Predictors of pregnancy and changes in pregnancy incidence among HIV-positive women accessing HIV clinical care at 13 large UK clinics

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Abstract

Objectives—To describe predictors of pregnancy and changes in pregnancy incidence among HIV-positive women accessing HIV clinical care.

Methods—Data were obtained through the linkage of two separate studies; the UK Collaborative HIV Cohort study (UK CHIC), a cohort of adults attending 13 large HIV clinics, and the National Study of HIV in Pregnancy and Childhood (NSHPC), a national surveillance study of HIV-positive pregnant women. Pregnancy incidence was measured using the proportion of women in UK CHIC with a pregnancy reported to NSHPC. Generalised estimating equations were used to identify predictors of pregnancy and assess changes in pregnancy incidence in 2000-2009.

Results—The number of women accessing care at UK CHIC sites increased as did the number of pregnancies (from 72 to 230). Older women were less likely to have a pregnancy (adjusted Relative Rate (aRR) 0.44 per 10 year increment in age [95% CI [0.41-0.46], p<0.001) as were women with CD4<200 cells/mm^3 compared with CD4 200-350 cells/mm^3 (aRR 0.65 [0.55-0.77] p<0.001) and women of white ethnicity compared with women of black-African ethnicity (aRR 0.67 [0.57-0.80], p<0.001). The likelihood that women had a pregnancy increased over the study period (aRR 1.05 [1.03-1.07], p<0.001). The rate of change did not significantly differ according to age group, ART use, CD4 group or ethnicity.

Conclusions—The pregnancy rate among women accessing HIV clinical care increased in 2000-2009. HIV-positive women with, or planning, a pregnancy require a high level of care and this is likely to continue and increase as more women of older age have pregnancies.

Keywords

HIV; pregnancy; pregnancy rate; maternal age; highly active antiretroviral therapy; maternal-fetal infection transmission; United Kingdom

Introduction

Diagnosed HIV-positive women accessing HIV-clinical care in the UK include women of different ethnicities, ages and levels of morbidity. The characteristics of this diverse group continue to change with an increasing proportion of older women and women on antiretroviral therapy (ART) [1, 2]. With advances in ART and developments in prescribing practice [3-5] leading to the improved wellbeing and longevity of HIV-positive women [6, 7], coupled with effective prevention of mother-to-child-transmission (PMTCT) [8], many HIV-positive women choose to have children [9, 10] and an increasing number have repeat pregnancies [11, 12].

Changes in the characteristics and clinical features of pregnant HIV-positive women are likely to reflect changes among women accessing HIV-clinical care, as well as changes in the pregnancy rate among specific groups. However, when using only data from antenatal studies of HIV-positive women it is not possible to assess the extent to which pregnancy incidence has changed over time among women accessing care. [1] Using data from two studies linked at the person level, an HIV cohort study of adults accessing HIV care and a national surveillance study of HIV-positive women accessing antenatal care, our aim was to identify factors predictive of having a pregnancy among women accessing HIV care at 13 large clinics in the UK and to describe trends in the pregnancy rate in 2000-2009.

Methods

Creating a combined dataset

Data were obtained from two studies, the UK Collaborative HIV Cohort (UK CHIC) study and the National Study of HIV in Pregnancy and Childhood (NSHPC). The UK CHIC study collates extensive data on HIV-related clinical care on an annual basis from (currently) 13 large HIV clinics in the UK, but does not record pregnancy-related data [13]. It represents approximately 30% of women aged 16-49 years who accessed care in the UK in 2000-2009. The NSHPC collates pregnancy data on HIV-positive women accessing antenatal care from all maternity units in the UK and Ireland using active surveillance. The records of women found in both these pseudonymised datasets were merged to create a dataset containing routine clinical and antenatal data for women with a pregnancy in 1996-2009 and who were HIV-diagnosed before or during pregnancy (n=2054). The methodology used to find women in both datasets has been described in more detail elsewhere [13-15] and further information on each study is available from www.nshpc.ucl.ac.uk and www.ukchic.org.uk. In brief, as neither study, records of women in UK CHIC were first linked to records in NSHPC using date of birth (DOB) to create a temporary dataset containing all pairs of records with identical DOB. These pairs were then assessed using fields including CD4 count, HIV-diagnosis date and site of care, to identify pairs that were likely to be genuine matches, i.e. records relating to the same woman. A dataset was created containing records for all women who accessed care at UK CHIC sites in 2000-2009 incorporating antenatal data for those with a pregnancy. Women were defined as 'accessing care' in a given calendar year if they had either a CD4, viral load or hepatitis assessment, AIDS diagnosis, or any ART or

