A Computerized Sexual Health Survey Improves Testing for Sexually Transmitted Infection in a Pediatric Emergency Department

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Objectives To assess whether clinical decision support, using computerized sexually transmitted infection (STI) risk assessments, results in increased STI testing of adolescents at high risk for STI.

Study design In a 2-arm, randomized, controlled trial conducted at a single, urban, pediatric emergency department, adolescents completed a computerized sexual health survey. For patients assigned to the intervention arm, attending physicians received decision support to guide STI testing based on the sexual health survey–derived STI risk; in the usual care arm, decision support was not provided. We compared STI testing rates between the intervention and usual care groups, adjusting for potential confounding using multivariable logistic regression.

Results Of the 728 enrolled patients, 635 (87.2%) had evaluable data (323 intervention arm; 312 usual care arm). STI testing frequency was higher in the intervention group compared with the usual care group (52.3% vs 42%; aOR 2 [95% CI 1.1, 3.8]). This effect was even more pronounced among the patients who presented asymptomatic for STI (28.6 vs 8.2%; aOR 4.7 [95% CI 1.4-15.5]).

Conclusions Providing sexual health survey–derived decision support to emergency department clinicians led to increased testing rates for STI in adolescents at high risk for infection, particularly in those presenting asymptomatic for infection. Studies to understand potential barriers to decision support adherence should be undertaken to inform larger, multicenter studies that could determine the generalizability of these findings and whether this process leads to increased STI detection. *(J Pediatr 2017;■■:■■-■■).*

Trial registration ClinicalTrials.gov: NCT02509572.

Adolescents are affected disproportionately by sexually transmitted infections (STIs).[1-5] Of the 19 million new cases of STIs in the US each year, more than 9 million occur among adolescents.[5] The emergency department (ED) is a key point of access to care for many adolescents, because they account for 15.8% of all ED visits, or almost 15 million ED visits annually.[6-9] More than one-third of adolescents do not report a source of primary care,[10-13] and fewer than 15% of adolescents participate in annual routine health maintenance examinations.[14] Furthermore, adolescents who seek care at EDs engage in riskier behaviors than those who access primary care services.[12,15] The early diagnosis and treatment of STIs can prevent serious reproductive morbidity and mortality, including pelvic inflammatory disease, ectopic pregnancy, infertility, and facilitation of transmission of HIV. Considering that one of the goals of Healthy People 2020 is increased STI screening for youth,[16] the ED may serve as a strategic setting for the diagnosis and treatment of STIs, and may in fact be the only site where this vulnerable population encounters health care providers.

STI testing is not conducted routinely in the ED setting.[17-19] Even when patients present with STI-related symptoms, sexual histories are not obtained routinely by clinicians,[17,19-21] and STI testing is not always conducted,[18-20,22] leading to underdiagnosis and undertreatment. Although adolescents are interested in receiving sexual health education and treatment in the ED setting,[23,24] adolescent patients may be uncomfortable disclosing sensitive health information to clinicians in face-to-face interviews.[25-30] Furthermore, patients may not recognize that their symptoms may be related to an STI or that they are at risk for STIs and, therefore, may not disclose their sexual behavior unless prompted. Finally, the hectic pace and lack of privacy in the ED setting may make it difficult to provide sexual health care confidentially and efficiently.

To address these barriers, computerized screening may serve as an additional method to obtain sensitive information efficiently and accurately.[29,31-34] Previously, we developed the sexual health screen, a computerized survey to efficiently and confidentially identify adolescents at risk for STIs.[35] The purpose of this study was to conduct a randomized behavioral trial to evaluate the effectiveness of decision support derived from the sexual health screen for targeted STI testing among adolescents at high risk for STIs. We hypothesized that provision

ED	Emergency department
STIs	Sexually transmitted infections

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of decision support for targeted testing of adolescents assessed to be at high risk for STIs would result in significantly increased frequency of STI testing compared with usual care (ie, nonreceipt of the decision support).

