Sexual Assault and Sexually Transmitted Infections in Adults, Adolescents, and Children

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Survivors of sexual assault are at risk for acquiring sexually transmitted infections (STIs). We conducted literature reviews and invited experts to assist in updating the sexual assault section for the 2015 Centers for Disease Control and Prevention sexually transmitted diseases (STD) treatment guidelines. New recommendations for STI management among adult and adolescent sexual assault survivors include use of nucleic acid amplification tests (NAATs) for detection of Trichomonas vaginalis by vaginal swabs; NAATs for detection of Neisseria gonorrhoeae and Chlamydia trachomatis from pharyngeal and rectal specimens among patients with a history of exposure or suspected extragenital contact after sexual assault; empiric therapy for gonorrhea, chlamydia, and trichomoniasis based on updated treatment regimens; vaccinations for human papillomavirus (HPV) among previously unvaccinated patients aged 9–26 years; and consideration for human immunodeficiency virus (HIV) nonoccupational postexposure prophylaxis using an algorithm to assess the timing and characteristics of the exposure. For child sexual assault (CSA) survivors, recommendations include targeted diagnostic testing with increased use of NAATs when appropriate; routine follow-up visits within 6 months after the last known sexual abuse; and use of HPV vaccination in accordance with national immunization guidelines as a preventive measure in the post–sexual assault care setting. For CSA patients, NAATs are considered to be acceptable for identification of gonococcal and chlamydial infections from urine samples, but are not recommended for extragenital testing due to the potential detection of nongonococcal Neisseria species. Several research questions were identified regarding the prevalence, detection, and management of STI/HIV infections among adult, adolescent, and pediatric sexual assault survivors.

Keywords. sexual assault; child sexual abuse; sexually transmitted infections.
providers weeks, months, or even years later after repeated sexual abuse. Acute SA management is complex with medical, psychological, and legal aspects. There are >700 sexual assault nurse examiner (SANE) and forensic nurse examiner programs in the United States and Canada that provide appropriate, evidence-based care to patients disclosing an acute SA. These programs are primarily emergency department based, but some exist in freestanding centers [4]. Some centers have a coordinated SA response team consisting of representatives from healthcare, forensics, local rape crisis centers, law enforcement, and the prosecutor’s office.

Recognizing that these programs provide a comprehensive medicolegal approach to the management of SA survivors, and that one of the principal concerns is exposure to sexually transmitted infections (STIs) and human immunodeficiency virus (HIV) [5, 6], the Centers for Disease Control and Prevention (CDC) sexually transmitted diseases (STDs) treatment guidelines are focused on the identification, prophylaxis, and treatment of STIs among adult, adolescent, and pediatric SA survivors. The collection of nonmicrobiologic specimens for forensic purposes and the management of potential pregnancy, physical, and psychological trauma are beyond the scope of the guidelines. The guidelines are primarily based on prior literature involving female SA patients; however, some of the following recommendations are also applicable to male SA survivors (ie, diagnostic tests for gonorrhea and chlamydia, and vaccinations for human papillomavirus [HPV]). To update the STD guidelines for adult, adolescent, and pediatric SA survivors, we defined relevant “key questions” regarding management and reviewed the recent literature regarding STI diagnostics, empiric STI antimicrobial prophylaxis and vaccinations, and HIV nonoccupational postexposure prophylaxis (nPEP), which involves the immediate short-term use of antiretroviral therapy after an exposure (eg, sexual, injection drug use) to reduce the likelihood of HIV infection.

METHODS

Experts in the field of SA agreed upon the key questions to address in SA management for the 2015 CDC STD treatment guidelines. Two CDC consultants conducted the literature review and facilitated the expert guidance process for the adult/adolescent SA and pediatric SA sections. For adults and adolescents, a systematic literature review was conducted using the PubMed, Medline, and Embase databases using the following Medical Subject Headings (MeSH) terms: SA and STDS; SA and STIs; rape and STDS; SA and gonorrhea; SA and chlamydia; SA and trichomonas; SA and HIV; SA and HPV; SA and hepatitis; HIV nPEP; sexual transmission of hepatitis C; and nucleic acid amplification tests and STIs. For children, a systematic literature review was conducted using PubMed using the MeSH term “child sexual abuse” cross-indexed with “diseases, sexually transmitted” OR the following individual search terms: Neisseria gonorrhoeae or gonorrhea; Chlamydia trachomatis; Trichomonas vaginalis or trichomonas infections; Treponema pallidum or syphilis; Herpesviridae infections or herpes genitalis; condyloma acuminata; papillomavirus vaccines/administration and dosage; HIV infection; bacterial vaginosis; Pthirus pubis.

