### Title

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### Journal

Western Journal of Nursing Research, 37(9)



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### Publication Date

2015-09-01

### DOI

10.1177/0193945914530192

Peer reviewed

HHS Public Access

Author manuscript

*West J Nurs Res*. Author manuscript; available in PMC 2016 September 01.

Published in final edited form as:

*West J Nurs Res*. 2015 September ; 37(9): 1194–1213. doi:10.1177/0193945914530192.

# Factors Associated with Forensic Nurses Offering HIV nPEP status-post Sexual Assault

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## Abstract

Non-occupational post-exposure prophylaxis (nPEP) for Human Immunodeficiency Virus (HIV) is offered inconsistently to patients who have been sexually assaulted. This may be due to Forensic Nurse Examiner (FNE) programs utilizing diverse nPEP protocols and HIV risk assessment algorithms. This study examines factors associated with FNEs offering nPEP to patients following sexual assault at two FNE programs in urban settings. Offering nPEP is mostly driven by site-specific protocol. At Site 1 in addition to open anal or open genital wounds, the presence of injury to the head or face was associated with FNEs offering nPEP (AOR 64.15, 95%CI [2.12 – 1942.37]). At Site 2, patients assaulted by someone of *other* race/ethnicity (non-White, non-African American) were 86% less likely to be offered nPEP (AOR 0.14, 95%CI [.03-.72]) than patients assaulted by Whites. In addition to following site specific protocols, future research should further explore the mechanisms influencing clinician decision making.

### Keywords

Obstetric-Gynecology; Violence; Acute care; Descriptive quantitative; Nurses

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Non-occupational post-exposure prophylaxis (nPEP) for Human Immunodeficiency Virus (HIV) has received increased attention during the last decade. HIV continues to be pandemic with an estimated 48,000 new HIV infections in the United States (US) in 2009 (Prejean et al., 2011). One in five women report a sexual assault during their lifetime (Black et al., 2011). The number of new HIV infections due to sexual assault is unknown but there have been documented cases in the US (Centers for Disease Control and Prevention, CDC, 2005). Sexual assault may increase HIV transmission risk through multiple mechanisms: lack of condom use (Davis, Schraufnagel, George, & Norris, 2008; Weller & Davis-Beaty, 2002); infliction of genital and/or anal trauma (Palmer, McNulty, D'Este, & Donovan, 2004; Sommers, 2007); object penetration (Sturgiss, Tyson, & Parekh, 2010); concurrent sexually transmitted infections (STIs; e.g. Galvin & Cohen, 2004); and multiple and/or unknown assailants (e.g. Riggs, Houry, Long, Markovchick, & Feldhaus, 2000; Sturgiss et al., 2010). nPEP is a four-week course of two to three anti-retroviral medications. The decision to initiate nPEP must be made within 72 hours post-sexual assault, as starting nPEP beyond 72 hours has negligible efficacy (CDC, 2005; Otten et al., 2000). Current guidelines regarding post-sexual assault care include completing a forensic medical examination to assess injury and collect evidence (Littel, 2013). In addition, pregnancy and STI testing and prophylaxis are recommended (Littel, 2013).

## nPEP Offered Inconsistently Post-Sexual Assault

The Department of Justice (Littel, 2013) and the CDC (2005) guidelines state nPEP should be offered for substantial risk exposures: exposures of mucous membrane or non-intact skin to blood, semen, vaginal secretions or other potentially infectious materials *when* the source is known to be HIV infected. When the source persons' HIV status is unknown the CDC recommends a case-by-case approach to offering nPEP (CDC, 2005). The guidelines for postexposure therapy are often based on occupational exposures, limiting the applicability to treatment of sexual assault patients (CDC, 2005). Determining risk on a case-by-case basis may be difficult for the clinician in a population where the source person is a stranger (42% of males, 31% of females) (Rand, 2008), and/or the source person's HIV status is not known and is often not obtainable. Many Sexual Assault Nurse Examiner (SANE) or Forensic Nurse Examiner (FNE) programs have created algorithms to determine which patients to offer nPEP. In a recent survey of SANE/FNE program coordinators, almost three-quarters reported having a protocol for HIV related care including nPEP (Draughon, Anderson, Hansen, & Sheridan, 2013). These algorithms differ by site and population; consequently there is wide variation in medication regimens, medication costs (to the program, patient, or both) as well as follow-up schedules.

In previous research there has been conflicting evidence about which factors of an assault (patient demographics, assault characteristics, exam findings, and HIV documentation) are associated with the health care provider (HCP) offering nPEP. In one study, being younger than 33 was a factor in offering nPEP (Linden, Oldeg, Mehta, McCabe, & LaBelle, 2005). Others found no association between patient age (Merchant, Phillips, Delong, Mayer, & Becker, 2008; Moe & Grau, 2001; Templeton, Davies, Garvin, & Garsia, 2005), sex (Moe & Grau, 2001; Templeton et al., 2005), or race (Moe & Grau, 2001) and the HCP offering nPEP.

Multiple studies have found that assaults categorized as high-risk (often those involving anal penetration) were qualitatively associated with the HCP offering nPEP (e.g. Diniz, Almeida, Ribeiro, & Macêdo, 2007; Linden et al., 2005; Loutfy et al., 2008; Rey et al., 2008). Two studies reported that high-risk assaults were significantly associated with the HCP offering nPEP (Merchant et al., 2008; Templeton et al., 2005).

In studies examining the relationship of the assailant to the patient, all three found no association with the HCP offering nPEP (Linden et al., 2005; Pesola, Westfal, & Kuffner, 1999; Templeton et al., 2005). No studies examined if there is an association between assailant race and whether the patient is offered nPEP. Only one study incorporated forensic exam findings, however Linden and colleagues found no association between offering nPEP and genital bleeding noted on exam (Linden et al., 2005). Finally, although HIV documentation is usually collected in studies of nPEP after sexual assault, whether a documented HIV risk assessment is associated with offering nPEP has not been assessed (Draughon & Sheridan, 2012).