Methods

We performed a single-blind, 2-arm, randomized, controlled trial (ClinicalTrials.gov: NCT02509572) to determine whether provision of decision support based on the sexual health screen resulted in increased STI testing of adolescents at high risk for STIs. Although trial registration was not required for this study, it was registered retrospectively on July 21, 2015, after all of the patients were enrolled, for the public record. Based on our prior work demonstrating differences in STI testing by gender and presence or absence of STI-related symptoms,[36] we purposefully oversampled females and asymptomatic patients. We ensured balanced allocation within groups by age, gender, and presence of STI-related symptoms in a 1:1. The randomization sequence was created by DatStat Illume (Seattle, Washington), which hosted our computerized sexual health survey, using random permuted blocks, ranging in size from 2 to 6. The hospital's Institutional Review Board approved the study protocol with a waiver of parental consent because adolescents are allowed to seek and receive confidential sexual health services in our jurisdiction.

Study Setting and Population

The study was conducted at a single, urban, pediatric ED located in a free-standing tertiary care, pediatric academic center with an annual ED visit volume of approximately 90 000, within a city with the highest rate of STIs nationally.[37] During the study period, trained research staff approached patients aged 14-19 years for study participation during randomly selected 8-hour shifts from 7 a.m.-11 p.m. daily. Because informed consent was required, we excluded patients who were critically ill, developmentally or neurocognitively delayed, in police custody, or presenting with altered mental status, a psychiatric emergency, or after an acute sexual assault. Because the survey was only available in English, patients who were not literate or did not understand English were ineligible. We also excluded patients from participation if they were under the clinical care of any of the study investigators.

Screening Tool

All enrolled patients completed the computerized sexual health screen, a validated sexual risk assessment tool.[35] This survey was administered via a tablet-based computer with headphones provided for patients in an audio computer-assisted self-interview format. Based on participant survey responses, subjects were classified into 1 of 3 categories for STI risk. Subjects were classified as at high risk for STIs if they disclosed being sexually active and having either the presence of STI-related symptoms or any of the following high-risk behaviors: more than 1 sexual partner in the last 3 months, no condom use during last sex, or a prior history of STI. Subjects were classified as at risk if they disclosed being sexually active but did not disclose having any STI-related symptoms or any high-risk sexual behaviors. Subjects were classified as at low risk if they denied any history of sexual activity.

Intervention

For subjects randomized to the intervention arm, the attending physician received decision support, that is, a printed report that included recommendations for gonorrhea and chlamydia testing based on the risk category derived from the sexual health screen. When patients were classified as at high risk, the attending physician received recommendations that STI testing was "highly recommended" and when they cared for patients who were classified as at risk, STI testing was "recommended." When attending physicians cared for patients who were classified as at low risk, they received recommendations that STI testing "was not necessary at this time." For patients in the usual care arm, the attending physician received no decision support.

All study participants, including participants who screened at low risk, underwent STI testing for *Neisseria gonorrhoeae* and *Chlamydia trachomatis* via polymerase chain reaction (Abbott RealTime PCR; Abbott Park, Illinois). We did not include HIV testing or *Trichomonas* testing specifically as study outcomes because our institution already has a well-established opt-out HIV screening program and because there are no current recommendations for *Trichomonas* testing of asymptomatic individuals.[38] If study participants did not have STI testing ordered by the clinician, research assistants sent previously collected urine for STI testing at time of ED discharge under the research protocol. As part of the sexual health screen, confidential phone numbers for result notification were collected from all enrolled patients. All patients with a positive test were notified of the results and prescribed or referred for treatment, either by clinical staff or the principal investigator.

Measures

The primary outcome measures were the difference in STI testing frequencies between the intervention and usual care arms for the entire cohort as well as for the asymptomatic participants who screened at high risk for STIs. We chose to focus on this asymptomatic population because we believe this group would be most likely to benefit most from improvements in screening, as they represent a group of patients who may not otherwise be identified. We chose STI testing as our primary outcome because the most proximate outcome for clinical decision support is clinician decision to perform STI testing. We hypothesized that STI testing rates would be higher in the intervention arm compared with the usual care arm. With a baseline STI testing rate of 10%[36] and at an alpha of 0.05, a sample size of 600 would provide 90% power to detect a 10% absolute difference between the 2 arms. To address potential perceived barriers to future implementation, as a secondary measure, we determined whether study participation or

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