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Disparities in the Provision of Sexually Transmitted Disease and Pregnancy Testing and Prophylaxis for Sexually Assaulted Women in Rhode Island Emergency Departments

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Abstract

Objectives—To determine how often sexually assaulted adult female emergency department (ED) patients are being offered testing and prophylaxis for sexually transmitted diseases (STDs) and pregnancy and identify factors associated with the offering of tests and prophylaxis.

Methods—This is a retrospective study of ED visits for adult female sexual assault in all Rhode Island EDs from January 1995 through June 2001. The percentage of patients offered testing and prophylaxis was calculated. Multivariable logistic regression was used to identify factors related to testing and prophylaxis use for women sustaining an anal/vaginal assault.

Results—Of the 780 patients, 78.2% sustained anal/vaginal penetration, 5.0% genital touching only, and 3.7% oral sex only, and 13.1% did not know what happened to them. Of those women anal/vaginally assaulted, 83.8% were offered chlamydia/gonorrhea testing, 69.4% syphilis testing, 82.9% pregnancy testing, 77.0% chlamydia/gonorrhea prophylaxis, 47.6% emergency contraception, and 19.2% HIV prophylaxis. In multivariable logistic regression models, patients evaluated at the state's women's hospital instead of academic or community hospitals and those who sustained anal/vaginal assault instead of other assaults had a greater odds of being offered testing and prophylaxis. In some cases, older women were offered testing and prophylaxis less often than younger women.

Conclusions—Testing and prophylaxis for chlamydia/gonorrhea were used much more often than prophylaxis for emergency contraception and HIV, even for patients who were anal/vaginally assaulted. Disparities in testing and prophylaxis exist by type of hospital and, in some cases, by age. Educational campaigns should be instituted to ensure that all women receive adequate testing and prophylaxis commensurate with the exposure they sustained from a sexual assault.

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DISCLOSURE STATEMENT

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INTRODUCTION

According to the U.S. Federal Bureau of Investigation (FBI), there were 93,934 forcible rapes reported to law enforcement officials during 2005, which constituted approximately 62.5 reported forcible rapes per 100,000 females of all ages in the United States.¹ However, according to a study by Rennison,² only 36% of completed rapes, 34% of attempted rapes, and 26% of other sexual assaults perpetrated on females aged ≥ 12 years in the United States are reported to the police. Two national surveys have canvassed U.S. females directly to determine the frequency of reported and unreported sexual assaults. Using data from the National Violence Against Women Survey, Tjaden and Thoennes³ estimated that 876,000 women sustain attempted or completed rape each year in the United States. Using data from the National Crime Victimization Study, Catalano⁴ estimated that 160 per 100,000 females aged ≥ 12 were sexually assaulted/raped in 2004. Unfortunately, these estimates do not account for all types of sexual violence against females in the United States, so the extent of the problem is even larger than reported in these studies.

Emergency departments (EDs) frequently play a vital role in the initial evaluation and treatment of women seeking medical care after sexual assault. Using data from the National Electronic Injury Surveillance System, Saltzman et al.⁵ estimated that there were 128,243 visits to U.S. EDs by females for sexual assault in 2001, which represented 43.9 visits for sexual assault per 100,000 females of all ages in the United States.⁵ Given that only an estimated 31% of women seek follow-up after their initial medical evaluation,⁶ it is essential that ED clinicians optimize the opportunity to offer in the ED the appropriate tests and prophylaxis for the exposures, infections, and clinical conditions associated with sexual assault.

The Centers for Disease Control and Prevention (CDC) has established national guidelines for the United States on testing and prophylaxis for sexually transmitted diseases (STDs) and pregnancy after sexual assault.⁷⁻¹⁰ Since 1993, the CDC has recommended testing at the initial evaluation after a sexual assault for chlamydia, gonorrhea, microbiological causes of vaginosis, and pregnancy. Testing at the initial evaluation for hepatitis B, HIV, and syphilis has been recommended since 1998 and at follow-up since 1993. Prophylaxis for chlamydia, gonorrhea, hepatitis B, trichomonas, and bacterial vaginosis has been recommended since 1993. HIV postexposure prophylaxis (PEP) has been discussed in the guidelines as an optional treatment since 1998. Emergency contraception was first briefly mentioned in the 2002 guidelines but was recommended in the 2006 guidelines.

Reviews of the National Hospital Ambulatory Medical Care Survey (NHAMCS) indicate that most patients evaluated in the ED after sexual assault are not receiving treatment in accordance with these guidelines. Amey et al.¹¹ observed that of sexually assaulted women aged ≥ 18 years in the 1992–1998 NHAMCS database, only 49% were tested or received prophylaxis for some type of STD, yet none received all the CDC-recommended antibiotics for STD prophylaxis. Only 20% of women able to become pregnant received emergency contraception. Rovi and Shimoni¹² also examined the NHAMCS database and found that no patients had received the full CDC-recommended antibiotic regimens from 1994 through 1999 and that 24.8% of females ≥ 12 years old received chlamydia/gonorrhea prophylaxis.

