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Predictors of the Initiation of HIV Postexposure Prophylaxis in Rhode Island Emergency Departments

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Abstract

The objective of this study was to elucidate factors that predicted the initiation of HIV postexposure prophylaxis (PEP) for blood or body fluid exposures evaluated at Rhode Island emergency departments (EDs). The study involved a retrospective review of patient visits to all civilian Rhode Island EDs for these exposures from 1995 to mid-2001. Multivariate logistic regression models were created to evaluate predictors of the offering and the acceptance and receipt of HIV PEP from 1996 to 2001. The search identified 3622 patients who sustained a blood or body fluid exposure. Of these, 43.8% were health care workers (HCWs) and 57.2% were not HCWs. Most (52.0%) of the exposures were nonsexual. HIV PEP was offered to 21.0% and accepted and received by 9.4% of all patients. HIV PEP was offered more often after significant exposures, exposures to known HIV-infected sources, when time elapsed after the exposure was shorter, if the patients were HCWs, adults, presented to a teaching hospital, presented during the latter years of the study, or sustained nonsexual exposures. Once offered HIV PEP, patients who were male, adult, sustained a significant exposure, knew the source was HIV infected, sustained a nonsexual exposure, or were HCWs had a greater odds of accepting and receiving HIV PEP. Even when controlling for exposure significance, HIV status, and time elapsed since the exposure, several factors such as gender and type of hospital that are unrelated to the exposure appeared to influence the initiation of HIV PEP. ED providers should ensure that these factors do not inappropriately restrict its initiation.

INTRODUCTION

Emergency departments (EDs) serve as the initial venue for the evaluation and treatment of many patients who sustain blood or body fluid exposures. It is likely that ED clinicians frequently make the initial decisions regarding occupational and nonoccupational HIV postexposure prophylaxis (PEP). It is not known on a national or state-level basis how often patients present to U.S. EDs for these exposures, which patients are offered or accept and receive HIV PEP, and how clinicians choose to initiate HIV PEP.

Even before federal nonoccupational guidelines on HIV PEP were released in 2005,[1] U.S. ED clinicians reported prescribing HIV PEP to persons who were not HCWs

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(nonoccupational HIV PEP).[2–7] However, U.S. ED clinicians report giving HIV PEP much more often to health care workers (HCWs) than non-HCWs, even when the risks of infection are similar. [2] Studies also indicate that HIV PEP, occupational and nonoccupational, has been prescribed in U.S. EDs when it should not have been and was not offered when it could have been.[8–12] Findings from these studies suggest that some U.S. ED clinicians are unaware of or were not following Centers for Disease Control and Prevention (CDC) guidelines, are improvising their care in the absence of federal guidelines on nonoccupational HIV PEP, or are responding to other factors that influenced their choices about using HIV PEP. Researchers in countries other than the United States have also reported the initiation HIV PEP at EDs[13–19] and some found instances of inappropriate initiation of or missed opportunities for prescribing HIV PEP.[20–22]

This study was designed to examine the factors that influence the initiation of HIV PEP in EDs at a state level in order to advise future guideline authors and emergency medicine educators on how HIV PEP is being prescribed and to identify any potential problems with its initiation in this setting. We sought to describe the spectrum of blood or body fluid exposures evaluated at all civilian EDs in Rhode Island and determine when HIV PEP was prescribed for these exposures. We studied PEP from 1995 to 2001—from 1 year prior to the release of the federal occupational HIV PEP guidelines (January 1996) to their second revision (June 2001), before the creation of the state nonoccupational HIV PEP guidelines (2002), and before the use of rapid HIV testing in the United States. We examined our hypothesis that, congruent with the principles of prescribing HIV PEP, patients with significant exposures to known HIV-infected sources and those who presented soon after their exposure were more likely to be offered or accept HIV PEP. We further investigated whether factors not related to the principles of prescribing HIV PEP were associated with its initiation, both in the offering and the acceptance and receipt of HIV PEP. We tested our hypothesis that the lack of federal guidelines on nonoccupational HIV PEP would be reflected in more frequent initiation of HIV PEP for HCWs than non-HCWs, for nonsexual rather than sexual exposures, and for adults rather than pediatric patients. Given the natural gradual dissemination of occupational HIV PEP guidelines, we also investigated if HIV PEP was initiated more frequently in teaching rather than nonteaching hospitals and for exposures sustained in the latter instead of the earlier years of the study when the guidelines were new. We were interested in whether or not the CDC's guidelines helped promulgate the use of HIV PEP in EDs early after their release. In addition, we explored whether or not gender was related to the initiation of HIV PEP, particularly given that most sexual assaults occur among women and adolescent females and because many HCWs who report blood or body fluid exposures are women.[23,24]