### Purpose

This study assessed factors associated with FNEs offering nPEP to patients after a sexual assault exposure at two sites with slightly different nPEP provision protocols.

## Methods

A retrospective chart review was conducted at two FNE programs located within urban hospitals in the Mid-Atlantic region of the United States which routinely provide nPEP according to an algorithm (described below) following sexual assault. At the first site (Site 1), charts were reviewed from January 1 to December 31, 2011. At the second site (Site 2), charts were reviewed from May 19, 2011 to May 31, 2012. The starting date at Site 2 was the first day the site began offering nPEP. Variables theoretically relevant to HIV risk were abstracted.

### HIV Risk Assessment Algorithms

**Site 1—**An evidence-based HIV risk assessment algorithm and nPEP clinical protocol was developed by program staff for the purpose of standardizing screening for the risk of HIV transmission following sexual assault and consistently implementing nPEP when warranted based on the risk of HIV transmission (Wieczorek, 2010). For example, both vaginal and anal penetration have a measurable risk of HIV transmission (Wieczorek, 2010). Evidence-based risk assessment considerations included the specific acts committed during the assault, the likelihood of exposure to blood or other potentially infectious material, the type and severity of trauma at the site of a potential exposure, the number of potential exposures, the presence of a concurrent sexually transmitted disease in either the assailant or patient, and when available, the source HIV status or presence of source HIV risk factors (Bamberger, Waldo, Gerberding, & Katz, 1999; CDC, 2005). Site 1 routinely offered nPEP according to protocol for patients who presented for care within 72 hours of exposure with sex acts with a measurable risk of transmission and had a break in skin integrity noted on exam. Evidence

of a potential concurrent STI was to be interpreted as a break in skin integrity due to potential microscopic breaks in the tissue.

**Site 2—**The medical director and nursing manager of the department developed an HIV exposure risk checklist based upon Table 1 from the CDC guidelines (p.7, CDC 2005) in concert with two infectious disease and one occupational health practitioners. Types of exposure that did not warrant nPEP were outlined as well as types of exposure that warranted nPEP. Risk greater than 1 per 10,000 exposures was considered a high risk exposure. This consensus separated oral sexual contact as a low risk exposure and receptive anal or vaginal sexual contact as a high risk exposure. nPEP was offered to patients who presented within 72 hours of exposure, and reported the following sex acts: (a) receptive or insertive vaginal or anal sex, (b) oral sex with ejaculation, and (c) oral vaginal contact with blood exposure when the source is HIV infected or of unknown HIV status. All patients were required to have baseline screening tests for HIV, blood counts, liver enzymes, electrolytes, and renal function.

The major difference between HIV risk assessment algorithms at Site 1 and Site 2 was the requirement at Site 1 for a break in skin integrity to be noted as present during the forensic exam. Neither site had frequent access to the HIV status of the reported assailant. As discussed previously, the CDC guidelines only categorize an exposure as *significant risk* – and nPEP is recommended – when the source is known to be HIV infected. Both protocols indicated to always offer nPEP when a patient has had contact of mucous membrane or non-intact skin to the blood, semen, or vaginal secretions of an HIV infected source. Neither site offered nPEP to exposures falling under the negligible risk category of the CDC guidelines (2005).

## Measures

**Dependent variable—**Offering nPEP was determined if the chart included documentation of the offer, acceptance, inclusion of nPEP prescriptions, or if the algorithm (described in previous section) had “offer nPEP” indicated.

**Independent variables—**Factors which might impact whether the FNE offered nPEP were assessed in each of the following categories: demographic characteristics, assault characteristics, exam findings, and whether an HIV risk assessment was documented. Patient demographics included their age, race/ethnicity and sex. Patient race was categorized as white, black and other. The “other” category included patients of mixed race, Asian, Hispanic and Middle Eastern ethnicity due to low prevalence of these categories in the sample.

**Assault characteristics:** Assault characteristics included whether the patient reported the assault to police and the length of time between the assault and the forensic exam. Information specific to the assailant(s) included: the number of assailants, assailant sex, assailant race/ethnicity and the assailant’s relationship to the patient. The number of assailants was dichotomized into a single assailant vs. more than one or an unknown number of assailants. Similarly, assailant sex was dichotomized into male vs. female or assailant of

unknown sex. Assailant race was categorized as white, black, other or unknown if the patient could not recall. Similar to patient race, the “other” race category included assailants of mixed race, Asian, Hispanic and Middle Eastern ethnicity due to low prevalence of these categories in the sample.

The assailant’s relationship to the patient was categorized as acquaintance/other, current/former intimate partner, stranger/known less than 24 hours, or unknown. There were four cases where the relationship of the assailant to the patient was known, but could not be categorized as an acquaintance, current or former intimate partner or a stranger. These four cases were grouped with acquaintances.

Assaults were categorized based on the specific acts documented in the patients chart. Penetration was categorized as: no penile penetration of the vagina or anus, penile penetration of the vagina without anal penetration, and penile penetration of the anus with or without vaginal penetration. In a subset of assaults the patient could not recall any acts perpetrated, these assaults were categorized as unknown risk. Condom use was categorized as “Yes” “No” and “Unknown.” There were several assaults where no penile penetration of the vagina or anus occurred (n = 22). These were placed in the “Yes” condom use category as the risk of transmission would be similar to protected sex when a condom is used appropriately.