The NHAMCS database is a complex national sample of ED visits that does not allow for a state-level assessment of the adequacy of treatment after sexual assault. In addition, given the recent debut of HIV PEP, this type of prophylaxis could not be adequately examined previously in NHAMCS-based studies.^{11,12} An examination of the ED medical treatment of sexual assault survivors on a state level would be more informative for local ED and public health officials. This examination would allow critical review and response of ED treatment

of sexual assault survivors in their locales. In addition, identifying factors that could not be studied using NHAMCS data but that are associated with receipt of proper medical services might help pinpoint disparities in the delivery of medical care and suggest areas of improvement for these services.

In light of CDC guidelines on this topic, we aimed to evaluate the adequacy of chlamydia/gonorrhea, syphilis, and pregnancy testing and chlamydia/gonorrhea, pregnancy, and HIV prophylaxis offered to adult female patients coming to all civilian Rhode Island EDs for medical evaluation after a sexual assault. We examined the proportion of patients who were offered and the proportion of patients who accepted testing and prophylaxis when it was offered. We compared how often each type of test and prophylaxis was offered compared with other tests and prophylaxes. We were curious if ED clinicians were favoring certain tests and prophylaxes even when they were recommended on equal terms in the CDC STD guidelines on sexual assault treatment. We thought this distinction was particularly important for emergency contraception and HIV PEP, as they are newer modalities in the treatment of sexually assaulted patients.

We further investigated whether type of assault, type of hospital, age of the sexual assault survivor, time elapsed from the assault to ED presentation, and the year of their assault and ED evaluation were associated with a patient's being offered testing and prophylaxis. We were particularly interested in factors associated with how tests and prophylaxis were being offered that were not based on the clinical characteristics of the assault—namely, the type of hospital where the patient was evaluated, the survivor's age, and the year of the assault. Any uncovered disparities in the offering of testing and prophylaxis along nonclinical lines would highlight opportunities for improvement in the provision of medical care in EDs after sexual assault.

MATERIALS AND METHODS

We searched for all adult female patients who visited the 11 civilian EDs in Rhode Island serving adult patients for medical evaluation and treatment following sexual assault during the 6.5-year period of January 1995 through June 2001. This period was chosen because it was prior to the 2002 release of state guidelines on nonoccupational HIV PEP and before the 2002 updated CDC STD guidelines on testing and prophylaxis after sexual assault.^{7,13} All 11 hospitals' institutional review boards approved the study.

The 11 EDs include the state's women's health-care specialty teaching hospital, five general academic hospitals (affiliated with a medical school and sponsor undergraduate and graduate medical education programs), and five community (nonteaching) general hospitals. The state's women's specialty hospital manages care for the majority of adult female sexual assault survivors in the state and is the referral hospital for follow-up of sexual assault evaluations in the outpatient setting. Sexual assault patients coming to academic hospitals are typically evaluated by resident physicians. Patients at the community hospitals are usually evaluated by attending ED physicians. At the time of this study, there was no Sexual Assault Nurse Examiner (SANE) program in the state. SANEs undergo rigorous specialized training in the evaluation and treatment of sexual assault survivors; they conduct forensic sexual assault evaluations and coordinate the care and follow-up received by these patients.

Hospital and ED billing databases from each of these hospitals were searched using *International Classification of Disease*, 9th Revision, (ICD-9)¹⁴ codes to identify ED visits for sexual assault. These codes were 995.83 (adult sexual abuse), E.960.1 (rape), V15.41 (rape), and V71.5 (observation following rape). Three EDs had separate ED provider and

hospital billing databases. These separate billing databases were searched independently to maximize capture of patient visits.

We searched for medical records of all patient visits identified by the ICD-9 code-directed database query. Each medical record was reviewed; those visits that were for a female adult sexual assault were included in the study. For these visits, the age of the patient, type of sexual assault (genital touching only, oral contact only, anal/vaginal penetration, or unclear/unknown contact), HIV status of the assailant, type of hospital (women's specialty, general academic, or general community hospital), year of sexual assault, hours elapsed from time of sexual assault to ED presentation, and type of testing (chlamydia/gonorrhea, syphilis, and pregnancy) and prophylaxis (chlamydia/gonorrhea, emergency contraception, and HIV) were recorded on a standardized form. Patients who were offered any of the CDC-recommended medications as prophylaxis against chlamydia/gonorrhea were designated as having been offered chlamydia/gonorrhea prophylaxis.

The data forms were entered into an Epi Info 2002 (CDC, Atlanta, GA) database created by the primary investigator. Two trained research assistants independently entered every form, then performed a data comparison analysis to verify that all forms were entered correctly. Incorrect entries were corrected, and subsequent analyses were performed on this verified database. The database was transferred for statistical analysis to STATA 8.2 (Stata Corporation, College Station, TX) using StatTransfer v6 (Circle Systems, Seattle, WA).

