

## HIV PREVALENCE AND TRENDS AMONG PREGNANT WOMEN IN ABUJA, NIGERIA: A 5-YEAR ANALYSIS

<sup>1</sup>Dr. C. O. Agboghoroma, <sup>2</sup>Zubairu Iliyasu

<sup>1</sup>Department of Obstetrics & Gynaecology, National Hospital Abuja

<sup>2</sup>Department of Community Medicine, Bayero University Kano, Nigeria

### ABSTRACT

**Background:** In the last decade there had been efforts to halt and reverse the high and increasing trends in HIV infection in sub-Saharan Africa. There is need to analyze trends in HIV prevalence to ascertain the current course of the HIV epidemic in our society. HIV prevalence among pregnant women attending Antenatal Clinics remains the principal data source to inform trends in generalized epidemics in developing countries.

**Objective:** The aim of this study was to determine the prevalence of HIV and its trends among pregnant women attending antenatal clinic at a public tertiary hospital in the Federal Capital Territory, Abuja, Nigeria.

**Methods:** Data of pregnant women who had HIV test as part of antenatal care between January 2005 and December 2009 were prospectively recorded and analyzed to determine the period HIV prevalence and trends.

**Results:** For the five year period, there was 95% uptake of HIV testing, and out of 8,443 pregnant women tested, 973 were sero-positive, giving a period prevalence of 11.5% (CI; 10.9%-12.2%). In 2005 HIV prevalence was 4.5%, rose to 11.2% in 2006 and peaked at 15.4% in 2009. This trend was statistically significant ( $\chi^2$ -trend=94.1; p<0.001). There was an inverse trend with maternal age with a higher prevalence among younger mothers (15-24years) compared to older cohorts (30-49years). This decreasing trend with maternal age was also statistically significant ( $\chi^2$ - trend=5.28; p=0.022). Although HIV prevalence was slightly higher among women with higher parity, this trend was not statistically significant ( $\chi^2$ -trend=0.73; p=0.39). HIV prevalence was significantly higher in women in lower social class 1-4, compared with those in higher social class 5 and 6 ( $\chi^2$ - trend=148.7; p<0.0001).

**Conclusion:** The HIV prevalence among pregnant women is high and showed an increasing trend over the five year period. It is an indication of ineffectiveness of measures taken to arrest the scourge over time. This has implication for obstetrics practice and may translate to increase in pediatrics HIV/AIDS if adequate measures are not taken to prevent mother-to-child transmission.

**Key Words:** HIV, Prevalence, Pregnant women, Prevention of mother-to-child transmission of HIV, Nigeria.

### INTRODUCTION

Since the first report of HIV and AIDS in the early 1980s, the epidemic has continued unabated especially in sub-Saharan African countries that

---

**Correspondence:** Dr. C. O. Agboghoroma

Department of Obstetrics & Gynaecology

National Hospital Abuja

E-mail: agboschris@yahoo.com

harbor about 69% of the 2011 global estimate of 34 million infected persons.<sup>1</sup> With an HIV population of about 3.1 million, Nigeria has the second highest number of people living with HIV in the world after South Africa.<sup>2</sup>

Antenatal clinic data have been the primary source of information for estimating local and national HIV prevalence in countries in sub-Saharan Africa. It is also the mainstay for tracking the epidemic in the region. While a reliable laboratory based test for detection of recent HIV infection that allows calculation of HIV incidence is yet to become universally available, analysis of surveillance data from the same populations over time can provide insight into trends of HIV prevalence. HIV prevalence among 15-24 year old pregnant women has been proposed and used as a proxy measure for incidence.<sup>3</sup>

Decline in HIV prevalence have been reported from some countries with generalized epidemics in recent years.<sup>4-9</sup> There are however, concerns whether the HIV prevalence declines are genuine or the result of measurement bias. There are also issues related to the possible cause of decline, whether as a result of decline in incidence or due to rising mortality rates overtaking the rate of new infections.<sup>10</sup> Some of the early reports possibly overestimate or underestimate HIV prevalence due to inappropriate site selection and quality of laboratory tests and testing strategies. The 2006 population of Nigeria was 140 million, with a national growth rate of 3.2 percent per annum.<sup>11</sup> Socio-cultural differences exists among the 36 States and the Federal Capital Territory. There are suggestions of decline in the prevalence of HIV in Nigeria following results of 2001, 2003 and 2005 HIV sero-prevalence study which gave a national median prevalence of 5.8%, 5.0% and 4.4% respectively.<sup>12,13</sup> The trend in decline in HIV prevalence was not sustained in the 2008 with a reported national prevalence of 4.6%.<sup>14</sup> The apparent

decline in national prevalence may be an artifact due to reasons which may include better representative ANC surveillance system and testing strategies in these later years. There is therefore the need for regular monitoring of the HIV situation in the country to determine actual trends which may vary in different parts of the country.