MATERIALS AND METHODS

Study setting and population

The study included patients who presented for medical care after a blood or body fluid exposure to all 12 civilian EDs in Rhode Island from January 1995 to June 2001. These exposures were percutaneous injuries, blood or body fluid splashes, and sexual exposures to blood or body fluids. Of the 12 EDs, 5 are general teaching hospitals (affiliated with a medical school and sponsor undergraduate and graduate medical education programs), 5 are nonteaching (community) general hospitals, 1 is a women's specialty care hospital, and 1 is a pediatric specialty care hospital.

Case selection

We searched hospital billing databases for blood or body fluid exposure visits using 10 *International Classification of Disease, Ninth Revision, Clinical Modification* (Department

of Health and Human Services, 6th Edition, 2001) (ICD-9) codes. These codes were 995.53 (child sexual abuse), 995.83 (adult sexual abuse), E920.5 (needle stick), V01.7 (exposure to other viral diseases), V01.8 (exposure to other communicable diseases), V07.8 (other specified prophylactic measure), V07.9 (unspecified prophylactic measure), V15.41 (rape), V15.85 (exposure to potentially hazardous body fluids), and V71.5 (observation following rape). The codes were determined from a pilot study to be those most likely to identify ED visits for blood or body fluid exposures.[8] Human bites and injecting drug exposures were not included in the study because there were no practical means of identifying all of these visits for the study period using ICD-9 codes.

Four EDs had separate ED provider and hospital billing databases. These separate billing databases were searched independently to maximize capture of patient visits. For three of these hospitals, the provider database contained records from October 1997 to June 2001 and for the remaining hospital November 2000 to June 2001. For these four EDs, the two databases were merged, the duplicates removed, and single list was generated. For all other hospitals, the sole source for cases was the hospital's billing database. One of these hospitals did not have records for review prior to 1998. Based upon the data for years 1998–2001, this hospital would likely have evaluated approximately 90 patients for blood or body fluids during 1995–1997.

Data collection and processing

The authors 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 blood or body fluid exposure were included in the study. Repeat or follow-up visits for the same exposure were excluded. For the visits included in the study, demographic characteristics and HIV status of the exposed patient, time of exposure and ED presentation, nature of the exposure, and if HIV PEP was offered or received were extracted and recorded on a standardized form by the primary author and trained research assistants. Pediatric patients were defined as patients younger than age 18. Exposures were considered "significant" if the exposure was a percutaneous injury, a mucosal exposure to blood, or an anal or vaginal exposure to blood or genital secretions. Two trained research assistants independently entered each form into an Epi Info 2002 (Centers for Disease Control and Prevention, 2002) database and 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.

Data analysis

The analysis included calculating summary statistics and the percentage of responses for categorical variables according to the stratification categories of interest. Groups were compared using binomial tests for proportions; differences were considered statistically significant at the $\alpha = 0.05$ level.