The literature review was limited to manuscripts in English that were published from January 2009 to April 2013; conference abstracts were not included in the review, and epidemiologic studies outside the United States and United Kingdom were generally excluded. Tables of evidence (Supplementary Tables 1 and 2) were constructed for each key question, which were distributed to the key experts along with a background summary for review. Conference calls were held with the SA experts to discuss the recommendations for changes to the new CDC STD treatment guidelines section. The proposed changes to the guidelines were based on the tables of evidence or expert opinion where there was no supporting evidence. The data and recommendations were presented at the CDC treatment guidelines meeting held in Atlanta, Georgia, on 30 April–2 May 2013.

RESULTS AND DISCUSSION

Adult and Adolescent Sexual Assault Survivors

Key Question 1. Are There New Data to Guide the Decision to Obtain Genital or Other Specimens for STI Diagnosis at the Initial Evaluation for Adult and Adolescent Sexual Assault Survivors?

When patients present acutely after SA, immediate STI screening may not be able to identify infections acquired recently during the assault. Therefore, many SANE and other SA programs do not routinely offer STI screening but instead provide antimicrobial prophylaxis at the initial evaluation. However, recommendations for STI screening are supported by prior literature among rape victims that demonstrate a high proportion of prevalent infections at initial evaluation [7, 8]. Recent studies have reported prevalent STIs in adolescents and adults at initial evaluation for sexual assault including N. gonorrhoeae, C. trachomatis, and T. vaginalis [9, 10, 13]. Gavril et al [13] reported STI diagnosis among 130 of 727 (17.9%) preadolescent and adolescent patients evaluated for SA or sexual abuse at the initial evaluation, most of whom had a normal or nonspecific examination on presentation. A retrospective study conducted in South Korea among 316 female rape victims with a median age of 23 years found prevalent C. trachomatis in 28.9% and prevalent N. gonorrhoeae in 6.3% [10].

In addition to detecting prevalent infections, conducting STI screening after SA is likely to be important for the psychological
and medical management of the patient. There are additional benefits from STI screening for the management of (consensual) sexual partners and monitoring of reportable conditions. Therefore, STI screening during the initial evaluation of SA survivors continues to be recommended with consideration on an individual basis, taking into account the type of SA, sites of exposure, and the psychological condition of the patient.

**Key Question 2. What New Data Are Available to Help Guide Diagnostic Evaluation of Adult and Adolescent Sexual Assault Survivors for STIs/HIV?**

There are data involving newer STI diagnostic methods that can improve the evaluation of adult and adolescent SA survivors, including (1) nucleic acid amplification tests (NAATs) for *T. vaginalis* detection in women and (2) NAATs for detection of *N. gonorrhoeae* and *C. trachomatis* from pharyngeal and rectal specimens in men or women. Several prospective studies involving adolescent and adult women have shown that NAATs significantly increase *T. vaginalis* detection compared with wet mount microscopy (WM) [14, 15, 30]. Compared to combined reference standards (WM and/or culture and NAATs), the reported sensitivities of transcription-mediated amplification-based (TMA) *T. vaginalis* testing among symptomatic and asymptomatic women from different specimen types were 96.6%–100% for vaginal, 89.8%–100% for endocervical, and 87.5%–95.2% for urine specimens [15].

NAATs have been recommended for the detection of urogenital infections caused by *C. trachomatis* and *N. gonorrhoeae* in men and women, and there are several US Food and Drug Administration (FDA)–cleared assays in the United States. Although NAATs are not FDA-cleared for pharyngeal and rectal *N. gonorrhoeae* and *C. trachomatis* detection, they are recommended for screening of extragenital infections due to their increased sensitivity, ease of specimen transport, and processing [11]. Commercially available NAATs can be used by laboratories to detect pharyngeal and rectal *C. trachomatis* and *N. gonorrhoeae* from clinical specimens after performing internal validation of the assays and establishing specifications for performance characteristics according to Clinical Laboratory Improvement Amendments regulations.