The on-going Prevention of Mother-to-Child transmission of HIV (PMTCT) programme in some Nigerian hospitals provides an opportunity to properly document and monitor HIV prevalence in the various cities.<sup>15</sup> We report on the prevalence of HIV and its trends from 2005 – 2009 using data of pregnant women accessing antenatal clinic of a tertiary hospital in the Federal Capital Territory, Abuja, Nigeria. The influence socio-demographic variables were also studied.

## PATIENTS AND METHODS

### Study Setting/Population

This study was conducted at the National Hospital Abuja. It is a public tertiary level health facility located in the metropolis of the Federal capital territory, Abuja, Nigeria. It is a 250 bed hospital which commenced service provision in 1999. Its services are accessed mainly by residence within FCT and nearby Niger and Nasarawa states. Because of the central and cosmopolitan site of the facility in the federal capital, clients cut across tribes, religion, socio-economic status, states and geopolitical zones in the country. The department of obstetrics and gynaecology provides a comprehensive range of reproductive health care services which include antenatal care, delivery care, postnatal care, gynecological care, family planning and screening for cervical cancer.

Screening for HIV was part of antenatal care from inception. This practice was reinforced with the commencement of the national PMTCT programme in 2002 for which the facility was

among the first 6 centres in the country.<sup>15</sup> The PMTCT programme is implemented in accordance with the National PMTCT guidelines<sup>16</sup> and PMTCT national standard operating procedures.<sup>17</sup> It essentially involves HIV counseling and testing of pregnant women and the provision of interventions for HIV positive women to reduce the risk of transmitting the infection to the newborn. The interventions offered include antiretroviral drug prophylaxis and treatment, modification of obstetric practice and infant feeding counseling. The infants of infected mothers also received ARV prophylaxis, expert follow-up and early infant diagnosis. The PMTCT programme has been integrated into the hospital's obstetrics and pediatrics service.

HIV information/group counseling is offered to all new antenatal clients along with routine HIV testing, with a right to 'opt out'. In line with the national HIV testing guidelines, the HIV-testing strategy utilized during this period was the parallel rapid test.<sup>18</sup> This involves the use of two different types of rapid test on all clients. A third 'tie-breaker' rapid test was also undertaken when there is discordant result with the initial two rapid tests. During the study period Capillus® test kit (Trinity –USA) and Genie® test kit (BioRad –France) were the test kits used for HIV diagnosis. Determine®(Abbot-Japan) was the test kit used as 'tie-breaker'. All women who had HIV test are offered appropriate post test counseling.

### Data Collection and Analysis

Client's age, occupation, parity, gestational age, type of counseling, HIV test result were prospectively recorded in registers and database that was developed to monitor and evaluate the national PMTCT programme. The information of women who registered and received service between January 1, 2005 and December 31, 2009 were entered into Epi-Info™ version 3.5.1 statistical software package<sup>19</sup> and subsequently exported to and analysed using Stata software Release 11.<sup>20</sup> Combined and

yearly HIV prevalence with corresponding 95% confidence intervals (95% CI) was estimated. The HIV prevalence was stratified on selected socio-demographic variables including maternal age, parity and social class. In each stratum, significance of the observed time trends in HIV prevalence was determined using the  $\chi^2$ -test for trends. The level of significance was set at  $p < 0.05$ .

## RESULTS

During the five year period 8,886 pregnant women registered for antenatal care and had HIV group pretest counseling. Of these, 8,443(95%) accepted HIV test and 976 were sero-positive. The period HIV prevalence was 11.5% (95% CI; 10.9%-12.2%). As shown in Table 1, the HIV prevalence during the period under consideration showed a rising trend which was statistically significant ( $\chi^2$ -trend=94.1;  $p < 0.001$ ). HIV prevalence rose from 4.5% in 2005, to 11.2% in 2006, to 13.3% in 2007, and peaked at 15.4% in 2009.