Univariate and multivariate logistic regression analyses were performed to compare factors potentially associated with the offering of and acceptance and receipt of HIV PEP. We constructed models involving ED patients who presented during 1996–2001, which were the years following the release of the initial federal occupational HIV PEP guidelines. 1995 was not included in these models because HIV PEP was not yet introduced by the CDC as an accepted form of prophylaxis. Factors significant at the $\alpha = 0.10$ level were considered for inclusion in the multivariate models. Two separate multivariate models were created that included covariates that classified exposures as either nonsexual versus sexual or as exposures sustained by HCWs versus non-HCWs. These classifications were modeled separately because type of exposure (sexual or nonsexual) was perfectly associated

statistically with being a HCW or non-HCW. As a result, these exposure classifications were collinear, so separated models were indicated. Furthermore, the model that classifies exposures as nonsexual or sexual served to emphasize how HIV PEP was given by type of exposure. The model that classifies exposures by who sustained them (HCW or non-HCW) investigated how HIV PEP was used after the release of occupational HIV PEP guidelines and in the absence of nonoccupational HIV PEP guidelines.

To emulate the situations in which HIV PEP would be more likely to be considered, the models were restricted to ED visits in which the exposure source was HIV infected or was of unknown HIV status and to visits in which the patients presented within 7 days of their exposure. The models for receipt of HIV PEP were restricted to those patients who were offered it. Ninety-five percent confidence intervals (95% CIs) were created for the odds ratio (OR) estimates. Hosmer-Lemeshow test and receiver- operating characteristic (ROC) curves were performed for each model to evaluate model performance and assist in the selection of the final models.

RESULTS

ICD-9 code search

A total of 5159 records were identified in the ICD-9 code search. Of these, 4895 (94.9%) could be reviewed. Of these, 3622 (74.0%) ED visits were for blood or body fluid exposures and the rest were from patients who had other diagnoses, i.e., were miscoded.

Demographic and exposure profiles of patients

Of the 3622 ED visits from 1995–2001, 42.8% of the patients were HCWs and 57.2% were not HCWs. Of all visits, 48.0% were for sexual (consensual sex or sexual assault) and 52.0% were for nonsexual (percutaneous injury or blood or body fluid splash) exposures. There were more ED visits for blood or body fluid exposures for non-HCWs than HCWs ($p \leq 0.001$) and more nonsexual than sexual exposures ($p \leq 0.001$). The majority (82.3%) of nonsexually exposed patients were HCWs. Of the non-HCW exposures, 42.8% were pediatric sexual, 41.1% adult sexual, 13.8% adult nonsexual, and 2.3% pediatric nonsexual exposures.

Tables 1 and 2, respectively, provide the demographic and exposure profiles of the ED patients from 1995–2001 who sustained a nonsexual or sexual exposure. For non-sexually exposed patients, the majority of patients was female, presented to nonteaching hospitals, was exposed to persons of unknown HIV status, had percutaneous injuries, experienced a significant exposure, and presented within 24 hours of their exposure. Among sexually exposed patients, the majority was female, presented to teaching hospitals, was exposed to persons of unknown HIV status, and sustained significant exposures. Most sexually exposed patients had anal or vaginal exposures. Overall, there were more patients who presented within 24 hours of their exposure than later, but sexually exposed patients were less likely to present within 24 hours than those who were nonsexually exposed (43.5% versus 89.3%; $p \leq 0.0001$). There were more patients in the nonsexual group with significant exposures than the sexually exposed group (74.8% versus 59.7%; $p \leq 0.0001$). As shown in the tables, there were variations in the percentages of patients who were within these categories by patient group for both nonsexually and sexually exposed patients.

HIV PEP

Table 3 shows the percentage of ED patients from 1995–2001 who were offered or accepted and received HIV PEP by type of exposure and patient group. As expected, among all patients, more patients were offered HIV PEP than received it (21.0% versus 9.4%; $p \leq$

0.0001). Overall, fewer than half of patients (44.8%) for all types of exposures accepted and received HIV PEP when it was offered to them. Patients who sustained nonsexual exposures were more likely to be offered HIV PEP than those with sexual exposures (28.1% versus 13.3%; $p \leq 0.0001$). The same was true for patients who received HIV PEP (14.1% versus 4.3%; $p \leq 0.0001$). Patients with significant versus nonsignificant exposures were more likely to be offered (27.2% versus 8.0%; $p \leq 0.0001$) and receive (12.7% versus 2.4%; $p \leq 0.0001$) HIV PEP. This finding was consistent among those with nonsexual and sexual exposures. As shown, there were variations in offering and receipt of HIV PEP within the non-sexual and sexual groups by type of exposure and type of patient. Acceptance of HIV PEP when it was offered was generally higher for those who sustained significant than nonsignificant exposures.