Investigators have demonstrated that the prevalence of pharyngeal gonorrhea is high among female adult and adolescent SA survivors [16], and that screening is important in individuals with reported exposure. In a study reported by Bachmann et al [12], 38% of men and women >15 years of age who had a history of oral sexual exposure and had gonococcal infection were identified with *N. gonorrhoeae* from their pharyngeal swabs only. In general, NAATs have increased sensitivity (91.9%–100%) compared with culture for gonorrhea from pharyngeal sites. However, the polymerase chain reaction (PCR) assay has a low specificity for *N. gonorrhoeae*, and should be used with caution for pharyngeal testing due to cross-contamination with commensal *Neisseria* species. Another study found that the PCR and strand-displacement amplification assays for *N. gonorrhoeae* produced the highest rate of false-negative results (14.1% and 11.1% of isolates tested, respectively), compared with other commercial NAAT assays (≤2.1% false-positives) [17].

NAATs are also significantly more sensitive than culture for rectal detection of *N. gonorrhoeae* and *C. trachomatis*. A study conducted among men and women with a history of receptive anal sex or contact with a partner with an STI reported that NAATs had sensitivities ranging from 95.5% to 100% for *N. gonorrhoeae* and *C. trachomatis* detection, compared with 71.9% and 45.7% for gonorrhea and chlamydia cultures, respectively [18]. In another study conducted among men and women ≥18 years of age who reported having had at least 1 episode of receptive anal sex, TMA was found to be superior to strand displacement amplification for the detection of *N. gonorrhoeae* and *C. trachomatis* from rectal swabs [31].

Based on the data above, NAATs for detection of *T. vaginalis* are recommended from vaginal swabs for female adult and adolescent SA survivors. NAATs for detection of pharyngeal and rectal *N. gonorrhoeae* and *C. trachomatis* infections should also be considered during the initial evaluation of adult/adolescent SA survivors who report a history of exposure or suspected extra-genital contact. Clinicians should be aware that a positive NAAT from an acute SA patient could represent infective assailant secretions rather than patient infection; in either case, follow-up to ensure complete assessment for STIs may be indicated.

**Key Question 3. Should All Sexual Assault Survivors Have Immediate Testing for HIV, Syphilis, Hepatitis B, and Hepatitis C?**

Overall, there is a low prevalence of HIV and syphilis reported among SA survivors at the initial evaluation [9, 10, 19]. However, screening for HIV infection is recommended as part of routine care for patients aged 13–64 years [20], and should be conducted along with syphilis testing as part of the initial evaluation for SA survivors. There are no new data regarding the prevalence of hepatitis B among SA patients. However, despite universal hepatitis B childhood vaccinations, the long-term duration of vaccine-induced immunity is not well known. Furthermore, waning of vaccine-induced immunity could leave SA survivors at risk for hepatitis B virus infection. Therefore, baseline hepatitis B testing is recommended (hepatitis B surface antigen, surface antibody, and core antibody), especially if post-exposure hepatitis B vaccination is provided.

Some studies have provided data regarding the sexual transmission of hepatitis C, suggesting an increased association among women with a history of multiple sexual partners, other STIs, or HIV infection [32, 33]. However, there are no studies reporting hepatitis C prevalence among SA survivors to recommend...
routine screening as part of the initial evaluation. Hepatitis C testing should be considered based on risk factors such as intravenous drug use or for persons born between 1945 and 1965 in accordance with other CDC recommendations [34].

**Key Question 4. Should Empiric Prophylactic Antimicrobial Therapy for STIs Be Recommended for Adult and Adolescent Sexual Assault Survivors, and What New Data Are Available to Guide Timing of Empiric Prophylactic Antimicrobial Therapy?**

There are no new data to guide the appropriate timing of empiric prophylactic antimicrobial therapy for SA survivors. However, empiric antimicrobial therapy targeted toward gonorrhea, chlamydia, and trichomonal infection, regardless of STI testing, continues to be recommended at the initial evaluation due to the rate of prevalent STIs and the low rate of return for follow-up visits among SA survivors. A retrospective study by Gavril et al [13] found that less than half (48.8%) of SA patients returned for a follow-up evaluation.