**Exam findings:** Exam findings abstracted included both extragenital and anogenital injuries. Injuries were categorized as abrasions, lacerations, incised wounds, bruises, erythema, swelling, and tenderness. Extragenital injuries were categorized into six body areas:

1. Head injury including injury to the face, eyes, and mouth. Loss of consciousness was only included if it was caused by an injury, not by drug or alcohol ingestion.
2. Neck injury was categorized separately as it may indicate a more severe assault
3. Arm injury including injury to the shoulders.
4. Leg injury including injury to the hips
5. Trunk injury including injury to the buttocks and torso except breast injury.
6. Breast injury was included as a separate category as breast injury is a distinct sexual component whereas injuries to other body parts may be intentional but are just as likely to be incidental to the sexual assault.

Injury to the genitalia or anus included the following types of injuries: lacerations, abrasions, erythema, bruising, bleeding, swelling, and tenderness. It is important to note that swelling and tenderness are subjective findings reported by patients, not visualized by the FNE, but are still forensically significant. Any finding to the genitalia (including injuries with intact skin) was classified as a genital injury being present. Open genital wounds were categorized as present in cases where lacerations, abrasions, or bleeding (excluding patients who were menstruating) was visualized and documented. Similarly, anal injury included any forensically significant finding to the anal folds and perianal region, where open anal

wounds were only those cases where lacerations, abrasions or bleeding was visualized and documented.

Whether the patient had a concurrent STI was dichotomized as “Yes” or “No”, based on testing done during the post-assault exam. Whether the patient had clinical signs of an STI was also dichotomized as “Yes” or “No” based on genital exam documentation. Although results of testing would not have been available to the FNE at the time of offering nPEP, clinical signs would potentially be visible. For example at Site 1 the evidence of a possible concurrent STI is to be interpreted as a break in skin integrity and incorporated into the decision to offer nPEP.

Finally, whether there was some evidence that the FNE documented an HIV risk assessment was abstracted (dichotomized into “Yes” or “No”). Both sites included use of a written HIV risk assessment in their nPEP protocol. Examining the quality and content of the documentation of the HIV risk assessment was beyond the scope of this study. Whether or not HIV testing was conducted was dichotomized as “Yes” or “No.” Both site protocols stipulate HIV testing only when a patient is accepting nPEP, therefore we will present proportions but will not examine HIV testing as a factor associated with the FNE offering nPEP. Charts were abstracted by a single author (JD), with data cleaning decisions made by two authors (JD and DS). Institutional Review Board approval was obtained at both clinical sites and the university prior to data collection.

## Sample

A total of 270 adult forensic nursing sexual assault examination charts were abstracted: 91 from Site 1 and 179 from Site 2. Charts were excluded if the patient did not present within 120 hours (jurisdictional time limit for evidence collection), if the chart was for a forensic consult only, and if the researcher was unable to determine if nPEP was offered (see Figure 1). Eighty-nine (33%) charts were excluded. From Site 1 the majority of cases (22% of charts) were excluded because only a forensic consult was performed; the Site does not offer nPEP without a physical exam. The few without a physical exam from Site 2 were not excluded, as they will still offer nPEP if warranted based on patient history. From Site 2 the largest proportion of cases (30% of charts) were excluded because it could not be determined whether nPEP was offered. All results reported are from the retained 182 charts (n = 68 from Site 1 and n = 114 from Site 2).

## Analysis

Pearson’s chi-square analyses were utilized to determine differences in variables by site. All further analysis was stratified by site. Sites were anticipated to differ on factors associated with the outcome of offering nPEP because the nPEP provision protocols differed in stringency. In addition there were statistically significant differences in patient demographics, exam findings, and HIV documentation. Data from each site were analyzed to assess if any factors were associated with offering nPEP beyond those dictated by the site specific nPEP protocols. Bivariate associations between variables and the primary outcome (offering nPEP) were assessed using logistic regression. Variables significant at alpha = 0.20 were retained for inclusion in the multivariate analysis. All analyses were performed using

available data without correcting for missing data points. Modeling used blocked hierarchical forward regression. Variables were included in the final model if the AIC improved by at least 2. All analyses were conducted using STATA 11 (StataCorp 2010).

## Results

### Patient characteristics

Half of patients seen at both sites were between 18-25 years old, approximately 30% were aged 26-35, and 20% were 36 or older. Ninety-eight percent (n=178) of patients at both sites were women. There were only four male cases, two at each site. At both sites almost 60% (n=106) of patients were white, however a larger proportion of patients at Site 1 were African American (32%, n=22) as compared to Site 2 (15%, n=15, $p < 0.01$). At Site 2 there was a greater proportion of patients of *Other* race or ethnicity (27%, n=31) than at Site 1 (7%, n=5, $p < 0.01$). There were no other significant differences in demographics by site.

### Assault characteristics

Only 15% of patients (n=27) did not report their assault to police. The majority (70%, n=129) of patients presented for care within 24 hours of their assault. An additional 15% (n=15) presented for care during the second day post-assault, with 9% (n=17) presenting during the third day. Four percent (n=8) of patients presented past the 72 hour deadline for nPEP eligibility; these patients were not offered nPEP at either site.

Over 90% (n=168) of assailants were male. Only one in ten (n=17) patients could not recall the race or ethnicity of their assailant. The remaining 90% were split fairly evenly among white assailants (30%, n=53), black or African American assailants (33%, n=59), or assailants of *Other* race/ethnicity (27%, n=47). A large proportion of patients were assaulted by an acquaintance (44%, n=79). Almost 30% were assaulted by a stranger or someone they met in the last 24 hours (n=50). One in five (20%) patients were assaulted by a current or former intimate partner (n=37) and a further 7% were unable to recall their assailant (n=12). At Site 1, 59% of assailants were the same race as the patient and at Site 2, 54% of assailants were the same race as the patient. There were no statistically significant differences in assailant characteristics by site.