In 7.2% of all exposures (0.4% of sexual and 13.6% of nonsexual) the clinician stated that HIV PEP was not indicated because the exposure was of low or no-risk for HIV transmission (data not shown). However, for 70.3% of the ED visits, the reasons why HIV PEP was not offered was not recorded. Only one patient, a HCW, received HIV PEP in 1995.

Table 4 displays the results of the logistic regression analysis of HIV PEP initiation for patients who presented within 7 days of their exposure during 1996–2001 and were exposed to sources of unknown status or known HIV-infected sources. The sample size was smaller than the original 3622 patients because of these restrictions, and because we limited this analysis to patients presenting within 1996–2001 and for patients for whom time elapsed was recorded in the medical record. Model 1 uses nonsexual versus sexual exposures as covariates and model 2 uses HCW versus non-HCW as covariates.

For the most part, the results of the multivariate analysis were consistent with those from the univariate analysis. The odds of being offered HIV PEP were significantly greater for those who sustained a significant exposure, were exposed to an HIV-infected source, were a HCW, had a nonsexual exposure, presented to a teaching hospital, presented in the latter years since the introduction of the CDC occupational HIV PEP guidelines, were an adult, and presented at the ED within 72 hours after their exposure. Gender was not a statistically significant factor in the univariate analysis and multivariate analysis examining sexual versus nonsexual exposures; however there is an indication that gender was a factor (OR 2.08, 95% CI 0.64 to 1.01) in the multivariate analysis examining HCWs versus non-HCWs. The trend was that females were less likely to be offered HIV PEP than males, after adjusting for the other confounders. There was an increasing trend of offering HIV PEP by year as shown by the increasing odds of HIV PEP offering by year. A statistical test of trend for increasing HIV PEP offering by year from 1996 to 2001 using year as a continuous rather than categorical covariate supported this observation (OR 1.39 [1.31–1.48]).

Most of the factors associated with the offering of HIV PEP were associated with the acceptance and receipt of HIV PEP among those who were offered it. After adjusting for other confounders in the multivariate model, the odds of accepting HIV PEP was significantly lower among women than men and among adult than pediatric patients. In addition, the odds of accepting HIV PEP once offered was not associated with the time between exposure and presentation to an ED. HIV PEP receipt appeared to increase then decrease over the study years.

DISCUSSION

The offering of HIV PEP after blood or body fluid exposures during this study period was low overall and varied by type of exposure. When HIV PEP was offered, about one half of

patients accepted and received it. Although it could not be examined in this study, lack of knowledge of the indications for HIV PEP by ED clinicians, the absence of nonoccupational HIV PEP guidelines, or the lack of hospital protocols on HIV PEP might be reasons for low offering of HIV PEP, especially after nonoccupational exposures. The large number of unknown type exposures and long delay in presentation common in the pediatric sexual exposures can also explain why HIV PEP was not offered for these exposures. Decline of HIV PEP once it was offered could reflect a fear of patients and clinicians regarding the adverse side effects of antiretroviral medications or the lack of definitive data verifying its efficacy. One concern is whether the high costs of HIV PEP medications, which are typically free to HCWs, affected acceptance of HIV PEP by patients who are not HCWs.

