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## **Working with Risk: Occupational Safety Issues among Health Care Workers in Kenya**

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**Working with Risk: Occupational Safety Issues among Health Care Workers in Kenya**

Journal:	<i>AIDS Care - Psychology, Health &amp; Medicine - Vulnerable Children and Youth Studies</i>
Manuscript ID:	AC-2007-04-0145.R1
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Keywords:	HIV, occupational exposure, voluntary counselling and testing, post exposure prophylaxis



**Introduction:**

In the last five years Kenya has seen a dramatic expansion of access to same-hour HIV testing (National AIDS and STD Control Programme, 2005) and substantial price decreases in antiretroviral therapy (ART) (UNAIDS, 2005). The rapid roll out of ART since mid 2004 means that health care workers in Kenya - who are at risk of contracting HIV at work - can now benefit from the availability of these drugs for post-exposure prophylaxis (PEP). In line with international guidelines and research (Mikulich & Schriger, 2002; Cardo et al., 1997) the Kenyan Ministry of Health recommends PEP for staff who get a needlestick injury (National AIDS and STD Control Programme, 2004). In addition, a key indicator in the *Kenyan Global Fund Strategy* for HIV was 'to increase the number of rape victims and individuals with occupational injuries getting PEP from 0 in 2003 to 3,200 in 2005 (2003). However, when the strategy was drawn up it was unclear what the need for and uptake of PEP among health care workers might be. This paper documents experiences of PEP provision in a Kenyan district.

Occupational exposures to infection, although rarely reported, are common occurrences in resource-poor countries (Sagoe-Moses, Pearson, Perry, & Jagger, 2001; Gounden YP, 2000; Mehta et al., 2005a), including Kenya. Adherence to occupational health guidelines is difficult in Kenya's public sector due to a lack of needle holders and the resulting presence of overflowing sharps bins and disposal pits. In addition, chronic understaffing is common, leading to a high turnover of short-term staff and poor knowledge of guidelines and policies. The high HIV sero-prevalence rates mean that increasing numbers of infectious carriers attend health care centres as patients (Arthur et al., 2000) and health care workers (HCWs) have justified concerns about the risk of

accidental exposure. In recognition of this, staff receive a small monthly salary supplementation in the form of a 'risk allowance'.

## Methods

We conducted a five-phase study in a representative Kenyan health district employing 650 staff and serving a population of approximately 660,000 people (Government of Kenya, 2001). A summary of the methods may be seen in table 1 below. The study combined quantitative and qualitative research methods (Hammersley, 1992). Quantitative data were entered in Epi Info and Exel and analysed in Epi Info 2000. Qualitative data were collected, recorded and transcribed by a single researcher with independent analysis by the principle investigator.

**Deleted:** to explore knowledge, attitudes and practice of post-exposure prophylaxis

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## Study site

The study was conducted in Thika District, Kenya. With technical assistance from a local NGO: [Liverpool VCT, Treatment and Care](#) in 2001 Thika became the first district in Kenya to integrate VCT into its government healthcare facilities. HIV seroprevalence rates in Thika reflected the national average between 10-15% (Government of Kenya, 2004) with hospital inpatient HIV rates estimated at 50-70% (Kibaru, 2002).

**Deleted:** The district was selected for its existing services in voluntary counselling and testing for HIV (VCT) as well as its relationship with a local NGO: Liverpool VCT and Care (LVCT)

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The study was undertaken in 11 health facilities with VCT: 2 hospitals, 8 health centres and 1 dispensary. Mission hospitals, private clinics and small dispensaries were omitted. The study was designed collaboratively with the district health management team, including public health officers (responsible for bio-safety), physicians, counsellor supervisors, a public health nurse and the hospital matron. At the start of the study there was no provision of PEP or hepatitis B vaccination in the district. There was

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no register of accidental exposures and no referral point for staff who wished to file a report. In early 2002 none of the private pharmacies in Thika district stocked antiretrovirals or hepatitis B vaccine.

### *Bio-safety Survey (Phase 1: March- April 2002)*

An initial survey of sharps disposal practice was conducted in all 69 clinical areas of the 11 facilities.

**Deleted:** As well as discussion of safe injection technique and observation of disposal practice (process indicators) objective criteria such as sharps bins, pits, incinerators, guidelines and log books (infrastructure indicators) were scored on a checklist.