Almost 20% (n=31) of assaults involved no penile penetration of the vagina or anus. A little over 10% (n=21) involved anal penetration. Almost 60% (n=107) of assaults involved vaginal penetration without anal penetration. Finally, in 13% (n=23) of cases penile penetration was unknown – patients could not recall what sex acts were perpetrated. Patients reported condom use or non-penetrative assaults in 17% of cases (n=29). Half of patients (n=85) reported their assailant had not used a condom. A further one-third of patients (n=55) did not know whether a condom had been used. There were no statistically significant differences in mode of penetration or condom use by site.

### Exam Findings

Over half of the patients (54%, n=99) had at least one extragenital injury. Arms (29%, n=52) and legs (24%, n=44) were the areas injured most frequently while, breasts (6%, n=10) were

injured least frequently. Head injury was present in 18% (n=33) of cases, neck injury in 10% (n=18), and trunk injury in 21% (n=38) of cases. Arm injury was noted less frequently at Site 1(19%, n = 13) than Site 2 (34%, n = 39; p=.03). There were no other site differences in the rates of extragenital injury noted.

No forensic finding of anogenital injury was found on examination in 39% (n=69) of patients. About 60% (n=102) had some evidence of injury to the genitals (including erythema and point tenderness) with almost 40% (n=69) having an open genital wound, 12% (n=21) having evidence of injury to their anus, and 9% (n=16) having an open anal wound. Not all of these patients reported penile penetration of the anus. Thus, 42% (n=75) of patients had some sort of open wound to their anus or genitalia noted during their forensic exam. One in five patients (n=31) had an STI at time of exam. There were no significant differences in having either an anal or genital injury or STIs by site.

### HIV Documentation

Overall, almost 70% (n=126) of charts included documentation that an HIV risk assessment was completed. At Site 1 all (n=68) patients had a documented HIV risk assessment included in the chart where Site 2 had a documented HIV risk assessment in half (n=58) of the cases ($p < 0.01$). Additionally, there was a significant difference between sites in HIV testing: 72% (n=81) of patients at Site 2 received HIV testing versus 5% (n=3) of patients at Site 1 ($p < 0.01$). nPEP was offered to 54% of patients (n=98); 22% (n=15) at Site 1 and 73% (n=83) at Site 2 ($p < 0.01$), patients at Site 2 were almost 10 times more likely to be offered nPEP than patients at Site 1 (OR 9.5, 95% CI [4.7-19.2] (results not shown).

**Bivariate Analysis—**There was no association between offering nPEP and the following characteristics: a) whether the patient reported the assault to police; b) the number of hours between the assault and the exam; c) the number of assailants; d) whether the patient was assaulted by an assailant of the same race/ethnicity; e) the presence of STI (either diagnosed or documented clinical signs) on exam, and f), extragenital injury except for head injury (results not shown).

### Male patients

Due to the small number of male cases we were unable to include patient sex in the analyses. No male patients were offered nPEP. Three of the four cases were lower risk assaults involving receptive oral sex or digital anal penetration by male perpetrators. In the fourth case the patient was forced to perform insertive vaginal sex by a female.

### Site 1

Offering nPEP was associated with the following variables at $p<0.20$: a) patient race/ethnicity, b) assailant race/ethnicity, c) penile penetration, d) head injury, e) genital injury, f) open genital wounds, g) anal injury, and h) open anal wounds (see Table 1 and 2).

### Site 2

Offering nPEP was associated with the following variables at $p<0.20$: a) patient age, b) patient sex, c) patient race/ethnicity, d) assailant sex, e) assailant race/ethnicity, f) assailant relationship to the patient, h) penile penetration, i) condom use, and j) head injury.

## Multivariate Analysis

### Site 1

Patient race/ethnicity, assailant race/ethnicity, open genital wounds, open anal wounds and head injury were retained for inclusion in the final model based on the results of the bivariate analysis. Having an open genital wound was not associated with having an open anal wound. The best fit occurred when the model accounted for the following: a) patient race/ethnicity, b) assailant race/ethnicity, c) open genital injury, d) open anal injury and e) head injury (see Table 3).

### Site 2

Patient age, patient race/ethnicity, assailant sex, assailant race/ethnicity, assailant relationship to the patient, penile penetration, condom use and head injury were retained for inclusion in the final model based on the results of the adjusted bivariate analysis. The best fit occurred when the model included: a) patient age, b) assailant sex, c) assailant race/ethnicity, d) penile penetration, e) head injury, and f) condom use (see Table 3).

## Discussion

At Site 1, 100% of charts included a documented HIV risk assessment, 63% of cases included vaginal penetration, 13% of cases included anal penetration, 22% of patients were offered nPEP. At Site 2, 51% of charts included a documented HIV risk assessment, 56% of cases included vaginal penetration, 10% of cases included anal penetration, 73% of patients were offered nPEP. Despite similar rates of vaginal and/or anal penetration at both sites, there was a significant difference in the frequency of offering nPEP with FNEs at Site 2 almost 10 times more likely to offer. This most likely reflects the difference in nPEP protocols. As stated previously, the Site 1 protocol indicates “HIV PEP may not be warranted” for sexual assault exposures where the patients’ skin is intact. At both sites the variables significantly associated with increased likelihood of offering nPEP matched the main factors of the respective site specific algorithms.

At Site 1 the significant factor associated with offering nPEP was open injury to the anus or genitalia. This contrasts with Linden and colleagues’ (2005) finding of no association between the presence of genital bleeding and offering nPEP. This may be due to our definition of open genital injury (meaning an abrasion, laceration, or bleeding not from menstruation) versus genital bleeding only. Similar to Linden and colleagues findings, at Site 2 the presence of any kind of anal or genital injury was not associated with offering nPEP. In previous research the presence of open genital injury has been noted in 20% to 90% patients (Anderson, McClain, & Riviello, 2006; Palmer et al., 2004; Sommers, 2007). Anderson and colleagues (2006) utilized the TEARS acronym to categorize injury: tears,

ecchymosis, abrasions, redness and swelling. This definition most closely mirrors that used in our study, and they found injury in 30% of their sample (Anderson et al., 2006). The study conducted by Palmer and colleagues (2004) found injury in 22% of women, noting only abrasions, bruises, and tears. Sommers (2007) review of techniques of injury detection found injury in 50-60% of patients using visual inspection, 40-58% using staining techniques, and 64-87% when using colposcopy. All three techniques were utilized at both sites in this study. Our finding of 39% (n = 69) of the total sample having an open genital injury falls within this previously identified range.