hepatitis drug start or stop dates recorded. data for years when women accessed care and were of childbearing age (16-49 years). - this meant that some years in which women had a pregnancy were excluded as the woman had not accessed care at a UK CHIC site.

Variables and definitions

Index pregnancy refers to the first pregnancy after HIV-diagnosis in the UK or the pregnancy during which HIV-diagnosis occurred. *Repeat pregnancy* refers to any subsequent pregnancy (even if it was the first pregnancy during the study period). As pregnancies could overlap two calendar years, *year of pregnancy* refers throughout to the year of conception. *Estimated date of conception* was calculated as 266 days before the expected date-of-delivery (normally estimated using ultrasound), as this allowed date of conception to be calculated for all pregnancies including those ending early.

Variables in the dataset included ethnicity, probable route of infection, age and ART status at start of year, earliest CD4 count in the year (determined using UK CHIC data) and whether they became pregnant. For women with a pregnancy, data were also included on the estimated date of conception, pregnancy outcome and whether the pregnancy was an index or repeat pregnancy.

Pregnancies resulting in a live or stillbirth were categorised as ending at delivery and pregnancies resulting in miscarriage or termination, and ectopic pregnancies, were categorised as ending early. Where pregnancy outcome was not known (n=23), the pregnancy was excluded from the analysis of factors predictive of pregnancy outcome.

Statistical methods

Analyses were carried out using SAS version 9.1 (SAS Institute Inc. Cary, NC, USA). The characteristics of women under follow-up and with a pregnancy in each year were first described. Trends seen in the characteristics of pregnant women are likely to reflect changes in the characteristics of women accessing care, and do not necessarily reflect the impact of any particular characteristic on the rate of pregnancy itself. Thus, the pregnancy rate was described for each calendar year using the number of women (aged 16-49 years) with clinical data in UK CHIC as the denominator and the number with a pregnancy (all outcomes) starting that year as the numerator. If a woman was diagnosed with HIV during her index pregnancy and attended care for the first time during that year (463 pregnancies), the attendance and pregnancy for that year were excluded from analyses (i.e. removed from the numerator and denominator for that calendar year). However, all future years during which the woman attended care (and any subsequent pregnancies) were included. If a woman had more than one pregnancy starting in the same calendar year, only the first was considered.

Predictors of pregnancy were identified using generalized estimating equations (Poisson regression), unadjusted and adjusted for year, age, CD4, ethnicity and ART use, accounting for repeat measures. We also considered the addition of interaction terms between calendar year and each covariate in the model in order to investigate whether there was evidence that calendar year trends varied in some subgroups of the population. Factors associated with pregnancy ending in delivery versus ending early were also assessed using generalized estimating equations. Factors considered were age, HIV exposure group, ethnicity, calendar year, ART use and CD4 count.

Results

Characterising women accessing HIV care

In total, 7853 women aged 16-49 years accessed HIV care at UK CHIC sites over the period 2000-2009, the number doubling from 2074 in 2000 to 4876 in 2009. The majority of women were of black-African ethnicity and most were infected via heterosexual sex (Table 1). During the period 2000-2009, the characteristics of women accessing care changed somewhat; the proportion of women of black-African, black-Caribbean or black-other ethnicity increased and the proportion of white women decreased. The proportion that had been infected via heterosexual sex or themselves via mother-to-child-transmission (MTCT) increased and the proportion infected via injecting drug use or contaminated blood/blood products decreased. The average age of women under follow-up increased with the number aged 36-49 years almost quadrupling (Table 1).