### *Baseline survey of knowledge, attitudes, practice and HIV sero-prevalence amongst health care workers (Phase 2: March- August 2002)*

An interviewer-administered questionnaire was conducted in English and/or

Kiswahili. This included all HCWs involved in patient care, the laboratory or the

**Deleted:** personnel and staff involved in

disposal of waste. Staff were excluded if they were unable to speak English or

**Deleted:** Staff lists were obtained from the District Medical Officer of Health and names of casual employees and student nurses were obtained from the departmental or health centre in-charges.

Kiswahili, had been transferred out of the district, were on permanent night shifts or

were absent for a period exceeding three months. Questions focused on knowledge of

blood borne viruses and PEP and current biosafety practices. Recent occupational

**Deleted:** knowledge of existing guidelines and current practices to minimize exposure

exposures reported through recall. High risk needlestick injuries were defined as deep

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injuries from hollow bore needles contaminated with blood or body fluids.

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Each staff member interviewed was asked to consent to serum being tested for HIV and

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hepatitis B using standard ELISA techniques. Hepatitis B test results were sent to the

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individuals concerned advising whether they needed vaccination. HIV testing was

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anonymous and unlinked. Healthcare workers wishing to know their HIV serostatus

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were advised to attend a VCT site for same-day testing.

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*Intervention (Phase 3: May 2002 - August 2003)*

Hepatitis B vaccine was made available through the existing cold chain for childhood immunisation without additional reminders or incentives. Uptake of three doses was left to the staff and administration to their immediate colleagues.

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HCWs were informed about PEP and the drugs were located in VCT sites. A two-drug PEP regime was chosen (Bassett, Freedberg, & Walensky, 2004). The initial 6 doses were available at sites before referral the the district hospital where a clinician prescribed further treatment to those who had tested HIV negative. A full blood count, renal and liver function tests were done at 0, 2 and 4 weeks and repeat HIV testing at 6 weeks and 3 months.

**Deleted:** and flowcharts provided. HIV nurse-counsellors were identified to be responsible for the appropriate use of PEP

**Deleted:** (a generic combination of Zidovudine and Lamivudine at standard adult dose for four weeks)

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Purpose-made sharps bins and needle-holders were provided to each clinical area.

**Deleted:** During the intervention period feedback to the district health management team led to improvements in bio-safety, pit inspections and increased awareness about bio-safety.

Staff education [and pit inspections by the district health management team were undertaken.](#)

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*Quantitative and qualitative one-year follow-up (Phase 4: March –August 2003)*

A repeat survey in the same clinical areas [at one year included all](#) HCWs in the district, whether or not they had previously completed the survey.

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Group and individual in-depth interviews were [utilized](#) to explore barriers to PEP.

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HCWs were interviewed in mixed groups that were purposively sampled (Patton, 2002; Ritchie, Lewis, & Elam, 2003). Semi-structured in depth individual interviews were conducted with key informants, such as matrons, doctors and in-charges. Structured

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topic guides were used to elicit information. Transcripts were analysed for similarities and differences, drawing out common themes.

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### *Systems follow-up (Phase 5: August 2003 – August 2006)*

At the end of the study - a time of increasing access to generic antiretrovirals through the government system - the researchers and LVCT handed over the PEP and hepatitis B administration systems to the district. Data on PEP uptake continued to be collected.

**Deleted:** Further data were collected on PEP for occupational exposure were collected as part of a larger programme on post-rape care in the district. This final phase was intended to look at policy and practice in the district without external research-driven support to assess long-term sustainability. ¶

## Results

The results are presented in the order of the study phases outlined and summarised in Table 1. The statistical comparisons between the initial survey (phase two) and the one year follow-up (phase 3) are presented in table 2.

### *Bio-safety survey and risk of occupational exposure*

Of the 69 clinical areas, none had copies of guidelines or universal precautions and none had reporting mechanisms for needlestick injuries. The use and supply of gloves was inconsistent - staff reported both double-gloving and running out of gloves. There was conflicting teaching on how to handle sharps. In some cases staff were transferring sharps into disinfectant for 24 hours before disposal, thereby exposing themselves twice to potential injury. Only 26% percent of sharps bins were purpose-made - staff were observed discarding contents in order to reuse them. Sixty-four percent of sharps bins were improvised out of old detergent bottles, moisturising cream or lard tubs and the remaining 10% were unsafe, including cardboard boxes and waste paper bins. All facilities had a covered placenta pit although only one third

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of facilities were disposing sharps into it with the remainder using an open pit. There were no functioning incinerators.