Statistical analysis included calculating summary statistics of the demographic characteristics of the sexual assault survivors and details of the type of sexual assault, HIV status of their assailant, type of hospital where they were evaluated, year of their assault, and hours elapsed from the assault to their ED presentation. The percentage of patients offered each type of test and prophylaxis was calculated; the percentage of patients who accepted each type of test and prophylaxis when it was offered was also calculated. Two-sample tests of binomial proportions were used to compare the proportions of patients offered each type of test and prophylaxis. Risk ratios (RRs) with corresponding 95% confidence intervals (CIs) were estimated to determine the relative risk of patients' being offered a given test or prophylaxis compared with the other tests and prophylaxes. Differences were considered statistically significant at the $\alpha = 0.05$ level.

The percentage of patients offered each type of test and prophylaxis was calculated as stratified by five factors: type of sexual assault (anal/vaginal, unclear/unknown, other), type of hospital (women's, community, or academic), age group, hours elapsed from time of assault to ED presentation, and year of assault. Patient age was partitioned using 5-year age groups for the younger age groups. Patients in the database ≥ 45 years old were grouped together, given the small numbers in this category. Pearson's chi-square test was used to assess whether or not these five factors were associated with patients' being offered each type of test and prophylaxis. Multivariable logistic regression models were created that assessed the relative association of these five factors of interest with the offering of each test and prophylaxis. Odds ratios (ORs) with corresponding 95% CIs were estimated.

RESULTS

ICD-9 code search results

The ICD-9 code search revealed 1010 potential ED visits for sexual assault. For these ED visits, 97.2% of the medical records were available for review, and 796 (81.0%) of these were verified as visits for adult female sexual assault. The rest included visits that were not for sexual assault and, therefore, constituted mistakes in ICD-9 coding. Of the 796 visits, 16 were not included in this analysis because the medical record did not contain details of the

sexual assault and the ED evaluation. As a result, there were 780 adult females who went to EDs for evaluation of a sexual assault within the study period and who were included in this analysis.

Demographics and ED evaluations for sexual assault

Of the 780 adult female sexual assault survivors, the median age was 25 (range 18–95); 75% were age ≤ 35 (Table 1). The majority sustained an assault involving penile-vaginal and/or anal penetration (78.2%), were evaluated at the state's women's hospital (63.2%), were exposed to assailants of unknown HIV status (99.9%), and were evaluated within 24 hours of their sexual assault (53.3%). The number of patients evaluated for sexual assault was similar each year.

Offering and acceptance of testing and prophylaxis

Table 2 provides the percentage of all patients offered testing and prophylaxis after their sexual assault. Patients were excluded from this analysis if they left before completion of their evaluation or treatment ($n = 10$) and, therefore, could not be offered a given test or prophylaxis. In addition, for pregnancy testing and emergency contraception, patients were excluded if they were already pregnant ($n = 8$) or likely to be physically incapable of being pregnant because of hysterectomy, bilateral tubal ligation, or being ≥ 55 years ($n = 32$). For emergency contraception, an additional 11 patients were excluded because they tested positive for pregnancy during their ED evaluation.

Among all patients evaluated for sexual assault, offering of tests and prophylaxes varied by type of test and prophylaxis. The percentage of patients offered syphilis testing was significantly less than the percentage offered chlamydia/gonorrhea (81.0% vs. 66.8%, $p \leq 0.00$) and pregnancy testing (80.9% vs. 66.8%, $p \leq 0.00$). Pregnancy testing was offered just as often as chlamydia/gonorrhea testing for all patients (80.9% vs. 81.0%, $p \leq 0.96$). The percentage of patients offered HIV PEP was less than the percentage offered emergency contraception (19.7% vs. 44.9%, $p \leq 0.00$) and STD prophylaxis (19.7% vs. 71.9%, $p \leq 0.00$). Emergency contraception was offered less often than chlamydia/gonorrhea prophylaxis (44.9% vs. 71.9%, $p \leq 0.00$). Patients had an RR 1.21 (1.14–1.29) greater risk of being offered testing for chlamydia/gonorrhea than syphilis, an RR 1.21 (1.14–1.28) greater risk of being offered testing for pregnancy than syphilis, and a similar risk of being offered chlamydia/gonorrhea and pregnancy testing (RR 1.00 (0.95–1.05)). Patients had an RR 1.60 (1.46–1.76) greater risk of being offered chlamydia/gonorrhea prophylaxis than emergency contraception, an RR 3.65 (3.15–4.24) greater risk of being offered chlamydia/gonorrhea prophylaxis than HIV PEP, and an RR 2.28 (1.93–2.69) greater risk of being offered emergency contraception than HIV PEP.