At Site 2 the significant factor associated with offering nPEP was mode of penile penetration. A recent literature review found in 10 of 14 studies that high-risk exposures (those including anal penetration) were positively associated with offering nPEP (Draughon & Sheridan, 2012). In contrast, there was no significant association between penile penetration and offering nPEP at Site 1. This is possibly due to the presence of an open injury overshadowing the mode of potential exposure based on the site protocol. Although lack of condom use during the assault was significantly associated with offering nPEP in bivariate analysis at Site 2, this relationship was nonsignificant when combined with penile penetration in the final model. This may be partially explained by the large number (30%, n=33) of patients who could not recall whether a condom was used.

Other characteristics contributed to the final models of factors associated with offering nPEP. Assailant race has not been previously studied in the context of offering nPEP. At both sites assailant race contributed to the frequency of FNEs offering nPEP. At Site 2, however, patients who had an assailant of *other* race were 86% (95% CI .03-.72) less likely to be offered nPEP than patients assaulted by a *white* person. Although not significant, there was a trend towards patients with a *black* assailant as also being less likely to be offered nPEP (AOR 0.30; 95% CI .06-1.59). This is concerning, and requires future research, as African Americans have an incidence of HIV infection of 60.4 per 100,000 while in Whites it is 7.0 per 100,000 (CDC, 2013). The incidence of HIV infection in races/ethnicities in the *other* category ranged between 6.5 and 19.5 per 100,000 (CDC, 2013). With the higher HIV incidence in non-white races/ethnicities, it seems counter-intuitive that FNEs at Site 2 offered nPEP less often to patients who reported their assailant(s) to be non-white. It is possible that assailant race was a proxy for patient race as perpetrators more often assault people in the same race/ethnicity group (Koch, 1995; Rand & Robinson, 2011); however, we did not have adequate power to assess for this association.

Prior to this study, non-genital injuries had not been studied in conjunction with offering nPEP. Although we included injuries found during the forensic examination in six major body areas, the only area significantly associated with being offered nPEP was injury to the head or face. This finding requires further study. Although we classified a *head injury* as any injury above the neck (including abrasions, swelling, or pain), the presence of a visible injury may have been perceived by the SANE/FNE as indicating a more severe assault. The authors originally posited that neck injury might signify a more severe assault; however, the results did not show an association. Patients most frequently had injury to the arms and legs and the breasts least often. This is consistent with research on accidental injury as the arms

and legs are more exposed, whereas breasts are in a protected area (Mosqueda, Burnight, & Liao, 2005).

At Site 2, patients with either a female assailant or an assailant of unknown sex were 99% (95% CI .00-.40) less likely to be offered nPEP than patients assaulted by a male. At either site there was no significant association between offering nPEP and whether a patient's assailant was "unknown" in any category. Conversely, Linden and colleagues (2005) found that nPEP was offered more frequently to patients with unknown assailants. This study's relatively small sample size may be the reason for this apparent discrepancy. More research is needed to determine the best practice in treating those with unknown exposure to determine if they should be treated as having experienced an assault with a measurable transmission risk (such as unprotected vaginal or anal penetration) or if these patients should be considered low risk.

Linden et al. (2005) also found that patients under the age of 33 were more often offered nPEP, perhaps due to the fact that sexual assault is most common among women age 15-25. In this study sample almost 50% of patients were under the age of 25. There was no significant relationship between offering nPEP and age of the patient, although patient age did contribute to the final model at Site 2 (Merchant et al., 2008; Moe & Grau, 2001; Templeton et al., 2005). Although patient race was a contributor to the final model at Site 1, similar to Moe and Grau (2001) we did not find any significant association between offering nPEP and patient race.

The small sample size limits the generalizability of this study, further reduced by analyzing the sites separately. The conclusions of this study may not be representative of the underlying population, and no causal associations can be made. However, by excluding factors from the final models which would have occurred *after* the offer of nPEP, the limitations of causal inference were minimized. In addition, this study was a retrospective chart review with a single abstractor. We were limited by what information was included in the FNE documentation. It is likely that the process of HIV risk assessment was operationalized and documented differently by each individual FNE. Furthermore, each FNE may have taken different factors – including many that might not be documented in the chart – into account before indicating on their HIV risk assessment form whether nPEP was offered. There was a history effect at Site 2. The program started offering nPEP on May 19, 2011; however, they did not formalize charting of this process until September 2011. It is possible that some of the 53 patients whose charts were excluded (see Figure 1) were in fact offered nPEP. Future research is necessary to better understand the process of nPEP protocol implementation, as well as the dynamics involved in the FNE-patient interaction specifically regarding nPEP. Such studies need to ensure a reliable and accurate method to capture the HIV risk assessment, offer of, and dispensing of nPEP. Multi-site prospective studies are needed, to further explore these phenomena in order to capture the entirety of the HIV risk assessment discussion, including factors which might not necessarily be documented.

