

# A behavioral and serological survey on HIV prevalence among prisoners in Benin

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## Abstract

Cases of HIV are common in Benin, with infection rates varying according to socio-economic and cultural factors, and by region. Certain segments of the population, such as prison inmates, sex worker clients and truck drivers are at high risk for HIV/AIDS. The aim of this study is to identify which behavioral and serological indicators contribute to the spread of HIV among prisoners. A total of 496 inmates from prisons located in all major cities in Benin were surveyed. Data was collected through interview sessions carried out using a questionnaire and through blood samples. The results show that most inmates are Beninese (83.5%), and the average age is 33 years (range: 14-80 years). No prisoner reported using a condom the last time they engaged in sexual intercourse. Blood exposure was found in 14.6% of inmates and HIV was detected in 1.4% of cases. Our analysis indicates that the length of detention and gender are factors that influence HIV status. However, age, education, nationality and HIV awareness had no significant effect on HIV prevalence among inmates. The results highlight the need to raise awareness in prisons about HIV. This can be achieved by strengthening communication strategies and by organizing HIV and sexually transmitted diseases information sessions for both prison officers and inmates.

## Introduction

HIV/AIDS is currently the world's fourth deadliest disease.<sup>1</sup> It is considered a public health issue and HIV is mostly transmitted through STDs. In 2014, UNAIDS estimated that 35 million people worldwide were living with HIV at the end of 2013. It is also estimated that, in 2013, there were 2.1 million new infections, which represents a decrease compared to 2001 when 3.4 million new cases are believed to have occurred. There has also been a 35% drop in the HIV-related deaths, declining from 2.3 million in 2005 to 1.5 million in 2013. Sub-Saharan Africa has the highest number of HIV cases: estimates are that between 23.5 and 26.1 million people in the region are infected, which represents roughly 7 out of 10 cases worldwide.<sup>2,3</sup>

HIV cases are common in Benin although infection rates vary according to socio-economic and cultural factors, and by region. Between 2006 and 2012, the rate of HIV infection in the country remained stable at 1.2% although certain departments and age groups saw an increase in the number of cases.<sup>4</sup>

The spread of HIV within prison populations in Africa is both a public health problem and a human rights issue. However, despite a significant increase in the amount of resources allocated to fighting HIV, prisons in Sub-Saharan Africa have received little attention.<sup>5</sup> Data from various countries indicates that HIV rates among prisoners are 6 to 50 times higher than in the rest of the adult population. The prevalence of HIV among inmates was greater by a factor of 6 in the United States, 10 in France, 27 in Switzerland and 50 in Mauritius.<sup>6</sup> Similar differences have also been documented in Africa. Based on results from voluntary screening tests and ELISA tests, the HIV infection rate among prisoners was higher in Senegal (2.7%), Zambia (27%) and Nigeria (9%).<sup>7</sup>

Second generation surveillance uses a behavioral and serologic approach to create monitoring systems adapted to the epidemic situation within a given country. This allows for resources to be allocated towards groups that are more likely to become infected.<sup>4,8,9</sup> In Benin, little is known about the awareness, attitudes and practices of inmates when it comes to HIV and STDs. Therefore, the aim of this study is to help develop better decision-making tools by determining which behavioral and serological factors influence the likelihood of HIV infection among prisoners.

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## Materials and Methods

The monitoring survey systematically covered all the main prisons located in Benin's urban centres. Our study uses statistical methods to analyse cross sectional data on behavioral and serological indicators. Information was collected from inmates regarding behavioral practices that increase the likelihood of HIV infection. The survey data was also used to estimate HIV rates among inmates and to test for correlations between sexual practices and HIV status.

## Materials

A lengthy interview questionnaire was used to analyze the behavioral practices of inmates. To collect serological data on the prison population, we used clean and unused syringes, alcohol tampons, gloves, paper filters and sealable plastic bags.

## Methodology

### Ethical considerations and administrative provisions

Before the study was implemented, the Ministry of Health through the CER-ISBA considered the ethical implications of the survey and provided input. The committee approved the research protocol in November, 2015. In addition, authorization was obtained from the ministries of all three levels of education, the Interior Ministry and civil society groups. Involvement in the study was voluntary and participants could opt out at any time. Participants were also asked to sign a written consent form. To protect the privacy of inmates, all those associated with the implementation of the study signed a confidentiality agreement with the *Programme National de Lutte contre le Sida* (PNLS).<sup>10</sup>

### Study population and sampling procedure

The survey was carried out in Benin's 10 prison centres. We used a stratified sampling method, defining the prisons as the strata and inmates as the sample units. The number of inmates to be surveyed in each prison was proportional to the size of the prison's population. In addition, we selected woman participants based on the percentage of female inmates. For each prison, secondary units were selected by dividing the total number of individuals to be surveyed by the number of houses or quarters. After the inmates were informed about the survey, cell leaders and peer educators were instructed on how it would be implemented. Cell leaders presented to the research team those who agreed to participate in the study and participants were accepted until the desired sample size was reached. Given the limited number of female inmates, all of them were invited to participate in the survey.