Age varied by ethnicity; compared with black-African women, women of black-Caribbean, black-other or 'other' ethnicities were more likely to be in the youngest age group (16-25 years) whilst white women were less likely to be in this group (p<0.001) (data not shown). The proportion of women born in the UK varied by ethnicity (white, 64.3%, 594/924; black-African, 7.3%, 231/2284; black-Caribbean, 38.3%, 88/230, where country of birth was reported).

Pregnancies among women accessing HIV clinical care

There were 1637 pregnancies among 1291 women who accessed care during the period 2000-2009: 1000 (77.5%) women had a single pregnancy, 245 (19.0%) had two and 46 (3.6%) had three or more. The number of pregnancies increased each year, from 72 in 2000 to 230 in 2009.

The number of pregnancies and characteristics of pregnant women under follow-up in each calendar period are presented in Table 2. The proportion of pregnancies which were repeat pregnancies increased from 30.1% (47/156) in 2000/01 to 52.2% (235/450) in 2008/09 (p<0.001), with 735 (44.9%) of the pregnancies being repeat pregnancies overall. Over time there was an increase in the age of pregnant women, with an increase in the proportion over 35 years and a decrease in the proportion aged 26-35 years. The proportion of pregnancies which were repeat pregnancies increased among all age groups (16-25 years, 25.0% (4/16) in 2000/01 to 46.4% (32/69) in 2008/09, p<0.001; 26-35 years, 33.0% (37/112) to 51.3% (139/271), p<0.001 and 36-49 years, 21.4% (6/28) to 58.2% (64/110), p<0.001).

There was an increase in the proportion of pregnant women on ART (at the start of the year they conceived) (p<0.001). In line with this, among pregnant women, the median CD4 cell count (at start of year) gradually increased over time and the proportion with CD4 <350 cells/mm^3 decreased (p<0.001). The proportion of pregnancies among women of black-African or black-Caribbean ethnicity increased (p<0.001) and that among white women decreased (p<0.001) (Table 2). Most pregnancies were among women infected via heterosexual sex (97.0%, 1432/1477, where probable route of exposure was reported), with 1.9% (n=28) among women infected via injecting drug use, 0.7% (n=11) among women infected via MTCT and six among women infected via other routes.

Pregnancy incidence and predictors of pregnancy

Pregnancy incidence was 3.5% (72/2074, 95% confidence interval (CI) 2.7-4.3) in 2000 and 4.7% (230/4876, 95% CI 4.1-5.3) in 2009, with the highest incidence in 2006 (4.8%, 216/4528, 95% CI 4.1-5.4). The likelihood that women had a pregnancy increased over the study period (relative rate [RR] per later year: 1.03 [1.01-1.05], p<0.001), this was also the

case after controlling for other factors (adjusted RR (aRR) 1.05 [1.03-1.07], p<0.001) (Table 3).

There were a number of independent predictors of pregnancy; older women were less likely to have a pregnancy than younger women (aRR 0.44 per 10 year increment in age [95% CI 0.41-0.46], p<0.001) as were women with CD4 <200 cells/mm^3 compared with women with CD4 200-350 cells/mm^3 (aRR 0.65 [0.55-0.77], p<0.001). Women of white ethnicity were less likely to have a pregnancy than women of black-African ethnicity (aRR 0.67 [0.57-0.80], p<0.001) as were women of black-Caribbean ethnicity after controlling for differences in age, ART use and CD4 count (aRR 0.75 [0.58-0.97], p=0.03). Women infected via injecting drug use were less likely to have a pregnancy than women infected via heterosexual sex (aRR 0.58 [0.35-0.97], p=0.04). In unadjusted analyses, women on ART were less likely to have a pregnancy than women not on ART (RR 0.82 [0.74-0.91], p<0.001) but this was not the case after adjustment for other factors (Table 3).