## Conclusions

nPEP implementation is a complex and sometimes confusing process. This study provides further evidence regarding the inconsistencies in provision of nPEP and HIV related services at SANE/FNE programs (Campbell et al., 2006; Chacko, Ford, Sbaiti, & Siddiqui, 2012; Draughon et al., 2013). Site specific nPEP protocols and HIV risk assessment algorithms have an impact on how and if nPEP is offered to patients. Programs in the process of creating a site specific protocol should carefully consider how to parse out the *case-by-case determination* section of the CDC guidelines (2005). Literature regarding HIV transmission is constantly changing, as are treatment modalities. Programs, as well as individual clinicians, need to keep abreast of these developments to ensure patients are being given consistent evidence-based care.It is also clear from our results that there is more influencing the FNE decision to offer nPEP than simply following the site protocol. Further research is needed to understand the ways FNEs are implementing nPEP protocols, and what other kinds of knowledge and/or reasonable suppositions FNEs are applying to an individual patients' case. [1]

## References


Anderson S, McClain N, Riviello RJ. Genital findings of women after consensual and nonconsensual intercourse. Journal of Forensic Nursing. 2006; 2(2):59–65. [PubMed: 17073065]

Bamberger JD, Waldo CR, Gerberding JL, Katz MH. Postexposure prophylaxis for human immunodeficiency virus (HIV) infection following sexual assault. The American Journal of Medicine. 1999; 106(3):323–326. doi:DOI: 10.1016/S0002-9343(99)00018-2. [PubMed: 10190382]

Black, MC.; Basile, KC.; Breiding, MJ.; Smith, SG.; Walters, ML.; Merrick, MT.; Stevens, MR. The national intimate partner and sexual violence survey (NISVS): 2010 summary report. Atlanta, GA: 2011. Retrieved from http://www.cdc.gov/ViolencePrevention/pdf/NISVS_Report2010-a.pdf

Campbell R, Townsend SM, Long SM, Kinnison KE, Pulley EM, Adames SB, Wasco SM. Responding to sexual assault victims' medical and emotional needs: a national study of the services provided by SANE programs. Research in Nursing & Health. 2006; 29:384–398. doi:10.1002/nur.20137. [PubMed: 16977639]

Centers for Disease Control and Prevention. Antiretroviral postexposure prophylaxis after sexual, injection-drug use, or other nonoccupational exposure to HIV in the United States: Recommendations from the U.S. Department of Health and Human Services. Morbidity and Mortality Weekly Report. 2005; 54(No. RR-2) inclusive page numbers.

Centers for Disease Control and Prevention. HIV Surveillance Report, 2011. 2013; Vol. 23 vol 23. Retrieved from http://www.cdc.gov/hiv/topics/surveillance/resources/reports/.

Chacko L, Ford N, Sbaiti M, Siddiqui R. Adherence to HIV post-exposure prophylaxis in victims of sexual assault : a systematic review and. Sexually Transmitted Infections. 2012:1–8. doi:10.1136/sextrans-2011-050371.

Davis KC, Schraufnagel TJ, George WH, Norris J. The use of alcohol and condoms during sexual assault. American Journal of Men's Health. 2008; 2(3):281–90. doi:10.1177/1557988308320008.

Diniz NMF, Almeida LCG, Ribeiro BCS, Macêdo VG. Women victims of sexual violence: adherence to chemoprevention of HIV. Revista Latino-Americana de Enfermagem. 2007; 15(1):7–12. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/17375226. [PubMed: 17375226]


[1]Notes: This study was supported by the National Institutes of Health, National Institute of Mental Health [grant number F31MH088850]. JD is supported by the National Institute of Nursing Research [grant number T32NR07081]. The contents of this article are solely the responsibility of the authors and do not necessarily represent the official views of the National Institutes of Health. Thank you for assistance from the Biostatistics/Epidemiology Core of the Johns Hopkins University Center for AIDS Research (P30AI094189).

Draughon JE, Anderson JC, Hansen BR, Sheridan DJ. Nonoccupational Postexposure HIV Prophylaxis in Sexual Assault Programs: A Survey of SANE and FNE Program Coordinators. The Journal of the Association of Nurses in AIDS Care: JANAC. 2013:1–11. doi:10.1016/j.jana.2013.07.001. [PubMed: 23290316]

Draughon JE, Sheridan DJ. Nonoccupational postexposure prophylaxis following sexual assault in industrialized low-HIV-prevalence countries: A review. Journal of Psychology, Health & Medicine. 2012; 17(2):235–254.

Galvin SR, Cohen MS. The role of sexually transmitted diseases in HIV transmission. Nature Reviews. Microbiology. 2004; 2(1):33–42. doi:10.1038/nrmicro794. [PubMed: 15035007]

Koch LW. Interractial rape: Examining the increasing frequency argument. The American Sociologist. 1995; 26(1):76–86. doi:10.1007/BF02692011.

Linden JA, Oldeg P, Mehta SD, McCabe KK, LaBelle C. HIV postexpsoure prophylaxis in sexual assault: Current practice and patient adherence to treatment recommendations in a large urban teaching hospital. Academic Emergency Medicine. 2005; 12(7):640–646. doi:10.1197/j.aem.2005.01.015. [PubMed: 15995097]

Littel, K. A National Protocol for Sexual Assault Medical Forensic Examinations: Adults/Adolescents Second Edition. NCJ 228119: U.S. Department of Justice, Office on Violence Against Women. 2013.

Loutfy MR, Macdonald S, Myhr T, Husson H, Du Mont J, Balla S, Rachlis A. Prospective cohort study of HIV post-exposure prophylaxis for sexual assault survivors. Antiviral Therapy. 2008; 13(1):87–95. [PubMed: 18389902]

Merchant RC, Phillips BZ, Delong AK, Mayer KH, Becker BM. Disparities in the provision of sexually transmitted disease and pregnancy testing and prophylaxis for sexually assaulted women in Rhode Island emergency departments. Journal of Women's Health (2002). 2008; 17(4):619–29. doi:10.1089/jwh.2007.0472.