The logistic regression analysis results suggest that ED providers were making reasonable assessments on the initiation of HIV PEP, given the greater odds of patients being offered or receiving HIV PEP for significant than nonsignificant exposures, for exposures to known HIV-infected sources, and in cases when the time elapsed from exposure to ED evaluation is shorter. Current and prior CDC HIV PEP guidelines favor the initiation of HIV PEP for significant exposures, for exposures to known HIV-infected sources over unknown HIV status sources, and when the time from exposure to presentation is less than 72 hours.[1,25–28] The prevalence of HIV in Rhode Island in the general populace is approximately 0.1%–0.3%, which suggests that most occupational and nonoccupational exposures to HIV will be to an HIV-uninfected source.[29] However, without knowing the HIV status of the source or even the source's HIV risk, it is difficult to assess the appropriateness of HIV PEP decisions for unknown HIV status sources. It should be recalled that HIV infections can and do result from exposures to sources of unknown HIV status, which constitute the majority of potential exposures to HIV.[30]

Increasing offering of HIV PEP increased as the years passed from the initial introduction of HIV PEP might reflect growing knowledge among ED providers, changes in hospital protocols, and patient familiarity with HIV PEP. This finding implies the value of disseminating guidelines on occupational HIV PEP as well as the impact of educational campaigns and hospital policies on its usage. It also suggests awareness of the Cardo et al.[31] study findings demonstrating efficacy of HIV PEP among HCWs sustaining percutaneous injuries. The increasing then decreasing receipt of HIV PEP may reflect growing awareness among HCWs (the predominant group offered HIV PEP) that few people have become HIV infected through the performance of their job. On the other hand, it might reflect a practice by ED clinicians of documenting their offering of HIV PEP, in accordance with protocols or guidelines, and documenting the patient's refusal of HIV PEP. It is also possible that clinicians offered but discouraged patients from taking HIV PEP over the study period. One should keep note, however, that the existence of HIV PEP guidelines does not necessarily mean that they will be followed, as shown by studies in British Columbia, France, and the United Kingdom,[20,32,33] although researchers in The Netherlands have found a reduction in unnecessary HIV PEP usage when protocols were followed.[34]

Given the adjustment for the significance of exposure, the time elapsed since the exposure, and the HIV status of the source, the greater offering and acceptance and receipt of HIV PEP for nonsexual or HCW exposures might be at least partly due to the absence of federal HIV PEP guidelines for sexual exposures during the years of the study as well as the lack of definitive data on the efficacy of nonoccupational HIV PEP. This discrepancy in its initiation persisted despite adjusting for year and type of hospital, which suggests that recommendations on HIV PEP in the medical literature by advocates might not be enough to encourage greater HIV PEP initiation for sexual exposures. An alternative explanation for this finding favoring non-sexual or HCW exposures is clinician bias against HIV PEP use for sexual exposures, perhaps because HCWs are considered "innocent victims" of their

exposure. However, the similar offering of HIV PEP for sexual assault and consensual sexual exposures argues against this explanation. Another explanation might be a recognition by ED providers that compliance with HIV PEP after sexual assault is typically poor, thus reducing their interest in providing it to these patients.[1]

In terms of the other factors, the focus of federal HIV PEP guidelines on adult rather than pediatric patients might help explain the greater offering of HIV PEP for adult exposures. Concerns by ED clinicians regarding the adverse side effects of antiretroviral medications and the complexity of dosing regimens also might be barriers to HIV PEP provision. Of course, the long delay in presentation after sexual exposures by pediatric patients greatly limits their candidacy for being offered HIV PEP. Greater HIV PEP initiation at teaching hospitals might indicate a lack of knowledge about HIV PEP by ED providers or the absence of defined protocols at non-teaching hospitals. The discrepancy persisted even when controlling for the significance of the exposure and HIV status of the source. Educational programs and defined HIV PEP protocols might help address this discrepancy.

The lower odds of women accepting and receiving HIV PEP is potentially alarming, particularly given the preponderance of females in this sample. We do not know if female patients are not encouraged to take it or if some other unmeasured factor is confounding this relationship, such as a general reluctance of to take this type of treatment over concerns about its efficacy or side effects. ED providers should be aware of this concern when counseling patients about HIV PEP and be certain that female patients have the same opportunities as males to accept HIV PEP when it is indicated and offered.