The annual incidence of needlestick injuries reported during the initial survey was 0.97 per health care worker per year, with 18% reporting a high-risk injury in the previous twelve months. Doctors, clinical officers and midwives had the highest rates of repeat injuries. At one-year follow up after instituting simple bio-safety measures, there was a significant reduction in high-risk injuries (OR 0.4, CI 0.25-0.6,  $p < 0.001$ ).

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### *Baseline knowledge, attitudes and practice; sero-prevalence of HIV and Hep B (Phase 2)*

The total number of staff in the district was 650 with 496 permanent positions, 100 medical and nursing students and 54 casual labourers. Five hundred and fifty-four (85%) staff answered the questionnaire, 72 were excluded and 24 declined interview. Of interviewees, 78% were female and 63% were nurses.

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Staff expressed concern about safety at work. Only 21% felt they had received adequate guidance in the workplace. Of those staff that had had a needlestick, 85% had taken appropriate first aid measures but only 14% reported the injury in the workplace; 2 people had taken PEP in the previous twelve months at their own expense. Knowledge of PEP was low (23%) at baseline, in keeping with other resource-poor settings (Chogle NL, 2002). The survey also revealed significant concern among HCWs that PEP should be available for rape survivors.

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Four hundred and seven staff gave a blood sample for HIV and hepatitis serology (73% of those completing the questionnaire) and they had similar ages and occupations to the 147 who did not give blood. There was no significant difference in the number of reported needlestick or sharps injuries or knowledge of HIV status, however, men (OR 1.6,  $p=0.003$ ) and previously vaccinated staff were less likely to give blood (OR 0.58;  $p=0.04$ ) than their female and unvaccinated colleagues. Seven percent of staff who gave blood were HIV positive and 41% were hepatitis B core antibody positive. Staff are no more likely to be HIV or Hep B positive than the general population (Government of Kenya, 2004; Lule, Okoth, Ogutu, & Mwai, 1989; Mwangi, 1999). The 93% of staff who were HIV negative would benefit from PEP in the event of a needlestick if they knew their HIV status and chose to access PEP.

#### ***Low uptake of PEP despite high uptake of Hepatitis B vaccine (phase 3)***

In the pre-intervention survey 530/554 (96%) of respondents felt that they would want PEP to be available. Eighty-three percent (461/554) went so far as to state they were willing to forgo their risk allowance for PEP to be made available. However, despite 68 staff recalling that they had a NSI during the intervention year, the uptake of PEP was very low. During the interval year PEP protocols were commenced by only 3 workers (all female nurses) and completed by two of them. In contrast, 173 out of 222 (78%) staff at risk of hepatitis B infection were self-motivated to attend for two or three doses of vaccine at 0, 1 and 6 months (Suckling et al., 2006).

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#### ***Improved knowledge of PEP and of HIV serostatus after one year (phase 4)***

At one year follow up 450 questionnaires were filled at 11 sites with similar staff demographics. Indicating a high turnover rate, 169 questionnaires were filled in by

staff new to the district. Knowledge of PEP increased significantly, as did the number of HCWs who had had an HIV test in the previous twelve months (OR 1.55, CI 1.2-2.1, p=0.003), a majority of these having used the VCT site in their own place of work (91 out of 130).

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#### Staff felt the low uptake of PEP was due to fear of testing (phase 4)

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Insights from the qualitative data revealed that staff feared having an HIV test as they were concerned about testing positive themselves. Despite knowing as a group they had relatively low rates (7%) many staff felt unsure of their own status. Others were concerned about confidentiality when testing at their own place of work. The following quotes reflect the sentiments of many staff:

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*“If there wasn’t the testing I can see that they will all take the PEP, because they are not fearing”* (female nurse, group interview, Thika)

and

*“This VCT that insists you must be tested to get the PEP. People are worried about their privacy”* (male clinical officer, individual interview, Thika)

Some were concerned that the knowledge of a positive status alone would make them ill

*“Once you discover you are HIV positive the word is that the immunity will still drop lower...”* (female nurse, individual interview, Thika)

Staff were also concerned about home life:

*“If you are positive it will be said that you are unfaithful and maybe you get divorced.”* (female nurse, individual interview, Thika)

Deleted: Some expressed a worry that they were more at risk of HIV at home than at work.