### Behavioral data

Data was collected using a questionnaire that was divided into different sections. The interviews allowed the research team to gather data on the following modules: information regarding the questionnaire and the interview; general information; sexual history (number and types of partners); paid sexual encounters; condom use; understanding of HIV/AIDS and STD transmission modes and prevention measures; knowledge, opinions and attitudes regarding HIV/AIDS and prevention; and HIV screening.

### Health data

The inmates could decide whether they wanted to participate in both stages of the study (questionnaire and blood test), partic-

ipate only in the questionnaire, or provide blood samples along with identification information. Blood samples were taken and sent to the PNLS by qualified health workers. Blood samples were obtained on site by trained health workers and the test results were given to those who wished to know their serological status.

### Statistical analysis

The behavioral and serological data collected was entered into EPIDATA 3.1 and any inconsistencies or errors during data entry were analyzed and corrected. The database was then transferred to SPSS 21 and sorted by strata, target group and gender. If required, the data was also ranked

according to prison size. We used both univariate and multivariate analysis to examine the information gathered from the survey on behavioral practices. Both the Pearson chi-square test and the Fisher test were applied, using a significance level of 5%. We also carried out a logistic regression to account for how behavioral factors might influence the spread of HIV.

## Results and Discussion

### Results

The number of people who were expected to participate in the study was 500.

**Table 1. Distribution of surveyed inmates by prison.**

Prisons	Prisoners enrolled	% total sample	Prisoners expected to enrol
Abomey	72	14.5	70
Abomey-Calavi	38	7.7	41
Akpro-Missereté	53	10.7	51
Cotonou	136	27.4	136
Kandi	23	4.6	22
Lokossa	33	6.7	33
Natitingou	34	6.9	34
Ouidah	24	4.8	23
Parakou	35	7.1	36
Porto-Novo	48	9.7	54
Total	496	100	500

**Table 2. Distribution of surveyed inmates based on age, gender, education level and profession.**

Characteristics	Surveyed inmates	
	No	%
Age (n=496)		
15-19	20	4.0
20-24	68	13.7
25-29	103	20.8
30-34	116	23.4
35-39	78	15.7
40-44	43	8.7
45-49	31	6.2
50 and older	37	7.5
Gender (n=496)		
Male	414	83.5
Female	82	16.5
Education level (n=495)		
None	153	30.9
Primary	138	27.9
Secondary and higher	204	41.2
Profession (n=496)		
Merchant/farmer/fisherman	168	33.9
Public or private professional	54	10.9
Driver/truck driver/taxi driver	43	8.7
Military serviceman/police officer	7	1.4
Artisan/artist	193	38.9
Other	31	6.2

In total, 496 inmates were involved, which represents a 99.2% enrolment rate. The prisons located in Cotonou (27.4%) and Abomey (14.5%) house a significant portion of the prison population (Table 1).

### Socio-demographic characteristics of inmates

#### *The breakdown of prisoners according to age, gender, education level and profession*

The average age of inmates is 33 years (range: 14-80 years) and the median age was 32 years. More than four out of five inmates (82.3%) are less than 25 years old and more than half are between 20 and 35 years of age. Moreover, 30.9% of inmates never attended school and more than half had not finished their primary education at the time of the study. Inmates practiced a variety of professions, with artisans representing that largest group (38.9%), followed by traders and farmers (33.9%). Public and private professionals represented 10.9% of the sampled prison population. Table 2 shows the breakdown of inmates by age, gender, and education level. In total, 83.5% of the prisoners that were surveyed were male compared to 16.5% who were female. The sex ratio of males per female was 5 to 1.