Table 2, shows an inverse trend with maternal age. There was higher prevalence among younger mothers (15-24years) compared to older cohorts (30-49years). This decreasing trend with maternal age was statistically significant ( $\chi^2$ - trend=5.28;  $p < 0.022$ ). HIV prevalence was significantly higher in women in lower social class 1-4 compared with those in higher social class 5 and 6 ( $\chi^2$ - trend=148.7;  $p < 0.001$ ). Although HIV prevalence was slightly higher among women with higher parity, this trend was not statistically significant ( $\chi^2$ - trend=0.73;  $p = 0.39$ ).

## DISCUSSION

We have used a five year data (2005-2009) from the antenatal clinic in our health facility to document the level and trend in HIV prevalence among pregnant women in Abuja, Nigeria. We found a period prevalence of 11.5% with an increase in

prevalence from 4.5% in 2005 to 11.2% in 2006, to 13.3% in 2007 and 2008 and finally 15.4% in 2009. Our finding is indicative of a high and rising trend in HIV prevalence in Abuja. The prevalence obtained in this study is higher than the 9.9% obtained in the sentinel survey conducted in the same city in 2008.<sup>14</sup> It is also much higher than the national prevalence of 4.1% obtained in the 2010 national sentinel survey.<sup>2</sup> Similarly, higher period prevalence compared with sentinel survey report has been recorded from another Nigerian city.<sup>21</sup> These differences have been attributed to the fact that sentinel surveys are point-prevalence estimates, obtained bi-annually, and are subject to the effect of fluctuations in patient flow, whereas in the current report as in other period-prevalence studies, involves all consenting ANC attendees over the entire five-year study period. Another probable factor for the higher prevalence in this study is the fact that the facility being a referral centre and a PMTCT site, receives clients from other centers, some of whom are HIV positive.

Generally, trends in HIV prevalence are related to HIV incidence and death rates. We do not have information on HIV related mortality rates during this period in the population. But we expect the contribution of mortality to the observed trend to be minimal. Since 2003, there are many facilities within and around Abuja that provides HIV treatment, care and support under the free antiretroviral treatment programme of the Federal government of Nigeria with assistance from United States - President's Emergency Plan for AIDS Relief (PEPFAR) and Global Fund to fight HIV/AIDS, Tuberculosis and Malaria (GFATM).<sup>22,23</sup> A reliable laboratory based test for detection of recent HIV infection that allows calculation of HIV incidence will best indicate trend in incidence, this is however not available for routine use in Nigeria. HIV prevalence in pregnant women aged 15-24 years (representing new entrants into the reproductive age group) has been used as indicator of

new infection rate in countries with generalized epidemics.<sup>3,24</sup> The sustained high prevalence of HIV among this age group as seen in this study suggests that the rise in the trend of HIV prevalence is possibly due to new infections. The finding of rise in HIV prevalence in this study is at variance with reports from many African countries that demonstrated sustained decline in National HIV prevalence among ANC clients.<sup>4-8</sup> It has been established that even in the presence of decline in national prevalence there are cities and regions within the country that may be experiencing actual increase.<sup>9</sup>

Although, this study did not include information on risk factors that could have provided clues to explain the observed trend in HIV prevalence, other reports have identified the main drivers of the epidemic in Nigeria; which include low risk perception, high risk behaviors, multiple concurrent partners, transactional and intergenerational sex, gender inequalities and a lack of an established STI programming for most-at-risk persons.<sup>23,25</sup> Poor knowledge on HIV and AIDS and means of prevention is another challenge in the control of the disease in the country. The 2013 National Demographic and Health Survey (DHS)<sup>26</sup> showed that only 26% of women aged 15-24 years and 37% of men aged 15-24 years had a comprehensive knowledge of HIV and AIDS. Another possible explanation for the high prevalence noted in this study was the influx of people from within and outside the country into Abuja because of its social, political and economic importance as the capital of Nigeria.<sup>22</sup>