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Many asked what the point of PEP in the workplace given that most HIV in Africa was transmitted sexually. In the words of this one woman:

*“It is not easy to get it at work..at home is more of a risk. I am not trusting that husband at home.”* (female nurse, individual interview, Thika)

and

*“And maybe the risk is too low from needle sticks..”* (male clinical officer, individual interview, Thika)

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#### Staff all wanted PEP available (phase 4)

Staff were asked whether PEP should be available despite the low uptake. The universal response of interviewees was yes. Various reasons were given, including the slow rate of behaviour change, time taken to accept and trust new services and the boost the availability of the service would give to staff morale. In the words of these staff:

*“You have to have at least confidence, so you know where to run to in case you have a problem.”* (female nurse, individual interview, Thika)

*“Yes (we still need PEP). Maybe the number might double by next year. Just like with VCT when we started. Before, the turnout wasn’t good. Now we are overloaded.”* (female manager, individual interview, Thika)

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#### Monitoring on-going systems (phase 5)

Since this study was conducted the Government of Kenya has been purchasing generic antiretrovirals through Global Fund support(2003) a regular clinic in Thika has been established for the distribution of antiretrovirals and the district became a referral point for the treatment of rape survivors. During the time period (August 2003 – August 2006) 23 requests for PEP for NSI and 251 for post-rape PEP were seen. No further hepatitis B vaccine was purchased or administered due to the lack of central purchasing, and lack of continuity among District Medical Officers of Health.

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## Discussion

At the time this study was initiated Thika was a representative district on the brink of an antiretroviral treatment programme for HIV-positive patients. Operational research conducted in this setting provides information relevant for national policies on needlestick injuries and PEP provision.

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As previously described, bio-safety [education and materials remain](#) the most significant intervention through reducing the number of needlestick incidents (Bell, 1991). The baseline rates in this study are comparable to those among HCWs in other resource-poor settings and greater than in resource-rich countries (Kosgeroglu N, 2004; Mehta et al., 2005b; Longbottom, Cox, & Sokas, 1993; Newsom & Kiwanuka, 2002; Talaat et al., 2003; Turner, Hurley, Butler, & Holl, 1999). Simple interventions such as supply of needle-holders, sharps bins and appropriate and [adequately](#) safe local solutions (use of improvised sharps bins, use of placenta pits) led to a significant reduction in sharps injuries at one year follow up. The involvement of the District Health Management Team means these changes are likely to be sustained.

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Staff *are* concerned about health and safety at work and value interventions that protect them. Eighty-five percent of all HCWs in the district took part in the study and 73% of these gave serum for testing. While women were more likely to give blood than men, [staff of both genders](#) were initially reluctant to give blood. Pre-employment screening for HIV is not conducted in Kenya and there is considerable anxiety amongst HCWs that blood testing of any sort could lead to limitations of employment. The high rates of participation may reflect staff concerns about their health, the

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incentive of free vaccination and the perceived trustworthiness of the researchers.

They also reflect ownership of the study with the district health management team and

departmental in-charges. The uptake of hepatitis B vaccine (Suckling et al., 2006)

demonstrates that staff will take up interventions that are familiar, free and

efficacious, even if it means going out of their way to do so. Given the rates of

occupational exposure it was not surprising to see a high demand for a PEP referral

point.

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The fear and stigma associated with HIV testing remain a barrier to PEP programmes

that will take time to overcome, even in the presence of focused efforts to address

them. The use of local VCT centres by HCWs in our study was encouraging. The

significant increase in HCWs who attended VCT near or at their place of work in the

year of the intervention indicate that instilling confidence in local testing services may

be one way of addressing this issue. Staff who already know they are HIV negative

might be more likely to opt for PEP and thus maintain their negative status than those

who do not know. The HCWs reported that the PEP programme made them feel

valued, indicating it may have had a positive influence on morale as well as stigma

reduction in the hospital environment.

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District implementation of PEP is sustainable in the context of a larger ARV

programme. PEP, following both occupational and non-occupational exposure, is now

increasingly linked to existing HIV ART and post-rape care services (National AIDS

and STD Control Programme, 2005). This allows for a focal point for occupational

PEP to which even private and mission hospitals are able to refer. A district risk-

reduction plan and the development of an annual training package would provide

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other practical points for implementation as well as pre-service training before students are sent on clinical attachments. The [availability](#) of PEP for occupational exposure in a district would also form a stepping stone [to link](#) to services required in comprehensive post rape care. The strengthening of government systems [\\_](#)reflecting national and international commitment to improved access to ART [\\_](#)has simplified systems for PEP. However, uptake was still lower than might be predicted from the number of needlestick injuries reported in previous years [in keeping with similar](#) reports from neighbouring countries(van Oosterhout et al., 2007). More needs to be done both to encourage staff to know their HIV serostatus and to make systems as user-friendly as possible in health centres [where there are no ART clinics.](#)