The recommended empiric antimicrobial regimen has been updated to include ceftriaxone 250 mg intramuscularly plus azithromycin 1 g orally, plus metronidazole or tinidazole 2 g orally in a single dose. Concerns regarding the efficacy of oral cephalosporins for treatment of gonorrhea have prompted recommendations for dual therapy with an injectable cephalosporin and a macrolide for empiric treatment of *N. gonorrhoeae*. Tinidazole as single-dose therapy has been reported as equivalent or superior to metronidazole for treatment of *T. vaginalis* in women [21]. Both drugs can increase the likelihood of vomiting when provided along with emergency contraception to women during the initial visit, and SA survivors may have recently ingested alcohol. Therefore, some experts recommend that the nitroimidazoles be provided to the patient to take at home rather than during the evaluation.

**Key Question 5. Which Adult and Adolescent Sexual Assault Survivors Should Be Offered HIV Nonoccupational Postexposure Prophylaxis?**

Use of HIV nPEP for SA survivors has been widely encouraged in the United States and other countries; however, since 2009, only a few studies have described the HIV risk assessment among SA survivors. To assist in the determination of which patients should be offered HIV nPEP, the expert committee on SA recommends that the algorithm (Figure 1) from the

![Figure 1. Algorithm for evaluation and treatment of possible human immunodeficiency virus (HIV) nonoccupational postexposure prophylaxis (nPEP).](https://academic.oup.com/cid/article-abstract/61/suppl_8/S856/345508)

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US Department of Health and Human Services Working Group on Nonoccupational Postexposure Prophylaxis be included in the CDC STD treatment guidelines [22].

Considerations in the algorithm include the timing of the exposure, the HIV status of the assailant (rarely known), HIV risk behaviors of the assailant, and the characteristics of the exposure. For SA survivors, HIV nPEP is generally recommended if the patient presents for evaluation ≤72 hours from the exposure and the assailant is known to be HIV positive. For individuals who present ≤72 hours but the HIV status of the assailant is unknown, case-by-case determination should consider the estimated per-act risk of acquisition by exposure route [22], in which receptive anal intercourse is associated with the highest risk for HIV transmission from an HIV-infected person among sexual exposures.

Griffith et al reported on the development and implementation of protocols for HIV nPEP in a Texas county hospital for female SA survivors, following key elements from the 2005 US Department of Health and Human Services guidelines [23]. The investigators noted that only 151 of 660 (22.9%) women aged 13–61 years received nPEP over a 12-month period, despite having trained faculty who assessed high-risk HIV transmission criteria and provision of monetary assistance for the medications. Of these women who received nPEP, only 41% returned for follow-up at 2, 4, 12, and 24 weeks, of which 60% reported taking at least 21 days of the prescribed course of therapy [23]. Other retrospective studies involving nPEP following high-risk exposures including SA from other countries have reported similar completion rates between 60% and 64% [24, 25].

Whether the patient is ready and willing or able to complete the nPEP regimen is an important consideration in the process of HIV nPEP evaluation. The reported adherence rates to the 28-day HIV nPEP regimen among SA survivors have been variable, and interventions to maximize these rates are greatly needed. Chacko et al [26] conducted a meta-analysis of 24 studies involving adherence to HIV nPEP with either a 2-drug or 3-drug regimen among SA survivors, and found that adherence ranged from 12% to 74% with a pooled estimate of 40.3%. The most recent study included in the meta-analysis involved SA survivors in South Africa, in which they achieved a 74% adherence rate with a 2-drug, 28-day HIV nPEP regimen by implementing a nurse-driven program in a hospital-based center in which they provided follow-up visits, medication adherence counseling, and rape counseling for the female patients [29].

Since 2013, the preferred regimen for nPEP in the United States now consists of a 3-drug regimen (i.e., tenofovir-emtricitabine and raltegravir) that has been shown to be well tolerated and to have high levels of adherence among men who have sex with men (MSM) [27, 28]. Recent CDC guidelines have also been issued regarding the use of preexposure prophylaxis (PrEP) for HIV prevention [35]. Medications given for nPEP during the first month after an assault can be converted to a PrEP regimen in SA survivors who are determined to be HIV negative and have ongoing high-risk HIV exposures.