Of the 722 patients in the study of childbearing age and capacity who were not pregnant, 56.9% were offered testing for chlamydia/gonorrhea, syphilis, and pregnancy; 15.0% were offered prophylaxis against chlamydia/gonorrhea, pregnancy, and HIV; and 10.8% were offered all tests and prophylaxes. Among the 566 women whose sexual assault involved anal/vaginal penetration and were of childbearing age and capacity and were not pregnant, 59.5% were offered testing for chlamydia/gonorrhea, syphilis, and pregnancy; 14.5% were offered prophylaxis against chlamydia/gonorrhea, pregnancy, and HIV; and 10.4% were offered all tests and prophylaxes.

Except for HIV PEP, almost all patients accepted the test or prophylaxis offered to them (Table 2). For HIV PEP, 152 patients were offered prophylaxis, and only 35 patients accepted it; 5 more patients were considered by the ED clinicians to have exposures of low/no risk for HIV. In addition, 3 patients were already known to be HIV infected, 4 were not

given HIV PEP because the examining clinician believed they arrived too long after their assault, and 1 “did not qualify” according to the examining clinician.

Comparison of factors potentially associated with offering of tests and prophylaxis after sexual assault

Table 2 also shows the percentage of patients offered testing and prophylaxis as stratified by five factors: age of the sexual assault survivor, assault type, hospital type, year of assault, and hours elapsed since the assault. Also shown are the results of the Pearson’s chi-square tests that examined the potential association of each of the five factors with the offering of testing and prophylaxis. Type of assault and hospital were associated with offering of each type of test or prophylaxis. The percentage of patients offered tests and prophylaxis was greater for patients anal/vaginally penetrated or whose type of sexual contact was unclear or unknown than for patients whose sexual assault involved genital touching or oral contact only. The percentage of patients offered testing and prophylaxis at the state’s women’s hospital was greater than those at other hospitals.

Younger age was associated with greater offering of chlamydia/gonorrhea prophylaxis and emergency contraception. Year of assault was related to offering of syphilis testing and all three types of prophylaxis. Offering of syphilis testing appeared to decrease over the study period, whereas offering of prophylaxis increased. There was no relationship between the hours elapsed since assault for chlamydia/gonorrhea, syphilis, and pregnancy testing or for chlamydia/gonorrhea or HIV prophylaxis. Offering of emergency contraception was less for patients who sought evaluation more than 72 hours after their assault. No patients who presented beyond 120 hours of their assault were offered emergency contraception. The percentage of patients who went to the ED within 72 hours (44.9%) and between 73 and 120 hours (44.6%) of their assault was the same (data not shown).

Table 3 displays the results of the multivariable logistic regression analysis that evaluated the relative importance of the five factors in regard to offering of testing and prophylaxis. Women who went to the state’s women’s hospital ED had a greater odds of being offered all types of testing and prophylaxis after sexual assault than women who went to both community and teaching hospital EDs throughout Rhode Island. Compared with women whose assault involved only oral sex or genital touching, women who sustained anal/vaginal penetration during their assault had a greater odds of being offered all types of testing and prophylaxis, except for HIV PEP. Women whose sexual assault circumstances were unknown or unclear had a greater odds of being offered pregnancy testing, chlamydia/gonorrhea prophylaxis, and emergency contraception but not other types of testing and prophylaxis.

There were some relationships between age of assault survivor and offering of testing and prophylaxis. In comparison to the youngest age group, women 30–34 and 40–44 years old were less likely to be offered testing for chlamydia/gonorrhea, and women between 35 and 39 years old were more likely to be offered testing for syphilis. Older women were less likely to be offered chlamydia/gonorrhea prophylaxis (aged ≥ 40) and emergency contraception (aged 35–44 years) prophylaxis compared with younger women.

For year of assault, there was a clear trend of greater offering of HIV PEP over the years of the study, as shown by the increasing odds ratios. However, the odds ratios were not stable estimates because of the small number of times HIV PEP was offered each year, particularly in 1995. Chlamydia/gonorrhea prophylaxis and emergency contraception appeared to be offered more frequently in the latter years of the study as well. Time elapsed from the sexual assault to ED presentation was associated with offering of emergency contraception and HIV PEP when the time elapsed was >72 hours; that is, there was greater offering of these

types of prophylaxes when a patient appeared within rather than after 72 hours of their assault.

DISCUSSION

Our findings demonstrate that offering of testing and prophylaxis after sexual assault in Rhode Island EDs varies according to several factors, some of which are perhaps justified on clinical grounds and by variations in the CDC STD treatment guidelines over the study period. Women who sustained vaginal/anal penetration during their assault or who could not recall the circumstances of their assault were more likely to be offered testing and prophylaxis than women who sustained other types of sexual assaults. This would be expected for vaginal/anal assaults, as they represent the highest risk for STDs, pregnancy, and HIV. For patients whose assault was not recalled or unknown to them, however, it appears that the clinicians' rationale was to offer testing and prophylaxis in a manner that mirrors offering to the known highest risk group. Research should concentrate on whether or not clinicians should follow the approach taken by these clinicians, and future guidelines should specifically address how to manage patients with this type of assault.

