services may reflect that this population is being missed by current approaches to providing sexual and reproductive health services outside of school settings. Given that young men have typically reported lower use of sexual and reproductive health services (Marcell, Wibbelsman, Seigel, & the Committee on Adolescence, 2011; National Adolescent Health Information Center, 2005) and health care in general (Marcell, Klein, Fischer, Allan, & Kokotailo, 2002), this finding may represent an important opportunity for school staff to help meet the needs of an underserved group. However, the number of male students in this study being referred is still low; the real opportunity to increase male access to sexual health services exists only if a higher percentage of males receive referrals and if those students act on the referrals. Future research may need to explore if—as this study found—males are usually referred more than females, and if so, what might make them more or less likely to secure the services for which they have been referred. However, even as researchers seek to better understand the role referral can play in increasing male students' access to services such as HIV/STD testing, it is critical that referral processes not exclude or overlook female students, who are also in need of diagnosis and treatment of STDs.

This study's findings also confirm that reported referrals by school staff are related to increased HIV and STD testing. Even while controlling for sex (male/female), age, race/ethnicity, sexual minority status, and having had sex (the strongest predictor of reporting having been tested), reporting having received a school staff referral for HIV or STD testing or treatment remained a significant and independent predictor of reporting having ever been tested for HIV or other STDs. More specifically, the odds of reporting being tested were more than 3 times as high for students who reported receiving school staff referrals for HIV or other STD testing or treatment as for students who did not report receiving such referrals. This finding is consistent with other studies that have found recommendation of testing from a provider is associated with getting tested (Centers for Disease Control and Prevention, 2005; Fernandez et al., 2003; Petroll et al., 2008). In the context of a school, staff may serve in a capacity similar to a trusted provider, and their recommendations may carry weight with youth.

Among students who reported receiving referrals for HIV or STD testing or treatment, more than a quarter (25.8%) reported having been tested specifically because of the referral, and almost half (47.6%) of the referred students reported having ever been tested. The data on reports of being tested because of the referral are particularly valuable given that the data in this study are cross-sectional, and as a result, it is not possible to determine the order of referrals or testing (e.g., a student may have been tested prior to receiving a referral). However, the wording of this particular survey question—a follow-up question asked only of students who received referrals—provides the best insight into the possible influence of the referral itself. Because of the question's phrasing, these findings suggest that for at least a subgroup of students, referrals from school staff may influence them to get tested.

Finally, the findings from this study suggest that follow-up (defined in this study as having the staff member check to see if the student received the recommended testing) may be a critical component of school staff referrals. Among students who received referrals for HIV or STD testing or treatment, the odds of reporting being tested were more than 3 times as high for students who reported that they received follow-up from school staff on their referrals than for those who did not. Among students who reported having received follow-up on their referrals for HIV or STD testing or treatment, 71.9% reported having been tested. This finding lends additional support to the idea that follow-up after a referral is initially made is a key component of connecting students to services (Center for Mental Health in Schools at UCLA, 2007; Cicatelli Associates Inc. & National Coalition for STD Directors, 2015). However, it is also important to note that a relatively low percentage of youth (30.2%) reported getting follow-up on their referral (which is out of the already small 2.2% of sexually experienced youth in the sample who received a referral at all), thereby representing an area where programmatically, school staff could make great strides to potentially increase their impact.

Limitations

These findings have important implications for school health professionals, including school nurses, counselors, and other school staff, but they need to be interpreted with careful consideration of the context of this particular data set. First, it is important to note that because this was baseline data collection, the participating school district had not yet made any concentrated efforts to make referrals for HIV or STD testing or treatment. As a result, students who reported referrals may have been the ones initiating conversations with staff on these topics. The data do not provide a way to determine who initiated conversations related to HIV or STD testing or which types of school staff members were making these referrals. Furthermore, because the measures did not specify where youth had received HIV or STD testing, it is not clear if students who received HIV or STD testing did so on school grounds or off-site. Findings from additional rounds of data collection that occur as the district makes more focused efforts to provide referrals for sexual health services may offer more insight.