**Key Question 6. Should Adult and Adolescent Sexual Assault Survivors Be Offered HPV Vaccination at the Initial Evaluation, Recognizing That Compliance With the 3-Dose Series May Be Suboptimal?**

Data regarding HPV infections in SA survivors have been reported from a prospective, multicenter cross-sectional study involving young girls evaluated for sexual abuse [36]. The investigators found an HPV prevalence of 11.8% overall, with a higher HPV prevalence by PCR detection associated with age ≥10 years, presence of genital warts, and evidence of sexual abuse [36]. Given this high HPV prevalence and the known consequences from infection, HPV vaccination for female SA survivors aged 9–26 years should be considered at the time of the initial examination if they have not been previously vaccinated.

The efficacy of the bivalent HPV vaccine has been reported to be 62.0% against anal HPV 16/18 DNA detection. A review of the phase 3 randomized controlled trials conducted with the quadrivalent vaccine demonstrated that HPV vaccine efficacy ranges from 45.1% to 54.8% for cervical intraepithelial neoplasia grade 2–3, 60% for adenoma in situ, and 79.5% for genital warts based on data from the intent-to-treat analyses [37]. In addition, there are data to suggest that <3 doses of the bivalent vaccine can still provide some level of protection from cervical HPV infection [38]. A study conducted among adolescent women reported that HPV vaccination was associated with fewer vaccine-type HPV infections despite incomplete vaccination and high-risk sexual behaviors [39]. Therefore, despite the challenges of initiating HPV vaccination in SA survivors who present acutely in emergency departments, there appears to be some benefit to patients even from 1-dose administration. Referral for subsequent doses of HPV vaccinations should be attempted at 1–2 months and at 6 months after the first dose (at least 24 weeks after the first dose), based on standard vaccine administration schedules. Some experts also recommend that follow-up examinations for SA survivors be considered at 1–2 months to reevaluate for development of anogenital warts, especially among those persons diagnosed with other STIs.

**Sexual Assault or Abuse of Children**

**Key Question 7. Are There New Data to Guide the Decision as to Which Prepubertal Children Being Evaluated for Sexual Abuse Should Be Tested or Presumptively Treated, and for Which Sexually Transmitted and Potential STIs?**

The prevalence of STIs and HIV infection among perpetrators and survivors of child sexual assault (CSA) should influence
decisions about testing and/or presumptive treatment in this setting. The most recent seminal study on CSA survivors aged 0–13 years from a prospective multicenter study was reported in 2009, and was previously reviewed for the 2010 CDC STD treatment guidelines [7, 40]. In this study, Girardet et al identified ≥1 STIs in 8.2% of 485 girls and no STIs in 51 boys. Key findings in the girls included: (1) a genitourinary prevalence of 3.1% for C. trachomatis (via NAATs) and 3.3% for N. gonorrhoeae, with differences among study sites consistent with geographic variations in overall gonorrhea prevalence; (2) T. vaginalis identified by WM in 5 of 85 (5.9%) symptomatic girls; (3) detectable herpes simplex virus type 2 (HSV-2) antibody in 2.5% and positive HSV-2 cultures from 5 of 12 (42%) of children with lesions; (4) a prevalence of 0.3% for syphilis by serologic testing; and (5) no cases of HIV infection [9].

A few studies published since 2009 have reported new data on prevalent STIs in children at initial CSA evaluation. For HPV, 11% of children aged 0–13 years had positive HPV PCR results but no lesions following CSA [36]. Trichomonas vaginalis was detected by either WM or culture in 4% of 10- to 17-year-old girls with “evidence of hymenal estrogenization” by Gallion, et al [41], of which only 5 of 12 had symptoms of vaginal discharge upon presentation. In another study, 14 (3.4%) of samples were positive for T. vaginalis by nested PCR, of which 6 of 14 samples came from individuals without vaginal discharge [42]. For HIV infection, Girardet et al [19] found an extremely low prevalence (0% [95% confidence interval, 0%–2%]) among children aged 0–19 years who were evaluated for SA at a large child sexual abuse referral center, despite the center’s location in a county where the background estimated HIV incidence was approximately 689–786 per 100,000 population.