The pregnancy rate increased for women in all age groups (16-25 years, aRR 1.07 per later calendar year [1.02-1.12], p=0.004; 26-35 years, aRR 1.06 [1.04-1.09], p<0.001; 36-49 years, aRR 1.05 [1.00-1.09], p=0.03) (Figure 1). The rate of increase in pregnancy incidence was not significantly different for the three age groups (p-value for interaction=0.15). Similarly, there was an increase in pregnancy rate for all CD4 groups with no evidence that the rate of increase was significantly different for any of these groups (p-value for interaction=0.07). Pregnancy incidence increased among women of black-African ethnicity (aRR 1.06 [1.03-1.08], p<0.001). There was no evidence that the rate of change of pregnancy incidence differed for any ethnic group from that of women of black-African ethnicity, apart from women categorised as 'black-other', who experienced a somewhat slower increase in pregnancy rate (p=0.02). As only a small proportion of women with a pregnancy were infected via routes other than heterosexual sex, it was not possible to assess trends in pregnancy rate for different exposure groups. The rate of increase in pregnancy incidence over this period did not significantly differ between women on ART and women not on ART (p-value for interaction=0.14), with predictors of pregnancy being the same regardless of treatment.

Pregnancy outcome

The majority of pregnancies resulted in a delivery (86.8%, 1421/1637; 1401 live births and 20 stillbirths) and 193 (11.8%) pregnancies ended early (126 miscarriages, 63 terminations and 4 ectopic pregnancies). Information on pregnancy outcome was unavailable for 8 (0.5%) pregnancies, with a further 15 (0.9%) still ongoing at the time of data submission. Among pregnant women, older women were less likely than younger women to have a pregnancy resulting in delivery (aRR 0.95 [0.92-0.99], p=0.02) and women infected via contaminated blood/blood products were more likely to have a pregnancy resulting in delivery than women infected via heterosexual sex (aRR 1.22 [1.10-1.34], p=0.001). Neither ethnicity, ART use or CD4 count were predictive of whether pregnancy resulted in delivery. The proportion of pregnancies resulting in delivery increased over time (aRR 1.01 [1.00-1.02], p=0.05) and the proportion resulting in a termination decreased, from 12.8% (20/156) in 2000/01 to 2.9% (13/450) in 2008/09, p<0.001.

Discussion

We report an increase in pregnancy rate among HIV-positive women accessing clinical care at 13 large HIV clinics in the UK over the period 2000-2009. Whilst the characteristics of women under HIV care in these clinics changed over this period, in line with changes reported from elsewhere in Europe [16], the increased pregnancy rate in later years remained after adjustment for these characteristics. Of note, there was no evidence that the pregnancy

rate increased more among women on ART or among women of a particular age, ethnicity or CD4 category.

increase in pregnancy rate across this diverse group likely to reflect improvements in HIV treatment and management which have led to reduced morbidity [6, 7] and MTCT rates [8, 14]. Changes in pregnancy rates and attitudes towards childbearing following improvements in treatment for both the mother and to prevent MTCTand transmission rates have previously been reported [10, 17, 18] and may also explain the reduction in terminations, also reported elsewhere [17]. Whilst this could also be due to less unplanned pregnancies, thought to be high among this population [19], no data were available on pregnancy intention or use of contraception. It should also be noted that the number of terminations in our study is likely to be an underestimation due to underreporting.

There were a number of characteristics predictive of having a pregnancy. Younger women were more likely to become pregnant than older women, as has been reported from studies of pregnancy rate [17, 20] and pregnancy intention [21, 22] among HIV-positive women. Women infected via injecting drug use were less likely to have a pregnancy than women infected via heterosexual sex, after accounting for age, ethnicity and CD4 count. This has been found elsewhere [22, 24] and is likely to reflect differences in health, lifestyle, desire for children [22] or menstrual changes associated with methadone and illicit drug use [24]. Women of black-African ethnicity were more likely to have a pregnancy than women of white ethnicity or women of black-Caribbean ethnicity. This is likely to be due to cultural differences in attitudes to childbearing and family size. African ethnicity was predictive of fertility intention among HIV-positive women in Canada [21] and France where African born women were more likely to want children than European born women [22]. Differences in pregnancy rate between women of black-African and black-Caribbean ethnicity may reflect cultural differences or differences in the proportion that were UK born.