Nearly all women who were offered testing and prophylaxis accepted it, except for HIV PEP. This finding suggests that failure of patients to undergo testing and receive prophylaxis in most cases is in the realm of the prescribing clinician and not the patient. Patient naiveté toward their exposure risk, lack of belief in or understanding of the effectiveness of HIV PEP, unwillingness to comply with follow-up, the complexity of the drug regimen, and the long duration of the prophylaxis could explain lower acceptance by patients for HIV PEP. In addition, clinicians could have offered HIV PEP to these patients but recommended against their using it.

Compliance with CDC guidelines on the offering of testing and prophylaxis was not optimal overall, even for patients who were anal/vaginally penetrated as part of their sexual assault. As demonstrated by the previously described NHAMCS database studies, suboptimal use of testing and prophylaxis occurs frequently for these patients on a national level across the United States.^{11,12} On a local level, Riggs et al.¹⁵ described in a prospective study the medical evaluations received by sexual assault survivors from 1992 to 1995 at the Denver Health Medical Center ED. These authors report that 60% of all female sexual assault survivors received emergency contraception, and 88% agreed to receive "antibiotic prophylaxis for sexually transmitted diseases" (not specified). The relatively higher use compared with our study finding reflects this ED's effort during their study to improve the treatment rendered for patients. In regard to HIV PEP, Linden et al.¹⁶ reported the efforts at Boston Medical Center during 1999–2002 to implement this type of prophylaxis for sexual assault survivors who sustained unprotected anal/vaginal intercourse. HIV PEP was offered to 49%, and 92% of these accepted it. Of note, 31% of patients presumably eligible for HIV PEP were not offered prophylaxis. Our study and these studies indicate that efforts to improve the use of testing and prophylaxis for sexually assaulted ED patients are still needed.

Our study findings indicate that the various tests and prophylaxes were not offered on an equal basis, even when clearly recommended by the CDC. Testing for syphilis was offered for less than two thirds of anal/vaginally assaulted patients and was offered less often than testing for chlamydia/gonorrhea and pregnancy. Changes over the study period in the guidelines of when the test was recommended—at the initial evaluation vs. at follow-up—did not appear to be the source of lower offering of this test compared with other tests. It is a concern that syphilis testing appeared to decrease over time. ED clinicians should become aware, however, that syphilis testing is a recommended test at the initial evaluation after a

sexual assault. It is unclear why this test was favored less than the other tests. Future research and educational campaigns might help elucidate why syphilis testing is being used less often than recommended.

Emergency contraception was offered at a lower level than was indicated for these patients and demonstrates that more work needs to be done to ensure that patients at risk of pregnancy are offered pregnancy prophylaxis. On the other hand, even though the CDC STD treatment guidelines did not mention emergency contraception as an option until 2002, ED clinicians were offering it. These clinicians were clearly following other recommendations regarding this type of prophylaxis. It appears that its use even increased over the study period despite the lack of CDC guidance on this topic. It is well known that emergency contraception is more effective when administered sooner rather than later after unprotected sexual intercourse, although the CDC STD treatment guidelines do not provide a time frame for when it can be used.¹⁷ Accordingly, it is reassuring and not surprising that ED clinicians were more apt to offer emergency contraception for patients who sought medical assistance within 72 hours of their assault. It is interesting to observe that offering of emergency contraception extends to 120 hours in ED practice, which is in accord with studies showing the effectiveness of this type of prophylaxis even when used later after sexual intercourse.^{18,19}

The utility of HIV PEP in sexual assault survivors is less well established than that of other types of prophylaxis and could account for the low offering of this prophylactic treatment. Further, the CDC STD guidelines on sexual assault do not specifically recommend this type of prophylaxis and only briefly addressed it in their guidelines during the study period. Nevertheless, ED clinicians appropriately favored giving HIV PEP to patients who appeared within 72 hours compared with those who came later. Even more apparent than for emergency contraception is the trend for more offering of HIV PEP in the latter years of the study, which suggests greater dissemination of recommendations on this topic from other sources.