Considering the data above, testing for T. vaginalis among CSA patients should not be limited to only those with a vaginal discharge, as there is some evidence to indicate that asymptomatic sexually abused children may also be infected. However, recommendations regarding testing and presumptive treatment for other STIs remain consistent with current American Academy of Pediatrics (AAP) guidelines [3]. While the AAP guidelines state that STI screening for all organisms from all sites is not recommended for asymptomatic prepubertal children, each case should be evaluated individually for STI risk in accordance with current CDC and AAP guidelines, in which the presence of the following risk factors should guide the clinician in the decision to perform STI screening: (1) history of penetration or evidence of recent or healed penetrative injury to the genitals, anus, or oropharynx; (2) abuse by a stranger; (3) abuse by a perpetrator known to be infected with an STI or at high risk of STIs (intravenous drug users, MSM, or people with multiple sexual partners); (4) sibling or other relative in the household with an STI; (5) residence in an area with a high rate of STI in the community; (6) signs or symptoms of STIs; or (7) already diagnosed with 1 STI (and therefore should be screened for other STIs). Additionally, clinicians should consider the patient’s and family’s need for reassurance that STIs were not transmitted. If STI screening is performed, specimens should be retained for additional testing or confirmation, because the identification of an STI in a child has forensic implications and STI testing results (particularly NAATs in children) can be challenged. Presumptive treatment for asymptomatic children who have been sexually assaulted is not routinely recommended, although concern from the child or parent/guardian may influence decisions to treat or not to treat in individuals once specimens are obtained for diagnostic purposes.

In the absence of major changes to the evidence base for HIV prevalence in CSA survivors or perpetrators, HIV testing and nPEP should remain individualized to the circumstances surrounding each particular assault, taking into account multiple considerations including family wishes, local epidemiology, evaluation of assault circumstances that might affect risk for HIV transmission (eg, mucosal trauma), and likelihood of adherence to prophylaxis. If HIV nPEP is being considered for a CSA patient, involvement of a specialist in treating HIV-infected children is advised.

Key Question 8. Can We Use NAATs and if so, on What Types of Specimens, to Detect C. trachomatis, N. gonorrhoeae, and T. vaginalis in Children Being Evaluated for Suspected Sexual Abuse?

Although cultures for detection of C. trachomatis and N. gonorrhoeae continue to be recommended if STI testing is performed among CSA patients, the major change in this area is the acceptance of NAATs for identification of these infections primarily from urine samples. This shift in clinical practice in many CSA referral centers stems from the increased acceptability of urine as compared to swab specimen collection from CSA patients, as well as the difficulty in accessing culture methods, particularly for C. trachomatis. For extragenital STI testing, there are insufficient data to support use of NAATs in CSA survivors, and concerns have been raised regarding certain NAAT platforms that cross-react and detect nongonococcal Neisseria species and other commensal organisms.

There are also insufficient data to recommend use of commercially available NAATs for T. vaginalis detection in prepubertal children. Bandea et al [42] performed T. vaginalis testing on 406 urine samples obtained from children aged 0–13 years who underwent CSA evaluation in a multicenter study originally conducted by Black et al [43], and found that 14 (3.4%) were positive for T. vaginalis by nested PCR assays. However, among a subset of 85 girls with vaginal discharge who also had WM testing in this study, discrepant results were shown among the girls who were identified with T. vaginalis infection by WM and PCR vs the TMA method [42]. The study design did not permit
direct comparison of detection methods, so although NAAT may improve detection of *T. vaginalis* compared with WM and culture in CSA patients who have vaginal discharge, *T. vaginalis* NAAT methods are not currently recommended for screening in prepubertal children.

**Key Question 9. Are There New Data to Influence Recommendations on Timing of Follow-up Examinations for CSA Survivors?**

Gavril et al conducted a retrospective chart review of 727 CSA patients who had initial and follow-up examinations, of whom 317 (44%) were <12 years of age [13]. The investigators found that follow-up examinations averaging about 1 month after the initial exam changed the interpretation of trauma likelihood or identified STIs in approximately one-fourth of patients. However, Gavril et al [13] acknowledged that the study group differed from patients who did not have follow-up exams, in that the latter were more likely to be uncooperative with the initial exam and to have normal findings. Considering these study limitations and that the majority of study patients were ≥12 years of age, no changes were made to the current recommendations regarding the timing of follow-up examinations at approximately 6 weeks, 3 months, and 6 months to allow time for examination findings or antibodies to infectious agents to develop.