Women with CD4 counts <200 cells/mm^3 were less likely to have a pregnancy than women with CD4 200-350 cells/mm^3, presumably because these immunosuppressed women had poorer health and were less likely to desire a pregnancy or conceive [23]. As is the case elsewhere in Europe, an increasing proportion of pregnant women conceived whilst using ART [25, 26]. When other factors were considered, ART use did not remain an independent predictor of pregnancy, although it has been found to be in some studies [17, 27]. However, analyses that consider the impact of ART on pregnancy rate may suffer from the problems of time-varying confounding, and can be biased as a result.

In our study the number of pregnancies increased from 156 in 2000/01 to 450 in 2008/09, due to an increase in the number of women accessing and remaining in care [1], and an increase in the likelihood that women became pregnant. Among all HIV-positive women in the UK and Ireland, including those diagnosed during pregnancy, the number of pregnancies stabilised in 2006 at around 1500 pregnancies per year [28], when pregnancy incidence in our study was highest (4.8%). This plateau may, in part, be due to a reporting delay, but could also be due to the increasing number of older women accessing care, women who, in general, are less likely to become pregnant.

As the number of pregnancies has risen, so has the use of specialist antenatal services. All HIV-positive women who are pregnant or planning a pregnancy require a high level of clinical care from a multidisciplinary team including specialist midwives, obstetricians, HIV specialists, GPs, paediatricians and health workers. Many women also require additional support in areas such as assisted reproduction, ART adherence, advice regarding HIV disclosure and social/immigration issues [29]. Demand for these services is likely to increase further, particularly as an increasing number of older women have pregnancies (as is the

case in the UK population [30]). Older women may require additional support, particularly those over 40, as they are at increased risk of experiencing fertility problems [31] and complications such as preterm delivery[31], pre-eclampsia and gestational diabetes [32], complications also associated with antenatal ART use[25, 33-36]. An increase in the number of older pregnant women, whose infants are at increased risk of neural tube defects [39] and Down's syndrome [40] may also lead to an increase in the use of invasive diagnostics. Older maternal age and HIV have both also been associated with an increased risk of stillbirth [41] and miscarriage [38, 42]. In our study older pregnant women were more likely to have a pregnancy which ended early.

As well as implications for HIV and antenatal services, the increased pregnancy rate among HIV-positive women receiving care has implications for the women and their children. Although MTCT in the UK is now rare among diagnosed women, with a transmission rate of 1.2% in 2000-2006 [14], an increasing number of infants are at risk of transmission and exposed to ART drugs *in utero*. Increasingly ART exposure is for the full duration of pregnancy. The long-term implications of ART exposure, particularly to newer drugs, are not fully understood and are difficult to monitor [37]. For HIV-positive women, pregnancy has become increasing normal and many can fulfil their desire for a 'normal' family life. Questions remain regarding the direct and indirect effects of pregnancy on HIV progression including the long-term impact of exposure to ART used for PMTCT during pregnancies on the women's health and future treatment responses [38, 39].

There were a number of limitations to the data available for analysis. Some possible predictors of pregnancy, such as parity, were not available in UK CHIC, and as such were not included in the analysis. Pregnancies during which HIV was diagnosed were not included in the analysis and factors predictive of pregnancy among women not aware of their HIV status may differ from those of diagnosed women. Also, the first CD4 count in the year and ART use at start of the year were used and these may have changed by the time the woman conceived. ART status did not take into account whether the woman was on ART for her own health or for PMTCT during an earlier pregnancy. Women whose pregnancies ended in termination or first trimester miscarriage may not have accessed antenatal care, and therefore not been reported to the NSHPC. As such, the proportion of pregnancies ending early is likely to be a minimum estimate and despite there being no significant change in the rate of miscarriages among reported pregnancies there may have been changes in the rate during this period.

As both datasets are pseudonymised, finding records for women reported to both studies relied on using demographic and clinical variables available from both studies. As a result here is likely to be incomplete linkage of the datasets and an underestimation of pregnancy incidence. However, any such underestimation is unlikely to affect our assessment of the predictors of pregnancy or trends over time. A higher proportion of women in the UK CHIC dataset accessed care in London than is the case nationally, although a direct comparison was not possible. The characteristics of pregnant women accessing care in London may differ from those accessing care elsewhere but trends in pregnancy incidence are likely to be similar.