#### *The breakdown of surveyed inmates by religious affiliation, nationality, marital status and length of incarceration*

Two out of three inmates surveyed were Christian (67.1%). Muslims represent almost a fifth of the prison population (19.4%), followed by adherents of traditional religions (8.5%). Most of the prisoners are Beninese nationals (87.9%), although some participants were from Togo (4.4%) or Nigeria (4.1%). More than half of inmates were married (54.3%), one out of four were single (25.2%) and 14.5% were in a non-marital relationship with one or more partners. Inmates who were divorced represented 4.2% of those surveyed. The average length of detention was 33.5 months although the median length was 12 months. Roughly a third of inmates (35.2%) had already spent 6 months in prison and more than half (50.6%) had been incarcerated for a year. Moreover, 8.7% of participants had already been to prison at least once. Among them, almost a third (32.6%) had been incarcerated for 6 months and a fifth (20.9%) spent more than 6 months in detention (Table 3).

### Tobacco alcohol and drug consumption by prison inmates

More than half of inmates surveyed (54.7%) are non-smokers; another 22.8% stopped smoking after their incarceration, while 22.6% continued to use tobacco in

prison. On average, participants who smoked were 19.4 years old and consumed an average of 5.1 cigarettes per day. The prisons located in the departments of Borgou, Alibori and Ouémé have the highest concentration of smokers: Parakou (45.7%), Kandi (30.4%), Akpro Missérété (28.3%) and Porto-Novo (27.3%). More than half (56.2%) of participants also reported consuming alcohol. Consumption was highest among inmates in Porto-Novo (81.3%), Akpro-Missérété (75.0%), Ouidah (60.9%) and Parakou (60.0%). As well, the alcoholic beverages that are most often consumed are beer (74.1%), liquor (74.1%) and wine (39.1%). More than two thirds of prisoners (68.5%) consume alcohol occasionally, and 6.7% report drinking two to three times per day. In addition, 9.7% of surveyed participants (48 out of 496) report having previously taken drugs. Among them, 45.8% (22) continued the habit in prison and 6.3% (n=3) reported using injectable drugs. Cannabis was the most widely used drug (58.6%) followed by cocaine (31.0%). Drugs are consumed both within the prison (4.4%) as well as outside (51.4%).

### Inmate sexual activities

#### *Sexual behaviour and condom use*

In total, 10.3% (n=495) participants reported having engaged in sexual intercourse during the prior month, of whom

21.6% used a condom. In the case of male inmates, 14.3% (n=42) had sexual intercourse during the previous 12 months and only a third (33.3%) used a condom. As well, five out of nine inmates (55.6%) had engaged in anal penetration, including four out of six men (66.7%) and one in three women (33.3%).

#### *Sexual relationships in prison*

Prior to their incarceration, 51.2% of participants (n=473) reported having more than one partner; most of those with multiple partners were men (96.3%). We note that in prison no inmate had sexual intercourse with a fellow inmate.

### Awareness and attitudes towards HIV/AIDS among inmates

#### *Awareness among prisoners about the modes of HIV/AIDS transmission*

The main modes of HIV transmission mentioned by participants were unprotected anal or vaginal penetration (67.1%) and injuries from contaminated objects (63.5%). However, inmates also provided incorrect answers: out of those surveyed, 19.4% said that mosquito bites could lead to HIV infection and 14.7% said that the virus was the result of divine will (Figure 1)

#### *Health information in prison*

During their incarceration, inmates

**Table 3. Distribution of surveyed prisoners by religious affiliation, nationality, marital status and length of incarceration.**

Variables	Surveyed inmates	
	No	%
<b>Religion (n=496)</b>		
No religion	19	3.8
Traditional	42	8.5
Christian	333	67.1
Muslim	96	19.4
Other	6	1.2
<b>Country of citizenship (n=496)</b>		
Benin	436	87.9
Ghana	7	1.4
Togo	22	4.4
Niger	20	4.1
Other	11	2.2
<b>Marital status (n=496)</b>		
Unmarried (no partner)	125	25.2
Unmarried (one or multiple partners)	72	14.5
Married (monogamous/polygamous relationship)	269	54.3
Divorced/Widow	21	4.2
Other	9	1.8
<b>Length of incarceration (n=395)</b>		
0-6 months	139	35.2
7-12 months	61	15.4
13-24 months	63	15.9
25-36 months	33	8.4
37 months and more	99	25.1



could access health material on a variety of topics. In total, 65.5% of surveyed prisoners were given information about HIV/AIDS and more than half (50.6%) received information regarding condoms (Figure 2).

**Incorrect views about HIV/AIDS**

There are still misunderstandings among inmates regarding HIV/AIDS. The notion that HIV can spread through mosquito bites was the most widely spread misconception (35.9%), followed by the belief that people can become infected by sharing food with someone who has the virus (20.6%) (Table 4).