Moe K, Grau A. HIV prophylaxis within a treatment protocol for sexual assault victims: Rationale for the decision. Journal of Emergency Nursing. 2001; 27(5):511–515. doi:DOI: 10.1067/men.2001.118804. [PubMed: 11577298]

Mosqueda L, Burnight K, Liao S. The life cycle of bruises in older adults. Journal of the American Geriatrics Society. 2005; 53(8):1339–43. doi:10.1111/j.1532-5415.2005.53406.x. [PubMed: 16078959]

Otten R, Smith D, Adams D, Pullium J, Jackson E, Kim C, Folks T. Efficacy of Postexposure Prophylaxis after Intravaginal Exposure of Pig-Tailed Macaques to a Human-Derived Retrovirus (Human Immunodeficiency Virus Type 2). Journal of Virology. 2000; 74(20):9771–9775. doi:10.1128/JVI.74.20.9771-9775.2000. [PubMed: 11000253]

Palmer CM, McNulty AM, D'Este C, Donovan B. Genital injuries in women reporting sexual assault. Sexual Health. 2004; 1:55–59. [PubMed: 16335297]

Pesola GR, Westfal RE, Kuffner CA. Emergency department characteristics of male sexual assault. Academic Emergency Medicine : Official Journal of the Society for Academic Emergency Medicine. 1999; 6(8):792–8. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/10463550. [PubMed: 10463550]

Prejean J, Song R, Hernandez A, Ziebell R, Green T, Walker F, Hall HI. Estimated HIV incidence in the United States, 2006-2009. PloS One. 2011; 6(8):e17502. doi:10.1371/journal.pone.0017502. [PubMed: 21826193]

Rand, MR. Bureau of Justice Statistics Bulletin Criminal Victimization, 2007. U.S. Department of Justice; Office of Justice Programs; 2008. (NCJ 224390)

Rand, MR.; Robinson, JE. Criminal victimization in the United States, 2008 - Statistical Tables. US Department of Justice; Office of Justice Programs; 2011. (NCJ 231173)Retrieved from http://www.bjs.gov/index.cfm?ty=pbdetail&iid=2218

Rey D, Bendiane M, Bouhnik A-D, Almeda J, Moatti JP, Carrieri MP. Physicians' and patients' adherence to antiretroviral prophylaxis after sexual exposure to HIV: Results from South-Eastern France. AIDS Care. 2008; 20(5):537–541. [PubMed: 18484321]

Riggs N, Houry D, Long G, Markovchick V, Feldhaus KM. Analysis of 1,076 cases of sexual assault. Annals of Emergency Medicine. 2000; 35(4):358–62. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/10736122. [PubMed: 10736122]

Sommers MS. Defining patterns of genital injury from sexual assault: a review. Trauma, Violence & Abuse. 2007; 8(3):270–80. doi:10.1177/1524838007303194.

Sturgiss EA, Tyson A, Parekh V. Characteristics of sexual assault in which adult victims report penetration by a foreign object. Journal of Forensic and Legal Medicine. 2010; 17(3):140–142. doi:10.1016/j.jflm.2009.11.001. [PubMed: 20211454]

Templeton DJ, Davies SC, Garvin AL, Garsia RJ. The uptake of HIV post-exposure prophylaxis within a sexual assault setting in Sydney , Australia. International Journal of STD & AIDS. 2005; 16(2):108–111. [PubMed: 15807937]

Weller SC, Davis-Beaty K. Condom effectiveness in reducing heterosexual HIV transmission. Cochrane Database of Systematic Reviews, 1. 2002 (Art. No.: CD003255). doi: 10.1002/14651858.CD003255.

Wieczorek K. A forensic nursing protocol for initiating human immunodeficiency virus post-exposure prophylaxis following sexual assault. Journal of Forensic Nursing. 2010; 6(1):29–39. doi: 10.1111/j.1939-3938.2010.01062.x. [PubMed: 20201913]

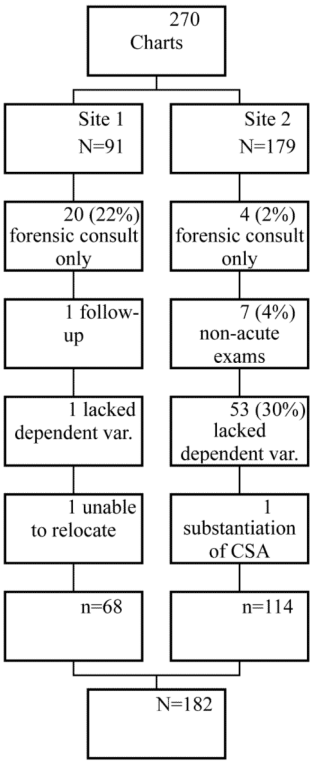


**Figure 1. Pathway of Exclusions of Abstracted Charts**
*Note:* var. = variable; CSA = child sex abuse

## Table 1

Bivariate Associations between FNE offering nPEP and Demographic Factors, and Assailant Factors

| | *Site 1* | | | *Site 2* | | |
|---|---|---|---|---|---|---|
| | **OR** | **95% CI** | ***p*** | **OR** | **95% CI** | ***p*** |
| **Age** | | | | | | |
| 18-25 | Ref | | | Ref | | |
| 26-35 | 1.75 | .48-6.34 | .39 | .75 | .27-2.12 | .59 |
| 36+ | 1.55 | .32-7.52 | .58 | .31 | .11-.85 | .02[a] |
| **Sex** | | | | | | |
| Female | Ref | | 1.00 | Ref | | .07 |
| Male | -- | | | -- | | |
| **Race/Ethnicity** [b] | | | | | | |
| White | Ref | | | Ref | | |
| Black | .92 | .24-3.47 | .90 | .50 | .16-1.60 | .24 |
| Other | 6.19 | .88-43.44 | .07 | .50 | .19-1.28 | .15 |
| **Assailant Sex** | | | | | | |
| Male | Ref | | | Ref | | |
| Female or Unknown | -- | | .57 | .21 | .06-.81 | .02[a] |
| **Assailant Race/Ethnicity** [c] | | | | | | |
| White | Ref | | | Ref | | |
| Black | .38 | .09-1.58 | .18 | .29 | .08-1.06 | .06 |
| Other | 1.08 | .23-5.06 | .92 | .29 | .08-1.03 | .06 |
| Unknown | .54 | .05-5.94 | .62 | .13 | .03-.62 | .01[a] |
| **Relationship** [d] | | | | | | |
| Acquaintance or other | Ref | | | Ref | | |
| Known <24h | 1.54 | .41-5.77 | .52 | .48 | .17-1.32 | .15 |
| Current or Ex IP | 1 | .17-5.79 | 1.0 | .92 | .29-2.89 | .89 |
| Unknown | -- | | .84 | .26 | .06-1.24 | .09 |