Conclusion

An increase in pregnancies among women accessing HIV-clinical care reflect increases in the pregnancy rate among this group as well as increases in the number of women accessing care. HIV-positive women with or planning a pregnancy require a high level of clinical care and this is likely to continue particularly as more older women have pregnancies.

Acknowledgments

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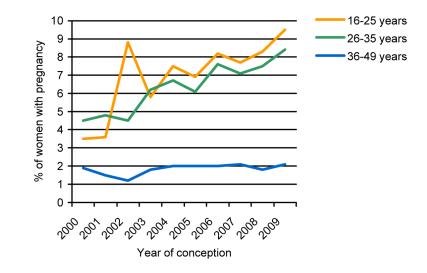
Figure 1. Pregnancy incidence in 2000-2009 among women accessing HIV clinical care – by age group

Table 1

Characteristics of HIV-positive women of childbearing age receiving HIV clinical care at UK CHIC sites in 2000-2009

		2000/1	%	2002/3	%	2004/5	%	2006/7	%	2008/9	%
Number of women		4555		6340		7901		9359		9942	
Median age (years) (IQR)		33	(29-38)	34	(29-39)	35	(30-40)	36	(31-41)	37	(32-42)
Age group (years)	16-25	450	9.9	621	9.8	782	9.9	855	9.1	778	7.8
	26-35	2401	52.7	3059	48.2	3426	43.4	3631	38.8	3410	34.3
	36-49	1704	37.4	2660	42.0	3693	46.7	4873	52.1	5754	57.9
ART use	On ART	2220	48.7	3278	51.7	4371	55.3	5863	62.7	6780	68.2
CD4 count (cells/mm^3)	200	1140	25.0	1336	21.1	1326	16.8	1226	13.1	1045	10.5
	201-350	1146	25.2	1602	25.3	2045	25.9	2121	22.7	1927	19.4
	>350	1849	40.6	2979	47.0	4131	52.3	5542	59.2	6654	66.9
	NK	420	9.2	423	6.7	399	5.0	470	5.0	316	3.2
Median CD4 (cells/mm^3)	(IQR)	338	(220-532)	353	(217-520)	380	(247-543)	420	(280-583)	463	(319-640)
Probable route of Injecting	Heterosexual sex	3606	79.2	5238	82.6	6703	84.8	7883	84.2	8297	83.5
	Injecting drug use	355	7.8	373	5.9	367	4.6	378	4.0	332	3.3
	Contaminate blood	27	0.6	35	0.6	40	0.5	47	0.5	32	0.3
	Other routes/Not known	567	12.4	694	10.9	791	10.0	1051	11.2	1281	12.9
Ethnicity	White	1147	25.2	1275	20.1	1408	17.8	1547	16.5	1616	16.3
	Black-Caribbean	134	2.9	221	3.5	306	3.9	374	4.0	448	4.5
	Black-African	2749	60.4	4113	64.9	5238	66.3	6214	66.4	6523	65.6
	Black-other	100	2.2	143	2.3	189	2.4	268	2.9	304	3.1
	Other	216	4.7	305	4.8	427	5.4	540	5.8	581	5.8
	Not reported	209	4.6	283	4.5	333	4.2	416	4.4	470	4.7

Table 2

Characteristics of HIV-positive pregnant women accessing HIV clinical care at UK CHIC sites in 2000-2009 before their pregnancy