There were some disparities in how testing and prophylaxis were offered to patients that are not accounted for by variations over time in the CDC STD guidelines on sexual assault or by differences in clinical presentation. Prophylaxis for chlamydia/gonorrhea increased over time for reasons that are unclear, given that the recommendations for prophylaxis did not change during the study period. Perhaps, educational campaigns or hospital protocols were successful on this measure. Women going to the state's women's hospital for evaluation after a sexual assault were much more likely to receive testing and prophylaxis than were those evaluated at either community or academic hospital EDs. This discrepancy could be because the staff working at the women's hospital are more accustomed to dealing with every aspect of the evaluation—from evidence collection to offering testing and prophylaxis and arranging follow-up—given the high volume of adult female sexual assault patients evaluated and treated at this facility. It is possible that community and academic EDs are not as accustomed to evaluating the sexually assaulted female patient, and this is manifested in the observed results. There were few differences between academic and community hospitals, and lack of testing and prophylaxis appears to be a consistent problem and should be addressed in educational campaigns for ED clinicians across all types of hospitals. It is unclear why certain older patients received testing and prophylaxis less often than younger patients. There were no indications that these patients had a reduced risk of infection or pregnancy. Clinicians should be mindful that potential biases exist in initiating testing and prophylaxis for these patients.

Limitations

The study has a number of limitations. First, ICD-9 code searches for medical records are limited in that they rely on diagnoses rendered by the clinician, the assignment of ICD-9 codes to the diagnosis, and the entry of codes into the databases. Sexual assault visits that were not diagnosed as or not coded as sexual assaults or incorrectly entered into the databases would not have been identified through our search methods. However, it is unlikely that missing cases would significantly affect the determination of the percentage of patients offered or accepting testing and prophylaxis or the association between the factors evaluated in the study and offering of testing and prophylaxis. It is not likely that missing cases would have been more or less likely to have been offered testing and prophylaxis or have a different distribution of the factors evaluated in the study. Second, because of the retrospective nature of the study, we were unable to assess other factors that might have influenced the use of testing and prophylaxis that were not reported or were poorly recorded in the medical records. Furthermore, sample sizes restricted by this type of data collection might have limited the ability to discern differences between groups or effects when they exist. Given the size of the sample collected, however, it is likely that we were able to discern important differences when they were present.

Third, observations on this topic made in Rhode Island may not be applicable to EDs in other states, particularly those with SANE programs. However, unless ED clinician offering of testing and prophylaxis varies significantly across states, we believe our overall findings are informative to other locales. Fourth, even if ED clinician offering of testing and prophylaxis does not vary, the demography of patients going to EDs does vary across states. As a result, our findings might not be applicable to areas with a different demographic composition. Fifth, limited use of HIV PEP created large CIs for the examination of HIV PEP offering over time; as a result, the estimated ORs are not precise. However, the trend for increasing offering over time appears to be valid. Sixth, our study findings might not reflect current ED practices. Future studies should continue to examine if there is an improvement in ED offering of testing and prophylaxis.

CONCLUSIONS

Women who sustained vaginal/anal penetration during their assault or who could not recall the circumstances of their assault were more likely to be offered testing and prophylaxis than women who sustained other types of sexual assaults. Nearly all women who were offered testing and prophylaxis accepted it, which suggests that failure of testing and prophylaxis lies with the prescribing clinician and not the patient. Although testing and prophylaxis for chlamydia/gonorrhea was high, testing for syphilis occurred less often, despite the existence of CDC guidelines on this topic. Most patients did not receive prophylaxis for emergency contraception and HIV even when the type of exposure, anal/vaginal assault, could potentially result in pregnancy or an HIV infection. Women going to the state's women's hospital for evaluation after a sexual assault were much more likely to receive testing and prophylaxis than were those evaluated at either community or academic hospital EDs. Older women might not be offered testing and prophylaxis as much as younger women. These disparities across healthcare facilities and by age indicate that educational initiatives are needed to standardize testing and prophylaxis for sexually assaulted women.

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Table 1**Adult Female Sexual Assault ED Evaluations**

	%
Age of assault survivor (<i>n</i> = 780)	
18–24	47.4
25–29	14.1
30–34	13.5
35–39	12.4
40–44	6.8
45–95	5.8
Assault type	
Genital touching only	5.0
Unclear/unknown	13.1
Oral only	3.7
Vaginal/anal penetration	78.2
HIV status of assailant	
Unknown HIV status	99.9
HIV infected	0.1
Hospital type	
Women's hospital	63.2
Academic	11.9
Community	24.9
Year of assault	
1995	12.4
1996	13.8
1997	15.8
1998	15.0
1999	18.1
2000	17.1
2001 ^a	7.8
Hours since assault (<i>n</i> = 752)	
<24	53.3
25–48	27.7
49–72	10.0
>72	9.0

^aJanuary–June 2001.