**Key Question 10. Should CSA Survivors Be Offered HPV Vaccination Upon Evaluation, if Age-Indicated?**

A prospective, multicenter cross-sectional study conducted among children aged 0–13 years evaluated for sexual abuse found a high genital HPV prevalence of 14% among children with definite/probable/possible CSA vs only 1% in those with no evidence of CSA [36]. In the study conducted by Gavril et al [13], described above, 34 patients were diagnosed with genital warts during the follow-up examination. These studies suggest that CSA survivors are at higher risk for HPV acquisition and may develop genital warts; therefore, they may benefit from early HPV vaccination.

In accordance with the Advisory Committee on Immunization Practices (ACIP), HPV vaccination of CSA patients aged ≥9 years who have not initiated or completed immunization is recommended at the initial evaluation. A retrospective review of patients aged 2 months–17 years from a single CSA referral center revealed that 26% had a medical or psychiatric diagnosis that “warranted intervention at time of referral” [44]. One implication of these findings is that these patients may not be getting their clinical needs met elsewhere, and that routine primary care (eg, routine HPV vaccination) may be underutilized. Furthermore, a review of prospective and retrospective studies found that CSA survivors are at higher risk for future unsafe sexual practices such as having multiple sex partners [45]. Lastly, immunogenicity data exist in children demonstrating that <3 doses of the quadrivalent vaccine or 3 doses provided on a nonstandard US schedule can still provide protective immunity [27,46].

Therefore, because CSA survivors are a high-risk group for future unsafe sexual practices that have been linked to increased risk of HPV acquisition, and are more likely to engage in these behaviors at an earlier age, HPV vaccination for CSA survivors aged 9–26 years for females and aged 9–21 years for males is recommended in accordance with ACIP guidelines. Although HPV vaccines will not protect against progression of infection already acquired or promote clearance of the infection, they would provide protection against vaccine types not yet acquired.

**RESEARCH PRIORITIES**

Many critical questions remain unanswered regarding the prevalence, detection, and management of STI/HIV infections among adult and adolescent SA survivors and CSA patients. Research priorities for adult and adolescent SA survivors include (1) the risk of acquiring viral STIs (eg, HIV, HPV, HSV) based on newer diagnostic tests and consideration of the optimal screening time; (2) the risk and prevalence of STIs among male SA survivors (ie, MSM); (3) the prevalence of hepatitis C infections; (4) the performance of point-of-care tests for STI/HIV screening at the initial evaluation (ie, rapid PCR tests for gonorrhea and chlamydia; rapid *T. vaginalis* antigen test); and (5) future interventions to increase adherence and follow-up with HIV nPEP. For CSA patients, research priorities include (1) the optimal methodologies for detecting STIs at different sites (ie, pharyngeal, genital, rectal); and (2) the diagnostic utility of NAATs to detect STIs, specifically *N. gonorrhoeae*, *C. trachomatis*, T. vaginalis, HSV type 1 (HSV-1), and HSV-2.

**CONCLUSIONS**

Based on the literature review and expert guidance process for the 2015 CDC STD treatment guidelines, new recommendations for STI management among adult and adolescent SA survivors include the use of NAATs for detection of *T. vaginalis* by vaginal swabs and NAATs for detection of *N. gonorrhoeae* and *C. trachomatis* from pharyngeal and rectal specimens as indicated; empiric therapy for gonorrhea, chlamydia, and trichomoniasis based on updated treatment regimens; HPV vaccinations for previously unvaccinated patients aged 9–26 years; and HIV nPEP and PrEP assessments. Recommendations regarding STI management in CSA survivors remain centered around focused diagnostic testing with increased use of NAATs when appropriate, acceptable, and feasible; routine follow-up visits within 6 months after the last known sexual abuse; and use of HPV vaccination in accordance with ACIP guidelines as a preventive measure in the post–sexual assault care setting.
Supplementary Data

Supplementary materials are available at Clinical Infectious Diseases online (http://cid.oxfordjournals.org). Supplementary materials consist of data provided by the authors that are published to benefit the reader. The posted materials are not copyrighted. The contents of all supplementary data are the sole responsibility of the authors. Questions or messages regarding errors should be addressed to the author.

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