**Access to care, prevention and screening for inmates**

**Accessing care and prevention methods**

Almost three four of four participants (74.2%) said they know about an HIV screening clinic and 59.5% are aware that a treatment option exists. However, more than half of those surveyed (53.6%) do not know the serological status of their partner (Table 5).

**HIV screening prior to survey**

Three out of four inmates (72.8%) had already undergone a screening test and 93.6% had received their results. Among this group, thirteen individuals had tested seropositive for HIV. These inmates came from all the prisons visited except for Abomey, Abomey-Calavi and Lokoss. Out of the thirteen prisoners, four of them

(incarcerated in Kandi, Parakou, Ouidah and Natitingou) were using ARV drugs. Those incarcerated in Natitingou and Kandi reported receiving their ARV treatment in prison.

**Willingness to undergo HIV screening**

Table 6 shows the number of inmates in each prison who agreed to undergo a screening test. Among those who enrolled in the study, 97.6% agreed to be screened.

**HIV prevalence among prisoners**

Among the 494 inmates who agreed to be screened, 7 tested positive. Consequently, we estimate that the rate of HIV infection among the prison population in Benin is 1.4% with a 95% confidence interval between 0.4 and 2.4.

**Association between HIV prevalence and socio-demographic characteristics**

Our analysis did not establish any link between HIV status and age. Specifically, there was no significant difference in terms of HIV prevalence between inmates who were 29 years of age or younger and those who were older.

**Factors associated with HIV prevalence among inmates**

The factors associated with HIV prevalence are presented in Table 7. The level of educational, religious affiliation, nationality, marital status and knowledge of at least

one HIV transmission mode had no effect on HIV status. However, HIV rates were higher among male inmates and those serving a sentence of more than one year ( $P < 0.05$ ).

**Discussion**

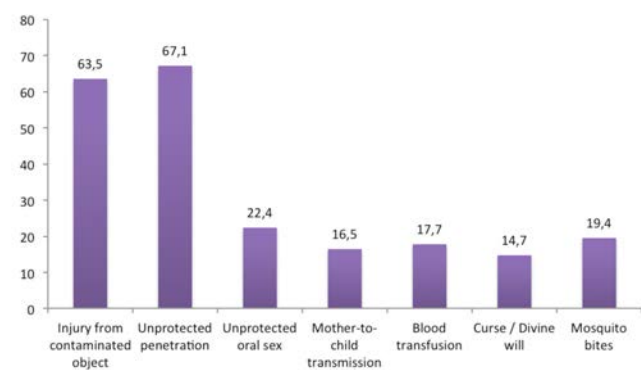
The aim of this study was to determine the severity of behavioral and serological indicators of HIV/AIDS among prisoners. The prevalence of HIV among surveyed inmates was 1.4% (7/494), which is higher than the rate among the general population in Benin (1.2%).<sup>4</sup> It is also higher than the rate estimated by previous studies for other social groups at risk in Benin such as truck drivers (1.2%) and sex workers (1.3%).

However, studies of prison populations in other African countries have reported higher rates of HIV infection in Mauritania (3.9%), Nigeria (9%), Burkina-Faso (11%), Zambia (27%), the Ivory Coast (28%) and South Africa (41.4%).<sup>5,11</sup> These infection rates among inmates are directly related to the level of HIV prevalence in each country.

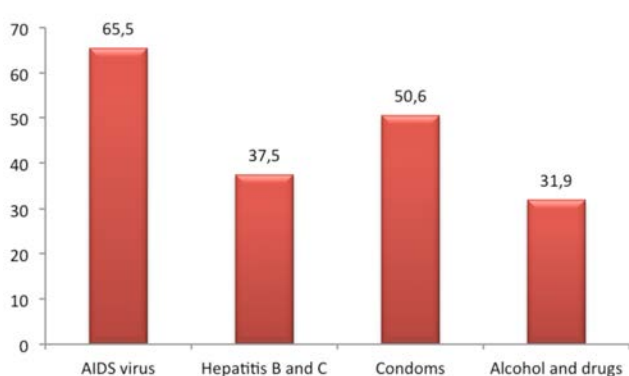
The rate of HIV infection within the prison population in Benin is dependant on behavioral indicators such as drug consumption, condom use and HIV/AIDS awareness. Only 21.6% of the prisoners surveyed who had sexual intercourse during the previous month had used a condom.