While HIV infection cuts across all social classes during the five year period, the prevalence rate was significantly lower in women in the higher social class 4 and 5. This finding is similar to recent reports from Zambia and Uganda that suggest a shift towards reduced risk and mortality differentials

amongst higher educated younger and older antenatal women respectively.<sup>27-30</sup> In the early part of the HIV epidemic, higher educational attainment and socio-economic status were associated with lifestyle changes and behaviors that increased the risk of HIV infection.<sup>29</sup> This relationship however, tend to dissolve as the epidemic spreads in any given population. The ability to understand and act on health promotional messages as well as attitudes that influence one's health is linked to educational attainment and social class. Highly educated persons and those of high social class may be the first to respond positively to preventive messages and take measures to reduce HIV infections. The relationship between social status and HIV infection and other associated factors will need to be further investigated in order to better understand the dynamics that might be associated with the present trend in HIV prevalence in Nigeria.

No clear relationship could be established between parity and HIV prevalence in the five year period studied. HIV prevalence was high in all the parity groups. This finding is not in keeping with previous reports from other Nigerian cities. Galadanci et al<sup>21</sup> reported decreasing trend of HIV prevalence with increasing parity.

## CONCLUSION

The HIV prevalence among pregnant women in the study is high and showed an increasing trend over the five year period. It is an indication that prevention and control measures have not achieved the desired result. This has implication for obstetrics practice and may translate to increase in pediatrics HIV/AIDS if adequate measures are not taken to prevent mother-to-child transmission. There is the need to continuously monitor the trends in HIV prevalence in the society. This will enable appreciation of the burden of the condition, successes in on-going interventions and the deployment of more

appropriate interventions. There is also the need for further studies to identify specific risk factors and causes for the increasing trend in HIV in Abuja. More HIV preventive initiatives are required to stem the increasing prevalence of HIV in our society.

**Table 1** Uptake of Antenatal HIV Counseling and Testing by Year of testing

	Year	Total				
		2005	2006	2007	2008	2009
Registered ANC Client	1810	1891	1691	1777	1717	8886
Group counseled	1818	1891	1691	1777	1717	8886
Had HIV test	1689	1814	1593	1702	1645	8443
Tested HIV positive	76	204	212	227	254	973
HIV prevalence	4.5%	11.2%	13.3%	13.3%	15.4%	11.5%
95% Confidence Interval	3.6%- 5.6%	9.8%- 12.8%	11.7%- 15.1%	11.8%- 15.0%	13.7%- 17.3%	10.9%- 12.2%

$\chi^2$  trend=94.1 P<0.001

**Table 2.** HIV Sero-prevalence by Year of testing, Age group, Social class and Parity.

Characteristics	Year	Total				
		2005 P/T (Prev.)	2006 P/T (Prev.)	2007 P/T (Prev.)	2008 P/T (Prev.)	2009 P/T (Prev.)
<b>Age Group</b>						
15-19	0/15 (0)	1/14 (13)	3/13 (23.1)	0/5 (0)	3/11 (27.3)	7/58 (12.1)
20-24	7/169 (4.1)	19/157 (12.1)	21/143 (14.7)	25/133 (18.8)	23/143 (16.1)	95/745 (12.8)
15-24	7/184 (3.8)	20/171 (11.7)	24/156 (15.4)	25/138 (18.1)	26/154 (16.9)	102/803 (12.7)
25-29	37/617 (6.0)	76/626 (12.1)	84/516 (16.3)	80/532 (15.0)	67/549 (12.2)	344/2840 (12.1)
30-34	24/622 (3.9)	83/721 (11.5)	70/646 (10.8)	82/670 (12.2)	104/589 (17.7)	363/3248 (11.2)
35-39	7/235 (3.0)	23/262 (8.8)	31/247 (12.6)	37/323 (11.5)	56/315 (17.8)	154/1382 (11.1)
$\geq 40$	1/31 (3.2)	2/34 (5.9)	3/28 (10.7)	3/39 (7.7)	1/38 (2.6)	10/170 (5.9)
$\chi^2$ trend=5.28 ; P=0.022						
<b>Social Class</b>						
1-Unemployed	31/613 (5.1)	95/687 (13.8)	102/591(7.3)	96/578 (16.6)	101/567 (17.8)	425/3036 (14.0)
2- Unskilled workers	0/7 (0)	3/9 (33.3)	3/10 (30.0)	2/23 (8.7)	2/11 (18.2)	10/60 (16.7)
3- Semi-skilled workers	9/155 (5.8)	9/36 (25.0)	8/38 (21.1)	14/63 (22.2)	42/210 (20.0)	82/502 (16.3)
4- Skilled workers	1/28 (3.6)	37/227 (16.3)	38/216 (17.6)	46/239 (19.2)	23/100 (23)	145/810 (17.9)