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### Conclusion:

[The rapid global scale-up of access to antiretroviral therapy \(ART\) for HIV means that HCWs at risk of contracting HIV at work in Sub-Saharan Africa, can now benefit from the availability of PEP. While the fear of HIV testing is a significant barrier to PEP programmes this can be overcome if there is universal access to HIV testing that HCWs have confidence in along with on-going ART programmes. HCWs are concerned about their health and value interventions that reduce occupational exposure to infection.](#)

**Deleted:** The rapid global scale-up of access to antiretroviral therapy (ART) for HIV means that HCWs in Sub-Saharan Africa, who are at risk of contracting HIV at work, can now benefit from the availability of PEP. HCWS are concerned about their health and value interventions that reduce occupational exposure to infection. While the fear of HIV testing is a significant barrier to PEP programmes this can be overcome if there is universal access to HIV testing that HCWs have confidence in and in the context of on-going ART programmes. ¶

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**Ethical Approval:** Ethical Review Board of the Kenya Medical Research Institute (KEMRI)

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For Peer Review Only

**Table 1: Summary of methodology and timescale of study**

	<i>Phase 1</i>	<i>Phase 2</i>	<i>Phase 3</i>	<i>Phase 4a</i>	<i>Phase 4b</i>	<i>Phase 5</i>
<b>Objective</b>	Baseline bio-safety	Baseline survey and sero-prevalence	Intervention; provision of biosafety, PEP and Hep B vaccine	Follow-up Survey	Qualitative exploration	Health Systems monitoring
<b>Dates</b>	Mar 2002 - Apr 2002	Mar 2002 - Aug 2002	May 2002 - Aug 2003	Mar 2003 – Aug 2003	July 2003	Aug 2003 – Aug 2004
<b>Design</b>	Survey	Survey	Operational research	Survey	Group and in-depth individual interviews	
<b>Sampling</b>	All govt. health care centres and hospitals	All HCWs in Thika district	All HCWs requiring vaccine or HIV PEP	HCWs in Thika District	Purposive sampling of HCWs and key informants	All HCWs in Thika district
<b>Participants</b>	11 health facilities	HCWs in Thika district	HCWs in Thika district	HCWs in Thika district	4 group interviews 11 individual interviews	All HCWs in Thika district
<b>Outcome Measures</b>	Bio-safety standards in clinical areas	Knowledge, attitudes and practice re: occupational exposure. Baseline HIV prevalence in HCWs	Uptake of PEP compared with uptake of Hepatitis vaccination	Changes in knowledge, attitudes and practice re: occupational exposure	Reasons for uptake elucidated	Sustainability indicators

**Table 2: Comparison of knowledge, attitudes and practice amongst Thika district health care workers at baseline and at one year**

Factor	Baseline (554)		One year (450)		OR*	CI	p value
		%		%			
Workplace guidance was adequate	116/554	21	293/448	65	9.6	7.1,13.1	<0.001
Any exposure in last 12 months	167/554	30	68/450	15	0.4	0.3,0.6	<0.001
High risk exposure in last 12 months	115/554	21	40/450	9	0.4	0.25,0.6	<0.001
Appropriate first aid after NSI in last 12 months	142/167	85	55/68	81	0.7	0.3,1.7	0.43
Exposures in last 12 months reported in the workplace	23/167	14	16/68	23	1.9	0.9,4.2	0.07
Hep B vaccine up to date	22/554	4	175/450	39	15	9.5,25.3	<0.001
Hep B core Ab	167/407	41	N/A				
HIV positive	29/407	7	N/A				
Had HIV test ever	180/554	32	202/450	45	1.7	1.3,2.2	<0.001
HIV test last 12 months	115/554	21	130/450	29	1.55	1.2,2.1	0.003
Had HIV test at local VCT centre	74/554	13	91/450	20	1.64	1.2,2.3	0.004
Knowledge of PEP	126/554	23	341/448	76	10.8	8.0,14.7	<0.001
Taken PEP for NSI in last 12 months	2/167	1	3/68	4	3.8	0.5,33.5	0.12

\*OR= Odds Ratio for the differences found at one year follow-up, given the value of the variable. An Odds Ratio >1 indicates an increase after the intervention and an Odds Ratio <1 indicates a decline after the intervention. The reference value for variables is given in the denominator of the proportions.