We believe that this study can lay ground-work for future investigations and initiatives regarding HIV PEP. We would like to determine how subsequent HIV PEP guidelines at the state and federal level impacted HIV PEP utilization in the state. We are curious if the state HIV PEP guidelines that were introduced in 2002 carried the same impact on ED provider practices as the federal guidelines. We also are curious how current HIV PEP practices compare to the early years after HIV PEP was first recommended by the CDC. We would also like to further examine ED clinician attitudes and opinions regarding HIV PEP to determine if biases exist against the use of HIV PEP for patients with sexual exposures to HIV. We hope that by presenting the results of this study ED providers will examine their HIV PEP decision-making and prescribing practices to ensure that they are adhering to best practices. We also ask that ED Directors establish protocols to improve HIV PEP in their ED and would like to see emergency medicine-specific guidance from national organizations to help promote better usage of this form of HIV prevention.

LIMITATIONS

There are several limitations to this study that impact the interpretation of the results. First, ICD-9 code billing searches rely on the accuracy of the coding and billing process. If coders did not utilize the billing codes searched for in this study, cases would have been missed. Furthermore, missing records prohibited us from analyzing all the records. However, it is unlikely that miscoding any missing cases confounded the relationship between our factors of interest and HIV PEP utilization. Second, blood or body fluid examinations and consequent HIV PEP decision-making rely on specifics of the exposure circumstances, e.g., presence of wounds in the skin, type of needle, usage of the needle, HIV risk factors in the source and the patient, etc. Furthermore, all retrospective studies involving medical record review depend upon the completeness of the data in the record. Clinician deliberations, such as determining that an exposure is not significant, and clinician–patient discussions on the need for HIV PEP were not consistently documented. These additional factors could not be assessed reliably from this retrospective review. This study instead focuses on other

potential factors related to HIV PEP decision making. Third, human bite and injecting-drug usage exposures could not be evaluated in this study. However, HIV PEP utilization after both exposures are likely rare, given the infrequent need for HIV PEP after human bite exposures and the difficulty of assessing HIV PEP needs after repeated exposures to HIV among injection-drug users. Fourth, current HIV PEP practices might not be similar now, especially after the advent of new guidelines on HIV PEP usage and rapid HIV testing. We are hopeful that this study can serve as a basis for future studies comparing contemporary HIV PEP practices to this study period.

CONCLUSIONS

The initiation of HIV PEP in Rhode Island EDs after blood or body fluid exposures during 1995–2001 was relatively low overall and varied by type of exposure. Despite non-HCWs being the majority of exposed patients and having a similar percentage of significant exposures, HCWs were more apt to be offered HIV PEP. This difference could be accounted for by the lack of definitive efficacy data on nonoccupational HIV PEP and the absence of nonoccupational HIV PEP guidelines during this period. In keeping with CDC HIV PEP guidance, HIV PEP initiation for significant exposures, exposures to known HIV-infected sources, and for persons who presented soon after their exposure was greater than for other exposures. Lower HIV PEP initiation after sexual exposures, for non-HCWs, by nonteaching hospitals, and perhaps for females indicate the continued need for comprehensive HIV PEP guidelines, hospital HIV PEP protocols, and ED provider educational campaigns on HIV PEP.