**Table 4. Misconceptions about HIV/AIDS.**

Questions	Respondent's answer	Respondents	%	95% CI
Can a person get HIV through mosquito bites?	Yes	196	35.9	35.4-36.4
Can a person get HIV by sharing food with an infected individual?	Yes	102	20.6	19.8-21.4
Can a person who appears healthy in fact be infected with HIV?	No	82	16.5	15.6-17.4



**Figure 1. Awareness about the modes of HIV/AIDS transmission.**



**Figure 2. Access to health information in prison regarding HIV/AIDS and sexually transmitted diseases.**

More than half of participants had multiple partners prior to incarceration. In addition, most inmates are aware that unprotected vaginal or anal sex (67.1%) or injury from contaminated objects (63.5%) increases the risk of getting HIV. This logical association between HIV/AIDS prevalence and certain behavioral indicators has been found in other studies. For example, in Mauritania, HIV rates were higher among prisoners in Nouakchott, of whom only 7.4% had perfect knowledge about the modes of HIV/AIDS transmission.<sup>12</sup> In total, 7% of inmates had reported using drugs. In our study, we did not establish any link between drug consumption and HIV/AIDS preva-

lence. However, excessive drug use can lead to high-risk behaviors that facilitate the spread of STDs and HIV (not using a condom, non-consensual sex, sexual violence, casual sexual intercourse). For instance, previous studies conducted in Senegal and the Seychelles have shown that drug dealers have a higher incidence of HIV/AIDS.<sup>13,14</sup> Thi Thu Vu *et al.*<sup>15</sup> also showed a significant correlation between methamphetamine use and HIV infection. In our study, a limited number of participants (6.3%) reported having injected drugs. While the percentage may be relatively low, the use of such drugs is a cause for concern given that up to 10% of HIV cases worldwide are attributable to

shared needles, syringes or other injection equipment and that more than 22% of people living with HIV/AIDS use injectable drugs.<sup>1</sup> Homosexual relationships are a form of high-risk behavior that potentially facilitates the spread of HIV/AIDS.<sup>16-18</sup> In Benin, there are strong social taboos against homosexuality, which could explain why no participant reported having been involved in a homosexual relationship. In a surveillance survey of truck drivers in Benin, two cases of homosexual encounters were reported.<sup>9</sup>

Previous research has shown that a high incidence of HIV/AIDS, such as the one observed among inmates in Benin, can be explained by certain behavioral factors (degree of awareness about HIV/AIDS, condom use, etc.). However, other authors have examined the role that poor conditions, low quality food, bad nutrition and the near absence of health services have played in the spread of HIV in prisons.<sup>5,11,19</sup> The results highlight the importance of developing plans that specifically address the needs of prisoners in Benin. These action plans could include providing inmates with information about HIV/AIDS, distributing condoms and improving sanitary conditions.

**Table 5. Access to care and prevention methods for inmates.**

Characteristics (n=496)	Inmates	
	No	%
Inmate knows of an HIV screening clinic		
Yes	368	74.2
No	128	25.8
Inmate knows about HIV treatments		
Yes	295	59.5
No	201	40.5
Inmate knows partner's serological status (married)		
Yes	230	46.4
No	266	53.6

**Table 6. Number of inmates willing to undergo HIV screening.**

Prison site	Screening conducted		Number
	Yes	No	
Abomey	100.0	0	72
Abomey-Calavi	100.0	0	38
Akpro-Misséré	100.0	0	53
Cotonou	100.0	0	136
Kandi	100.0	0	23
Lokossa	100.0	0	33
Natitingou	97.0	2.9	34
Ouidah	100.0	0	24
Parakou	97.1	2.9	35
Porto-Novo	100.0	0	48
Total	99.6	0.4	496

**Table 7. Analysis of factors associated with HIV prevalence among inmates.**

Variables	HIV infection		P-value
	Positive	Negative	
Under 29 years of age	34.6	28.6	0.74
30 years of age and older	38.9	57.1	0.32
Gender = male	83.5	42.9	0.00
Primary or secondary school attendance	30.7	42.9	0.49
Religious affiliation = Christian	67.6	57.1	0.55
Nationality = Benin	88.7	71.4	0.15
Inmate knows at least one HIV transmission mode	84.9	71.4	0.32
Marital status = married	54.1	71.4	0.36
Prison sentence is greater than 1 year	51.3	14.3	3,

## Conclusions

Despite numerous awareness and prevention campaigns, prisoners in Benin continue to have a higher incidence of HIV infection. The results of our study indicate that the risk of exposure to HIV among inmates remains high. Therefore, it is recommended that stakeholders in the fight against HIV/AIDS develop communication strategies specifically tailored to inmates. Awareness campaigns could spread the message that condom use helps prevent STDs, HIV and AIDS. Furthermore, the free distribution of male condoms in prison and better detention conditions could prove beneficial effects.

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