This study has a few additional limitations of importance. As has been previously mentioned, the data used for these analyses are cross-sectional and limit the study teams' ability to examine any causal relationships between variables. Our questions asked about school staff referrals "during this school year" and having "ever been" tested for HIV

and other STDs; it is possible data include students who received a referral during the current year, but had been tested prior to receipt of such a referral. In addition, the data in this study were from students' self-report of referrals and school staff follow-up on those referrals, as well as self-report of HIV or STD testing; these measures could be subject to recall or social desirability bias, although use of anonymous data collection is believed to have reduced the impact of social desirability bias. Furthermore, several of the analyses—specifically, analyses related to the role of staff follow-up on referrals—are limited to a very small subset of the overall sample. Because only 1.3% of the sample reported having ever received a referral for HIV or STD testing or treatment, all analyses among those students speak only to what is reflected in a tiny percentage of the overall sample. Finally, the data were collected from students in only seven high schools in a single school district in the southeastern United States, and therefore, findings are not representative of all students in the district, students in the United States more broadly, or students in other countries. The varied context of school nursing both within and outside of the United States further limits the conclusions that can be drawn from the findings.

Conclusions and Implications

Collectively, these findings highlight key implications for school staff, particularly school nurses and other school health professionals. First, referrals seem to matter, and as such, school nurses and other staff who want to increase their students' access to key sexual health services such as HIV or STD testing—whether these services are available in schools or outside of schools in nearby community settings—may find it helpful to devote greater attention to encouraging and enabling school staff to make effective referrals for these services. Second, overall rates of referrals for HIV and STD testing are relatively low, even among sexually experienced youth, and leave much room for school staff to increase referral rates among students at highest risk for HIV and other STDs. To the extent possible, referral processes need to be clearly articulated and staff may need professional development to ensure they are confident and competent when it comes to making referrals, particularly for sensitive topics such as sexual health services. Third, school staff may be particularly well suited to reach certain groups of students—such as males—who may be less likely to have routine access to sexual health services and to help them get connected to the services they need. And finally, purposeful inclusion of procedures for follow-up (including specifically checking to see if a student received the relevant service) can be incorporated into existing or new referral systems to potentially increase percentage of students who receive the services for which they were referred.

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Table 1.

Demographic, social, and clinical characteristics of the full analytical sample, students reporting referral for HIV or STD testing/treatment, and students reporting having ever been tested for HIV or other STDs.

	Full analytic sample (n= 11303)		Students reporting referral for HIV or STD testing/ treatment (n=144)		Students reporting ever tested for HIV or other STDs (n=1796)	
	n	%	n	%	n	%
Sex						
Female	5716	50.7	48	33.3	889	49.6
Male	5563	49.3	96	66.7	903	50.4
Age						
13 years old	29	0.3	0	0.0	2	0.1
14 years old	1691	15.0	16	11.1	142	7.9
15 years old	2942	26.0	36	25.0	347	19.3
16 years old	974	26.3	31	21.5	480	26.7
17 years old	2512	22.2	32	22.2	517	28.8
18 years old or older	1155	10.2	29	20.1	308	17.1
Race and ethnicity						
Black/African American, non-Hispanic	3899	34.7	51	36.2	720	40.4
White, non-Hispanic	1846	16.5	15	10.6	250	14.0
Hispanic	4571	40.7	57	40.4	679	38.1
Other or Multiracial	905	8.1	18	12.8	134	7.5
Sexual minority						
Sexual minority youth	1457	12.9	46	31.9	327	81.8
Non sexual minority youth	9846	87.1	98	68.1	1469	18.2
Ever had sex?						
Yes	4441	40.7	96	69.6	1286	73.3
No	6466	59.3	42	30.4	469	26.7
Ever been tested for HIV or other STDs?						
Yes	1796	17.0	60	47.6	1796	100.0
No	8766	83.0	66	52.4	0	0.0
Ever been referred by school staff for HIV or STD testing or treatment?						
Yes	144	1.3	144	100.0	60	3.3
No	10803	98.7	0	0.0	1682	93.7
Did you receive [HIV or STD testing] because of the referral? [a]						
Yes			31	25.8	19	36.5
No			89	74.2	33	63.5
Did the school staff member who referred you check to see that you received the HIV or STD testing? [a]						
Yes			35	30.2	23	54.0

	Full analytic sample (n= 11303)		Students reporting referral for HIV or STD testing/ treatment (n=144)		Students reporting ever tested for HIV or other STDs (n=1796)	
	n	%	n	%	n	%
No			81	69.8	27	46.0

Note: Missing data not included.

[a]This question only asked of students who reported they had received a referral for the service.

Table 2.