Year of conception		2000/1	%	2002/3	%	2004/5	%	2006/7	%	2008/9	%
Number of women accessing HIV clinical care (16-49 years)		4555		6340		7901		9359		9942	
Women with a pregnancy		156	3.4 (2.9-4.0)	250	3.9 (3.5-4.4)	347	4.4 (3.9-4.8)	434	4.6 (4.2-5.1)	450	4.5 (4.1-4.9)
(95% Confidence Interval)											
Repeat pregnancies		47	30.1	90	36.0	156	45.0	207	47.7	235	52.2
Median age (years) (IQR)		31	(27-34)	31	(27-34)	31	(27-35)	32	(27-35)	32	(28-35)
Age group	16-25	16	10.3	45	18.0	56	16.1	68	15.7	69	15.3
(years)	26-35	112	71.8	165	66.0	218	62.8	266	61.3	271	60.2
	36-49	28	17.9	40	16.0	73	21.0	100	23.0	110	24.4
ART use	On ART	72	46.2	127	50.8	179	51.6	225	51.8	287	63.8
CD4 count	200	31	19.9	35	14.0	36	10.4	44	10.1	37	8.2
(cells/mm^3)	201-350	49	31.4	65	26.0	98	28.2	106	24.4	103	22.9
	>350	74	47.4	137	54.8	204	58.8	264	60.8	302	67.1
	NK	2	1.3	13	5.2	9	2.6	20	4.6	8	1.8
Median CD4 count (cells/mm^3) (IQR)		338	(220-532)	389	(257-544)	401	(283-564)	425	(287-597)	458	(321-630)
Ethnicity	White	35	22.4	30	12.0	48	13.8	42	9.7	48	10.7
	Black-Caribbean	3	1.9	6	2.4	14	4.0	18	4.1	18	4.0
	Black-African	104	66.7	182	72.8	236	68.0	322	74.2	329	73.1
	Black-other	5	3.2	12	4.8	10	2.9	11	2.5	11	2.4
	Other	4	2.6	7	2.8	26	7.5	18	4.1	20	4.4
	Not reported	5	3.2	13	5.2	13	3.7	23	5.3	24	5.3

Table 3

Predictors of pregnancy among HIV-positive women already accessing HIV clinical care at UK CHIC sites in 2000-2009

Variables		Person-years	Pregnancies	Pregnancy rate (per 100 person-years)	95% CI	Relative Rate	95% CI	p	Adjusted Relative Rate*	95% CI	p
Year of conception**		38,097	1637	4.3	4.1 - 4.5	1.03	1.01-1.05	<0.001	1.05	1.03-1.07	<0.001
Age group	16-25 years	3486	254	7.3	6.4 - 8.1	1.12	0.98-1.29	0.10	1.12	0.98-1.29	0.11
	26-35 years	15,927	1032	6.5	6.1 - 6.9	1.00	-	-	1.00	-	-
	36-49 years	18,684	351	1.9	1.7 -2.1	0.30	0.26-0.34	<0.001	0.29	0.25-0.33	<0.001
ART use	On ART	22,512	890	4.0	3.7 - 4.2	0.82	0.74-0.91	<0.001	0.95	0.85-1.05	0.32
CD4 count (cells/mm^3)	200	6073	183	3.0	2.6 - 3.4	0.64	0.54-0.76	<0.001	0.65	0.55-0.77	<0.001
	201-350	8841	421	4.8	4.3 - 5.2	1.00	-	-	1.00	-	-
	>350	21,155	981	4.6	4.4 - 4.9	0.98	0.87-1.10	0.71	0.99	0.88-1.11	0.83
	NK	2028	52	2.6	1.9 -3.3	0.54	0.41-0.72	<0.001	0.52	0.39-0.68	<0.001
Ethnicity	White	6993	203	2.9	2.5 - 3.3	0.62	0.52-0.73	<0.001	0.67	0.57-0.80	<0.001
	Black-Caribbean	1483	59	4.0	3.0 - 5.0	0.85	0.65-1.11	0.23	0.75	0.58-0.97	0.03
	Black-African	24,837	1173	4.7	4.5 - 5.0	1.00	-	-	1.00	-	-
	Black-other	1004	49	4.9	3.5 - 6.2	1.04	0.77-1.39	0.81	0.94	0.71-1.25	0.68
	Other	2069	75	3.6	2.8 - 4.4	0.77	0.59-0.99	0.04	0.71	0.56-0.91	0.01
	Not reported	1711	78	4.6	3.6 - 5.5	0.96	0.75-1.23	0.76	0.95	0.75-1.20	0.66

*
Where all variables in the table were included in the model.

**
As year is a continuous variable, RRs refer to an increase of one year.