*Note:* OR = Odds Ratio; CI = confidence interval; Data rounded to second decimal point;

--: omitted, predicts failure perfectly, p value reported is for Fisher's Exact

[a] indicates p<0.05

[b] Site 2: *n = 113*

[c] Site 1: *n = 63;* Site 2: *n = 113*

[d] Site 1: *n = 67*

## Table 2

Bivariate Associations between FNE offering nPEP and Assault Factors, and Exam Findings

| | *Site 1* | | | *Site 2* | | |
|---|---|---|---|---|---|---|
| | **OR** | **95% CI** | ***p*** | **OR** | **95% CI** | ***p*** |
| **Penile penetration** | | | | | | |
| No vaginal/anal | Ref | | | Ref | | |
| Vaginal w/o anal | 2.42 | .27-21.8 | .43 | 6.26 | 2.18-18.00 | .00[a] |
| Anal | 6.40 | .55-74.89 | .14 | 15.89 | 1.73-145.79 | .01[a] |
| Unknown | -- | | | 3.18 | .82-12.34 | .10 |
| Condom Use[b] | | | | | | |
| Yes/No Penetration | -- | | .32 | Ref | | |
| No | | | | 4.89 | 1.65-14.46 | .00[a] |
| Unknown | | | | 2.11 | .70-6.36 | .19 |
| **Head Injury**[c,d] | 3.29 | .86-12.50 | .08 | 2.62 | .72-9.64 | .15 |
| **Genital Injury**[d,e] | 7.02 | 1.44-34.25 | .02[a] | .81 | .35-1.89 | .63 |
| **Open Genital Injury**[d,e] | 19.11 | 4.46-81.87 | .00[a] | .90 | .39-2.07 | .80 |
| **Anal Injury**[d,f] | 5.94 | 1.16-30.41 | .03[a] | 2.52 | .53-11.98 | .24 |
| **Open Anal Injury**[d,f] | 18.54 | 1.88-182.43 | .01[a] | 1.81 | .37-8.90 | .46 |
| **Any Anogenital Injury**[d,e] | 14.00 | 1.71-114.36 | .01[a] | .87 | .37-2.06 | .75 |
| **Open Anogenital Injury**[d,e] | 68.89 | 7.77-575.50 | .00[a] | .92 | .40-2.10 | .84 |
| **HIV Risk Documented** [d] | -- | | | .80 | .35-1.84 | .60 |

*Note:* OR = Odds Ratio; CI = confidence interval; Data rounded to second decimal point;

--: omitted, predicts failure perfectly, p value reported is for Fisher's Exact

[a] indicates significance at $p<0.05$

[b] Site 1: *n = 56;* Site 2: *n = 113*

[c] Site 2: *n = 113*

[d] Referent category is "injury not present"

[e] Site 1: *n = 67*; Site 2: *n = 111*

[f] Site 1: *n = 67*; Site 2: *n = 112*

## Table 3

Multiple Regression Analysis – Factors associated with FNE offering nPEP

| | AOR | 95% CI | *p* | *AIC* |
|---|---|---|---|---|
| **Site 1 (n=67)** | | | | |
| **Race** | | | | |
| White | Ref | | | |
| Black | .10 | .00-22.64 | .40 | |
| Other | 8.00 | .06-1000.75 | .40 | |
| **Assailant Race** | | | | |
| White | Ref | | | |
| Black | .37 | .00-61.34 | .70 | |
| Other or Unknown | .54 | .04-6.92 | .63 | |
| **Head injury**[a,b] | 64.15 | 2.12-1942.37 | .02 | |
| **Open Genital Wound**[a,b] | 204.02 | 9.08-4581.14 | .00 | |
| **Open Anal Wound**[a,b] | 68.97 | 2.80-1700.40 | .01 | 41.79 |
| **Site 2 (n=111)** | | | | |
| **Age** | | | | |
| 18-25 | Ref | | | |
| 25-35 | .96 | .27-3.43 | .95 | |
| 36+ | .57 | .15-2.13 | .40 | |
| **Assailant Sex** | | | | |
| Male | Ref | | | |
| Female/Unknown[a] | .01 | .00-.40 | .01 | |
| **Assailant Race** | | | | |
| White | Ref | | | |
| Black | .30 | .06-1.59 | .16 | |
| Other[a] | .14 | .03-.72 | .02 | |
| Unknown | 1.80 | .11-29.29 | .68 | |
| **Penile Penetration** | | | | |
| No vaginal/anal penetration | Ref | | | |
| Vaginal &/or Anal[a] | 10.58 | 2.36-47.29 | .00 | |
| Unknown penetration | 8.47 | .63-114.37 | .11 | |
| **Condom Use** | | | | |
| No | Ref | | | |
| Yes | 2.34 | .59-9.38 | .23 | |
| Unknown | 3.25 | .55-19.09 | .19 | |
| **Head Injury** [b] | 5.02 | .71-35.51 | .11 | 115.86 |

*Note:* AOR = Adjusted Odds Ratio; CI = confidence interval; Data rounded to second decimal point

[a] indicates significance at $p<0.05$

[b] Referent category is “injury not present”