Penalized maximum likelihood logistic regression analysis identifying predictors of reporting having received a referral for HIV or STD testing or treatment, among the full analytic sample

Characteristic	OR	S.E.	Z	Sig.	95% CI	
MODEL 1[a] (n=10,650)						
Sex (male)	2.492	.487	4.67	<.001	1.699	3.654
Age	1.074	.081	.95	.340	.927	1.244
Race/Ethnicity						
Black/African-American, Non-Hispanic	1.652	.497	1.67	.095	.916	2.979
Hispanic	1.443	.431	1.23	.220	.803	2.590
Other or Multiracial	2.717	.968	2.80	.005	1.351	5.462
Sexual minority	3.799	.759	6.68	<.001	2.567	5.621
Ever had sex	2.579	.506	4.83	<.001	1.755	3.788
MODEL 2[b] (n=10,650)						
Sex (male)	2.501	.489	4.69	<.001	1.705	3.668
Race/Ethnicity						
Black/African-American, Non-Hispanic	1.664	.500	1.69	.090	.923	3.000
Hispanic	1.444	.431	1.23	.218	.804	2.593
Other or Multiracial	2.717	.968	2.80	.005	1.351	5.462
Sexual minority	3.810	.762	6.69	<.001	2.574	5.639
Ever had sex	2.711	.514	5.26	<.001	1.870	3.930

[a] Model Wald $X^2(7)=103.20$, $p<.001$.

[b] Model 2 excludes variables (age) found to be not significant in the initial model. Model Wald $X^2(6)=102.34$, $p<.001$.

Table 3.

Penalized maximum likelihood logistic regression analysis identifying predictors of reporting having been tested for HIV or other STDs, among the full analytic sample.

Characteristic	OR	S.E.	Z	Sig.	95% CI	
MODEL 1[a] (n=9,998)						
Sex (male)	.908	.053	−1.65	.099	.809	1.018
Age	1.180	.029	6.75	<.001	1.125	1.238
Race/Ethnicity						
Black/African-American, Non-Hispanic	1.391	.119	3.86	<.001	1.176	1.644
Hispanic	1.050	.089	.58	.565	.889	1.241
Other or Multiracial	1.230	.155	1.63	.102	.960	1.575
Sexual minority	1.230	.096	2.65	.008	1.055	1.434
Ever had sex	4.451	.279	23.82	<.001	3.936	5.033
Received school staff referral for HIV/STD testing	3.173	.635	5.77	<.001	2.144	4.696
MODEL 2[b] (n=10,018)						
Age	1.181	.029	6.79	<.001	1.126	1.239
Race/Ethnicity						
Black/African-American, Non-Hispanic	1.395	.119	3.91	<.001	1.181	1.649
Hispanic	1.052	.089	.59	.554	.890	1.242
Other or Multiracial	1.227	.155	1.62	.106	.958	1.572
Sexual minority	1.272	.096	3.19	.001	1.097	1.474
Ever had sex	4.397	.272	23.94	<.001	3.895	4.963
Received school staff referral for HIV/STD testing	3.107	.621	5.67	<.001	2.100	4.596

[a] Model Wald $X^2(8)=840.78$, $p<.001$.

[b] Model 2 excludes variables (sex) found to be not significant in the initial model. Model Wald $X^2(7)=843.32$, $p<.001$.

Table 4.

Penalized maximum likelihood logistic regression analysis identifying predictors of reporting having ever been tested for HIV or other STDs among students who report they were referred for either HIV or STD testing or treatment.

Characteristic	OR	S.E.	Z	Sig.	95% CI	
MODEL 1[a] (n=99)						
Sex	1.402	.669	.71	.478	.551	3.571
Age	1.341	.231	1.70	.089	.956	1.881
Race/Ethnicity						
Black/African-American, Non-Hispanic	2.399	1.888	1.11	.266	.513	11.218
Hispanic	2.618	2.060	1.22	.221	.560	12.241
Other or Multiracial	1.906	1.781	.69	.490	.305	11.897
Sexual minority	1.201	.567	.39	.698	.476	3.029
Ever had sex	1.537	.776	.85	.395	.571	4.133
School staff checked to see if student received testing	3.288	1.539	2.54	.011	1.313	8.231
MODEL 2[b] (n=105)						
School staff checked to see if student received testing	4.183	1.897	3.16	.002	1.720	10.174

[a] Model Wald $X^2(8)=12.82$, $p=.118$.

[b] Model 2 excludes variables (age, race/ethnicity, sexual minority, ever had sex) found to be not significant in the initial model. Model Wald $X^2(1)=9.96$, $p=.002$.