Table 2

Offering and Acceptance of Testing and Prophylaxis after Sexual Assault

	Percentage of patients offered testing by type of test			Percentage of patients offered prophylaxis by type of prophylaxis			
	Chlamydia/ gonorrhea (n = 772)	Syphilis (n = 772)	Pregnancy (n = 772)	Chlamydia/ gonorrhea (n = 772)	Emergency contraception (n = 711)	HIV post-exposure prophylaxis (n = 772)	
Percentage of patients offered testing or prophylaxis	81.0%	66.8%	80.9%	71.9%	44.9%	19.7%	
Percentage of patients accepting testing or prophylaxis when offered	98.7%	97.5%	98.2%	99.8%	99.7%	23.0%	
Factors potentially associated with offering of testing and prophylaxis	%	%	%	%	%	%	%
Age of assault survivor							
18-24	84.4	66.9	81.4	76.5	51.4	23.2	
25-29	79.1	60.0	83.7	69.1	40.6	18.2	
30-34	76.7	66.0	82.3	68.9	44.2	14.6	
35-39	78.9	72.6	83.2	72.6	32.6	16.8	
40-44	73.6	73.6	68.0	66.0	32.7	17.0	
45-95	80.0	64.4	73.9	53.3	39.1	15.6	
Age chi-square <i>p</i> value ^a	<i>p</i> ≤ 0.26	<i>p</i> ≤ 0.42	<i>p</i> ≤ 0.21	<i>p</i> ≤ 0.02	<i>p</i> ≤ 0.01	<i>p</i> ≤ 0.31	
Assault type							
Genital touching only	57.9	50.0	58.3	26.3	13.9	7.9	
Unclear/unknown	78.0	66.0	85.3	69.0	51.6	30.0	
Oral only	62.1	37.9	52.0	34.5	20.0	10.3	
Vaginal/anal penetration	83.8	69.4	82.9	77.0	46.8	19.2	
Assault type chi-square <i>p</i> value ^a	<i>p</i> ≤ 0.00	<i>p</i> ≤ 0.00	<i>p</i> ≤ 0.00	<i>p</i> ≤ 0.00	<i>p</i> ≤ 0.00	<i>p</i> ≤ 0.01	
Hospital type							
Women's hospital	88.1	85.9	88.7	82.0	54.4	27.2	
Academic	65.6	30.1	75.6	58.1	38.2	14.0	
Community	70.0	35.8	64.1	52.6	24.6	3.2	
Hospital type chi-square <i>p</i> value ^a	<i>p</i> ≤ 0.00	<i>p</i> ≤ 0.00	<i>p</i> ≤ 0.00	<i>p</i> ≤ 0.00	<i>p</i> ≤ 0.00	<i>p</i> ≤ 0.00	
Year of assault							
1995	88.5	70.8	82.0	67.7	43.5	1.0	

	Percentage of patients offered testing by type of test			Percentage of patients offered prophylaxis by type of prophylaxis		
	Chlamydia/ gonorrhea (<i>n</i> = 772)	Syphilis (<i>n</i> = 772)	Pregnancy (<i>n</i> = 772)	Chlamydia/ gonorrhea (<i>n</i> = 772)	Emergency contraception (<i>n</i> = 711)	HIV post-exposure prophylaxis (<i>n</i> = 772)
1996	81.3	75.7	82.5	64.5	35.8	1.9
1997	84.4	68.9	86.2	74.6	45.1	5.7
1998	77.0	54.9	77.0	65.5	38.4	12.4
1999	82.1	70.7	78.7	70.0	41.5	30.7
2000	76.7	60.2	80.7	80.5	54.0	39.9
2001 ^b	75.4	68.9	78.3	83.6	60.0	52.5
Year of assault chi-square <i>p</i> value ^a	<i>p</i> ≤ 0.20	<i>p</i> ≤ 0.02	<i>p</i> ≤ 0.67	<i>p</i> ≤ 0.02	<i>p</i> ≤ 0.02	<i>p</i> ≤ 0.00
Hours since assault						
<24	79.6	66.0	78.9	71.5	44.1	18.9
25–48	84.0	70.4	82.2	75.2	50.8	20.9
49–72	81.3	66.7	88.7	68.0	50.7	21.3
>72	82.1	62.7	81.0	70.2	22.6	17.9
Hours since assault chi-square <i>p</i> value ^a	<i>p</i> ≤ 0.63	<i>p</i> ≤ 0.61	<i>p</i> ≤ 0.26	<i>p</i> ≤ 0.61	<i>p</i> ≤ 0.00	<i>p</i> ≤ 0.90

^a Chi-square *p* values are shown for each of the five factors for comparison of the proportion of patients offered vs. not offered each test and prophylaxis.

^b January–June 2001.