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Table 1

Nonsexual Exposures

	HCWs *n* = 1551	**Non-HCW adults *n* = 285**	**Pediatric *n* = 48**	**Total non-sexual exposures *n* = 1884**
Median age (range)	35 (15–76)	32 (18–81)	8 (1–17)	34 (1–81)
Gender	%	%	%	%
Male	30.3	66.3	54.2	36.4
Female	69.7	33.7	45.8	63.6
Type of hospital				
Teaching	50.4	28.4	52.1	47.1
Nonteaching	49.6	71.6	47.9	52.9
HIV status of source				
Negative	1.9	4.6	18.8	2.8
HIV infected	2.5	4.9	2.1	2.8
Unknown	95.6	90.5	79.2	94.4
Type of exposure				
Percutaneous	72.5	44.2	85.4	68.5
Blood splash to mucous membrane	6.9	4.6	0.0	6.4
Blood splash to skin	8.2	33.7	8.3	12.0
Body fluid splash to mucous membrane	7.9	9.5	2.1	8.0
Body fluid splash to skin	4.6	8.1	4.2	5.1
Total significant exposures	79.3	48.8	87.5	74.8
Hours elapsed since exposure[a]	*n* = 1384	*n* = 255	*n* = 38	*n* = 1677
<24	91.2	80.4	81.6	89.3
25–48	6.5	10.2	13.2	7.2
49–72	0.5	3.1	2.6	0.9
>72	0.6	1.6	2.6	0.8

[a]Hours elapsed since exposure was not available for all patients.

HCWs, health care workers.

Table 2

Sexual Exposures

	Adults *n* = 852	**Pediatric *n* = 886**	**Total non-sexual exposures *n* = 1738**
Median age (range)	(18–96)	12 (0–17)	17 (0–96)
Gender	%	%	%
Male	4.5	15.5	10.1
Female	95.5	84.5	89.9
Hospital			
Teaching	73.8	77.1	75.5
Nonteaching	26.2	22.9	24.5
HIV status of source			
HIV infected	1.6	0.1	0.9
Unknown	98.4	99.9	99.1
Hours elapsed since exposure[a]	*n* = 814	*n* = 638	*n* = 1452
<24	51.1	33.7	43.5
25–48	27.9	29	28.4
49–72	10.2	10.3	10.3
>72	10.8	27	17.9
Sexual assault	*n* = 823	*n* = 842	*n* = 1665
Genital touching only	4.9	23.9	14.5
Oral only	4.3	5.7	4.9
Anal/vaginal penetration	76.1	42.5	59.2
Unknown/unclear	14.8	8.6	11.7
Sexual assault evaluation	NA	19.4	9.8
Consensual sex	*n* = 29	*n* = 44	*n* = 73
Genital touching only	NA	2.3	1.4
Oral only	10.3	6.8	6.8
Anal/vaginal/penile penetration	69.0	81.8	78.1
Unknown/unclear	20.7	9.1	13.7
Total significant sexual exposures	75.6	52.1	59.7

[a]Hours elapsed since exposure was not available for all patients.

Table 3

HIV PEP Offered and Received

		Significant exposures			Nonsignificant exposures			Total		
	n	% Offered HIV PEP	Overall % accepting HIV PEP	% Accepting HIV PEP when offered	% Offered HIV PEP	Overall % accepting HIV PEP	% Accepting HIV PEP when offered	% Offered HIV PEP	Overall % accepting HIV PEP	% Accepting HIV PEP when offered
Nonsexual exposures										
HCWs	1551	35.3	17.6	49.9	10.9	4.0	36.7	30.2	14.8	49.0
Non-HCW adults	285	33.1	18.7	56.5	6.8	3.4	50.0	19.6	10.9	55.6
Pediatric	48	12.2	12.2	100.0	0.0	0.0	N.A	10.4	10.4	100.0
Total non-sexual exposures	1884	34.4	17.5	50.9	9.5	3.8	40.0	28.1	14.1	50.2
Sexual exposures										
Adult sexual assault	823	19.2	5.4	28.1	19.8	2.5	12.6	19.3	4.7	24.4
Adult consexual sex	29	22.2	22.2	100.0	0.0	0.0	N.A	13.8	13.8	100.0
Pediatric sexual assault	842	15.4	7.3	47.4	1.9	1.0	52.6	7.6	3.7	48.7
Pediatric consensual sex	44	8.3	2.8	33.7	12.5	0.0	0.0	9.1	2.3	25.3
Total sexual exposures	1738	17.5	6.3	36.0	7.0	1.4	20.0	13.3	4.3	32.3
Total all exposures	3622	27.2	12.7	46.7	8.0	2.4	30.0	21.0	9.4	44.8

PEP, postexposure prophylaxis.