	5-	19/450 (4.2)	50/612	52/528	60/533	70/520	251/2643
Intermediate category			(8.2)	(9.8)	(11.3)	(13.5)	(9.5)
6-Senior category/Top Professionals		16/417 (3.8)	9/221	8/199	6/251	11/208	50/1296
			(4.1)	(4.0)	(2.4)	(5.3)	(3.9)
							$\chi^2=148.7$ , P<0.001
Parity							
0		40/625 (6.4)	71/650	75/546	74/541	73/523	333/2885
			(10.9)	(13.7)	(13.7)	(14.0)	(11.5)
1		20/544 (3.7)	55/536	61/472	67/492	73/475	276/2519
			(10.3)	(12.9)	(13.6)	(15.4)	(11.0)
2		12/303 (4.0)	41/325	39/308	54/366	50/347	196/1649
			(12.6)	(12.7)	(14.8)	(14.4)	(11.9)
3		2/120 (1.7)	20/176	22/174	18/188	36/182	98/840
			(11.4)	(12.6)	(9.6)	(19.8)	(11.7)
4		1/61 (1.6)	11/79	9/55	6/66	14/75	41/336
			(13.9)	(16.4)	(9.1)	(18.7)	(12.2)
>=5		1/36 (2.7)	6/48	6/38	8/49	8/43	29/214
			(12.5)	(15.8)	(16.3)	(18.6)	(13.5)
							$\chi^2_{\text{trend}}=0.73$ , P=0.39

P=number who tested positive, T=number tested, Prev=prevalence

## REFERENCES

1. UNAIDS, Global report: UNAIDS report on the global AIDS epidemic. Geneva: UNAIDS, 2012
2. Federal Ministry of Health. Technical report 2010 National HIV sero-prevalence survey among pregnant women attending antenatal clinics in Nigeria. Abuja. Federal Ministry of Health, 2010.
3. Ghys PD, Kufa E, George MV. Measuring trends in prevalence and incidence of HIV infection in countries with generalized epidemics. *Sex Transm Infect* 2006; 82(Suppl 1): i52–i56
4. Kirungi WL, Musinguzi J, Madraa E, Mulumba N, Callejja T, Ghys P, Bessinger. Trends in antenatal HIV prevalence in Urban Uganda associated with uptake of preventive sexual behavior. *Sex Transm Infect* 2006; 82(Suppl 1): i36–i41
5. Msellati P, Sakarovich C, Bequet L, Atta H, Alioum A, Viho I, Timothee O, Leroy V, Welffens-Ekra C, Dabis F. Decrease of human immunodeficiency virus prevalence in antenatal clinics in Abidjan, Cote d'Ivoire, 1995-2002. *International Journal of STD & AIDS* 2006; 17: 57–60
6. Urassa W, Kaaya S, Mwakagile D, O'Brien M, Antelman G, Hunter D, Fawzi W, Msamanga G. Evidence of a substantial decline in prevalence of HIV-1 infection among pregnant women: Data from 1995 to 2003 in Dar es Salaam, Tanzania. *Scandinavian Journal of Public Health* 2006; 34: 272–278
7. Wolday D, Meles H, Hailu E, Messele T, Mengistu Y, Fekadu M, Parekh BS, Wuhib T. Temporal trends in the incidence of HIV infection in antenatal clinic attendees in Addis Ababa, Ethiopia, 1995-2003. *Journal of Internal Medicine* 2007; 261: 132–137.
8. Mahomva A, Greby S, Dube S, Mugurungi O, Hargrove J, Rosen D, Dehne K-L, Gregson S, St Louis M, Hader S. HIV prevalence and trends from data in Zimbabwe, 1997-2004. *Sex Transm Infect* 2006; 82(Suppl 1): 142-147.
9. Sandoy IF, Kvale G, Michelo C, Fylkesnes K. Antenatal clinic-based HIV prevalence in Zambia: Declining trends but sharp local contrasts in young women. *Tropical Medicine and International health* 2006; 11: 917-928.
10. Asamoah-Odei E, Calleja JMG, Boerma JT. HIV prevalence and trends in sub-Saharan Africa: no decline and large subregional differences. *Lancet* 2004; 364: 35–40
11. Federal Republic of Nigeria Official Gazette. Legal notice on publication of 2006 census final results. Vol.96. Abuja. Federal Government of Nigeria, 2009
12. Federal Ministry of Health A Technical report on the 2001 National HIV/Syphilis sentinel survey among pregnant women attending antenatal clinics in Nigeria. Abuja: Federal Ministry of Health:

- November 2001
13. Federal Ministry of Health. Technical report - 2005 National HIV/Syphilis sero-prevalence Sentinel survey among pregnant women attending antenatal clinics in Nigeria. Abuja: Federal Ministry of Health: April 2006
14. Federal Ministry of Health. Technical report 2008. National HIV sero-prevalence survey among pregnant women attending antenatal clinics in Nigeria. Abuja. Federal Ministry of Health, 2008
15. Agboghoroma OC, Sagay SA, Ikechebelu JI. Nigerian prevention of mother-to-child transmission of human immunodeficiency virus program: The journey so far. *Journal of HIV & Human Reproduction* 2013; 1(1): 1-7
16. Federal Ministry of Health, Nigeria. National Guidelines on Prevention of Mother to Child Transmission (PMTCT) of HIV in Nigeria. Federal Ministry of Health, Abuja 2007.
17. Federal Ministry of Health. National standard operating procedures for prevention of mother-to-child transmission of HIV (PMTCT). Abuja, Federal Ministry of Health, 2007.
18. Nigerian Federal Ministry of Health. National guidelines for HIV/AIDS voluntary counseling & testing. Abuja, Federal Ministry of Health, 2003.
19. Dean AG, Burton AH, Dicker RC. Epi-info version 3.5.1. A word processing, database and statistics program for epidemiology on microcomputers. Stone Mountain, Georgia, USD incorporated 2008
20. StataCorp. Stata: Release 11. Statistical Software. College Station, TX: StataCorp LP 2009
21. Galadanci HS, Iliyasu Z, Tukur J, Muktar-Yola M, Adeleke SI. Uptake of voluntary mother-to-child transmission programme at Aminu Kano Teaching Hospital, Nigeria. *African Journal of AIDS Research* 2008; 7(1): 143-148.
22. FCT Agency for the Control of AIDS (FACA). FCT HIV/AIDS strategic plan 2010-2015. Abuja. FCT Agency for the Control of AIDS, 2010
23. National Agency for the Control of AIDS (NACA). National HIV/AIDS response review 2005-09. Abuja, Nigeria. National Agency for the Control of AIDS, 2009.
24. Williams BG, Gouws E, Wilkinson D, et al. Estimating HIV-I incidence rates from age-specific prevalence data in epidemic situations. *Stat Med* 2001; 20: 2003-16
25. Sagay AS, Kapiga SH, Imade GE, Sankale JL, Idoko J, Kanki P. HIV infection among pregnant women in Nigeria. *International Journal of Gynaecology and Obstetrics* 2005; 90: 61-67
26. National Population Commission, ICF International. Nigeria Demographic and Health Survey 2013. <https://dhsprogram.com/pubs/pdf/FR293/FR293.pdf>. Published June 2014. Accessed September 12, 2014.
27. Kilian AH, Gregson S, Ndyanabangi B, Walusaga K, Kipp W, Sahlmuller G, et al. Reduction in risk behavior provide the most consistent explanation for declining HIV-1 prevalence in Uganda. *AIDS* 1999; 13: 391-398
28. Fylkesnes K, Musonda RM, Sichone M, Ndhlovu Z, Tembo F, Monze M. Declining HIV prevalence and risk behaviours in Zambia: evidence from surveillance and population-based surveys. *AIDS* 2001; 15: 907-916
29. Michelo C, Sandoy IF, Fylkesnes K. Marked HIV prevalence declines in higher

educated young people: evidence from population-based surveys (1995-2003) in Zambia. AIDS 2006; 20:1031-1018

30. Fylkesnes k, Musonda RM, Kasumba K, Ndhlovu Z, Mluanda F, Kaetano L, et al. The HIV epidemic in Zambia; socio-demographic prevalence patterns and indications of trends among childbearing women. AIDS 1997; 11: 339-345