Table 3

Multivariable Logistic Regression Analysis

Factors potentially associated with offering of testing and prophylaxis	Offering of testing by type of test			Offering of prophylaxis by type of prophylaxis			
	Chlamydia/gonorrhea (n = 745) OR (95% CI)	Syphilis (n = 745) OR (95% CI)	Pregnancy (n = 707) OR (95% CI)	Chlamydia/gonorrhea (n = 745) OR (95% CI)	Emergency contraception (n = 711) OR (95% CI)	HIV post-exposure prophylaxis (n = 745) OR (95% CI)	
Age of assault survivor							
18–24	1.00	1.00	1.00	1.00	1.00	1.00	
25–29	0.72 (0.41–1.29)	0.75 (0.44–1.29)	1.35 (0.73–2.48)	0.62 (0.37–1.05)	0.63 (0.39–1.02)	0.82 (0.42–1.59)	
30–34	0.54 (0.30–0.96)	0.89 (0.51–1.57)	1.19 (0.63–2.23)	0.59 (0.34–1.04)	0.73 (0.44–1.20)	0.48 (0.23–1.00)	
35–39	0.84 (0.44–1.60)	1.97 (1.04–3.73)	1.73 (0.86–3.49)	1.04 (0.57–1.92)	0.51 (0.29–0.88)	0.84 (0.40–1.78)	
40–44	0.44 (0.21–0.92)	1.28 (0.58–2.83)	0.51 (0.25–1.06)	0.49 (0.24–0.99)	0.46 (0.23–0.92)	0.48 (0.18–1.27)	
45–95	1.12 (0.43–2.96)	1.18 (0.48–2.90)	0.88 (0.30–2.55)	0.37 (0.17–0.83)	0.69 (0.27–1.75)	0.85 (0.30–2.37)	
Assault type							
Oral or genital touching	1.00	1.00	1.00	1.00	1.00	1.00	
Unclear/unknown	2.17 (0.99–4.77)	1.86 (0.81–4.25)	4.53 (1.95–10.5)	4.27 (1.96–9.31)	5.01 (2.10–11.96)	2.92 (0.96–8.93)	
Vaginal/anal penetration	3.19 (1.79–5.71)	2.52 (1.33–4.78)	3.69 (2.06–6.61)	8.11 (4.37–15.06)	4.67 (2.20–9.93)	2.34 (0.87–6.34)	
Hospital type							
Women's hospital	1.00	1.00	1.00	1.00	1.00	1.00	
Academic	0.27 (0.16–0.47)	0.07 (0.04–0.13)	0.49 (0.27–0.88)	0.25 (0.14–0.42)	0.50 (0.30–0.84)	0.22 (0.10–0.45)	
Community	0.30 (0.19–0.47)	0.09 (0.06–0.13)	0.25 (0.16–0.38)	0.22 (0.14–0.32)	0.28 (0.19–0.42)	0.06 (0.03–0.15)	
Year of assault							
1995	1.00	1.00	1.00	1.00	1.00	1.00	
1996	0.68 (0.29–1.62)	1.30 (0.61–2.78)	1.06 (0.47–2.40)	0.83 (0.42–1.61)	0.82 (0.43–1.57)	1.74 (0.15–19.76)	
1997	0.85 (0.37–1.97)	1.16 (0.57–2.35)	1.39 (0.62–3.12)	1.82 (0.92–3.62)	1.34 (0.73–2.47)	6.47 (0.77–54.29)	
1998	0.48 (0.21–1.10)	0.57 (0.28–1.16)	0.62 (0.29–1.32)	1.13 (0.48–2.21)	0.90 (0.48–1.69)	16.33 (2.07–128.73)	
1999	0.66 (0.29–1.48)	1.49 (0.74–2.98)	0.72 (0.35–1.48)	1.25 (0.66–2.37)	1.09 (0.60–1.98)	53.78 (7.10–407.21)	
2000	0.50 (0.23–1.10)	0.73 (0.37–1.45)	0.84 (0.40–1.77)	3.04 (1.50–6.18)	2.03 (1.11–3.70)	95.74 (12.63–725.52)	
2001 ^a	0.37 (0.88–1.25)	1.05 (0.44–2.51)	0.78 (0.31–1.97)	2.90 (1.16–7.28)	2.83 (1.34–5.97)	151.22 (18.85–1212.77)	
Hours since assault							
<24	1.00	1.00	1.00	1.00	1.00	1.00	
25–48	1.24 (0.77–2.01)	0.97 (0.61–1.52)	1.10 (0.68–1.76)	1.11 (0.72–1.72)	1.19 (0.81–1.74)	1.05 (0.62–1.79)	

Factors potentially associated with offering of testing and prophylaxis	Offering of testing by type of test			Offering of prophylaxis by type of prophylaxis			
	Chlamydia/gonorrhea (n = 745) OR (95% CI)	Syphilis (n = 745) OR (95% CI)	Pregnancy (n = 707) OR (95% CI)	Chlamydia/gonorrhea (n = 745) OR (95% CI)	Emergency contraception (n = 711) OR (95% CI)	HIV post-exposure prophylaxis (n = 745) OR (95% CI)	
49–72	0.95 (0.48–1.87)	0.72 (0.38–1.35)	2.03 (0.90–4.59)	0.58 (0.32–1.06)	0.98 (0.57–1.69)	0.80 (0.38–1.65)	
>72	1.17 (0.56–2.41)	0.66 (0.34–1.28)	1.02 (0.49–2.12)	0.72 (0.36–1.42)	0.23 (0.12–0.46)	0.39 (0.18–0.87)	

^a January–June 2001.