Table 4

HIV PEP Usage Logistic Regression Analysis

	Univariate analysis		Multivariate Model 1 Nonsexual vs. sexual exposures		Multivariate Model 2 HCW vs. non-HCW exposures	
	HIV PEP offered	HIV PEP received	HIV PEP offered	HIV PEP received	HIV PEP offered	HIV PEP received
Factor of interest	***n* = 2782 OR (95% CI)**	***n* = 695 OR (95% CI)**	***n* = 2782 OR (95% CI)**	***n* = 695 OR (95% CI)**	***n* = 2782 OR (95% CI)**	***n* = 695 OR (95% CI)**
Significant vs. non-significant exposures	3.41 (2.66–4.35)	1.91 (1.18–3.09)	3.36 (2.57–4.38)	1.94 (1.13–3.35)	3.31 (2.54–4.32)	2.09 (1.22–3.57)
Known HIV infected vs. unknown HIV status	3.94 (2.24–6.93)	4.89 (1.96–12.2)	4.37 (2.28–8.38)	3.94 (1.52–10.25)	4.64 (2.39–9.01)	4.25 (1.62–11.14)
HCWs vs. non-HCWs	2.08 (1.74–2.48)	1.52 (1.12–2.07)	NA	NA	1.69 (1.36–2.10)	1.65 (1.13–2.42)
Nonsexual vs. sexual exposures	1.98 (1.65–2.38)	2.08 (1.49–2.92)	1.90 (1.50–2.41)	2.66 (1.68–4.19)	NA	NA
Teaching vs. non-teaching hospital EDs	2.63 (2.16–3.19)	2.24 (1.54–3.25)	3.47 (2.79–4.31)	2.91 (1.93–4.40)	3.28 (2.65–4.06)	2.50 (1.67–3.74)
1997 vs. 1996	1.95 (1.23–3.11)	1.91 (0.77–4.76)	1.84 (1.14–2.98)	1.51 (0.57–3.97)	1.85 (1.14–3.00)	1.53 (0.58–4.01)
1998 vs. 1996	4.33 (2.82–6.65)	2.10 (0.91–4.85)	4.15 (2.65–6.48)	2.05 (0.85–4.97)	4.21 (2.69–6.58)	1.96 (0.81–4.74)
1999 vs. 1996	4.78 (3.13–7.31)	1.62 (0.71–3.71)	5.25 (3.38–8.16)	1.86 (0.77–4.50)	5.30 (3.41–8.23)	1.69 (0.70–4.05)
2000 vs. 1996	5.38 (3.51–8.24)	1.23 (0.54–2.82)	6.05 (3.88–9.43)	1.51 (0.62–3.66)	6.17 (3.96–9.62)	1.35 (0.56–3.26)
2001 vs. 1996	7.48 (4.76–11.76)	0.81 (0.34–1.93)	8.58 (5.34–13.78)	1.04 (0.41–2.63)	8.58 (5.34–13.78)	0.92 (0.36–2.31)
Female vs. male	0.87 (0.71–1.06)	0.41 (0.29–0.58)	0.91 (0.72–1.16)	0.50 (0.34–0.74)	0.80 (0.64–1.01)	0.41 (0.28–0.60)
Adult vs. pediatric	2.70 (2.06–3.53)	0.80 (0.49–1.32)	1.99 (1.45–2.73)	0.36 (0.20–0.66)	2.08 (1.52–2.85)	0.46 (0.26–0.83)
≤3 days vs. >3 days elapsed	0.26 (0.12–0.53)	1.52 (1.12–2.07)	0.34 (0.16–0.73)	0.77 (0.14–4.09)	0.32 (0.15–0.70)	0.65 (0.12–3.40)

PEP, postexposure prophylaxis; HCWs, health care workers; OR, odds ratio; CI, confidence interval.

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